CHAPTER – 1

PROCESS DOCUMENTATION RESEARCH ON PATTERN OF PESTICIDE USE

1. Trend of pesticide use in India in the era of agroindustrialization

The utilization of various inputs for crop production mainly depends on our national policies and strategies for agricultural development and these are routed in our Five Year Plan for the development. The First Five Year Plan has emphasized agricultural sector to be develop by increasing area under cultivation through expansion of cultivable land by providing the irrigation sources. In the next phase, agricultural development aimed by massive introduction of chemical fertilizer and promoted these through Second Five Year Plan. Under Third Plan, special policy was formulated to promote high yielding varieties and assured to supplies various inputs required for the high yielding varieties. The modernization of agriculture in term of high yielding varieties and supply of ample irrigation water and chemical fertilizer has lead to crops more vulnerable to the pest attack Resultantly, the third five year plan also seeks to have place for pesticide which indicates importance of the pesticide in crop production, realized at that time. During this period, several policies related to pesticide trade and special Government organization has been formed to promote the use of pesticide in the country (NCAER 1967). As a result the pesticide use hiked in the country. Not only that but over use of pesticide has been started in several region of the country.

The pesticide utilization in the country was 2350 tons during the first five-year plan, which reached up to 75000 tons in the end of 90' s It was 32 times higher than its introduction phase. Quantity of technical grade pesticide utilization was in steadily increased from 1950-51 to 1990-91 (Singhal, 1999; Figure 1.1). Certainly, the growth rate of pesticide utilization was reduced in the middle of agricultural development phase (in 80"s). But initial growth rate of pesticide utilization was much higher; it was 36.80 % in 60' s and 281.15 % during 70' s. The decline in growth rate mainly due to introduction of new pesticide compounds which require low dose to control the target pest. In other word, new compound are highly toxic to the targeted pest.

During the DDT era about 85 % of the Indian farmers has utilized the organochlorine pesticides for pest control (NCAER 1967). The rate of application of organochlorine pesticide was 0 39 kg/ha and applied over nearly 282 million hectors of agricultural land of the country. In similar trend organochlorine pesticide has been utilized in the country up to 70' s. In subsequent years, new organophosphate compounds slowly replaced by the organochlorine pesticide. Because of repeated failure of organochlorine pesticides to control the pest and also has increased the problem of pest resurgence. Even though today' s pest control practices relies 16 % on the organochlorine pesticides. It means 16 % of the total utilized pesticides in the country from the organochlorine group (Singhal, 1999).

At present, the consumption of the chemical pesticide is highest in Andhra Pradesh 33%, followed by Punjab 14%, Karnataka 11%. The Tamil Nadu 9 %, Maharashtra 7 %, Haryana 6 %, Gujarat 5 %, Uttar Pradesh 5 % and the rest states accounts for 9.5 % of the total pesticides utilized in the country ,(Singhal, 1999). Gujarat stands forth in quantity of pesticide utilized per hector; it is 1.479 (NCAER 1967). Nearly 70 % of the total

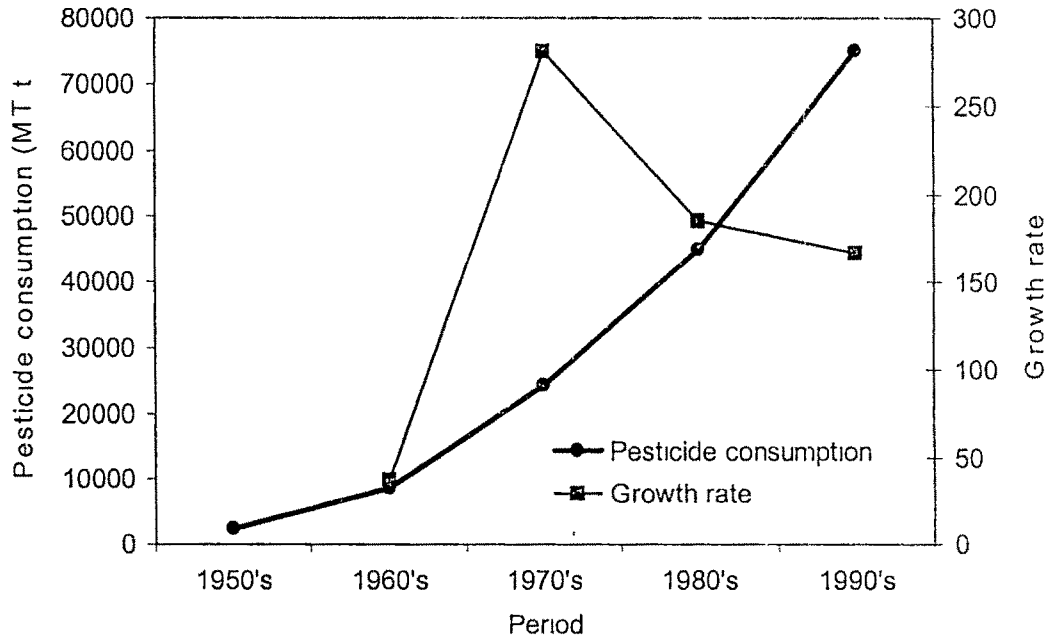

Figure 1 1. Trend of pesticide use in India

pesticides consumed in India were utilized for cotton (45%) and rice (22%) (Vyas, 1998). This share of pesticide utilization in different state of the country and crops remained almost same over last 50 years. This indicates that the pesticide use in the country is heavily skewed towards a few crops for exports. The crops like cotton and rice. This suggest that policies targeted towards a few crops- strict enforcement of Integrated Pest Management program and research on alternative pest control method may have measurable effects for sustainable agricultural development of the country by reducing pesticide utilization

1.1. Pattern of pesticide use in Kheda district

Paddy (*Oryza sativa* Lin) is the staple food of more than half of the World population. Its production is mainly concentrated in the South and Southeast Asian countries namely India, Japan, China, Java and Korea, which together accounts for 90 to 92 per cent of total area under paddy cultivation in the World. India produces three fifth to two fifth of paddy in the world. Paddy is also considered as major food of over 55 % of India' s population and is grown in almost all the states. Its total cultivated area is 42 million ha with a production of 75 to 105 million tons by 2000 AD to feed its growing population (Anon, 1994)

This crop occupies about 5 % of the gross cropped area of Gujarat State The crop is cultivated in 7.5 to 8.0 Lakhs ha of land. About 80 % area is confined to South and Central Gujarat, comprising the districts of Kheda, Surat, Valsad, Panchmahal, Ahmedabad and Vadodara The average grain production in Gujarat is 2.5 tons/ha of transplanted paddy (Korat and Mehta, 1996). Average yield of paddy in India is 2.8 tons/ha which is very low compared to 8.0 tons/ha in Greece and 3.7 tons/ha in Asia (Patel, 1997).

The wide spread introduction of high yielding paddy cultivars and adoption of intensive crop management practices although resulted in substantial increase in the paddy yield, but have also increased the menace of insect, diseases, weeds, rodents and nematodes. The yield loss due to these pests ranges from 35 – 40 %. Thus pest management remains as an important functional component in paddy production in India The indiscriminant use of pesticides has led to the disturbances in the natural ecosystem, leading to the resurgence of pests as well as a havoc-increased load of toxic hazard and residues in the environment.

Several insect pests, diseases and weeds attack the crop right from the seedling stage to harvest, resulting in significant crop losses. Proper study of agro-ecosystem and awareness of pest control practices can enable us to grow healthy paddy crop with wee use of pesticides. Looking to these facts, the present study was taken up to find out the factors motivating the farmers to use pesticides judiciously for pest control and to estimate the amount of pesticides presently being used for controlling the pest

2. MATERIAL AND METHODS

The study taken up was characterized with the format as: 1 Study plan, 2. Sampling technique, 3. Study area, 4. Tools used, 5. Pre-testing of Interview schedule, 6. Data collection, 7. Selection of variables, and 8. Measurement of Variables. The plan of study is described in detail as follows.

2.1. Study plan

The present study was designed to know the impact of the individual farmers background, knowledge, socio- economic status, participatory approach, attitude towards the adoption of IPM and magnitude of pesticides used by him for pest control.

2.2. Sampling technique

In this investigation simple random sampling procedure was utilized for the selection of farmers/respondents. A list of farmers was obtained from the Panchayat and out of the list 10 cultivators were selected at random from each village. The study was carried out in six villages based on the land under paddy crop and yield potential from the record. The selected villages are namely, Devataj, Lingda, Matar, Davda, Rudel and Gobrapura. Thus in total 60 respondents were interviewed from six villages of Kheda district.

2.3 Tools used

The interview schedule incorporating the objectives was used as the tool in this study. The questionnaire was formulated after referring the available literature, integrated management approach and popular articles (Appendix 1.1). The efforts were also made to consult the extension field experts and on the basis of suggestion made by them, schedule was revised for proper collection of responses and information accurately

2.4 Pre testing of interview schedule

The purpose of pre-testing of interview schedule was to know whether the questions included in the questionnaire were suitable to achieve the goal in terms of understandability of the respondents. Pre-testing was therefore done with five farmers; however, the data was not incorporated in the analysis of this study. Before initiating this study each farmer was explained properly about the purpose of the study Based on the experience gained, the ambiguity of words and language were modified and corrected to the extent possible and made suitable in the final format of the interview schedule

2.5 Collection of Data

Data was collected during the month of November and December of year 1999; the respondents were interviewed at their home or at community places or at their farms. Before initiating the interview, the objectives of the study were explained to the respondents, thereby enabling them to get a wholehearted response and correct information from the interview The questions from the schedule were asked one by one and their response were recorded on the spot. Every possible care was taken to maintain congenial atmosphere for getting unbiased answers from the respondents

2.6. Selection of the Variables

The variables under study were selected on the basis of extensive review of literature on the subject, and by consultation with experts. Only those variables, which were found most relevant to the present investigation, were finally selected for study.

a) Personal Characteristics

1. Age
2. Education

b). Social Characteristics

3 Social participation
4. Extension contact

c). Economic Characteristics

5. Size of land holding
6. Area under paddy crop

d). Psychological Characteristics

7. Scientific orientation

8. Awareness about IPM

9. Adoption of IPM

2.7. Measurement of the Variables

The personal, social, economic and psychological characteristics were selected to describe the listed parameters. They were grouped into various categories on the basis of information available on age, education, social participation, land holding, paddy area, and productivity data as under.

2.7.1. Persona charecterstic

1. Age

It refers to chronological age of the respondents at the time of interview, which was recorded and categories into three groups as under.

A Young age group (up to 30 years)

B Middle age group (31 to 50 years)

C Old age group (above 50 years)

2. Education

It refers to formal education obtained by the respondent in terms of their level of education. The respondents were classified into four groups according to their educational level and measured score assigned actual possessed against their qualification The respondents, who can read and write have been assigned one score.

Educational Level		Score
a.	Illiterate	0
b.	Primary (up to 7th std.)	1 to 7
c.	Secondary (8 to 12th std.)	8 to 12
d.	College and above (above 12th)	above 12th

2.7.2. Social Participation

3. Membership in organization

Information regarding membership in the formal organization was collected and categorized into four groups and measured with score assigned as per scale developed by Pareek and Trivedi (1965)

	Social Participation	Score
a.	No membership	0
b.	Membership in one organization	1
c.	Membership in more than one organization	2
d.	Position holding in any organization	3

4. Extension Contact

Extension Worker	Name		Head quarter Yes/No	Number of Time Contact		
	Don't Know	Know		Fort-night	Monthly	Occasional
Score	0	2	1/0	3	2	1
VLW						
Agri. Ext. Office						
Asst. Dire. Agri. Ext.						
Dy. Director of Agri.. Ext.						
University Scientists						

The pooled score expressed the extent of contact of respondents with extension agency. The respondents were grouped into three categories on the basis of their mean and standard deviation as under

Low extension contact : $< X - S.D$

Medium . $X \pm S D$

High : $> X + S.D$

2.7.3. Economic characteristics

5. Size of Land Holding

The actual land holding possessed by the cultivators in hectare was considered for measuring this variable and on the basis of their land holding, were categorized as follows·

Up to 1.0 hectare (Marginal Farmers)

1.01 to 2 hectares (Small farmers)

Above 2 hectare (big farmers)

6. Area Under Paddy Crop

The actual area under paddy crop out of total land holding was considered and paddy growers were categorized as follows

Up to 1 0 hectares

1.01 to 2.00 hectare

Above 2.00 hectares

7. Productivity

The respondents were asked about the total production of paddy crop. The total production was recorded in kilograms and same was worked out as per hectare considering the area under paddy crop. The respondents were grouped into three categories on the basis of their mean and standard deviation.

Low yield : < X - S.D

Medium yield : X ± S.D

High yield : > X + S.D

2.7.4. Psychological characteristic

8. Scientific Orientation

It was measured with the help of a scale developed by the Supe (1969) with due modifications. The scale consisted of six statements. The responses of the farmers were obtained against their agreement or disagreement with the statement. Five point continue ranging from strongly agree to strongly disagree. The positive and negative statements were scored as follow:

Statement	Strongly agree	Agree	Unclear	Disagree	Strongly disagree
Positive	5	4	3	2	1
Negative	1	2	3	4	5

The scientific orientation score of an individual respondent was the sum of the total score of all the statements included in the scale. Categories on the basis of mean and standard deviation are as follow.

Low scientific orientation : < X - S.D

Medium scientific orientation : X ± S.D

High scientific orientation : > X + S.D

9. Awareness about IPM program

To measure the awareness of respondent about IPM program, a few questions were developed. The scoring system followed `0' and `I' for incorrect and correct answers respectively. Awareness index was calculated with the help of following formula.

$$AI = \frac{X1 + X2 + \text{- - - - - - - - - } + Xn}{N} \times 100$$

Where,

AI = Awareness Index

X1 + X2 + - - - - - - - - + Xn = Total number of correct answer

N = Total number of items in the test

The respondent were grouped into three levels of awareness by using mean and standard deviation

Low awareness : < X - S.D

Medium awareness : X ± S.D

High awareness : > X + S.D

10. Measurement of Knowledge

To measure the knowledge of respondents about the recommended IPM strategy, a teacher made scale based on scale developed by Jha and

Singh (1970) was used in the study The knowledge index was calculated for each respondent with the help of formula given below

$$KI = \frac{X1 + X2 + \text{- - - - - - - - } + Xn}{N} \times 100$$

Where,

KI = Knowledge Index

X1 + X2 + - - - - - - - - + Xn =Total number of correct answer

N = Total number of items in the test

The respondents were grouped into three levels of knowledge by using mean and standard deviation

Low level of knowledge : < X - S.D

Medium level of knowledge X ± S D

High level of knowledge > X ± S D

11. Measurement of Extent of Adoption

The information regarding the extent of adoption of each of the selected practices and potentiality of its adoption was collected The adoption quotient developed by Chattopadhyay (1974) was used with slight modification. The adoption quotient of each respondent for each of the selected practices was worked out with the help of following formula.

$$AQ = \frac{\frac{e_1}{p_1}\sum W_1 + \frac{e_2}{p_2}\sum W_2 + \text{----} + \frac{e_n}{p_n}\sum W_3}{W \times N} \times 100$$

Where,

A.Q = Adoption quotient

e_1, e_2,----, e_3 = Extent of adoption of score obtained by the respondents for particular practices (viz., for not adopted, below recommendation, above recommendation and as per recommendation 0, 1, 2 and 3 score were given respectively)

p_1, p_2,----, p_3 = Potential capacity of respondent in terms of score obtained for the particular practices.

N = Number of year for which adoption quotient is calculated.

The weightage of the particular practice was determined by seeking the opinion of 30 experts. The experts were asked to give their opinion in the form of weightage of each practice from 100 marks considering the existing technologies and its importance in IPM strategy of paddy crop The weightage of particular practice was collected and calculated with the help of arithmetic mean and round of nearest integral figure. Hence these figures show the actual weightage of particular practices in percent as under (Appendix 1.2).

3. RESULTS AND DISCUSSION

The data for present investigation was collected through interview schedule from the paddy growers in light of the objective of the study. The collected data were processed for statistical analysis. The information collected were classified, tabulated, analyzed and presented as per specific purpose of the study

3.1. Personal, Social, Economic and Psychological Characteristic of the Farmers

By modifying the innovative farming practices or the pattern of pest control can reduce the amount of pesticide load in the environment The adoption of an agricultural innovation is viewed as a complex process, which is influenced by various personal, social, economic and psychological characteristics of the farmer like education, land holding, knowledge etc. In this investigation such characteristics were studied and results obtained are presented as under.

3.1.1. Personal Characteristics

1. Age

Age is the factor, which may have some influence on taking the decision for farm operation. The data in this regard is presented in Table 1 1 It refers that majority (60 %) of paddy growers were in the age group of 31 to 50 years followed by 17% of farmers in the age group of about 50 years whereas only 7% paddy growers were in the age group up to 30 years. The maximum amount of pesticide was utilized by the middle age group (2526 g/ha) followed by the young age group (1504 h/ha).

2. Education

Education plays an important role in understanding and adapting to new/ innovative methods of farming. To understand the influence of education, paddy growers were classified into four categories. The data presented in Table 1.2 revealed that majority of the paddy grower having secondary level of education (55.00 %), followed by 26.67 % of paddy growers, which were in group of primary level of education. Data further revealed that 18.33% of the paddy growers were having college level of education while

Table 1.1: Distribution of respondents according to their age (n = 60)

Age group (Years)	Number	Percentage	Pesticide used (g/ha)
Up to 30	7	11.67	1504 ± 42.07
31 to 50	36	60.00	2526 ± 30 12
More than 50	17	28.3	512 ± 10 23

Table 1 2: Distribution of respondents according to their level of education (n = 60)

Category	Number	Percentage	Pesticide used (g/ha)
Illiterate	0.00	0.00	-
Primary level	16	26.67	1004 ± 72.05
Secondary level	33	55.00	2367 ± 55 32
College level	11	18 33	1454 ± 80.00

no one was illiterate in respondents. Pesticide utilization was higher by the farmers having secondary level of education as compared to farmers from the rest-identified categories. It was 2367 g/ha.

The pesticide utilization was much higher by the group of farmers having middle level of education and age. Also, nearly 60 % of cultivators are from these categories, which indicate the magnitude of the problem of over use of the pesticide. The age indirectly reflects the year of farming experience and education reflects their ability to understand and accesses the different farming technology. Here, farmers from higher age and education category shown less interest toward the pesticide might be their knowledge about the pesticides and pest control practices is sound so they have managed the pest with little amount of pesticide.

3.1.2. Social Characteristics

3. Membership in organization

The paddy growers were asked about their enrollment of membership in different formal village organizations and holding positions. The data presented in Table 1.3 shows that majority of paddy growers (i.e. 63.33%) were members of one or more organization and 16.67 % of them were holding position in various organizations. Pesticide utilization was higher by the farmer, which were having the membership of one or more organizations.

4. Extension Contact

The distribution of paddy growers according to their extension contact is presented in Table 1.4. The data presented shows that majority of the farmers had medium level of extension contact (i.e. 80.00%), followed by 16.67% paddy grower having high level of extension contact. The amount

Table 1.3: Distribution of respondents according to their degree of social participation (n = 60).

Degree of social participation	Number	Percentage	Pesticide used (g/ha)
No membership	12	20.00	904 ± 60 35
Membership in 1 organization	17	28.33	2272 ± 62 15
Membership in >2 organization	21	35.00	2175 ± 90.12
Holding position	10	16.67	1502 ± 112.01

Table 1.4: Distribution of respondents according to their level of extension contact (n = 60)

Category	Number	Percentage	Pesticide used (g/ha)
Low	02	3 33	3125 ± 302 02
Medium	48	80.00	1917 ± 82 10
High	10	16 67	1502 ± 91 13

of pesticide utilization was higher in farmers having low level of extension contact, which was 3125 g/ha followed by 1917 g/ha in the medium level of extension contact.

The farmers from the category of membership in one or more organization utilized higher amount of pesticides. Because of their membership in various organizations (i.e. *Seva Sahkari Mandali,* Milk Co-operative Society), they are able to arrange required finance for the agricultural inputs, which has enabled them to use more pesticide compared to farmers from rest of the categories. On the other hand extension machinery provided right and regular guidance to the farming community. It was reflected by comparatively less amount of pesticide required by the farmers having high level of extension contact compared to other groups Those having low level of extension contact failed to perform the farm operation needed for combating pest and ultimately they became solely depended on the pesticides as guided by pesticide dealers, so pesticide utilization is higher in these groups.

3.1.3. Economic Characteristics

5. Size of Land Holding

The paddy growers, on the basis of their actual size of land holding were classified into three groups. The data presented in Table 1 5 reveal that majority (65.50%) of paddy growers were having their land holding above two ha, followed by 21.67% having their land holding 1.01 to 2 ha. The amount of pesticide utilization was higher by farmers having large land holding as compared to small and marginal farmers.

Table 1 5: Distribution of respondents according to their size of land holding (n = 60).

Category	Number	Percentage	Pesticide used (g/ha)
Marginal	8	13 33	928 ± 131.52
Small	13	21.67	14.02 ± 68 21
Big	39	65.50	2167 ± 30 22

6. Area Under Paddy Cultivation

Area under paddy crop has been considered as one of the variable of the study and may have some influence on knowledge and adoption of IPM strategy. The data presented in Table1.6 reveals that the 41 % farmers from the group of having land under paddy cultivation followed by one third with 1-2 ha and farmers one forth under paddy cultivation. Pesticide utilization was higher in the middle category of farmers having land under paddy cultivation (1.1 to 2 ha) compare to farmers of other categories.

7. Productivity

One of the important objectives of this study is to ascertain the impact of pesticide and adoption of IPM strategy in terms of yield difference between the farmers. The maximum pesticide utilization was higher by the farmers having low yield per hectare, followed by medium yield per hectare. Majority of farmers used comparatively lower percentage of pesticides and got higher yield of paddy (70.00%) per hectare (Table 1 7)

Economic characteristic of the farmers plays an important role in the decision of whether pesticides should be applied or not and what should be the quantity. Study indicates that farmers having large land holdings utilize more pesticides because they are able to arrange finance required for the pesticides. Middle group , who have more of land under paddy cultivation showed more interest towards pesticide utilization as they want their fullest yield out of their whatever land holdings to support themselves. However, pesticides do secure the production but do not improve the productivity. As illustrated in Table 1.7, the pesticide utilization although being less the productivity was not affected. This could also be due to the more curatives measures taken by the concerned farmers.

Table 1 6. Distribution of respondents according to their land under paddy cultivation (n = 60)

Category	Number	Percentage	Pesticide used (g/ha)
Up to 1 ha	15	25.00	1098 ± 100 18
1.01 to 2 ha	20	33.33	3216 ± 95.30
Above 2 ha	25	41.67	1175 ± 115 02

Table 1.7: Distribution of respondents according to productivity of land for paddy (n = 60).

Yield	Number	Percentage	Pesticide used (g/ha)
Low	3	5 00	4068 ± 213 20
Medium	42	70.00	1666 ± 81 17
High	15	25 00	1866 ± 110.00

3.1.4. Psychological Characteristic

The evaluation of psychological characteristics like scientific orientation, awareness about program and knowledge of the individual respondent were assessed.

8. Scientific Orientation

The data presented in Table 1.8 indicates that majority of the paddy growers were having medium level of scientific orientation while 15% had low level, of scientific orientation and only 5% of the paddy growers were having a high level of scientific orientation.

9. Awareness about IPM Program

The data presented in Table 1.9 reveals that awareness about IPM program amongst the paddy growers is very low, and 61.67% paddy growers fall in this low level category while 36% of the paddy growers were having a medium knowledge and only one percent belongs to high level of awareness category.

10. Knowledge

The data presented in Table 1.10 indicates that knowledge was very low among the large group of farmers (75%), only 13% of farmers having the medium level of knowledge and almost same percent (11%) were among group of higher knowledge

The major decision was influenced by the psychology of the individual. The individual farmers takes decision for their farm operation like choice of seeds, pesticides, operation timings etc. for higher yield. In the present study, such important characteristic of the farmers were identified. The results indicate that pesticide utilization was negatively related with

Table 1.8. Distribution of respondents according to their degree of scientific orientation (n = 60).

Category	Number	Percentage	Pesticide used (g/ha)
Low	7	15.00	2413 ± 72.16
Medium	48	80.00	1812 ± 55.55
High	3	5.00	2100 ± 152.28

Table 1 9 Distribution of respondents according to their awareness about IPM program (n = 60)

Category	Number	Percentage	Pesticide used (g/ha)
Low	37	61.67	2306 ± 25 31
Medium	22	36 67	1000 ± 51 20
High	1	1.66	846 ± 0.00

Table 1 10 Distribution of respondents according to their level of knowledge (n = 60)

Category	Number	Percentage	Pesticide used (g/ha)
Low	45	75.00	2872 ± 28.12
Medium	8	13.33	1815 ± 71.20
High	7	11.67	1217 ± 92.01

scientific orientation and the knowledge of the farmers. Farmers with higher-level knowledge do not prefer the overuse of pesticides. On the basis of this study it can be suggested that to reduce the overuse of pesticide, the knowledge and the scientific fact about the pest control practices should be strengthen amongst the farming community.

11. Adoption of IPM

The adoption of the particular strategy, several factors influence on it, it may be positive, negative or neutral. So to check the relationship between personal, social, economic and psychological characteristics of paddy growers and their extent of adoption of IPM strategy were checked and correlation coefficient against each characteristics is added (Table 1.11). The result indicates that the education, social participation, area under paddy crop and productivity, scientific orientation and awareness about IPM were highly correlated with the extent of IPM strategy.

Reduction in the pesticides use can be achieved by adopting the IPM approach. The IPM policy, by reducing the exclusive reliance on chemical measures to combat pest, and enhance the profitability of the crop cultivation for the individual farmers. While at the same time it minimizes the hazards of the pesticides to the environment. However, to put IPM in practice, there are several limitations, first from the user groups, the adoption rate is very slow. Second from the inadequate resources. To overcome such problems, there is requirement to check the factors that influences the adoption rate Through the present study, it is well indicated that the level of education, extension contact, area under particular crop (crop of interest), productivity of the land, scientific orientation of the farmers and the awareness about IPM, showed a strong correlation with the adoption of the IPM. To increase the familiarity of the IPM, requires an

Table 1.11: Relationship between personal, social, economic and psychological characteristic of respondents and their extent of adoption of IPM strategy on paddy.

Sr. No.	Character	Correlation	Correlation coefficient
1	Personal characteristics		
	1. Age	NS	0 42
	2. Education	**	0 91
2	Social		
	3 Social participation	*	0 62
	4. Extension contact	**	0 87
3	Economic characteristics		
	5 Size of land holding	NS	0 38
	6 Area under paddy cultivation	**	0 72
	7. Productivity	**	0 89
4	Psychological characteristics	NS	
	8 Scientific orientation	**	0 77
	9. Awareness	**	0.81
	10 Knowledge	*	0 65

NS = Non significant, * Significant at < p = 0 01, * *Significant at < p = 0 001

extensive responsibility of the extension agencies, which should aid the farmers with necessary information at the appropriate time. At the same time, special agricultural policies required to diversify the cropping pattern in place of today' s export oriented policies. The overall change in the agricultural policies structure and the mental make up of the farmer for utilization of the agricultural inputs will help in the rise in sustainable crop production.

Today, the pest control practices for controlling the pest are mainly to save crop and secure the yield. In other words pesticides are used to reduce risk of yield loss due to pest attack. While other agricultural inputs are use to increase the productivity In comparison to other inputs, pesticides are unique in nature by their role in the crop production. But increasing trend of chemical control of pest had created havoc and hazard to environment The amount of pesticide to control the pest is increasing day by day and is a serious concern for the environment. From the above study it is clear that maximum input of chemical is by the certain group of the farmers which could be due to lack of proper knowledge about pesticides

The awareness about IPM in the farmers should be emphasized The selection of the trainee should be more from farmers having small land holdings. Very small group of farmers are from higher education and they are aware of pesticide use and its impact. It is the mass, which should be made knowledgeable to save our crops from pest by using appropriate, and minimum dose of pesticides and thus the environment and wildlife depending on agriculture could be saved from adverse effects of hazardous pesticides used otherwise.