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A study on knowledge level of the cabbage growers regarding cabbage cultivation in Western Uttar Pradesh

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Abstract
The present study was carried out during the year 2020-21, in Meerut and Hapur district of Western Uttar Pradesh to know the knowledge level of cabbage growers regarding cabbage cultivation. The study was done on 200 respondents of various categories and data were collected through personal interview method. The study revealed that most of the cabbage growers were having high knowledge about recommended soil (51.00 per cent), field preparation (50.00 per cent), inter-culture and weed management (59.50 per cent), packing of heads (61.00 per cent) and marketing (69.50 per cent), while medium knowledge had about the recommended seed rate (67.00 per cent), nursery management (55.50 per cent), transplanting (52.50 per cent), planting distance (58.00 per cent), manure and fertilizer application (71.00 per cent), irrigation management (75.00 per cent), insect-pest control (73.00 per cent), harvesting crop (78.00 per cent), and obtain yield per ha (65.00 per cent), where are low knowledge was found in selection of improved varieties and disease control. The variables "Education" Was found high positive correlated with knowledge level of respondents regarding cabbage crop cultivation and caste was found very low negatively correlated with knowledge.

Keywords: Knowledge level, cabbage growers and correlation

Introduction

Cabbage play an important role in vegetable cultivation scenario in the world. Cabbage (*Brassica oleracea* var. *capitata*) is a member of genus *Brassica* and the mustard family, *Brassicaceae*. Cabbage is the most popular winter vegetable in India. Cabbage is generally grown for its densely leaved heads, produced during the first year of its biennial cycle. Plants perform best when grown in well-drained soil in a location that receives full sun. Different varieties prefer different soil types, ranging from lighter sand and loam to heavier clay soil, but all prefer fertile ground with a pH between 6.0 and 6.8. For optimal growth, there must be adequate levels of nitrogen in the soil, especially during the early head formation stage, and sufficient phosphorus and potassium during the early stages of expansion of the outer leaves. Temperatures between 4 and 24 °C (39 and 75 °F) prompt the best growth, and extended periods of higher or lower temperatures may result in premature bolting (flowering). Flowering induced by periods of low temperatures (a process called vernalization) only occurs if the plant is past the juvenile period. The transition from a juvenile to adult state happens when the stem diameter is about 6 mm. Vernalization allows the plant to grow to an adequate size before flowering. In certain climates, cabbage can be planted at the beginning of the cold period and survive until a later warm period without being induced to flower, a practice that was common in the eastern US.

Cabbage crop is harvesting during December, January and February as a traditionally in Odisha, so the cabbage production supply is not uniform throughout the year. Also, the concept of marketing is not focus on the product, but to focus on the users. (Desai and Solanki, 2012) [6].

Cabbage is one of the fresh leafy vegetable rich in carbohydrates, proteins, fibers, vitamins, and minerals and is used in a variety of dishes for its naturally spicy flavor. Cabbage is widely consumed raw, cooked, or preserved in a great variety of dishes. Apart from this it has proven medicinal properties and is used to treat acute inflammation and a disease of the head and neck caused by human papillomavirus. Cabbage leaves are low in calories (27 per cent), fat (0.1 per cent) and carbohydrates (4.6 per cent). It is a good source of protein (1.3 per cent) which contains all amino acids, particularly sulphur containing amino acids.

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It helps digestion. There is a great variation in the cultivated type of cabbage. They differ in size, shape and of leaves and texture of head. As per the latest data available, the per capita availability of vegetable is 92gm/day/head, whereas the consumption has increased from 95 gm to 175 gm per day/head. Thus, there appears a wide gap between the per capita consumption and per capita availability of vegetables. (Wikipedia, 2020)

Cabbage is a widely popular vegetable. It occupies an area of 0.27 m ha with a 5.45% share in total vegetable production (Ahuja *et al.* 2010) [2]. India ranks second in vegetable. Cabbage is the fourth most widely grown vegetable crop in our country. India is the leading country producing Cabbage. Among major vegetable crops, cabbage occupies a maximum of 393.84 thousand hectares with a net production of 8805.95 thousand million tones. An area of 8.36 thousand hectares comes under cabbage crop in Uttar Pradesh with the production of 292.02 thousand million tones. (Anonymous, 2018-19) [1].

The study was conducted with the following objectives
1. To assess the knowledge level of cabbage growers regarding package of practices.
2. To study the correlation coefficients of socio-economic status with the knowledge level.

Research Methodology
The present study was conducted in Western Zone of Uttar Pradesh. There are 23 districts in six divisions of Western Uttar Pradesh, out of which two districts Hapur and Meerut were purposively selected on the basis of maximum area of cabbage cultivation. Two blocks from each district were selected purposively. From each block five villages were selected randomly thus, the total 20 villages were selected for the investigation and from each village 10 cabbage growers were randomly selected. The total sample size was of 200 respondents for the investigation. The data was collected through personal interview with the help of pre-tested interview schedule. The data was analysed, tabulated and find out the frequency, percentage, mean, MPS and correlation-coefficient.

Result and Discussion
The many researcher are engaged in improving the production and productivity of vegetable crops in all over the country for fulfil the requirement of the vegetable. In this contex the researcher collected the data from the cabbage growers to assess the knowledge of growers. The results are discussed on the basis of their responses.

1. Recommended Soil
Table 1, indicated that majority of the respondents (51.00 per cent) were having high knowledge about recommended soil for cabbage crop cultivation, followed by (45.50 per cent) of the respondents were reported medium knowledge and the remaining (03.50 per cent) respondents had low knowledge about type of soil for cabbage cultivation and their total score, Mean value and MPS were found 495, 2.47 and (85.50 per cent) respectively.

2. Improved varieties of cabbage
Table 1, revealed that majority of the respondents (48.00 per cent) were having low knowledge about improved varieties of cabbage followed by (47.00 per cent) of the respondents were reported medium knowledge and the remaining (05.00 per cent) respondents had high knowledge about improved varieties of cabbage crop and their total score, Mean value and MPS were found 314, 1.57 and (52.33 per cent) respectively.

3. Recommended seed rate
Table 1, indicated that majority of the respondents (67.00 per cent) were having medium knowledge about seed rate per ha for cabbage, followed by (23.00 per cent) of the respondents were reported high knowledge about seed rate per ha and the remaining (2.00 per cent) respondents had low knowledge about seed rate per ha for cabbage cultivation and their total score, Mean value and MPS were found 426, 2.13 and (71.00 per cent) respectively.

4. Sowing time
Table 1, indicated that majority of the respondents (43.50 per cent) were having high knowledge about actual sowing time of cabbage crop, followed by (37.00 per cent) of the respondents were reported medium knowledge about actual sowing time and the remaining (19.50 per cent) respondents had low knowledge about actual sowing time of cabbage crop and their total score, Mean value and MPS were found 448, 2.24 and (74.67 per cent) respectively.

Table 1: Distribution of respondents according to their Knowledge level

Sr. No.	Particulars	Low Knowledge		Medium Knowledge		High Knowledge		Total Score	Mean Value	MPS (%)
		F	P	F	P	F	P			
1	Recommended soil	7	03.50	91	45.50	102	51.00	495	2.47	85.50
2	Improved varieties of cabbage	96	48.00	94	47.00	10	05.00	314	1.57	52.33
3	Recommended seed rate	20	10.00	134	67.00	46	23.00	426	2.13	71.00
4	Sowing time	39	19.50	74	37.00	87	43.50	448	2.24	74.67
5	Seed treatment	77	38.50	96	48.00	27	13.50	350	1.75	58.33
6	Nursery management	12	06.00	111	55.50	77	33.50	465	2.32	77.50
7	Field preparation	17	08.50	83	41.50	100	50.00	483	2.415	80.50
8	Transplanting	40	20.00	105	52.50	55	27.50	415	2.075	69.17
9	Planting distance	71	35.50	116	58.00	13	06.50	342	1.71	57.00
10	Manure and fertilizer application	38	19.00	142	71.00	20	10.00	382	1.91	63.67
11	Irrigation management	2	01.00	150	75.00	48	24.00	446	2.23	74.33
12	Inter-culture and weed control	16	08.00	65	32.50	119	59.50	503	2.515	83.33
13	Insect pest control	50	25.00	146	73.00	04	02.00	354	1.77	59.00
14	Disease control	113	56.50	86	43.00	01	0.50	288	1.44	48.00
15	Harvesting the crop	21	10.50	156	78.00	23	11.50	400	2.00	66.67
16	Yield per ha.	47	23.50	130	65.00	23	11.50	376	1.88	62.67

| 17 | Packing of heads | 13 | 06.50 | 65 | 32.50 | 122 | 61.00 | 508 | 2.54 | 84.67 |
| 18 | Marketing | 8 | 04.00 | 53 | 26.50 | 139 | 69.50 | 533 | 2.665 | 88.83 |

"F = Frequency, P = Percentage, MSP = Mean Percentage Score"

5. Seed treatment
Table 1, indicated that majority of the respondents (48.00 per cent) were having medium knowledge about seed treatment, followed by (38.50 per cent) of the respondents were reported low knowledge about seed treatment and the remaining (13.50 per cent) respondents had high knowledge about seed treatment and their total score, Mean value and MPS were found 350, 1.75 and (58.33 per cent) respectively.

6. Nursery management
Table 1, indicated that majority of the respondents (55.00 per cent) were having medium knowledge about Nursery management, followed by (33.50 per cent) of the respondents were reported high knowledge about Nursery management and the remaining (06.00 per cent) respondents had low knowledge about Nursery Management and their total score, Mean value and MPS were found 465, 2.32 and (77.50 per cent) respectively.

7. Field preparation
Table 1, indicated that majority of the respondents (50.00 per cent) were having high knowledge about field preparation for cabbage cultivation, followed by (41.50 per cent) of the respondents were reported medium knowledge about field preparation for cabbage cultivation and the remaining (08.50 per cent) respondents had low knowledge about field preparation for cabbage cultivation and their total score, Mean value and MPS were found 483, 2.415 and (80.50 per cent) respectively.

8. Transplanting
The data presented in table 1, reveals that majority of the respondents (52.50 per cent) were having medium knowledge about transplanting, followed by (27.50 per cent) of the respondents were reported high knowledge about transplanting and the remaining (20.00 per cent) respondents were having low knowledge about transplanting and their total score, Mean value and MPS were found 415, 2.075 and (67.17 per cent) respectively.

9. Planting Distance
Table 1, indicated that majority of the respondents (58.00 per cent) were having medium knowledge about planting distance, followed by (35.50 per cent) of the respondents were reported low knowledge about planting distance and the remaining (06.50 per cent) respondents had high knowledge about planting distance and their total score, Mean value and MPS were found 342, 1.71 and (57.00 per cent) respectively.

10. Manure and fertilizer application
The data presented in table 1, shows that majority of the respondents (71.00 per cent) were having medium knowledge about manure and fertilizer application, followed by (19.00 per cent) of the respondents were reported low knowledge about manure and fertilizer application and the remaining (10.00 per cent) respondents had high knowledge about manure and fertilizer application and their total score, Mean value and MPS were found 382, 1.91 and (63.67 per cent) respectively.

11. Irrigation Management
Table 1, indicated that majority of the respondents (75.00 per cent) were having medium knowledge about irrigation management, followed by (24.00 per cent) of the respondents were reported high knowledge about irrigation management and the remaining (01.00 per cent) respondents had low knowledge about irrigation management and their total score, Mean value and MPS were found 446, 2.23 and (74.33 per cent) respectively.

12. Inter-culture and weed control
The data presented in table 1, indicates that majority of the respondents (59.50 per cent) were having high knowledge about inter-culture and weed control, followed by (32.50 per cent) of the respondents were reported medium knowledge about inter-culture and weed control and the remaining (08.00 per cent) respondents had low knowledge about inter-culture and weed control and their total score, Mean value and MPS were found 503, 2.515 and (83.33 per cent) respectively.

13. Insect pest control
Table 1, shows that majority of the respondents (73.00 per cent) were having medium knowledge about insect pest control, followed by (25.00 per cent) of the respondents were reported low knowledge about insect pest control and the remaining (02.00 per cent) respondents were had high knowledge about insect pest control and their total score, Mean value and MPS were found 354, 1.77 and (59.00 per cent) respectively.

14. Disease control
Table 1, indicated that majority of the respondents (56.50 per cent) were having low knowledge about disease control, followed by (43.00 per cent) of the respondents were reported medium knowledge about disease control and the remaining (0.50 per cent) respondents were had high knowledge about disease control and their total score, Mean value and MPS were found 288, 1.44 and (48.00 per cent) respectively.

15. Harvesting the crop
Table 1, revealed that majority of the respondents (78.00 per cent) were having medium knowledge about harvesting the crop, followed by (11.50 per cent) of the respondents were reported high knowledge about harvesting the crop and the remaining (10.50 per cent) respondents were had low knowledge about harvesting the crop and their total score, Mean value and MPS were found 400, 2.00 and (66.67 per cent) respectively.

16. Yield per ha.
Table 1, indicated that majority of the respondents (65.00 per cent) were having medium knowledge about obtain yield per ha, followed by (23.50 per cent) of the respondents were reported low knowledge about obtain yield per ha and the remaining (11.50 per cent) respondents were had high knowledge about obtain yield per ha and their total score, Mean value and MPS were found 376, 1.88 and (62.67 per cent) respectively.

17. Packing of heads
The data presented in table 1, obvious that majority of the respondents (61.00 per cent) were having high knowledge about packing of heads, followed by (32.50 per cent) of the respondents were reported medium knowledge about packing of heads and the remaining (06.50 per cent) respondents had low knowledge about packing of heads and their total score, Mean value and MPS were found 508, 2.54 and (84.67 per cent) respectively.

18. Marketing
Table 1, indicated that majority of the respondents (69.50 per cent) were having high knowledge about marketing, followed by (26.50 per cent) of the respondents were reported under medium knowledge about marketing and the remaining (04.00 per cent) respondents had low knowledge about marketing and their total score, Mean value and MPS were found 533, 2.6675 and (84.83 per cent) respectively.

Correlation Coefficient
Correlation Coefficient (r) between Independent variables and knowledge level of cabbage growers regarding cabbage cultivation
Correlation is a statistical measure that describes how two variables are related and indicates that as one variable changes in value, the other variable tends to change in a specific direction. In present research study we had given more stress on the knowledge level of respondents towards cabbage cultivation. Table 2, indicated that the correlation coefficient of independents variables (age, caste, education, marital status, type of family, size of family, type of house, occupation, social participation, land holding, irrigation facility, material possession, annual income, extension contact, mass media contact) and dependent variable with knowledge level of cabbage growers regarding package of practices.

Table 2: Correlation coefficient (r) between Independent variables and knowledge level of cabbage growers regarding cabbage cultivation

Sr. No.	Independent variable	Correlation Coefficient (r) with knowledge level
1.	Age	-0.21317
2.	Caste	-0.08856
3.	Education	0.666881**
4.	Marital status	-0.24847
5.	Type of family	0.12367*
6.	Size of family	0.133318*
7.	Type of house	0.05919*
8	Occupation	0.157017*
9.	Social participation	0.036788*
10.	Land holding	0.162702*
11.	Irrigation facility	0.183512*
12.	Home appliance	0.176659*
13.	Transportation facility	0.170987*
14.	Agricultural Implements	0.199922*
15.	Annual income	0.265876*
16.	Extension Contact	0.080689*
17	Mass media contact	0.372211**

*Significant at 0.05% probability level

The independence variable of education value of (0.666881) was found highly positive correlated with knowledge level of respondents regarding cabbage crop cultivation, followed by mass media contact (0.372211) moderate positive correlated with knowledge level of respondents. Other variables, like annual income (0.265875), agricultural implements (0.199922), irrigation facility (0.183512), home appliance (0.176659), transportation facility (0.170987), land holding (0.162702), occupation (0.157017), size of family (0.133318), type of family (0.12367), extension contact (0.080689), type of house (0.05919) and social participation (0.036788), were low positive correlated with knowledge level of respondents. While, the variable Marital status (-0.24847), Age (-0.21317) and caste (-0.08856) were low negligible correlated with knowledge level of respondents regarding cabbage crop.

Conclusion
It may be concluded that most of the cabbage growers were having high knowledge about soil, field preparation, inter-culture and weed management, packing of heads and marketing, while medium knowledge had about the recommended seed rate, nursery management, transplanting, planting distance, manure and fertilizer application, irrigation management , insect & pest control, harvesting crop, and obtain yield per ha. where are low knowledge was found in selection of improved varieties and disease control. The variables "Education" was found high positive correlated with knowledge level of respondents regarding cabbage crop cultivation and caste was found very low negatively correlated with knowledge.

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