International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

A Study on Adoption of IPM Integrated Pest Management in Cabbage and Cauliflower in Bishnupur District, Manipur

Maisnam Chandrika[1], Maningwang Newmai[2], Athokpam Suria[3]

[1,2,3]Student, pddiaus

Abstract

An insect pest problem is one of the important limiting factors in the profitable production of agricultural crops. In India, including Manipur, insect pest control is mainly base on the use of insecticidal chemicals because of their quicker action, easy availability and giving spectacular result within a short time, so, the concept of Integrated Pest Management emerged.Therefore the present study entitled "A Study on Adoption of IPM in Cabbage and Cauliflower at Bishnupur District of Manipur" was designed with the following objectives To study socio-psychological, extension-communication and agro-economic characteristics of the respondents.

Keywords: IPM: integrated pest management

INTRODUCTION:

Manipur is a small hilly state having total horticultural potential area of 2,77, 064 hectare (identified under Techno economic feasibility survey conducted by National Horticultural Board). Major vegetables crops includes cauliflower, cabbage, tomato, pea, potato and other vegetable suitable for processing of various products like pickle, sauce, chutney, juice, canned products, etc.

Objectives of the study:

To study socio psychological, extension communication and agro-economic characteristics of the respondents.

REVIEW OF LITERATURE:

Dube (1961) reported that the all farmers adopted more improved seeds, fertilizers and manures than younger farmers which indicated as association between the age of farmers and their adoption. **Rajagopal et al. (1975**) reported that majority of the vegetable growers were below the age of 30 years

Tantry (1987) found young farmers to be good acceptors of almost all innovations compared to the aged farmers in rice cultivation.

Ram (1988) reported that majority 51.00 per cent of the trainees were in the aged group of 35 to 45 years. Next in order 20.0 , 13.0 and 10.0 per cent of the trainees in the age group of 25 to 35 years, above 45 years and up to 25 years respectively.

Singh and Sharma (1990) found that age was an insignificant impact on technology adoption where **Das *et al.* (1998)** found that age did not play any significant role in explaining technological gap in Gram Production.

Pyasi *et al*. (2002) revealed that the higher percentage of rural people were of old age group.

The research methodology, which was followed for conducting this investigation, is discussed under the following heads:

Locale of the study:

Within the available limited time and resources for the investigator and for such research involving respondents as the limit of study required good rapports as well as free and frank conservation with the respondents to get reliable response. The investigator has selected Bishnupur district.

Sampling technique/ procedure:

A multi-stage sampling procedure was followed for selection of district, villages and respondents. At the first, Bishnupur District was selected as 'locale of study'. Since it would not be possible to conduct an intensive study in the entire state within the limited time and resources, at the disposal of the investigator, only one district i.e., Bishnupur District was selected purposively for the study.

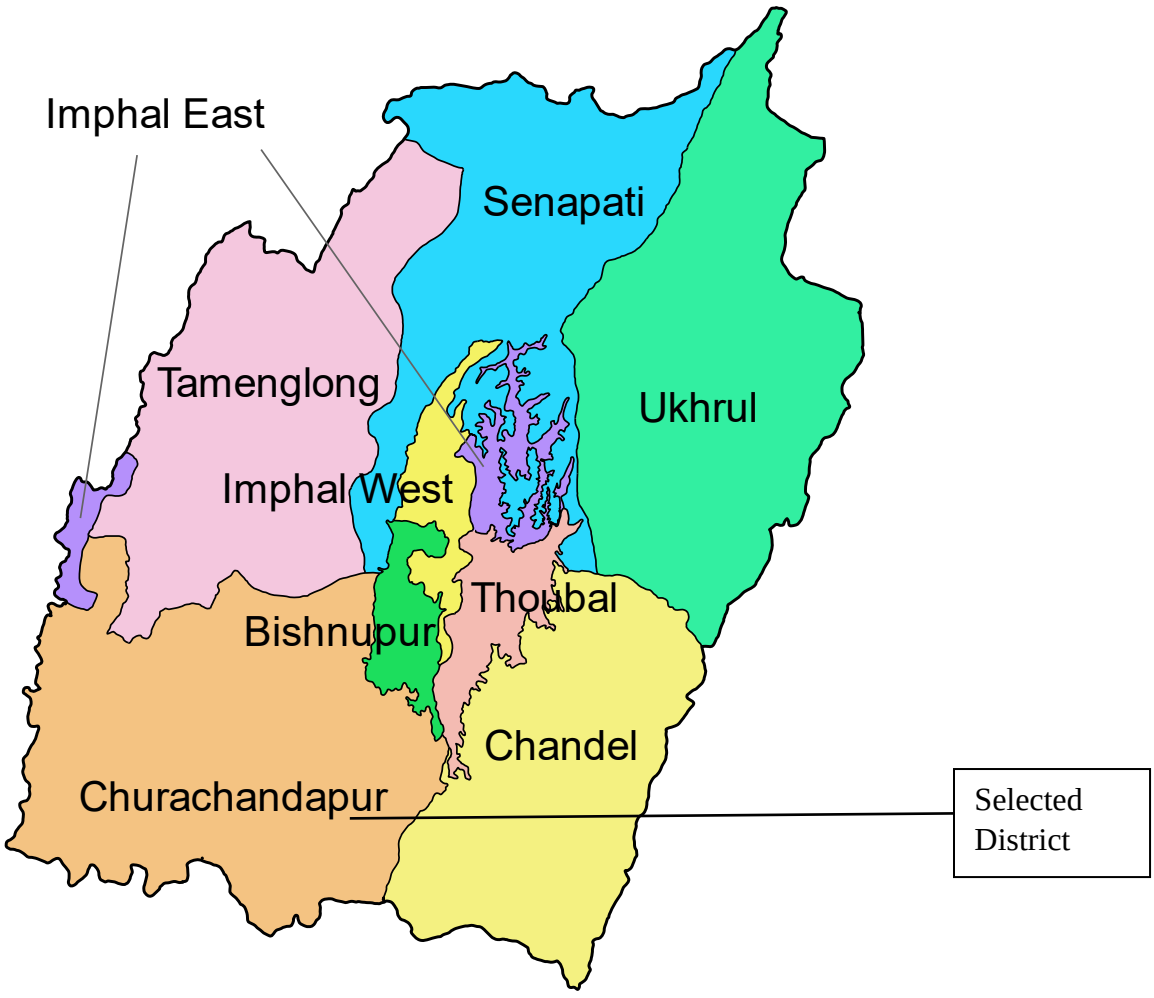

fig: map of Manipur showing the selected district

Selection of block:
In Bishnupur District there are 3 CD blocks viz., Nambol CD block, Bishnupur CD block, Moirang CD block. Out of these three blocks, Bishnupur CD district block was selected as randomly and four village was selected for the present study as randomly.

Selection of village:
Four villages were selected randomly. The sample villages were Toubul, Kwaksiphaikhunou, Kwaksiphaikhulen, Ngaikhong Khunou.

Selection of the respondents:
Separate list of respondents from each village were prepared after consultation with local leaders like members and Pradhan. The respondents constituting the final samples were selected by the method of proportional allocation. Numbers of respondents was selected with the help of the proportionate random sampling from the total villages 8 percent of the respondents were selected for the present study. Thus, nearly 28,26,40 and 26 respondents were selected from Toubul village, Kwaksiphaikhunou, Kwaksiphaikhulen, Ngaikhongkhunou villages were selected respectively. Finally a sample of 120 households was selected for the study.

Research design:
The present study was based on 'Descriptive and Analytical Research Design' under cross sectional study in which 'ex-post-facto' approach has been followed. The investigation was under taking during March-April 2020. The statistical techniques and the tools were selected to analyze the data and to represent the result.

Pilot study:
Pilot study was conducted in the area to study the insights of the local situation , farming conditions and population in agriculture activities, for which the investigator twice the area, during which the researcher discussed with the Pradhan and members of the Gram Panchayats as well as some other informal leaders of the villages.

SELECTION OF VARIABLE
A detailed account of selected of dependent and independent variables have been presented in the table – 1.
SL NO. Category of variables to be undertaken Measurement techniques A Dependent Variables y Adoption of IPM practices. Schedule was developed.
SL NO.Category of variables to be undertaken Measurement techniques b Independent Variables
x_1 age chronological age of the respondents
X2 sex schedule was developed
X3 education SES scale rural Pareek & Trivedi, 1964
X4 caste Scale was developed by Trivedi ,1963
X5 Occupation Scale was developed by Trivedi ,1963
X6 Famiy Size Arbitary scoring
X7 Innovation proneness Innovation proneness scale (Moulik,1965)

X8 Economic Motivation Scale developed by Singh,1993
X9 Risk Orientation Risk preference scale, (Supe,1969)
X10 Contact Extension staff Schedule developed by Singh,1993

Independent variables

Age: It was measured by the number of years completed by the respondent at the time of investigation . Respondents were categories as follows :

s.no.	Age groups	Categories
1.	Young (0-35)	Less than mean – S.D.
2.	Middle aged (36-45)	In between mean ± S.D.
3.	Old (45 and above)	Greater than mean +S.D.

Sex:The data covering about the male or female who are engaged in the vegetable growers were collected. Later on the male and female number has been classified in percentage.

Sl.no.	Categories	Score
Male	Number	
Female	Number	

Education : The data concerning education of the vegetable growers respondents were collected in the way similar to one described in age of the respondents.

Sl. No.	Categories	Score
1	Illiterate	0
2	Can read only	1
3	Can read and write	2
4	Primary (v standard)	3
5	Middle school	4
6	High school	5
7	Graduate and above	6

Caste: All the caste were placed into three categories based on their prestige and social positions. The three categories were assigned on the arbitrary weightage 3,2 and 1 respectively.

Sl no.	Categories	Caste
1	General	3
2	OBC	2
3	SC/ST	1

Occupation : This variable was quantified as the basis of scoring used in the socio-economic status scale of Trivedi (1963). The score were as under:

Sl no.	Categories	Score
1	Agriculture	4
2	Agril.and Service	3
3	Service	2
4	Other occupation	1

Family size: Operationally this was measured by the total no. of members of both the sexes living in the family in the date of interview inducing those who had joined as a member in the family for the establishment of a new life. The respondent were classified as nuclear and joint family.

Sl no.	Items	Categories
1	Nuclear	Upto 5 members
2	Joint	6 and above

Innovation proneness:Each individual respondents was asked to choose one of the three items in each group which he perceived most to himself. The total score on the three terms, he had chose determine the innovation proneness score of the farmers. Farmers were then classified into three categories:

Sl no.	Categories	Score
1	Agree	3
2	Disagree	2
3	Undecided	1

Economic motivation: The scale consisted of seven items, they were rated in three point response categories namely , 'agree' ,'undecided' and 'disagree'. The total score obtainable by a farmer ranged from 7 to 21. Farmers were then categorised as low ,medium and high group as follows.

Sl no.	Items	Categories
1	Low	Less than mean +S.D.
2	Medium	In between mean ± S.D.
3	High	Greater than mean +S.D.

Risk orientation:In the present study, the risk preferences of the respondents were measured with the help of scale developed by Supe (1969).

Sl no.	Categories	Score
1	Strongly disagree	1
2	Disagree	2
3	Undecided	3
4	Agree	4
5	Strongly agree	5

Contact with extension staff: This variable was measured, in the present study by asking to indicate how often the farmers made contact with the officials listed below in the past Singh (1993).

Village extension worker
Circle extensionofficer
Sub divisional/block agricultural officer
Subject matter specialist
Any other personal of block/agricultural department

The pooled score obtained from the response categories for each official he contacted determined the degree of extension contact of the respondents. Based on their degree of contact, the farmers were categories as follows.

Sl no.	Categories	Score
1	Never	0
2	Sometimes	1
3	Often	2
4	Regular	3

Dependent variables

Adoption of IPM practices:

Adoption of IPM practices in cabbage and cauliflower was measured with the help of structural schedule which was developed in consultation with the expert. The schedule consisted of 25 items from different aspect of IPM practices in cabbage like cultural, mechanical, biological and chemical control. Scoring on each items was done on a scale with 4 points continuum, in terms of frequency with which the practice was followed and scores of assigned to the regular practitioner -3,2 to less frequently practitioners 1 to very less frequent practioners and 0 (zero) to every non-practitioners. Thus, with the help of this schedule it was possible on the answered given by the IPM practitioner respondent. Individual score was later converted to standardize score of adoption index with the help of the following formula

Adoption if IPM = (obtained adoption score)/(highest obtainable score) ×100

Pretesting of the research schedule :

In the present study a suitable structure schedule was prepared keeping in view of the objectives the schedule was finalised with the help of the extension experts and the entomologist, and the pre- tested in a sample of 5 respondents were not included in the sample of the study on the basis of pre testing necessary modification, whatever required , were carefully made in the scale and indices which were used as the final schedule to collect the necessary information from the respondents

Framing of hypothesis: According to George A. Lundberg “a hypothesis is a tentative generalization, validity of which remains to be tested. In its most ordinary stage the hypothesis be any hunch, guess, imagination, idea, which becomes the basis for action and investigation.

Considering the importance of the selected to be studied with reference to the objective of the present study mentioned in the chapter 1 the hy7pothesis is formed for this study have been described below.

H_{o1} : there is no relationship between socio-physiological, extension communication and agro-economic characteristics of the farmer.

H_{o2}: there is no difference between the level of adoption of IPM practices with the socio-physiological, extension communication, agro-economic characteristics of the farmers.

Tabulation and analysis of the data:

After collection of data, it was sorted out, tabulated, classified, analysed and finally processed statistically, to draw inferences. Interpretation of the data was made in accordance with the objective of this study. The statistical tools and technological used in this study includes mean, percentage, frequency, standard deviation, multiple correlation, regression and ranking.

Arithmetic Mean:

It was used in the categorization of farmers and in finding the value in different practices under this study. It is the arithmetic average and is denoted by Mean.

$$\bar{x}=\sum_{i}^{n}(=_{1}xi)/n$$

Where, $\bar{x}$= arithmetic mean

n = no. Of observations

i = 1,2,...,n

Standard deviation:

It is the square of arithmetic mean of the square of all deviation, the deviations being measured from the arithmetic mean of the distribution. It is commonly denoted by the symbol σ (Sigma). It is less affected by sampling errors and is more stable measure of dispersion. The standard deviation of the data group in the form of a frequency distribution is computed by the formula :

$$\sigma = \sqrt{((Xi-\bar{x})^2)/n}$$

where, Xi = ith value of the independent variables

$\bar{x}$ = mean

n = total no. of observations.

Correlation:

When an increase or decrease in one variate is accompanied by an increase or decrease in the other variate, the two are said to be correlated and the phenomena is known as Correlation coefficient (r) a measure of the relationship between the two variables which are at the interval or ratio level of the measurement are linearly related. A person product – moment 'r' is computed by the formula:

$$r = (N\sum\ 〖XY- (\sum X)(\sum Y) 〗)/\sqrt{([N\sum\ 〖X^2-(\sum X)^2〗][N\sum\ 〖Y^2-(\sum Y)^2〗]}$$

)

where,

X and Y = originals scores in the variables X and Y.

N = no. of paired scores.

$\sum XY$ = each X multiplied by its correlating Y, then summed .

$\sum X$ = sum of X scores .

$\sum X^2$ = each X squared, then summed.

$(\sum X)^2$= sum of X scores, summed.

$\sum Y^2$ = each Y squared, then summed.

$(\sum Y)^2$ = sum of Y scores, squared.

Multiple regressions:

The correlation coefficient only expresses association and by itself tells us nothing about the casual relationships of the variates. Thus, purely from the knowledge that two variates x and y correlated, we cannot say whether variation in y or whether the association results from mutual dependence of the two variates or common causes from both of them. Similarly, the more existence of high value of correlation coefficient is not necessary indicative of an underlying relationship between the two variates.

The under relationship between X and Y in a bivariate population can be expressed in the form of a mathematical equation known as regression equation and is said to be represented the regression of the value of the variate Y on X.

A multiple correlation coefficient measures the combined relation between a dependent and series of independent variables. It can also be explain as the correlation between the observed values of the dependent variable and its value estimated values from the independent variable values, estimated with the help of the multiple regression equation (Chandel, 1970).

If Y is the dependent variable and x1, x2, ... x13 are the independent variables, and the multiple regression equation will be:

$$Y = a + \sum_{i}^{n} b_i x_i$$

Where,

Y= dependent variable.

a = intercept.

bi =ith regression coefficient .

xi =ith independent variables.

n = total no. of independent variables.

A multiple linear regression of dependent variables which are significantly correlated with the independent variable were calculated out. 't' test was applied to multiple regression to identify the significant cause and effect relationship i.e. to ascertain the role of independence variable with the dependent variable. The formula of 't' test is given below:

$$t = b_i/(S.E.(b_i))$$

where

bi = regression coefficient.

S.E.= standard error of the regression coefficient.

The calculated value of 't' were compared with the table value of 't' at 0.05 and 0.01 level of probability.

'F' test

To test the significance of R or R2 , 'F' was calculated by the formula :

$$F= (R^2(n-k))/((1-R^2)(k-1))$$

Where,

R^2= coefficient of multiple determination (multiple regression)

K= number of parameter.

n = no. of respondents in the sample.

The calculated value were compared against the table value of 'F' for [(K-1),(n-K)] degree of freedom (Snedecor and Cochran, 1967).

FINDINGS AND DISCUSSION

1 **AGE:**Table -1. Distribution of the farmers with respect to their age.
N=120

Sl.No.	Age Group	Frequency	Percentage
1.	Young (less than 35 years)	23	23
2.	Middle age group (36-45)	38	38
3.	Old age group (above 46 years)	59	59

This table -1 exhibits that the old age farmers were 59 percent followed by middle age 38 percent the least number was observed in case of young age group 23 percent.The possible reasons for this would be that "old aged" farmers were mostly involved in agricultural enterprises with long experience while young and middle aged respondents had negligible role in agriculture enterprises. This might be due to the fact that young and middle age people might have engaged in other occupation and middle age farmers might be counseling and guiding the family members.

2 SEX: Table -2. Distribution of the farmers with respect to their sex.
N=120

Sl. No.	Categories	Frequency	Percentage
1.	Male	88	88
2.	Female	32	32

The table -2 depicts the distribution of the farmers on the basis of their sex, out of 120 farmers, 88 percent of the farmers were found to be in a male category and only 32 percent of the farmers were found to be in a female category.

3 EDUCATION:

Table-3: Distribution of the farmer with respect to their education.
N=120

Sl. No.	Categories	Frequency	Percentage
1	illiterate	24	24
2	Can read and write	12	12
3	Primary school	9	9
4	Middle school	20	20
5	High school	25	25
6	Graduate and above	30	30

Table-3 depicts the distribution of the farmer with respect to their education,out of 120 farmers, 30 percent were graduate and above, 25 percent were up to high school, 20 percent went to middle school, 12 percent of the farmers can read and write only and 9 percent of them went upto primary school, and

24 percent of the farmers were illiterate.It may also be concluded that all the categories of farmers were more in literate that illiterate. The possible reason for this would be that, with the change in our society from traditional to modern one, education is more formal, systematically organized and bureaucratized. And in most modern societies, it is compulsory. This logically true from this fact that the percentage of literacy is very high in state (68.87%).

4 CASTE: Table -4. Distribution of the farmers with respect to their caste.
N=120

Sl. No.	Categories	Frequency	Percentage
1.	Upper caste (general)	86	86
2.	Other Backward caste	22	22
3.	Scheduled Caste/ Scheduled Tribe	12	12

Table -4 reveals out of 100 farmers, 86 percent of the farmers were found to be in the upper caste (general), 22 percent of the farmers were found to be in other backward caste and only 12 percent of the farmers were found to be in the scheduled caste/ scheduled tribe. The possible reasons for this would be that, in that area most of the peoples belonged to upper caste and those some backward caste were migrated from other places.

5.OCCUPATION: Table -5. Distribution of the farmers with respect to their occupation.
N=120

Sl. No.	Categories	Frequency	Percentage
1.	Agriculture	79	79
2.	Service	15	15
3.	Agriculture & Service	19	19
4.	Other occupation	7	7

Table-5 depicts the distribution of the farmers on the basis of occupation, the majority of the farmers 79 percent were having agriculture, followed by agriculture and service 19 percent, 7 percent were having other occupation and only 15 percent were found to be in service category. The possible reason would be that, in agriculture and allied service state more that 70 percent of the people were engaged on agriculture. So, your state is one of them and that's most peoples 69 percent was found to be in agriculture.

6 FAMILY TYPE: Table -6. Distribution of the farmers with respect to their family type.
N=120

Sl. No.	Categories	Frequency	Percentage
1.	Nuclear	52	52
2.	Joint	68	68

It reveals that out of 120 farmers 68 percent of the farmers had joint family type and 52 percent of the farmers had the nuclear family. The reason may be that there family might not be broken after marriage of their sons because of their low size of holding.

7.INNOVATIVE PRONENESS:

Table-7 distribution of the farmers with respect to their innovative proneness.

N=120

Sl no.	category	frequency	Percentage
1.	Low	41	41
2.	Medium	21	21
3.	high	58	48

It was evident from table-7 that 58 percent of the farmers had more access of innovation followed by 41 percent of the farmers having low access of innovation, whereas 21 percent of the farmers have medium innovative proneness.

8 ECONOMIC MOTIVATION:table- 8 distribution of the farmers with respect to their economic motivation.

N=120

Sl. No.	**Category**	**Frequency**	**Percentage**
1.	**Low**	**30**	**30**
2.	**Medium**	**42**	**42**
3.	**High**	**48**	**48**

It was depicted from table 8 that 48 per cent of the farmers had high economic motivation,42 percent of the farmers had medium economic motivation and 30 percent of te farmers had lower economic motivation.

RISK ORIENTATION: Table -9. Distribution of the farmers with respect to their risk orientation.

N=120

Sl. No.	**Categories**	**Frequency**	**Percentage**
1.	Low	25	25
2.	Medium	38	38
3.	High	57	57

x=(mean score)= 38.53 SD= (standard deviation) =5.82

Table-9 revealed that, in the whole samples 57 percent of the farmers belonged to high category of risk orientation, followed by medium category 38 percent and only 25 percent in case of low category. The respondents thus comprised mostly high risk farmers in adopting new agricultural practice.

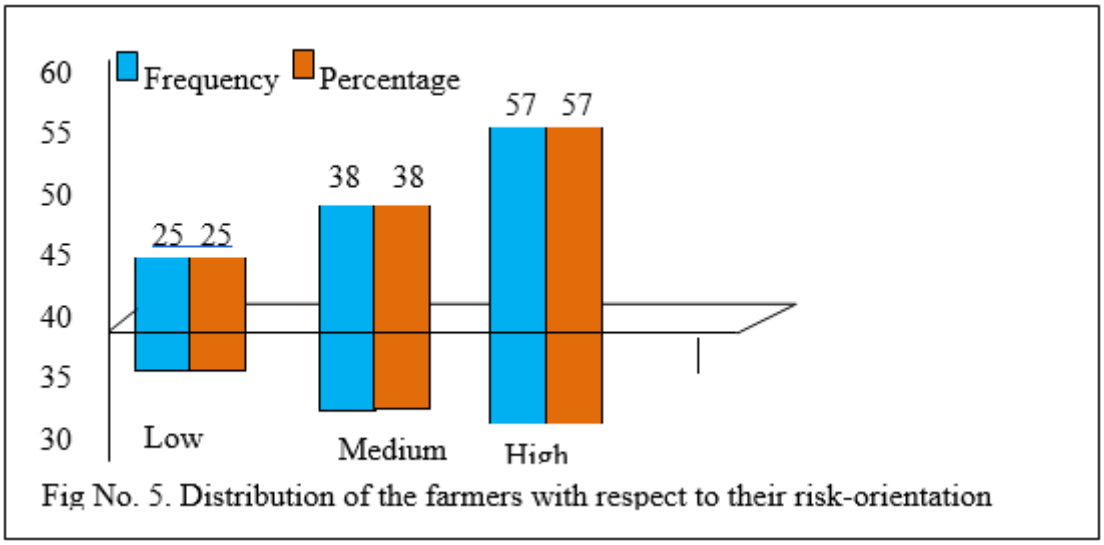

Fig No. 5. Distribution of the farmers with respect to their risk-orientation

10 CONTACT WITH EXTENSION STAFF: Table -10. Distribution of the farmers with respect to their contact with extension staff.

N=120

Sl. No.	Categories	Frequency	Percentage
1.	Low	17	17
2.	Medium	34	34
3.	High	69	69

Table -10 indicates that majority of the farmers 69 percent were having high contact with extension staff followed by medium 34 percent and only 17 percent by low category.

SUMMARY AND CONCLUSION

This chapter deal with a brief description of study carried out, methodology followed, major findings, conclusion and suggestions for future action.

India is the second largest producers of vegetable crops in the world next to China with an estimated production of about 50.09 million tonnes from an area of 4.5 million. Cabbage and cauliflower are one of the important vegetables among the Cole crops. Vegetables are the only crops next to cereal which could supplement the food needs of our country in a very substantial manner to feed nearly billion of people. Looking back into the history of Indian agriculture after independence, the present production of 90.8 million tones is to be raised 250 million tones by 2004-2025. Although recent agricultural research has shown immense scope for increasing productivity of vegetable, but real increase in production is visibly a challenging as well as with no more scope for expansion of net shown area.

The significant of vegetable cabbage and cauliflower in the agrarian economy and dietary is the irrefutable fact. Comparing to major vegetable growing states of India, Manipur is one of the states which grow vegetables in large area. The total horticultural potential area is 2,77064 and the total cultivated land is 12093 hectares. Cabbage and cauliflower are cultivated in almost all the 8 district of Manipur.