Original Research Article

The knowledge of improved onion production practices of Farmers in Gaya, district in Bihar

Abstract: A study was conducted in Gaya District of Bihar during the 2022-23 period to assess the level of knowledge among farmers regarding improved onion production practices. The study selected a total of 120 respondents from five villages within the Bodhgaya block, based on the high concentration of onion growers in the district. The data was collected through personnel interviews using a pre-structured interview schedule and subsequently analyzed using appropriate statistical methods. The findings revealed that the majority of respondents (62.5%) belonged to the middle age range, and 43.33% of them had marginal land holdings. Most respondents had a moderate level of extension contact, scientific orientation, risk orientation, and economic motivation. Additionally, 64.17% of the respondents exhibited a medium level of knowledge regarding onion production practices.The respondents displayed a good understanding of topics such as soil types, ploughing, farmyard manure (FYM) application, onion varieties, seed treatment, sowing time, nursery transplanting, seed rate, weeding and hoeing, and the suitable season for growing and harvesting onions. However, they had relatively less knowledge about seed treatment and nursery transplanting. Furthermore, factors such as age, educational qualifications, family size, housing patterns, land holdings, annual income, extension contact, source of information, scientific orientation, economic motivation, and risk-bearing capacity showed positive and significant correlations with the knowledge levels of onion growers.In summary, the study demonstrated that farmers in the Gaya District of Bihar had varying levels of knowledge regarding improved onion production practices. While they possessed a good understanding of certain aspects, there were areas where their knowledge could be further enhanced.

Keywords: Knowledge, Onion, improved production practices, marginal land holdings, economic motivation

INTRODUCTION

Onion, scientifically known as Allium cepa L., holds significant importance as a condiment and vegetable in every kitchen. Its pungent flavor and versatility make it a cherished ingredient used in various culinary preparations, such as soups, sauces, and seasoning food **(Purse Glove 1972 and Meena *et al.*, 2013)**. The green leaves and immature bulbs of onions are consumed raw or cooked as a vegetable. Additionally, dehydrated onion products like onion powder and flakes are in high demand due to their convenience, reduced transport costs, and improved storage longevity when compared to fresh onions. The reconstitution of dried onion flakes by cooking them in water further enhances their utility in culinary applications.

Notably, onions offer not just culinary benefits but also possess medicinal properties. They have long been used as folk remedies, and recent reports suggest their potential role in preventing heart disease and other ailments **(Purse Glove 1972 and Meena *et al.*, 2013).** Onions exhibit diuretic properties and can be topically applied to treat bruises, boils, and wounds. Therefore, they hold both nutritional and therapeutic significance.

In India, where a majority of the population is vegetarian by choice or due to limited access, vegetables play a vital role in meeting their nutritional requirements. Among the cultivated vegetable crops, onion holds universal importance as a significant bulbous crop. It is highly regarded for its economic value, being both an export-oriented crop and a valuable source of foreign exchange for the country **(Kulkarni *et al.*, 2012).**

Despite the immense potential of onion cultivation, the productivity in India remains relatively low. This can be attributed to various factors, including the limited availability of quality seeds and the lack of hybrid development in onions (Kulkarni et al., 2012). India, being the second-largest onion-producing country globally, cultivates onions across all states, with Maharashtra, Karnataka, Madhya Pradesh, Rajasthan, Gujarat, Andhra Pradesh, and Bihar accounting for approximately 70 percent of the total onion cultivation area. In recent years, Rajasthan, Madhya Pradesh, and Bihar have emerged as significant onion-producing states, while Maharashtra leads in terms of both area and production. Bihar, on the other hand, ranks fifth in terms of area (10.64 lakh tonnes) and holds the fourth position in production (1064.17 thousand tonnes) and productivity (19.86 tonnes/hectare) of onions in India **(Gummagolmath *et al.*, 2013).**

Overall, onions occupy a central position in Indian agriculture, culinary traditions, and health practices. Efforts to address the challenges faced in onion cultivation, such as improving seed availability and promoting hybrid development, can contribute to enhancing the productivity and profitability of this essential crop.

MATERIALS AND METHODS

The study employed a descriptive research design, which aimed to provide a comprehensive description of the phenomena under investigation. Bodhgaya, one of the 24 blocks in Gaya district, was specifically chosen based on its high number of farmers engaged in onion cultivation. Among the 139 villages in Bodhgaya block, five villages were randomly selected. A total of 120 respondents were chosen as participants for the study. Data collection was conducted through personal interviews using a structured questionnaire.

RESULTS AND DISCUSSION

Table No. 1- Socio-economic profile of the respondents:

S. No	Independent variables	Category	Frequency	Percentage
1.	Age	Young (18-35 years)	6	5
		Middle (36-55 years)	75	62.5
		Old (above 55 years)	39	32.5
2.	Education	Illiterate	28	23.33
		Primary	11	9.16
		High	38	31.67
		Intermediate	32	26.67
		Graduate & above	11	9.17
3	Occupation	Exclusively Agriculture	58	48.33
		Agriculture & Wage worker	33	27.5
		Agriculture & Business	24	20
		Agriculture & Service	5	4.17
4	Size of family	Small (<5 members)	23	19.17
		Medium (5 – 6 members)	54	45.00
		Large (>6 members)	43	35.83
5	Housing pattern	Kachha	12	10.00
		Semi-cemented	68	56.67
		Cemented	40	33.33
6	Land holding	Marginal(<1 ha.)	52	43.33
		Small (1.0-2.0)	23	19.17
		Medium(2.0-4.0)	22	18.33
		Large(>4.0)	23	19.17

7	Annual income	Low (< 100000)	61	50.83
		Medium (100001 - 200000)	48	40.00
		High (>200001)	11	9.17
8	Extension contacts	Rarely (6-7)	23	19.67
		Sometimes (8-9)	64	53.33
		Frequently (10-11)	33	27.5
9	Scientific orientation	Low (10-12)	28	23.33
		Medium (13-14)	54	45.00
		High (15-16)	38	31.67
10	Source of information	Low (11-12)	26	21.67
		Medium (13-14)	56	46.67
		High (15-16)	38	31.66
11	Economic motivation	Low (10-12)	24	20.00
		Medium (13-14)	56	46.67
		High (15-16)	40	33.33
12	Risk bearing capacity	Low (10-12)	28	23.33
		Medium (13-14)	54	45
		High (15-16)	38	31.67

According to the data presented in Table 1, it can be observed that 62.5% of the respondents fall within the middle age group. The statistics indicate that 31.67% of the respondents are illiterate. Furthermore, it is notable that 46.67% of the respondents are solely engaged in agriculture as their occupation, and 45.00% of them have a medium-sized family. The table illustrates that 56.67% of the respondents reside in semi-cemented housing patterns. In terms of land ownership, 43.33% of the respondents have marginal land holdings of less than 1 hectare. Additionally, 58.83% of the respondents reported a low level of annual income (less than 100,000). This finding aligns with a similar study by **Shukla and Singh (2018)**. Furthermore, it is evident that 57.50% of the respondents have infrequent contact with extension services, which is consistent with the findings reported by **Vaishnavi & Aski (2018)**. The table also demonstrates that 45.00% of the respondents have a moderate level of scientific orientation, and 46.67% have a moderate level of reliance on information sources. It is observed that 46.67% of the respondents exhibit a medium level of economic motivation, and 45.00% display a moderate level of risk tolerance.

Table No. 2 - Knowledge of the respondents towards Improved Onion Production Technology.

S. No.	Statement	Response		
		Fully Correct F%	Partially Correct F%	Not corrected F%
1.	Sandy loam soil, loamy soil, soil is suitable for the onion crop.	110 (91.67%)	10 (8.33%)	0 (0%)
2.	Deep ploughing with cultivators.	100 (83.33%)	20 (16.67%)	0 (0%)
3.	FYM 20-25 t/ha.	75 (62.5%)	38 (31.67%)	7 (5.83%)
4.	Improved variety: Patna red	76 (63.33%)	44 (36.67%)	0 (0%)
5.	Seed treatment.	4 (3.33%)	15 (12.5%)	101 (84.17%)
6.	Sowing time in rabi season of nursery.	30 (25.00%)	80 (66.67%)	10 (8.33%)
7.	Nursery transplanting	14 (11.67%)	24 (20.00%)	82 (68.33%)
8.	Seed from KVK or Other research station.	8 (6.67%)	46 (38.33%)	66 (55.66%)
9.	Seed rate/ha 8 to 10 kg/ha.	55 (45.83%)	45 (37.5%)	20 (16.67%)
10.	Spacing: 12.5*7.5 cm	49 (40.83%)	65 (54.17%)	6 (5.00%)
11.	N:P:K/ha. 110:40:60kg.	51 (42.5%)	57 (47.5%)	12 (10.00%)
12.	Sulphure 35kg/ha.	41 (34.17%)	67 (55.83%	12 (10.00%)
13.	weeding and Hoeing.	56 (46.67%)	60 (50.00%)	4% (3.33%)
14.	Irrigate 10 to15 times.	31 (25.83%)	71 (59.17%)	18 (15.00%)
15.	Weedicide Pest and disease through Dithane M-45 (0.3%) and Profenophos (0.1%).	22 (18.33%)	84 (70.00%)	14 (11.67%)
16.	Harvest 110 to 140 days.	41 (34.17%)	64 (53.33%)	6 (5.00%)
17.	Yield 15 to 20t/ha.	24 (20.00%)	90 (75.00%)	6 (5.00%)
18.	Storage method of onion.	30 (25.00%	76 (63.33%)	14(11.67%)

The data presented in Table 2 indicates that a majority, 91.67%, of the respondents possess accurate knowledge about the suitability of soil for onion cultivation. Similarly, 83.33% of

the respondents correctly emphasized the importance of deep ploughing with cultivators. Regarding the use of farmyard manure (FYM), 62.5% of the respondents demonstrated a thorough understanding. When it came to the use of high-yielding varieties, 63.33% of the respondents displayed accurate knowledge. On the other hand, 84.17% of the respondents disagreed or lacked knowledge about seed treatment with bio-fertilizers. In terms of nursery sowing time, 66.67% of the respondents had partial understanding and preferred conventional timings. Approximately 45.83% of the respondents had partial knowledge about the appropriate seed rate per hectare. Furthermore, 68.33% of the respondents disagreed on the suitable time for nursery transplanting, and 54.17% partially knew about the appropriate spacing for onion crops. A significant portion, 55.66%, of the respondents disagreed on the recommendation to obtain seeds from KVK or other research stations. Moreover, 47.5% of the respondents had partial knowledge regarding the optimal dosage of fertilizers, while 55.83% had partial understanding regarding the required dose of sulfur. About half, 50.00%, of the respondents had partial knowledge of intercultural operations such as weeding and hoeing. Additionally, 59.17% of the respondents partially understood the importance of irrigation during critical periods for production. When it came to the use of chemicals as weedicides, pesticides, and disease control measures, 70.00% of the respondents had partial knowledge. Approximately 53.33% of the respondents partially knew the suggested harvesting time. Regarding yield expectations, 75.00% of the respondents had partial knowledge that onion yield can reach up to 15-20 tons per hectare. Lastly, 63.33% of the respondents had partial knowledge about proper storage of the crop in warehouses.

Table No. 3 - Distribution of Respondents According to their Overall Knowledge Level

S. No.	Category	Number	Percentage
1.	Low level knowledge (21 – 27)	22	18.33
2.	Medium level knowledge (28 – 33)	77	64.17
3.	High level knowledge (34 – 39)	21	17.50
	Total	120	100.00

According to the findings presented in Table 3, it is evident that 64.17% of the respondents possessed a moderate level of knowledge regarding improved onion production techniques. A significant proportion of respondents, 18.33%, demonstrated a low level of knowledge, while17.50% exhibited a high level of knowledge. These results align with a similar study conducted by **Choudhary et al. (2019)**.

Fig. 1- Distribution of respondents according to their knowledge towards improved Onion production technology.

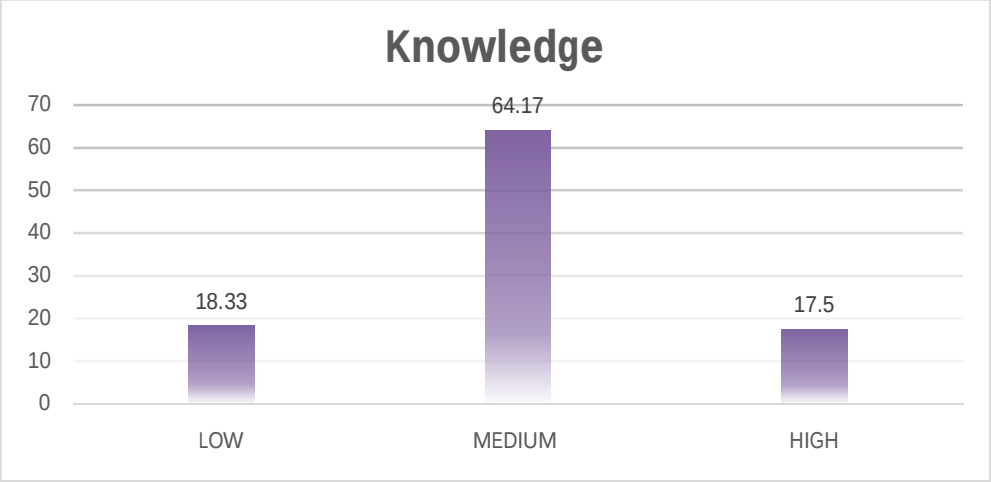

Table No. 4 Association between selected independent variables with utilization.

Sl.No.	Variables	Correlation coefficient
1	Age	0.870733*
2	Education	0.709671*
3	Occupation	0.928346*
4	Family Size	0.761433*
5	Housing pattern	0.858119*
6	Land holding	0.301058**
7	Annual Income	0.282066**
8	Extension Contact	0.968495*
9	Source of Information	0.911352*
10	Scientific Orientation	0.918413*
11	Economic Motivations	0.858119*
12	Risk Bearing Capacity	0.918413*

***=Correlation is significant at the 0.01 %level of probability**

****= Correlation is significant at the 0.05% level of probability**

NS = Non-significant

Based on the analysis presented in Table 4, it was observed that several variables exhibited a positive and significant correlation with the respondents' knowledge regarding improved onion production technology. These variables include age, education, occupation, family size, housing pattern, extension contact, source of information, scientific orientation, economic motivation, and risk bearing capacity. The correlation was found to be statistically significant at a probability level of 0.01%. Additionally, the variables of land holding and annual income were also positively and significantly correlated with the respondents' knowledge, but at a slightly lower probability level of 0.05%.

CONCLUSION:

It has been concluded that the majority of respondents in the study were middle-aged, had limited educational attainment, belonged to medium-sized families, resided in semi-cemented houses, had marginal land holdings, and had low incomes. In terms of their engagement with extension agents, scientific orientation, information sources, economic motivation, and risk-bearing capacity, the respondents displayed a moderate level. Regarding knowledge about improved onion production technology, the majority of respondents exhibited a medium level of understanding. The variables of age, education, land holding, occupation, family size, housing pattern, information sources, scientific orientation, economic motivation, and risk-bearing capacity were found to have a positive and significant association with the respondents' knowledge. Overall, these findings highlight the socio-economic characteristics of the respondents and their correlation with knowledge levels, providing valuable insights for further research and the development of targeted interventions to improve onion production practices in the area.

REFERENCES

Baraker, S. K., Lalitha, K. C., Manjunath, K. V., & Reddy, D. A. (2020). Knowledge level of onion growers on improved onion production technologies in Gadag district of Karnataka. *Current Journal Applied Science Technology,* 14:1-6.

Choudhary,M.,Asiwal,B.L., and Dular,R.K. (2019) Knowledge Level of Farmers about Improved Production Technology of Onion Crops in Sikar District of Rajasthan. *Journal Krishi Vigyan ,* 8 (1) : 191-196.

Gummagolmath, K.C. (2012). Report on Trends in Marketing and Export of Onion in India Prepared by NIAM.

Kulkarni,B.S.,Patil,S.M., and Ramchandra,V.A. (2012). Growth trends in area, production and export of onion from India -An economic analysis. International Journal Commerce and Business Management 5(2):159-163.

Pulseglove, J.W. (1972) Tropical Crop Monocotyledons. Longman Group Limited, p. 607.

Meena, L. K., Kumari, M., & Wadhwani, M. K. (2016). Performance of Onion in Bihar-An economic analysis. *Economic Affairs*, 61(2), 299-304.

Mohanty, A. K., Lepch, B., & Kumar, A. (2013). Constraints analysis in adoption of vegetable production technologies for livelihood perspective of tribal farmers in North Sikkim. *Indian research journal of Extension education*, 13(2), 51-56.

Ministry of Agriculture and farmers welfare, government of India(2019) Horticulture statistics division, department of agriculture, cooperation & farmers welfare.

Shukla,K., and Singh,N(2018). Study of socio -economic status of onion farmers in Nashik district of Maharashtra. *International Journal of Agriculture Sciences,* 10(12): 6425-6427.

Statista (2022) Cultivation area for onion production across India from financial year 2014 to 2021, with an estimate for 2022**.**

Vaishnavi, S., and Aski, S. G. (2018). Socio-economic profile of onion growers in north Karnataka. *Advance Research Journal of Social Science,* 9(2), 158-163.