



INDIGENOUS TECHNICAL KNOWLEDGE (ITK) IN ORGANIC PEST MANAGEMENT FOR SUSTAINABLE AGRICULTURE DEVELOPMENT.

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Abstract: This study investigates pest management practices among farmers, focusing on their knowledge of organic pest management. Organic farming is crucial for sustainable development in agriculture. The objectives of study are to study the socio – economic profile of selected area and to assess the knowledge level of farmers on organic pest management. A structured questionnaire was used to collect data from 50 respondents addressing socio-demographics and knowledge of farmers in Perinaickenpalayam village, Naickenpalayam Block, Coimbatore District. The findings indicate that there is no knowledge of organic pest management techniques, with the Chi square analysis supporting this observation and the socio-demographic profile with Anova ($p < .05$) and t-test (1.078) analysis supporting this observation, revealing no significant differences in the knowledge and socio-demographic profile of the respondents. Most of the farmers are from the middle age group, and all the farmers are married. More than 80% are Hindu. Through organic farming, farmers earn ten to fifteen thousand rupees per month. Fifty percent of farmers said primary goal of farming is to reduce pesticide, use and minimize harm to the environment. Seventy four percent said Common method of organic pest control is crop rotation. This study holds significance in addressing the prevailing lack of awareness about organic pest management among farmers, highlighting the need for educational initiatives to promote organic farming and training programs.

Index Terms - Organic Pest management, knowledge, Farmers, Practices, Educational initiatives, sustainable development, Educational Intervention.

I. INTRODUCTION

India is a land of Agriculture. Overall, 58% of people live hood is based on agriculture. people directly depend on farming the agrarian play's vital role in nation's economy. Farmers comes from rural background. they depend on agriculture. agriculture contributes 17% of GDP in India economy. India is the largest producers of spices, pulses and milk in the world. (Kalkura. P 2021).

Organic farming management relies on developing biological diversity in the field to disrupt habitat for pest organisms and the purposeful maintenance and replenishment of soil fertility. Organic farmers are not allowed to use synthetic pesticides or fertilizers.

Organic farming is a crop system that emphasizes environmental protection and natural farming techniques. It concerns the end product and the entire system used to produce and deliver the agricultural product. To this end, the entire farm cycle excludes using artificial products such as genetically modified organisms (GMOs) and specific external agricultural inputs, such as pesticides and synthetic fertilizers, from production and

processing to handling and delivery. Organic farmers rely instead on natural farming methods and modern scientific ecological knowledge to maximize the ecosystem's long-term health and productivity, enhance the quality of the products, and protect the environment. Proponents of organic methods believe it is a more sustainable and less damaging environmental approach. Source:(TNAU Agri portal).

The study has been carried out with following objectives

- To study the socio – economic profile of selected area.
- To assess the knowledge level of farmers on organic pest.

II. RESEARCH METHODOLOGY

The methodology is the systematic and theoretical analysis of the methods applied to a field of study. The methodology adopted for the present study is entitled “Indigenous technical knowledge (ITK) in organic pest management for sustainable agriculture development” among selected farmers in the Perianaickenpalayam village of Coimbatore, Tamil Nadu. The sample size of the present study was 50 farmers. The interview schedule includes questions related to the demographic profile and knowledge level of farmers in organic pest management. The researcher used and filled in an interview schedule through face-to-face interviews during data collection. A list of variables was prepared based on the objectives of the study. Following data collection, the information was processed, tabulated, and statistically evaluated in line with the study’s objectives. Statistical techniques and tests are used for analysing the data.

III. RESULTS AND DISCUSSION

I Socio Economic Profile of the Respondents

TABLE -I Demographic Profile of the Respondents

Particular	Categories	Percentage (%)
Gender	Male	86
	Female	14
Age	26-35	8
	36-50	58
	>51	34
Marital Status	Married	100
Religion	Christian	6
	Hindu	88
	Muslim	6
Occupation	Own Farming	100
Caste	SC	12
	ST	22
	BC	28
	OC	38
Education Qualification	Secondary	22
	Higher Secondary	24
	Graduate	54
Income of Very Month	5000-10,000	8
	10,000- 15,000	92
Mobiles of family Members	1	12
	2-3	28
	3-4	60

The above table shows the result of gender, the majority of the respondents are male with 86 percent. And 14 percent are female are selected from the Perianaickenpalayam village of Coimbatore District, Tamil Nadu.

Regarding the age wise distribution, majority fifty eight percent of the respondents were between the age 36-50 years of age, least eight percent with 26-35 years of age, and thirty four percent of the respondents are above 51 years.

In the category of religion, Hindu were dominant with eighty eight percent followed by Christian six percent of the respondents and six percent of respondents are from Muslim. All the respondents have their own farming land.

Regrading category of caste a maximum of thirty eight percent of the respondents are from General category and twenty eight percent of the respondents are BC caste. And twenty two percent respondents are from schedule tribe category and least twelve percent of respondents are schedule category. No one of them are form the other than that are mentioned in the interview schedule.

In the category of marital status hundred percent of respondents are married in the Perianaickenpalayam village. Who are doing organic farming.

In the category of Educational Qualification fifty four percent of the respondents are graduate and twenty four percent of respondents has higher secondary education and followed by twenty two percent have secondary education.

As per monthly income ninety percent of respondents earn ten to fifteen thousand per month and eight percent of people earn five thousand to ten thousand rupees per month.

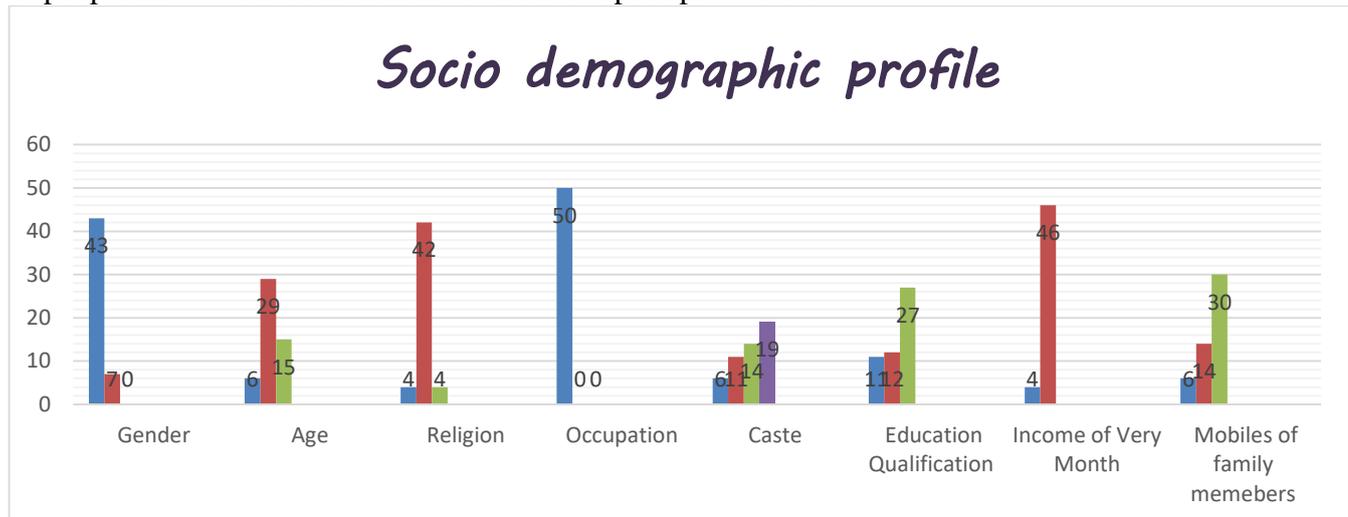


FIG: I Socio Demo Graphic Profile

TABLE – II KNOWLEDGE ON ORGANIC PEST MANAGEMENT

Variable	Categories	Frequency	Percentage
primary goal of organic pest management	To eliminate all pests	10	20
	To reduce pesticide, use and minimize harm to the environment	25	50
	To use the most potent chemical pesticides	14	28
	To maximize crop yield cost	1	2
Common method of organic pest control	Synthetic chemical pesticides	1	2
	Crop rotation	37	74
	Genetic modification of crops	8	16
	Irrigation	4	8
Beneficial insects in organic farming	Insects that harm crops	4	8
	Insects that are not relevant to farming	14	28
	Insects that help control pest population	29	58
	Insects that are resistant to pesticides	3	6
	To attract pollinators	2	4

Trap crops used for in organic farming	To be lure and trap pests away from the main crop	22	44
	To provide shade for crops	21	42
	To increase soil fertility	5	10
Not a sustainable practice in organic pest management	Hand picking and removing pest	7	14
	Using natural predators to control pests' populations	30	60
	Applying synthetic chemical pesticides	9	18
	Using neem oil as a natural pesticide	4	8

From above table shows fifty percent of respondents twenty-five people stated that primary goal of organic pest management to reduce pesticide, use and minimize harm to the environment and 20 percent stated that to eliminate all pests and one percent said to maximize crop yield cost.

Regarding common method of organic pest control thirty-seven respondents with seventy-four percentage said that crop rotation is the common method of organic pest control and eight percent of respondents said irrigation and insects that harm is the common method of pest control method.

Twenty ninety percent of respondents stated that insects that are not relevant to farming. Twenty eight percent of respondents said that insects that are not relevant for farming and least respondents with six percent of respondents said insects that are resistant to pesticides are beneficial insects in organic farming.

Regrading forty four percent said lure and trap pests away from the main crop in organic farming and twenty-one respondents with forty two percent said provide shade for crops and four percent of respondents said to attract pollinators to trap crops used for in organic farming.

sixty percent of respondents using natural predators to control pests' population and eighteen percent of people said applying synthetic chemical pesticides and eight percent of respondents are using neem oil as a natural pesticide they are not sustainable practice in organic pest management.

TABLE IIA. CORREALTION TEST ON KNOWLEDGE ON ORGANIC PEST MANAGEMENT

Aspects	P Value					
	Age (In Years)	Gender	Religio n	Caste Type	Educat ion	Income
primary goal of organic pest management	.170	-.066	-.135	-.275	-.264	-.052
	.237	.651	.349	.053	.063	.720
Common method of organic pest control	.295*	.210	-.105	.029	-.045	-.198
	.038	.143	.469	.841	.754	.169
Beneficial insects in organic farming	.019	-.027	.139	-.068	-.032	-.259
	.897	.851	.335	.640	.828	.070
Trap crops used for in organic farming	.035	.234	-.138	.142	.025	-.069
	.811	.102	.339	.326	.866	.633

Not a sustainable practice in organic pest management	.261 .068	.205 .153	.124 .392	-.009 .953	.105 .469	.058 .687
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The above table shows the correlation and significance values of Knowledge and socio-demographic profile on organic pest management in farming. The result shows a significant correlation between Knowledge and socio-demographic profile age with the variable standard method of organic pest control, which has significance at 0.05 level at one per cent and five per cent.

The correlation between farmers' Knowledge of organic pest management and socio-demographic profile is insignificant with Gender, Education, Caste and the farmers.

TABLE – III KNOWLEDGE ON ORGANIC PEST MANAGEMENT IN FARMING.

Variable	Categories	Frequency	Percentage
Role of neem in organic pest control	It is a synthetic chemical pesticide	4	8
	It is used as a natural pesticide to deter and kill pests	24	48
	It is a type of genetically modified crop	20	40
Example of cultural control in organic pest management	Applying a chemical pesticide	4	8
	Planting diseases – resistant crops varieties	28	56
	Using pheromone traps	8	16
	Removing plant debris and weeds from the field	10	20
Purpose of introducing predator insects in organic pest control	To provide food for pests	7	14
	To increase pest populations	17	34
	To eat and control pest population	26	52
	To pollinate crops	-	-
Organic pest control method involves using a fine mesh or netting to physically block pests from reaching crops	Crop rotation	21	42
	Biological control	14	28
	Pest exclusion	11	22
	Companion planting	4	8
Primary advantage of using control method in organic farming	Minimal cost	5	10
	Rapid pest eradication	20	40
	Minimal environmental impact	22	44
	Long – lasting protection	3	6

Forty eight percent said they used as a natural pesticide to deter and kill pests and twenty respondents with forty percent stated neem in organic pest control is a type of genetically modified crop and four percent said to increase crop yield neem is used in organic pest.

Regarding of cultural control in organic pest management fifty six percent said planting diseases resistant crop varieties and sixteen percent stated with using pheromone traps are example of cultural control and eight percent said applying chemical pesticides is example of cultural control in organic pest management.

From the above table fifty two percent said to eat and control pest population is purpose of introducing predator insects in organic pest control and thirty four percent of respondents stated to increase pest population is purpose of introducing predator insects in organic pest management.

The forty eight percent said crop rotation is the best organic pest control method and fourteen respondents with twenty-eight said biological control and twenty two percent said pest exclusion is best method and eight percent said companion planting is Organic pest control method involves using a fine mesh or netting to physically block pests from reaching crops.

Regarding Primary advantage of using control method in organic farming and forty four percent minimal environmental impact is primary advantage and six percent of respondents said primary advantage of using control method in organic farming.

TABLE III.A CORREALTION TEST ON KNOWLEDGE ON ORGANIC PEST MANAGEMENT

Aspects	P Value					
	Age (In Years)	Gender	Religion	Caste Type	Education	Income
Role of neem in organic pest control	.019 .898	.100 .490	.217 .131	-.095 .513	.057 .694	-.043 .769
Example of cultural control in organic pest management	.238 .095	-.151 .295	.111 .442	.170 .238	.091 .530	-.252 .077
Purpose of introducing predator insects in organic pest control	.205 .153	-.053 .715	.139 .335	.095 .513	.100 .488	-.049 .734
Organic pest control method involves using a fine mesh or netting to physically block pests from reaching crops	.274 .054	-.337* .017	-.051 .725	.036 .802	-.085 .559	.139 .337
Primary advantage of using control method in organic farming	.292* .039	.060 .681	.066 .647	.047 .745	.119 .410	-.211 .141

Table III.A explains the knowledge level of the farmers in organic pest management. There exists a noteworthy correlation between the age and the variable primary advantage of using the control method in organic farming with 0.05 level at one per cent and five per cent levels.

The variable organic pest control method involves using a fine mesh or netting to physically block pests from reaching crops, which is significant with gender $-.337^*$ correlation significance at 0.005 level at one percent and five percent level.

TABLE – IV KNOWLEDGE ON ORGANIC PEST MANAGEMENT

Variable	Categories	Frequency	Percentage
The main principle behind using pheromone traps in organic pest management	To attracts pests to the trap's ad kill them	19	38
	To repel pests away from the crops	18	36
	To sterilize pests in the vicinity	10	20
	To increase crop yield	3	6
“Integrated pest management “IPM refer to	Using only chemical pesticides	7	14
	Combining organic and synthetic pesticides for better results	20	40
	Using a variety of techniques to manage pest while minimizing environmental impact	21	42
	Eliminating all pests from the farm	2	4
Purpose of applying diatomaceous earth in organic pest control	To provide nutrients to the soil	5	10
	To act as a physical barrier that damages pests' exoskeletons	21	42
	To improve crop flavor	19	38
	To deter birds form feeding on crops	4	8
NOT a common natural predator used in biological pest control	Lady bugs	3	6
	Praying mantises	29	58
	Synthetic pesticides	12	24
	Nematodes	6	12
Primary benefit of using cover crops in organic farming	They provide shade to crops	2	4
	They are the main crop harvested for sale	16	32
	They improve soil fertility and suppress weeds	29	58
	They attract more pests to the field	3	6

The above table shows thirty eight percent of respondents said to attract pest and kill them and thirty percent said that to repel pests away from the crops and six percent to increase crop production is the main principle behind using pheromone traps in organic pest management.

The forty percent of respondents said that using a variety of techniques to manage pest while minimizing environmental impact and forty percent of respondents stated that combining organic and synthetic pesticides for better results. And four percent of respondents feel that Eliminating all pests from the farm refers to Integrated pest management.

Regarding Purpose of applying diatomaceous earth in organic pest control forty percent said that to act as a physical barrier that damages pests' exoskeletons and eight percent of respondents stated to deter birds form feeding on crops. Thirty percent said to improve crop flavor.

Fifty eight percent of respondents from above table clear shows twenty-nine said praying manties is not common natural predator used in biological pest control. Twelve percent said nematodes is natural predator and twenty percent of respondents said that syntenic pesticides are not a common natural predator used in biological pest control.

Fifty eight percent of the respondents stated Primary benefit of using cover crops in organic farming is improve soil fertility and suppress weeds and thirty-two percentage sated that they are the main crop harvested for sale.

TABLE- IV A. CORREALTION TEST ON KNOWLEDGE ON ORGANIC PEST MANAGEMENT

Aspects	P Value					
	Age (In Years)	Gender	Religion	Caste Type	Education	Income
The main principle behind using pheromone traps in organic pest management	.055 .706	.027 .853	-.055 .703	-.347* .014	-.028 .845	-.264 .064
“Integrated pest management “IPM refer to	.324* .022-	-.189 .189	.000 1.000	-.014 .923	-.089 .541	-.150 .300
Purpose of applying diatomaceous earth in organic pest control	.208 .147	.142 .325	-.321 .023	-.006 .967	.030 .834	-.023 .876
NOT a common natural predator used in biological pest control	.050 .728	.004 .976	.000 1.000	-.008 .956	.295* .038	-.125 .386
Primary benefit of using cover crops in organic farming	.102 .483	-.232 .105	.154 .287	-.011 .941	-.097 .503	.072 .617

It is evident from table shows that there is a strong relation between Age and integrated pest management, and there is a strong relation between cate type and the main principle behind using pheromone traps in organic pest management. There is a significant correlation between socio-demographic profile and knowledge in education and the statement, not a common natural predator used in biological pest control with .295* correlation significance at 0.005 level at one per cent and five per cent levels.

TABLE – V KNOWLEDGE ON ORGANIC PEST MANAGEMENT

Variable	Categories	Frequency	Percentage
Pest control method involves introducing specific nematode species into the soil – dwelling pest	Companion planting	9	18
	Biological control	20	40
	Soil sterilization	19	38
	Fertilizer application	3	6
Practice of rotating crops to disrupt the life cycles of pests and diseases	Pesticide application	2	4
	Mono cropping	26	52
	Crop rotation	16	32
	Genetic modification	3	6
Primary purpose of using organic pesticides in farming	To eradicate all pests	4	8
	To reduce pesticide costs	16	32
	To minimize harm to the environment and human health	22	44
	To increase crop yield without any constraints	5	10
key characteristic of organic pesticides	They are synthetic chemicals	4	8
	They have no impact on the environment	17	34
	They are only effective against a single pest species	24	48
	They are derived from natural sources	7	14
Role of organic pesticides in integrated pest management (IPM)	To be used in combination with synthetic pesticides	5	10
	To be the sole method of pest control	24	48
	To be avoided entirely in IPM practices	16	32
	To be a primary tool for pest prevention	5	10

Forty percent of respondents said pest control method involves introducing specific nematode species into the soil – dwelling pest and thirty-eight said biological control. Six percent stage said fertilization is pest control method in nematode species.

The regarding practice of rotating crops to disrupt the life cycles of pests and diseases fifty two percent mono cropping and thirty two percent said crop rotation and six percent said that Is best for practicing of rotating crop to disrupt the life cycle of pest and diseases.

Forty eight percent respondents stated that they are only effective against a single pest species are key characteristic of organic pesticides Thirty four percent said there is no impact on environment. Fourteen percent said they are derived from natural sources.

Forty eight percent of respondents said sole method of pest control is role of organic pesticides in integrated pest management (IPM). And thirty two percent said avoid IPM practices and ten percent said to be a primary tool for pest prevention.

TABLE V A. CORREALTION TEST ON KNOWLEDGE ON ORGANIC PEST MANAGEMENT

Aspects	P Value					
	Age (In Years)	Gender	Religion	Caste Type	Education	Income
Pest control method involves introducing specific nematode species into the soil – dwelling pest	.205	-.146	-.060	-.135	.065	.284*
	.153	.313	.678	.351	.652	.046
Practice of rotating crops to disrupt the life cycles of pests and diseases	.200	-.055	-.154	.049	.092	-.041
	.163	.705	.287	.738	.523	.779
Primary purpose of using organic pesticides in farming	.017	-.025	.065	-.213	-.061	.046
	.904	.861	.655	.137	.672	.752
key characteristic of organic pesticides	.323*	-.245	.061	.013	.023	-.130
	.022	.086	.674	.927	.875	.370
Role of organic pesticides in integrated pest management (IPM)	-.191	-.211	.062	-.104	-.084	.246
	.183	.141	.667	.473	.564	.085

The knowledge level of the farmers in organic pest management clearly shows significance between age and statement with a critical characteristic of organic pesticides with .323* correlation significance at 0.005 level at one per cent and five per cent level. Income has .284* correlation significance with the Pest control method, which involves introducing specific nematode species into the soil–dwelling pest.

TABLE – VI KNOWLEDGE ON ORGANIC PEST MANAGEMENT

Variable	Categories	Frequency	Percentage
Example of an organic pesticide commonly used in farming	Glyphosate	5	10
	DDT	28	56
	Pyrethrin	15	30
	Atrazine	2	4
Organic pesticides typically work to control pests	By altering the genetics of pests	4	8
	By physically repelling pests from	12	24
	By interfering with pest's metabolic processes or nervous system	30	60
	By providing food for pests to distract them from crops	4	8
Farmers consider when using organic pesticides to minimize to harm to beneficial insects	Organic pesticides do not harm beneficial insects	6	12
	Only apply organic pesticides during the day	21	42
	Choose pesticides that are specific to the target pest	19	38
	Avoid using organic pesticides altogether	3	6
Primary benefit of using organic farming	They are less expensive than synthetic pesticides	12	24
	They align with organic farming principles and regulations	19	38
	They are more potent than synthetic pesticides	16	32
Organic pesticides be stored to maintain their effectiveness	In direct sunlight	4	6
	In a cool, dry place away from children and pets	19	38
	In the field for easy access during spraying	22	44
	In the refrigerator	5	10

Fifty-six of respondents said DDT is the example of an organic pesticide commonly used in farming. Thirty percentage stated Pyrethrin and remaining ten stated Glyphosate is example of an organic pesticide commonly used in farming and four percent of respondents said Atrazine respectively.

Organic pesticides typically work to control pests, the majority of respondents sixty percent marked by interfering with pest's metabolic processes or nervous system. And eight percent respondents said by providing food for pests to distract them from crops and by altering the genetics of pests.

The majority of respondents forty percent said only apply organic pesticides during the day. And twelve percent said organic pesticides do not harm beneficial insects and forty two percent stated that choose pesticides that are specific to the target pest.

The majority of respondents with thirty eight percent said that They align with organic farming principles and regulations and thirty two percent said they are more potent than synthetic pesticides and twenty four percent stated that they are less expensive than synthetic pesticides. They are primary benefit of using organic farming. Regarding Organic pesticides be stored to maintain their effectiveness forty-four percentage said in the field for easy access during spraying organic pest and thirty eight percent said in a cool, dry place away from children and pets. Ten percent in the refrigerator and six percent said direct sunlight is maintain effectiveness in organic pesticides for filed.

TABLE VI. A CORREALTION TEST ON KNOWLEDGE ON ORGANIC PEST MANAGEMENT

Aspects	P Value					
	Age (In Years)	Gender	Religion	Caste Type	Education	Income
Example of an organic pesticide commonly used in farming	-.093 .521	-.060 .680	.068 .638	.151 .297	-.164 .255	-.129 .373
Organic pesticides typically work to control pests	-.111 .442	-.068 .641	-.125 .388	.257 .072	-.022 .879	-.029 .839
Farmers consider when using organic pesticides to minimize to harm to beneficial insects	-.089 .538	-.086 .554	.100 .487	-.067 .645	.391** .005	.041 .775
Primary benefit of using organic farming	-.084 .561	-.068 .638	.064 .658	.031 .832	.128 .376	.401** .004

The socio-demographic profile of education and knowledge level of farmers in organic pest management correlates with what farmers consider when using organic pesticides to minimize harm to beneficial insects with 0.01 per cent levels at one per cent and five per cent levels.

The Primary benefit of using organic farming correlates with a .401** level at one per cent and a five per cent level of education.

IV. CONCLUSION

From the study "Indigenous technical knowledge (ITK) in organic pest management for sustainable agriculture development". It can be concluded that the farmers need more knowledge of organic pest management. To evaluate farmers' knowledge of organic pest management, The researcher conducted ANOVA, T-test and correlation. Organic pest management offers a sustainable and environmentally friendly approach to controlling pests in agriculture.

The mostly grown crops are banayan, coconut and curry leaves in Perinaickenpalayam village. The findings indicate that training programs, government policies, and schemes are necessary to improve organic farming and new organic farming techniques. Most of the farmers are from the middle age group, and all the farmers are married. More than eighty per cent are Hindu. Through organic farming, farmers earn ten to fifteen thousand rupees per month. Organic pest management utilizes natural predators, crop rotation, and non-chemical methods. It promotes sustainable balance, and it helps in environmental conservation.

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