Adoption of Recommended Cabbage Cultivation Technology by the Farmers in East Khasi Hils, Meghalaya

Calwin Jones Kharmawlong [a*¥] and Dipak Kumar Bose [a#]

[a] Department of Agricultural Extension and Communication SHUATS, Prayagraj, India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

The main purpose of the study was to ascertain the adoption of recommended cabbage cultivation technology of the farmers in east khasi hills district, Meghalaya. The aforementioned study was conducted in Mawryngkneng Block in East Khasi Hills District,Meghalaya in the year 2022. A descriptive research designed was applied for this study. The primary data was collected from 120 respondents by personal interview method using pre-structure interview schedule. Adoption of the farmers was measured by asking 14 question in respect of cabbage cultivation. Findings showed that 56.67 per cent of the respondents have medium adoption level of cabbage cultivation, followed by low adoption level i.e., 33.33 per cent and high adoption level 10 per cent respectively. The relationship between profile of the respondents and their adoption about the improved cabbage cultivation practices the co-efficient correlation was revealed that independent variables like education, land holding, farming experience, extention contact and cosmopolite/source of information are positive and significantly associated with adoption of farmers.

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[¥]*Research Scholar;*
[#]*Associate Professor;*
Corresponding author: E-mail: cawlinjones26@gmail.com;

1. INTRODUCTION

Cabbage, also referred to as *Brassica oleracea* L. var. *capitata*, is a cruciferous *Brassica* vegetable hailing from the Cruciferae plant family or mustard family. The prefix "*Brassica*" descends from the Latin language meaning cabbage whilst the name crucifer refers to "cross" which is given to this plant family due to the fact they possess four petals that are the same shape and size (Moreb, et al., 2020). Cabbage is a favourite cuisine dish around the world, and it is prepared by various methods as steaming, sautéing, and shredding. Raw cabbage is also used to make juice. Some varieties of the plant are cultivated as fodder for animals while red cabbage is often pickled. In some cases, cabbages are applied directly to the skin to promote wound healing (worldatlas.com) [1-5].

1.1 Top Cabbage Producing Nations

China accounts for 32,800,000 tons of cabbage produced in the world. Other Asian countries in the list are India (8,500,000 tons), Japan (2,300,000 tons), South Korea (2,118,930 tons), and Indonesia (1,487,531 tons). Top cabbage producing nations in Europe are Russia (3,309,315 tons), Ukraine (1,922,400 tons), Poland (1,198,726 tons), and Romania (990,154 tons). The US accounts for 964,830 tons of the total world production (worldatlas.com).

1.1.1 In India

From Europe, cultivated variants of cabbage spread to Asia and Americas. It was brought to India by colonizing traders from Portugal somewhere between a 14th and 17th century, and it was unknown in Japan until the 18th century (vegetablefacts.net).

Cabbages are extensively cultivated throughout the country as an annual crop. India is the second-largest producer of cabbage in the world after China. The major cabbage producing states in India include West Bengal, Madhya Pradesh, Orissa, Bihar, Gujrat, Assam, Jharkhand, Haryana, Uttar Pradesh, and Chhattisgarh. West Bengal is the largest producer of them all.

1.1.2 In Meghalaya

Cabbage is major vegetable crop in Meghalaya after potato. The present study was conducted in East Khasi Hills district of Meghalaya as it was showing highest in area, production and productivity of cabbage. Compound Annual Growth Rate (CAGR) for area, production and productivity for cabbage was estimated. The growth rate in area in Meghalaya found to be 2.59 per cent, 2.86 per cent for production and 0.40 per cent for productivity annually. Similarly the growth rate under area in East Khasi Hills was found to be 0.83 per cent, 1.6 per cent for production and 0.84 per cent for productivity for cabbage. The reason for the low growth rate might be lack of knowledge on latest agricultural practices, seasonal pest infestation and lack of extension and training advisory (Karuna, et al., 2021).

The area under cabbage in Meghalaya was 1943 hectares; the production was 42677 MT with a yield of 178129 kg per hectare (GoM, 2017) [6-10]. Among the different districts of Meghalaya, the East Khasi Hills district was contributing highest in area, production and yield with respect to the cabbage. The agro-climatic conditions of East Khasi Hills district in Meghalaya are highly favourable for cultivating various vegetable crops especially cole crops (Karuna, et al., 2021).

2. RESEARCH METHODOLOGY

Descriptive research design was followed for this study as it describes the characteristics or phenomenon that is being studied. The study was conducted at east Khasi Hills, Meghalaya. Mawryngkneng block was selected purposively out of 11 blocks. Six villages were selected randomly from this block and a total number of120 respondents were selected proportionately for the present study (Figs. 1 and 2).

2.1 Objective

➢ To ascertain the adoption of recommended cabbage cultivation technology by the respondents.
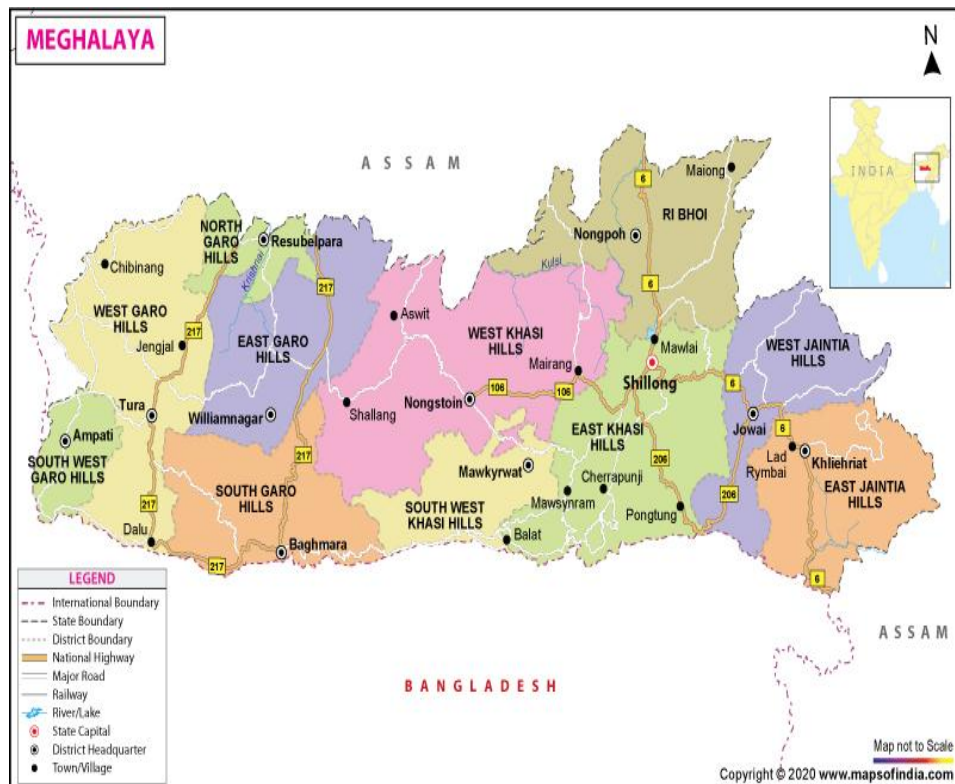➢ To find the association between independent variables and adoption of the farmers.

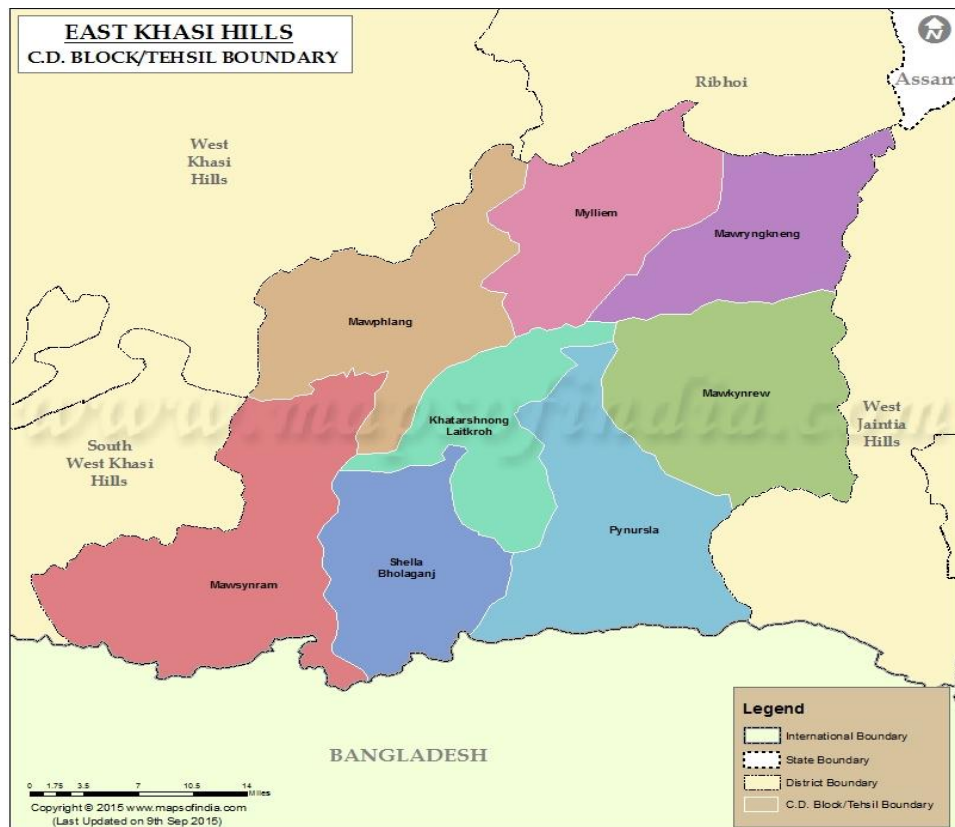**Fig. 1. Map of state of Meghalaya**

Fig. 2. Map of East Khasi Hills district showing Mawryngkneng block

3. RESULTS AND DISCUSSION

3.1 Socio Economic Characteristics of the Respondents

Table 1. Characteristics of the respondents (N=120)

Sl.no	Attributes	Characteristics	f	%
1	Age	Young (20-40 years)	24	20.00
		Middle (40-60 years)	62	51.67
		Old (Above 60 years)	34	28.33
2	Educational qualification	Illiterate	47	39.17
		Primary school	55	45.83
		Secondary	15	12.50
		High School	3	2.50
3	Annual income	Low (Upto 1 Lakh)	8	6.66
		Medium (50,000-1 Lakhs)	92	76.67
		High (Above 1 lakhs)	20	16.67
4	Family size	Less than 5	76	63.33
		More than 5	44	36.67
5	Type of house	Hut	2	1.67
		Semi-cemented	100	83.33
		Cemented	18	15.00
6	Land holding	Less than 0.5	80	66.67
		More than 0.5	40	33.33
7	Farming experience	Low (Up to 10 years)	4	35.00
		Medium (10 to 20 years)	84	41.67
		High (Above 20 years)	32	23.33
8	Extention Contact	Low	23	19.17
		Medium	77	64.17
		High	20	16.66
9	Cosmopolite/Source of Information	Low	34	28.33
		Medium	68	56.67
		High	18	15.00
10	Risk bearing Capacity	Low	52	43.33
		Medium	50	41.67
		High	18	15.00

The perusal of the data given in Table 1 revealed that the majority of the respondents 51.67 per cent were in between 40-60 years of age followed by 28.33 per cent of respondents fall under the category of above 60 years old and 20.00 per cent of the respondents were 20-40 years of age. The Table 1 also indicated that 45.83 per cent of the respondents were educated upto primary followed by 39.17 per cent were illiterate subsequently 12.50 per cent each till secondary school and only 2.50 per cent were educated upto high school. It was revealed that most of the respondents 76.67 per cent were found under medium income group, followed by the 16.67 per cent were under high income group and 6.66 per cent under low income group. It was found that 63.33 per cent of the respondents were having a family size of less than 5 members, 36.67 per cent having more than 5 members. Majority of the respondents 83.33 per

cent were having semi-cemented house followed by 15.00 per cent having cemented house and only 1.67 per cent of the respondents having hut. It was found that 66.67 per were having land holding less than 0.5 ha and 33.33 per cent were having land holding more than 0.5 ha. It was found that 41.67 per cent of the respondents were having a farm experience of 10- 20 years, 35 per cent have experience of below 10 years while 35.00 per cent of the respondents have a farming experience upto 10 years and 23.33 per cent were having a farming experience above 20 years. Extension contact can be found that 64.17 per cent of the respondents have medium level of contact, 19.17 per cent have low level of contact and about only 16.66 per cent of the respondents have high level of contact. It was found that majority 56.67 per cent of the respondents having medium level of cosmopolite/source of information followed by

28.33 per cent having low cosmopolite/source of information and 15.00 33 per cent having high cosmopolite/source of information. It was found that 43.33 per cent of the respondents were having low risk bearing capacity about cabbage cultivation, followed by 41.67 per cent having medium level and only 15.00 per cent having high risk bearing capacity about cabbage cultivation.

3.2 Adoption of Recommended Practice for Cabbage Cultivation

The Table 2 shows that majority 56.67 per cent of the respondents are not adopted in using improved varieties of cabbage, while 43.33 per cent of the respondents are partially adopted in using improved varieties of cabbage. 71.67 per cent of the respondents do not adopt the use of soil testing methods and 28.33 per cent partially adopted the soil testing methods. Majority (53.33%) of the respondents partially adopted method of planting of cabbage and 46.67% per cent fully adopted method of planting of cabbage in the area. It was found that 78.33 per cent of the respondents partially adopted the recommended time sowing of cabbage while 21.67% per cent of the respondents fully adopted the recommended time sowing of cabbage It also indicated that 65.00 per cent of the respondents partially adopted the method of transplanting of cabbage, while 33.33 per cent of the respondents fully adopted the method of transplanting and only 1.67 per cent of the respondents do not adopt the method of transplanting of cabbage. The Table 2 revealed 76.67 per cent of the respondents partially adopted weeding practice, while 20% per cent were fully adopted and 3.33 per cent of the respondents are not adopted in weeding

practice. 78.33 per cent of the respondents were partially adopted earthing up practice, while 16.67 per cent of the respondents are fully adopted and 5.00 per cent of the respondents are not adopted in earthing up practice of cabbage.75.00 per cent of the respondents partially adopted the recommended spacing of cabbage, while 25.00 fully adopted the recommended spacing of cabbage. 76.67 per cent of the respondents partially adopted irrigation practice of cabbage and only 23.33 per cent of the respondents fully adopted irrigation practice of cabbage. Majority (83.33%) of the respondents partially adopted in using the recommended dose of FYM, while 13.33 per cent fully adopted and only 3.34 per cent of the respondents not adopted in using the recommended dose of FYM in cabbage cultivation. Majority (80%) of the respondents partially adopted in using the recommended weedicides in cabbage cultivation, while 16.67 per cent do not adopted the recommended weedicides and only 3.33 per cent of the respondents fully adopted in using the recommended weedicides in cabbage cultivation. Majority (76.67%) of the respondents partially adopted the recommended dose of N:P:K, while 16.67 per cent are not adopted and only 6.67 per cent of the respondents fully adopted the recommended dose of N:P:K. 66.67 per cent of the respondents partially adopted the recommended crop rotation suitable in the area and 33.33 per cent of the respondents fully adopted the recommended crop rotation suitable in the area. It was also found that 65.00 per cent of the respondents partially adopted the practice of storage under proper conditions and only 35.00 per cent do not adopt the storage of cabbage under proper conditions.
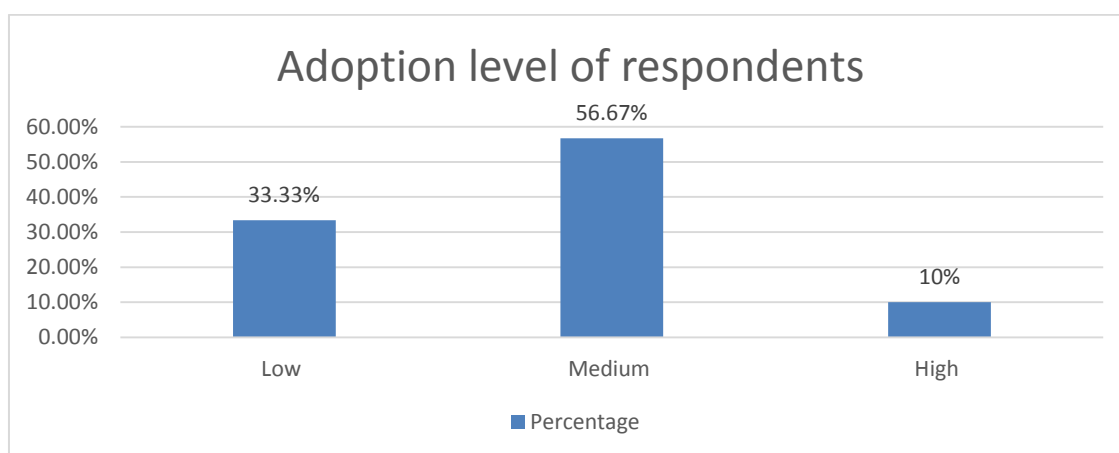

Fig. 3. Overall adoption level of the respondents

Table 2. Distribution of respondents based on adoption level of the respondents about improved cabbage cultivation practices: (N=120)

S. No.	Statement	Fully adopted		Partially adopted		Not adopted	
		f	%	*f*	%	*f*	%
1	Cultivation of improved varieties	0	0	52	43.33	68	56.67
2	Soil testing	0	0	34	28.33	86	71.67
3	Method of Planting	56	46.67	64	53.33	0	0
4	Timely sowing	26	21.67	94	78.33	0	0
5	Transplanting	40	33.33	78	65.00	2	1.67
6	Weeding	24	20.00	92	76.67	4	3.33
7	Earthing up	20	16.67	94	78.33	6	5.00
8	Spacing	30	25.00	90	75.00	0	0
9	Irrigation practices	28	23.33	92	76.67	0	0
10	Use of FYM	16	13.33	100	83.33	4	3.34
11	Use of weedicides	4	3.33	96	80.00	20	16.67
12	Use of NPK	8	6.67	92	76.67	20	16.67
13	Crop rotation: Cabbage-Tomato-Peas	40	33.33	80	66.67	0	0
14	Storage under proper conditions	0	0	78	65.00	42	35.00

F=Frequency; %=Percentage

Table 3. Overall adoption level of the respondents towards cabbage cultivation

S. No.	Adoption Level	Response	
		Frequency	Percentage
1	Low (23-26)	40	33.33
2	Medium (27-30)	68	56.67
3	High (31-32)	12	10.00
	Total	120	100.00

Based on the data in (Table.1) it can be observed in (Table 2) that the level of adoption about improved cabbage cultivation practice is medium i.e., (56.67%) followed by low adoption level i.e., (33.33%) and high adoption level (10.00%). Similar findings were also found in Supriya et al., [1]), Kant et al., [2] and Rashid et al., [3].

3.3 Association between Selected Independent Variables with the Adoption of the Respondents towards Improved Cabbage Cultivation Practices

Table 4. Association between selected independent variables and adoption

S/no	Variables	Pearson's correlation coefficient
1	Age	0.05204 NS
2	Education	0.267183**
3	Annual income	0.038973 NS
4	Size of family	-0.23561 NS
5	Type of House	0.077362NS
6	Land holding	0.303018**
7	Farming experience	0.668837**
8	Extension contact	0.449205**
9	Cosmopolite/Source of information	0.436973**
10	Risk Bearing capacity	0.001828 NS

* = Significant at p = 0.05%, **= Significant at p = 0.01%, NS= Non-Significant

In the above Table 4 revealed that independent variables like education, land holding, farming experience, extention contact and cosmopolite/source of information are positive and significantly associated with adoption of farmers. Further, the variables like age, annual income, type of house and risk bearing capacity was found to be non-significant with the adoption of farmers towards the improved cabbage cultivation practices. While of the family was negatively and non-significant with the adoption of farmers towards the improved cabbage cultivation practices. The findings were partially related with Kumar et al., [4].

4. CONCLUSION

It is concluded that majority of the respondents had medium level of adoption followed by low and high in respective to the recommended practice given by BDO, AEO, DAO and some other allied extension workers. Subsequently majority of the selected independent variables were positively significant with the adoption of the farmers.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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