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RESEARCH ARTICLE

Knowledge Status of Onion Growers Regarding Pre and Post-Harvest Management Practices

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ABSTRACT

India's large population is vegetarian and their routine diet and healthy diet include vegetables which play very significant role by supplying different minerals and vitamins essential for healthy body. Therefore, vegetables have great importance for food and nutritional security. Onion is one of the major crops among cultivated vegetables in our country. It is popularly known as "Queen of kitchen" plays an important role in cookery, as it is used in both forms i.e. green as well as in mature form by the people in different dishes and soups. The findings reported that overall knowledge of farmers pertaining to pre and post-harvest management practices for onion production was moderate to high since about 85 per cent of the onion farmers belonged to these categories mainly due to correct knowledge of pre harvest management practices viz. number as well critical stages of irrigation, time of sowing in nursery, time of transplanting, weed control measures and proper seed rate while maturity index and proper harvesting, precooling, proper packaging material as post harvest management practices. But it was found low in case of curative measures and certain value addition practices which included diseases and their control measures followed by storage, curing, stoppage of irrigation before harvesting, grading, insect pests and their control measures, and waiting period for spray of chemicals before harvesting of produce.

***Key words**: Knowledge status; Onion growers; Pre and Post-harvest management.*

India being a predominantly agricultural economy has over 10 per cent share of global fruits and vegetables in both production and export but hardly 2 per cent of the production is being processed. Indeed, India is on second position after China in relation to area and overall production of vegetables with an average productivity of 18.40 tonnes/ha (*NHB 2018-19*). Presently vegetable crops occupy 6.10 million hectares (ha) area with an annual production of 85 million tones across the country. By the grace of God India is blessed with distinct seasons and diverse climates that offer a favourable environment and weather for a variety of vegetable cultivation. So, in every part of country different types of vegetables are cultivated under different climatic zones and in different types of soil i.e. hilly regions as well plains. Onion, cabbage, cauliflower, tomato, okra, brinjal and peas etc. are the major vegetables cultivated in India.

The contribution of India in world vegetable production is approximately 14 per cent of total vegetable production. It is well known that in our routine diet and healthy diet, vegetables play very significant role by supplying different minerals and vitamins to our body. Different researches have reported that any type of meal without vegetables is considered as incomplete. In India large population is vegetarian thereby for food and nutrition security vegetables have great importance. As per the guidelines of ICMR, there is requirement of 300 grams of vegetables per capita per day, while the availability is approximately 198 grams which shows that there is very high gap in the availability and requirement of vegetables.

Globally, post- harvest losses in case of fruits and vegetables have been reported up to the extent of 30-40 per cent every year which are more in tropical and sub-tropical countries like ours. The post-production losses are enormous in vegetables crops due to their high perishable nature. The major accountable factors

for the post-harvest losses also include environmental (such as temperature, moisture, mechanical damage during harvesting and handling), improper post-harvest sanitation, and poor cooling and environmental control. Vegetables sector also suffers from lack of availability of good quality planting material and low use of hybrid seed. Poor farm management and manual harvesting practices also apply to the vegetables cultivation in India.

A vast quantity of vegetables is destroying every year because of lack of knowledge about pre and post harvest technologies. Due to high perishability of vegetables their cultivation requires proper and efficient management from sowing to harvesting as well as post harvesting. So farmers can enhance their income through value addition in vegetables which comprises the process of cleaning, washing, sorting, grading, packaging, marketing and processing of vegetable products. Value addition starts from the field and end to the consumer.

Onion is extremely important vegetable crop due to highest foreign exchange earner among the vegetables. It holds the 2nd position in term of area and 3rd position in term of production of the total vegetables in the world. India is next only to China in production of onion in the world. Though productivity in India is very low (14.21 M.T./ha) in comparison to China and other countries like Egypt, Netherland and Iran etc. Indian states like Maharashtra, Madhya Pradesh, Karnataka and Gujarat are the major onion growing states in India while Haryana has just a share of 3.4 per cent of total area under onion cultivation in the country (*NHB Report 2018*). In Haryana, area under onion cultivation was 31005 ha in 2016-17 which was 3.4 per cent of total area under onion cultivation in the country having total production of 682.94 metric tonnes (*NHB Report, 2018*).

Keeping in view the economics of onion production in Haryana the farmers should be fully aware of the profitability and the pattern of resources used in its cultivation which is of paramount importance, particularly in Mewat and Ambala districts where onion cultivation has become very popular nowadays due to higher demand in the nearby big cities like Chandigarh and Delhi. Area under Onion in Mewat district was about 28.70 thousand hectares with the production of 219.10 thousand tonnes. The productivity of onion in the state as well as in the district was found low i.e. approximately 22 tonnes per hectare.

Farmers are ambitious to earn more per unit profit in present era of global and liberal trade in agriculture. So, adoption of recommended modern and scientific pre and post harvest practices is necessary since these are not only complementary and supplementary in augmentation of productivity but also enhance quality of produce to fetch higher prices. Continuously there have been changes in farming practices over time. To manage the crops the farmers build on their own experiences and that of their neighbours also. The major challenges faced by farmers are sudden change in weather conditions, marketing facilities, storage facilities and inputs availability at times which all are also very dynamic. *Kumar (2014)* reported that due to lack of scientific knowledge regarding post-harvest technology, poor transport and storage facilities had also contributed to the postharvest losses in tomato and these can be reduced by improve in knowledge. Haryana state being near to the national capital has better marketing opportunities of value-added products of fruits and vegetables. So. to meet the domestic a well as the export demands of vegetables it is essential to integrate the various technologies from production to post-harvest. Keeping in view the above facts, the study was undertaken to assess onion growers' knowledge pertaining to recommended pre and post-harvest management practices.

METHODOLOGY

To collect the primary data on "Onion growers' knowledge status regarding pre and post-harvest management practices" ex post facto research design was followed whereby respondents were selected with multistage sampling. Haryana state from the country was purposively selected being food bowl of country, largest fruit and vegetable market to be established in near future along with Asia's largest vegetable market in its vicinity in national capital, New Delhi for better marketing opportunities. From the state, two districts viz. Mewat and Ambala were selected purposively due to highest area under onion cultivation as well production. From Mewat district, Firozpur Jhirka and Puna Hana blocks were selected purposively due to maximum onion area. Similarly from Ambala district, Barara and Narayangarh blocks were selected purposively with larger area under onion cultivation and its production. Then three onion growing villages namely Badarpur, Dogari and Ghaghas were selected from Firozpur Jhirka block and Akabarpur, Indana and

Jalika villages were selected from Puna Hana block. Similarly, Rajokheri, Maka-maki and Kambasi villages from Barara block and Baroli, Chotibasi and Fatehpur were selected randomly from Narayangarh block. Thus, total twelve villages were selected and finally 10 onion growing farmers were selected randomly from each selected village to constitute a sample of 120 onion growers who were personally interviewed by the researcher. The data were collected with the help of well-structured pretested interview schedule designed for recommended pre and post harvest management practices by CCSHAU, Hisar for onion. The data were analyzed using descriptive statistical measures like frequency, per centage, weighted mean and rank orders to draw tangible inferences.

RESULTS AND DISCUSSION

The data pertaining to Knowledge level of onion growing farmers pertaining to pre harvest management practices presented Table 1 reveals that farmers had correct knowledge of number as well critical stages of irrigation with top ranking & weighted mean score of 1.86 followed by time of sowing in nursery, time of transplanting and weed control measures with weighted mean score 1.85 and fifth rank was attained by proper seed rate with weighted mean score 1.81, means these were the major practices for which onion farmers had correct knowledge. whereas, they had less knowledge or incorrect knowledge related to practices such as treatment of nursery soil, insect-pest and their control measures and diseases and their control measures especially preventive or curative measures such as diseases and their control measures with weighted mean scores of 1.57, 1.47 and 1.28 and ranking of 11th, 12th and 13th respectively. They had moderate knowledge of practices of remaining practices viz. recommended cultivars, recommended doses of manures and fertilizers had sixth rank with weighted mean score 1.80. 8th, 9th and 10thrank attained by the practices like nursery raising, seed treatment and planting distance respectively with weighted mean score 1.77, 1.72 and 1.70 respectively. The findings are in agreement with the findings of *Choudhary et al (2019)* who observed that 70.74 per cent respondents had good knowledge about field preparation and hence this practice was ranked first. The second highest per cent of respondents 61.48 per cent were having knowledge about transplanting of nursery in main field which was given second rank. Only 25.0 per cent respondents had knowledge about selection of suitable variety which was ranked last because most of the respondents had minimum knowledge about this practice.

The explanation of data presented in Table 2 elicits that farmers had correct knowledge related to proper transportation, maturity index and proper harvesting with weighted mean score of 1.90 followed by fourth rank by proper packaging material with weighted mean score 1.80and fifth by precooling with mean score 1.77. While, they had moderate knowledge of practices viz. sorting, grading and the waiting period for spraying of chemicals before harvesting (7-10 days) with weighted mean score 1.66, 1.63 and 1.60 respectively and ranking orders 6th, 7th and 8th respectively. Onion growers had less knowledge or incorrect knowledge of practices viz. proper storage, curing and stop irrigation

Table 1. Knowledge level of onion growing farmers pertaining to pre harvest management practices (N=120)

Aspects	Correct Knowledge(2)	Incorrect Knowledge (1)	TWS	WMS	Rank
Recommended cultivars	96(80)	24(20)	216	1.80	VI
Seed rate(4-6 kg/acre)	97(80.83)	23(19.17)	217	1.81	V
Time of sowing in nursery	103(85.53)	17(14.17)	223	1.85	II
Time of Transplanting	103(85.83)	17(14.17)	223	1.85	II
Planting distance	85(70.83)	35(29.17)	205	1.70	X
Treatment of nursery soil	69(57.50)	51(42.50)	189	1.57	XI
Seed treatment	87(72.50)	33(27.50)	207	1.72	IX
Nursery raising	93(77.50)	27(22.50)	213	1.77	VIII
Manures and Fertilizers doses	96(80)	24(20)	216	1.80	VI
Irrigation (no. as well critical stages)	104(86.67)	16(13.33)	224	1.86	I
Weed control measures	103(85.83)	17(14.17)	223	1.85	II
Insect pests and their control measures	57(47.50)	63(52.50)	177	1.47	XII
Diseases and their control measures	34(28.33)	86(72.67)	154	1.28	XIII

Table 2. Knowledge level of onion growing farmers pertaining to post-harvest management practices (N=120)

Aspects	Correct Knowledge (2)	Incorrect Knowledge (1)	TWS	WMS	Rank
Stop irrigation before 15 days of harvesting	67(55.83)	53(44.17)	187	1.55	IX
The waiting period for spray of chemicals	73(60.83)	47(39.17)	193	1.60	VIII
Maturity index	108(90)	12(10)	228	1.90	I
Proper harvesting	108(90)	12(10)	228	1.90	I
Precooling	93(77.50)	27(22.50)	213	1.77	V
Sorting	80(66.7)	40(33.33)	200	1.66	VI
Curing	53(44.16)	67(55.83)	173	1.44	X
Grading	76(63.33)	44(36.67)	196	1.63	VII
Proper packaging	96(80)	24(20)	216	1.80	IV
Storage (0^0C temp. and RH – 65-70%)	44(36.67)	76(63.33)	164	1.36	XI
Proper transportation	108(90)	12(10)	228	1.90	I

before 15 days of harvesting with mean weighted score 1.36, 1.44 and 1.55 respectively and ranking of 11th, 10th and 9th respectively.

The result of the study showed that majority of the onion growing farmers possessed correct knowledge about the practices proper transportation, maturity indices of onion, harvesting, irrigation, time of sowing in nursery, time of transplanting and weed control measures while, they have either incorrect knowledge or insufficient knowledge about the practices like disease control measures, insect pest and their control, grading, curing and storage. *Choudhary et al (2019)* who observed that knowledge about innovation may be an important factor affecting the adoption behavior of farmers. The farmers who have more knowledge about newly developed technologies also have more level of adoption of technology compared to those who have low knowledge and supported by findings of adoption of similar practices by *Ghanghas et al. (2017)* which revealed that common practices such as proper cleaning or washing before marketing, grading and sorting of vegetables, safe loading, transportation and unloading were regularly adopted by farmers whereas keeping the harvesting produce at shaddy place, harvesting of produce at proper maturity indices, curing, cooling and precooling of vegetables and modern packaging techniques were occasionally adopted.

Data pertaining to overall knowledge of onion growers regarding pre and post harvest management presented in Figure 1 explicit hat majority of the farmers i.e. 54.16 per cent belonged to high knowledge level category followed by 30.00 per cent to medium knowledge level and the remaining 15.83 per cent farmers belonged to low knowledge level. In nutshell, about 85 per cent of the farmers had medium to high knowledge level of pre and post-harvest management practices of onion cultivation. The findings get strength from past findings of *Azad et al. (2014)* which revealed that majority of the respondents (56 per cent) had medium knowledge on post-harvest practices of vegetables; while 8.3 per cent had low knowledge and 35.8 per cent had high knowledge and *Choudhary et al (2019)* who observed that maximum number of the respondents i.e. 65.56 per cent had medium overall knowledge followed by 20.00 per cent of them had low level of knowledge and only 14.14 per cent of them belonged to high level of overall knowledge.

Results presented in Table 3 related to correlation analysis depicts that only economic motivation was positively and significantly correlation with knowledge of onion growers regarding pre and post-harvest management practices at 10 per cent level of significance while, non-significant positive correlation with institutional sources, operational landholding), non-institutional sources, media sources, innovativeness and family education. *Goyal (2011)* reported that adoption of pre and post-harvest management practices per hectare require greater initial investment but later

Table 3. Relationship between antecedent variables and knowledge level of onion growers

Variables	'r' values
Innovativeness	0.20
Operational landholding	0.35
Institutional sources	0.54
Non-Institutional sources	0.33
Media sources	0.25
Family education	0.09
Economic motivation	0.23***

on it was found to be more beneficial in terms of capital intensive. Due to this direct relationship of economic motivation was found between profit and increased use of pre and post-harvest practices.

CONCLUSION

The study revealed that transportation, proper harvesting, maturity index, irrigation, weed control measures, time of sowing in nursery and time of transplanting were the major practices about which majority of farmers had correct knowledge while they had incorrect or insufficient knowledge of practices such as stop irrigation before 15 days of harvesting, insect pests and their control measures, curing, storage and diseases and their control measures essential for shelf life and quality enhancement along with premium prices through off season sale or higher export potential. The overall knowledge level of onion growers about pre and post-harvest management practices was medium to high since 85 per cent of respondents belonged to these categories and only 15 per cent farmers belonged to low knowledge category. The extension organizations should conduct sufficient and proper training for both field functionaries and farmers especially to post harvest management practices to make the enterprise profitable and sustainable.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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