4

RESULTS AND DISCUSSION

The findings of the study **"Creating Awareness on Organic Waste Management Practices among Selected Rural Households"** are discussed and presented under the following headings:

A. **Household Survey**
B. **Impact of Awareness on Organic Waste Management for Organic Farming among Selected Frontline Farmers.**
C. **Impact of the Awareness on Organic Waste Management for Organic Farming among Selected Rural Households.**

A. Household Survey

Household surveys collect comprehensive and diverse socio-demographic data about the conditions under which people live- their welfare, demographic characteristics, and cultural factors that influence behaviour, as well as social and economic change. https://www.sogolytics.com (2024). Researchers administer questionnaires to a sample of households in a population. Their primary advantage lies in giving the interviewer considerable discretion over the information that respondents request. Thus, the investigator conducted a household survey to gather information on the demographic profile, crop production, productivity, challenges encountered, strategies to address these challenges, and organic waste management practices in the selected households.

The findings of the household survey are discussed under the following headings:

i. Demographic Profile of the Selected Households
ii. Agricultural Farming Practices in the Selected Households
iii. Organic Waste Management Practices in the Selected Households

i. Demographic Profile of the Selected Households

Demographics refer to the description or distribution of characteristics for a target audience, customer base, or population. Demographic data can help us understand communities in their current state, their past, and their future direction. It can be a powerful tool for tracking change over time and identifying a community's needs or strengths. Examine the family's age, marital status, type of family, educational qualification, occupation, and monthly income of the family in the demographic profile. This was done because it was expected that a variety of demographic factors would influence the respondents' choices. Table III explains the demographic profile of the selected households.The Department of Agriculture, Tamil Nadu (2021), categorized farmers into three types.

Marginal farmers - up to 2 ½ acres
Small farmers - 2 ½ to 5 acres.
Large farmers - above 5 acres

TABLE III

DEMOGRAPHIC PROFILE OF THE SELECTED HOUSEHOLDS

(N=450)

		Marginal(150)		**Small(150)**		**Large (150)**	
		N	**%**	**N**	**%**	**N**	**%**
Age (In Years)	Below 30	44	29	51	34	20	13
	30-40	41	27	47	31	42	28
	40-50	63	43	46	31	80	54
	50 and above	2	1	6	4	8	5
Marital Status	Married	102	68	76	51	83	55
	Unmarried	48	32	74	49	67	45
Type of Family	Joint family	99	66	77	51	96	64
	Nuclear family	51	34	73	49	54	36
Education	Primary	40	27	56	38	15	10
	Secondary	79	53	42	28	18	12
	High secondary	23	15	38	25	51	34
	Graduate	8	5	14	9	66	44

Occupation *	Agricultural	150	100	150	100	150	100
	Subsidiary occupation						
	Dairy	119	79	104	69	120	80
	Poultry	62	41	89	59	51	34
	Business Trade	6	4	18	12	41	27
Monthly income	Rs.10000 to Rs. 20000	24	16	39	26	0	0
	Rs.20001 to Rs.30000	121	81	45	30	2	1
	Above 30001	5	3	66	44	148	99

(Multiple Responses)*

The demographic profile of selected households, categorized as marginal, small, and large, reveals distinct characteristics. The majority of individuals fall within the 40-50 age range, with small households having a higher representation of individuals below 30. Individuals aged 50 and above account for one, four, and five percent, respectively, in these households.

The study reveals a high prevalence of married individuals in marginal, small, and large households, while unmarried individuals make up 32 percent 49 percent, and 45 percent, respectively. Family structure favours joint families, with 66 percent of marginal, 51 percent of small, and 64 percent of large in these categories, while nuclear families make up the remaining percentage.

Regarding educational status, in small households, primary education was more prevalent than in marginal households. Secondary and higher secondary education levels vary, while graduates make up five percent, nine percent, and 44 percent in marginal, small, and large households, respectively.

Agriculture was the primary occupation in all categories, accounting for 100 per percent of all occupations. However, dairy-related occupations were present in 79 percent of marginal households, 69 percent of small households, and 80 percent of large households. Poultry engagement was at 41 percent, 59 percent and 34 percent in these households. Business trade was identified as a minor occupation with variation.

The monthly income distribution shows income disparities among categories, with marginal households accounting for 81 percent in the range of Rs. 20001 to Rs. 30000/- and 44

per cent and 99 percent of small and large farmers coming under the income range of above Rs. 30,001/-

ii.Agricultural Farming Practices in the Selected Households

India possesses one of the world's largest arable land areas, with a net sown area of 140.1 million hectares. Agriculture and its related sectors remain the primary source of livelihood, engaging 54.6 percent of India's workforce, particularly in rural regions where around 70 percent of households depend on agriculture. Notably, 146 million farming families, predominantly small and marginal, with landholdings of 2 hectares or less, contribute to this sector (Sarkar et al., 2023). Therefore, the existing agricultural practices in the selected rural areas are essential for further improvement. The selected households' existing agricultural farming practices are discussed under the following heading:

a. Types of Land Holding
b. Types of Food Crops Cultivated
c. Frequency of Crop Cultivation
d. Types of Fertilizers Used for Cultivation
e. Average Fertilizer Used and its Cost per Cropping
f. Difficulties Faced during Cultivation
g. Common Insects and Pests Identified in the Field
h. Common Diseases Identified in the Field
i. Pesticides Used to Control Insects and Pests
j. Average Pesticides used and its Costs per Cropping
k. Problems Faced by Using Inorganic Fertilizers and Pesticides
l. Food grain Losses during Storage
m. Existing Organic Agricultural Practices in the Selected Households

a) Type of Land Holdings

The main types of soil in Sathyamangalam Block, Erode District, are red sandy soil, red loam, and laterite soil. The availability of water in the region determines the selection of crops to cultivate, more so than the soil type. The crop pattern varies from place to place depends on the soil type. Wet areas, dry areas, and semi-arid areas generally divide the land.

Table IV and Figure 3 presents the type of land owned by the selected households.

TABLE IV

TYPE OF LAND HOLDINGS BY THE SELECTED HOUSEHOLDS

(N=450)

Particulars	Marginal (150)		Small (150)		Large (150)	
	N	%	N	%	N	%
Dry land	63	42	47	31	44	29
Wet land	47	31	42	28	36	24
Semi- Arid	40	27	61	41	70	47

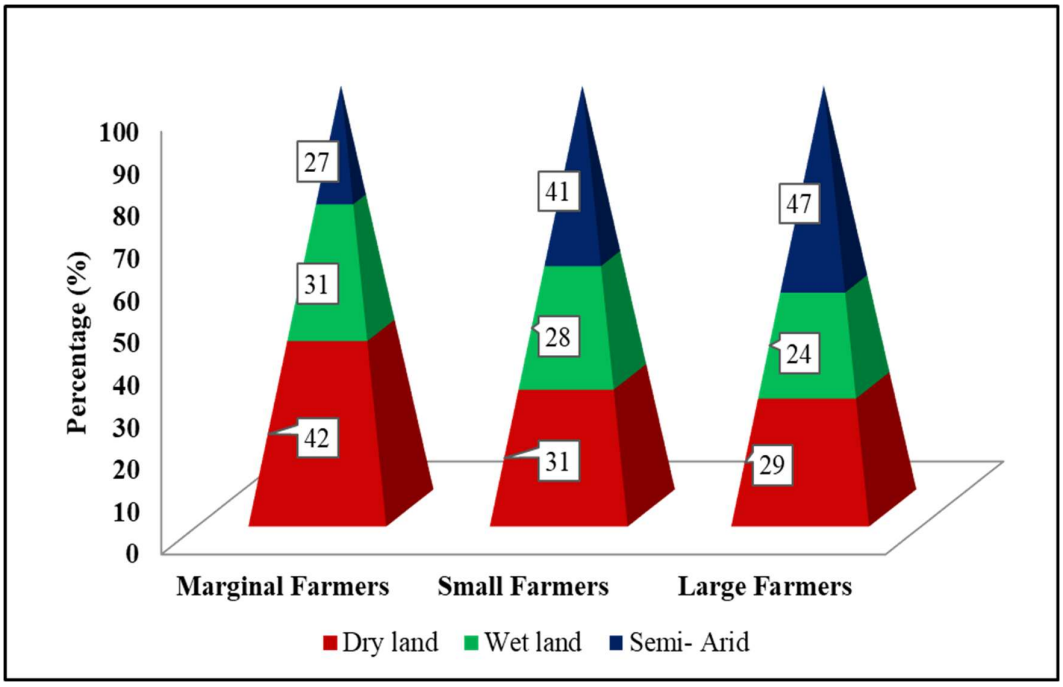


FIGURE 3
TYPE OF LAND HOLDING BY THE SELECTED HOUSEHOLDS

The agricultural landscape of households, categorized as marginal, small, and large, presents distinct patterns in land usage. In terms of land use, 31 percent of marginal farmers had wetlands, compared to 28 percent and 24 percent of small and large farmers, respectively. Forty-two percent of marginal farmers, 31 percent of small farmers, and 29 percent of large farmers owned dry land. Twenty-seven percent, 41 percent, and 47 percent of marginal, small, and large farmers, respectively, possessed semi-arid land. Small and large farmers owned more semi-arid land than marginal farmers, likely due to their greater access to borewell water.

The result from a similar study by Ibitoye and Stephen in 2015 in 'The influence of farm size, educational status, and income level on farmers' shows that adoption of maize varieties in Kogi State, Nigeria' showed that farm size of 3.0–5.0 hectares has the greatest influence on variety A (improved maize). Farmers operating above 5.0 hectares have more influence on variety B (Downy Mildew Resistant Variety), and those operating less than 3.0 hectares have more influence on variety C (local variety).

b) Types of Food Crops Cultivated

The cropping pattern refers to the relative area beneath each crop. Table V displays the types of food crops grown by the chosen households.

TABLE V

TYPE OF FOOD CROPS CULTIVATED BY THE SELECTED HOUSEHOLDS

(N=450)

Types of Crop Cultivated (in last 12months)						
Types of Food Crops*	**Marginal**		**Small**		**Large**	
	N	**%**	**N**	**%**	**N**	**%**
Cereals						
Paddy	65	43	104	49	58	39
Maize	83	55	48	32	70	46
Sorghum	18	12	28	19	22	15
Pulses						
Black gram	21	14	9	6	30	20
Green gram	5	3	36	24	26	17
Horse gram	27	18	30	20	18	12
Nuts and Oil seeds						
Sunflower	20	13	27	18	33	22
Gingelly (Sesame)	39	26	42	28	48	32
Groundnut	93	62	107	71	117	78
Coconut	42	28	48	32	87	58

Vegetables						
Lady's finger	20	13	36	24	42	28
Tomato	12	8	26	17	33	22
Brinjal	15	10	27	18	38	25
Moringa	15	10	20	13	27	18
Fruits						
Banana	89	59	96	64	102	68
Tapioca	96	64	80	53	99	66
Sugarcane	98	65	87	58	77	51
Mango	32	21	26	17	53	35
Guava	42	28	59	39	38	25
Onion	68	45	87	58	90	60
Greens	43	29	48	32	123	82

* Multiple Responses

Examining crop varieties shows notable tendencies. Cereal farming, which includes crops such as rice, maize, and sorghum, exhibits significant variability. Paddy agriculture was more common in small families (49 percent), whereas maize cultivation was more prevalent in marginal households (55 percent).

Furthermore, the cultivation of pulses such as black gram, green gram, and horse gram demonstrates varying preferences among categories, showing cropping decisions depending on local circumstances. Nuanced patterns emerge from the production of nuts and oilseeds, including sunflower, gingelly (sesame), and groundnut.

Large households were more likely to cultivate groundnuts (78 percent), while small households chose sunflowers (18 percent). Coconut cultivation was very stable across all groups, with marginal householdss having the lowest percentage (28 percent).

Variations exist among vegetables and fruits. Small households preferentially cultivated lady's finger (24 percent) followed by brinjal (18 percent). Large households play an important role in the production of bananas (68 percent), tapioca (66 percent), and sugarcane

(51 percent). It was worth noting that more than 80 percent of large farmers cultivated greens on their land.

The results suggest a downward trend in agricultural productivity, which might be attributed to water and manpower limitations, expensive fertilizer and pesticide prices, and inconsistent weather conditions.

c. Frequency of Crop Cultivation

Seventy-two percent of large farmers, 39 percent of small farmers, and 21 percent of marginal farmers cultivated paddy twice a year. Large farmers cultivated maize, black gram, green gram, and horse gram twice every year. All the marginal and small farmers only cultivated maize, black gram, green gram, and horse gram once a year. All the marginal, small, and large farmers cultivated groundnuts only once a year. All sorts of farmers grow vegetables and greens four times a year.

In a 2020 study, Zhao et al. reported that crop rotation increases yields by 20% when compared to continuous monoculture. In soil with a coarse or medium texture and a medium initial SOC content, rotation performed better. Legume-based rotations produced yields that were 14% greater than non-legume rotations. For two to three years, rotation has a residual positive impact on crop yield.

d.Types of Fertilizers Used for Cultivation

Understanding the importance of inorganic fertilizers, often called chemical fertilizers or chemical inorganic fertilizers, is crucial. They are industrially manufactured products containing essential nutrients that plants require for their growth and development. The primary nutrients- nitrogen, phosphorus, and potassium- form the collective NPK classification. Therefore, these are the three fundamental nutritional elements necessary for healthy plant growth and, thus, found in vegetation growth inducers.Table VI emphasizes the fertilizers used for cultivation per crop.

TABLE VI

TYPES OF FERTILIZERS USED FOR CULTIVATION

(N=450)

Fertilizers*	Marginal (150)		Small (150)		Large (150)	
	N	%	N	%	N	%
Urea	129	86	134	89	131	87
DAP (D- Ammonium Phosphate)	119	79	107	71	126	84
SSP (Single Superphosphate)	123	82	113	75	128	85

***Multiple Responses**

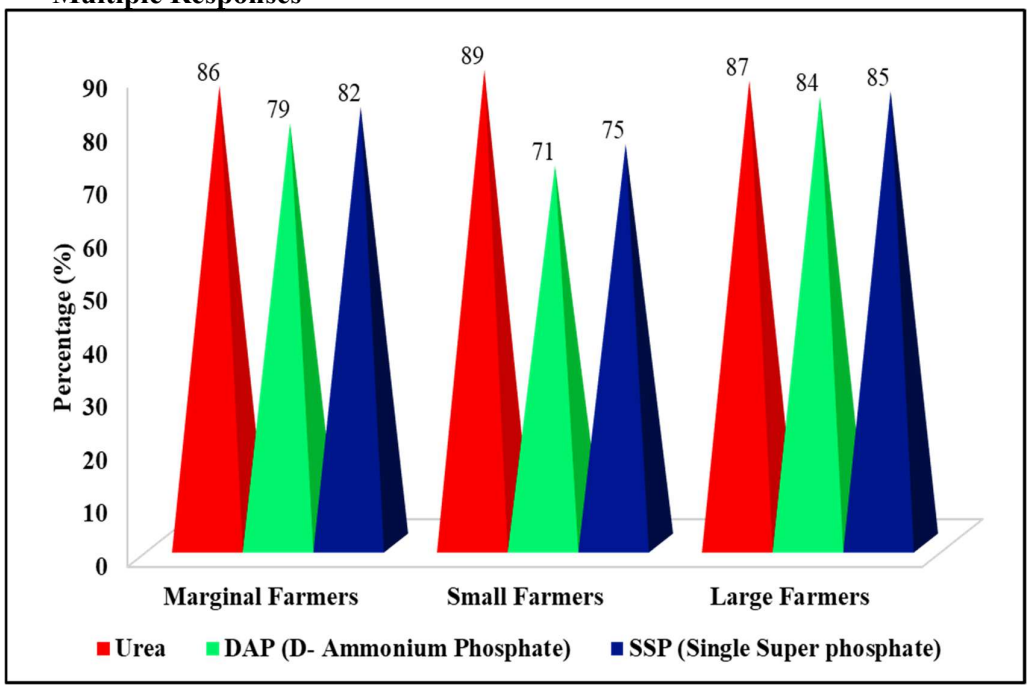


FIGURE 4

FERTILIZERS USED FOR CULTIVATION

Fertilizers were used in agricultural operations by marginal, small, and large households in similar proportions. The usage of various forms of fertilizers, expressed as percentages, gives information on agricultural practices within each category.

All groups utilized urea, a popular nitrogenous fertiliser, with 86 percent in marginal, 89 percent in small, and 87 percent in large households. This suggests a widespread reliance on urea for nitrogen supplementation, underlining its importance in increasing soil fertility.

Farmers also widely use DAP (D-ammonium phosphate), a phosphate fertilizer. Marginal households use DAP at 79 percent, small households at 71 percent, and large households at 84 percent. This suggests a high dependency on phosphate fertilizers, notably DAP, across all categories. SSP (Single Super Phosphate), another phosphate fertilizer, follows a similar pattern. The SSP was 82 percent for marginal households, 75 percent for small households, and 85 percent for large households.

The regular use of phosphate fertilizers emphasises their relevance in promoting plant growth and development. The multiple-response nature of fertilizer application implies that families often employ a mix of these fertilisers, recognising the need for a varied range of nutrients for maximum crop output. Most likely, the desire to address specific soil nutrient deficits and enhance overall soil health drives this multi-fertilizer method.

In conclusion, marginal, small, and large households widespread use of urea, DAP, and SSP demonstrates the relevance of these fertilizers in improving soil fertility and crop development. The similarity in fertilizer application patterns across categories demonstrates a common awareness of the critical role fertilizers' play in current agricultural techniques.

e. Average Fertilizer Used and its Cost per cropping

The essential components of inorganic chemicals – nitrogen, phosphorus, and potassium – are the building blocks for these crucial substances. Fertilizers not only supply plants with both macro- and micronutrients. They also play a vital role in delivering equally essential minerals like calcium, magnesium, and sulphur. Furthermore, they provide trace elements necessary for fruit and vegetable development and maturation. Table VII presents the number of inorganic fertilizers used and their money value per crop.

TABLE VII

AVERAGE FERTILIZERS USED AND ITS COST PER CROPPING

(N=450)

S.No	Fertilizers	Marginal (150)		Small (150)		Large (150)	
		Quantity in Kg	Money value (Rs`)	Quantity in Kg	Money value (Rs`)	Quantity in Kg	Money value (Rs`)
1.	Urea	200kg	1280	300 kg	1920	500 kg	3200
2.	DAP (D- Ammonium Phosphate)	1lt	1250	2lt	2500	4lt	5000
3.	SSP (Single Superphosphate)	100kg	840	150kg	1260	250 kg	2100
	Total Amount		**3,370**		**5,680**		**10,300**

It was evident from the above table that marginal farmers spent about Rs. 3370/- to purchase chemical fertilizers per crop, while small farmers and large farmers spent about Rs. 5680/- and Rs. 10,300/-, respectively. The marginal farmers spent comparatively less on fertilizers and pesticides due to their high costs and owning less land.

f. Difficulties Faced During Cultivation

The major constraints include unstable weather, water scarcity, pest-damaged crops, and poor transportation, as well as minor constraints such as the inability to access and use such things as seed and fertilizers, a lack of capital to buy, inadequate investment in irrigation, which makes farmers very vulnerable to drought, and a lack of knowledge and skill among all farmers. (Bergstrand, K. J., 2022) Table VIII shows the difficulties faced during the cultivation of food crops, as expressed by the farmers in the selected households.

TABLE VIII

DIFFICULTIES FACED DURING CULTIVATION

(N=450)

Difficulties	Marginal (150)		Small (150)		Large (150)	
	N	%	N	%	N	%
Pest attack	29	19	44	29	25	17
Labour shortage	17	12	23	15	37	25
Labour demands high pay	33	22	40	27	42	28
High cost of fertilizer and pesticides	46	30	28	19	32	21
Water shortage	25	17	15	10	14	9

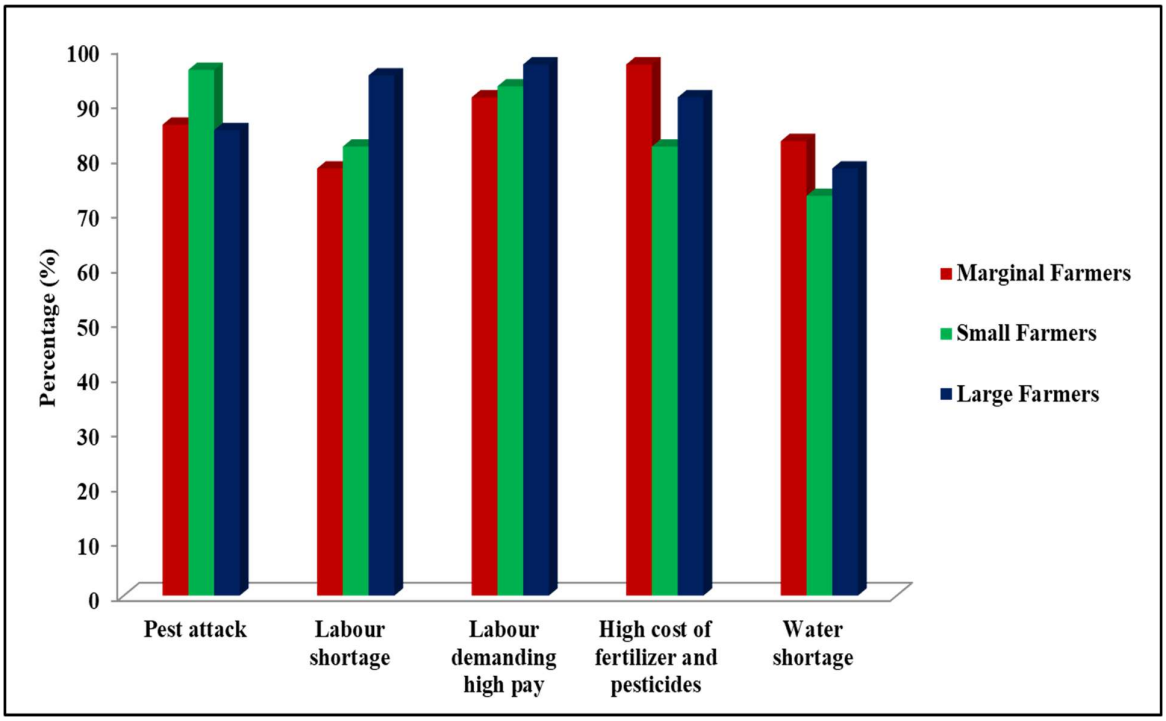


FIGURE 5

DIFFICULTIES FACED DURING CULTIVATION

The challenges encountered by households engaged in agriculture, categorized as marginal, small, and large, revealed distinct patterns and concerns. All the farmers stated that pest attacks were the major problem during cultivation and also during storage, with percentages indicating 19 percent in marginal, 29 percent in small, and 17 percent in large households. This underscores the universal struggle to mitigate the impact of pests on crops.

The labour shortage poses a substantial challenge, particularly for large households, where it reaches 25 percent, contrasting with 12 percent in marginal and 15 percent in small households. The demand for high-paying labour remained consistently high across all categories, ranging from 22 percent and 28 percent for marginal and large households, respectively.

The high cost of fertilizers and pesticides emerges as a notable concern, with 30 percent of marginal, 19 percent of small, and 21 percent of large households expressing apprehension about the financial burden associated with agricultural inputs. Water shortage, another significant challenge, varies in intensity, with 17 percent in marginal households, 10 percent in small households, and nine percent in large households. This highlights the diverse nature of water-related concerns among different household categories.Similar to the current study, Rohit et al. (2017) found that the most significant technological constraint was the inability to obtain inputs, such as fertilisers, at the appropriate time, and the most significant labour constraint was the lack of labour during the harvest season.

g. Common Insects and Pests Identified in the Field

The common pests identified in the crops were white worm, green worm, caterpillar, white fly, stem borer, and leaf folder. In and around Tamil Nadu, the common pests that attack the crops are leaf folder stem borer pest, green leaf hopper, bollworm, white fly, and leaf miner, as stated by Tamil Nadu Agricultural Officers (TNAU) Table IX and Plate 14 present the common pests found in the field.

TABLE IX

COMMON INSECTS AND PESTS IDENTIFIED IN THE FIELD

Insects and Pest Identified *	Marginal (150)		Small (150)		Large (150)	
	N	%	N	%	N	%
Rice moth	82	54	72	48	78	52
Mealy bugs	67	45	62	41	83	55
White worms	62	41	59	39	65	43
Green worms	65	43	52	35	57	38
Hairy caterpillar	35	23	47	31	59	39
Whiteflies	80	53	82	55	77	51
Stem borer	77	51	77	51	78	52
leaf folder	54	36	51	34	66	44

*Multiple Responses

The above table shows that various insects and pests affected the crops during cultivation. More than 50 percent of the pests identified in marginal households were rice moth, whiteflies and stem borer, where as in small households, they were whiteflies and stem borers, and in large households, they were rice moth, mealy bugs and stem borers. Pests that impacted over 40 percent of marginal households were mealy bugs, white worms and green worms, respectively**.**

According to a 2016 study by Pal et al., high nitrogen fertilizer levels dramatically increase the incidence of most insect pests, such as the internode stalk borer and pyrilla in sugarcane; leaf folder, white fly, and bollworm in rice; and yellow stem borer, leaf folder, and green leaf hopper in rice. On the other side, many insect pests are less common when potash and nitrogen are applied.

h. Common Diseases Identified in the Field

Farmers all over the world suffer significant food losses as a result of crop infection by pathogens such as fungi, viruses, bacteria, and others. Farmers can examine the moisture, temperature, and humidity content of the leaf to detect nutrient deficiencies and disease

infections, which can spread in crops and reduce yield. Plant diseases pose a serious threat to the entire crop. As a result, it is critical for farmers to effectively deal with them and control them through timely prevention. This task can be difficult depending on the size of the agricultural area, especially since the list of harmful crop diseases is quite long. Crop monitoring allows farmers to identify risky areas and treat each crop individually, resulting in a significant increase in disease control effects. The Table X , Figure 6 and Plate 15 show the various diseases identified in the field in the adopted villages.

TABLE X

COMMON DISEASES IDENTIFIED IN THE FIELD

(N=450)

Diseases*	Marginal (150)		Small (150)		Large (150)	
	N	%	N	%	N	%
Wilt in tomato	84	56	66	44	51	34
Cercospora leaf spot	25	17	14	9	9	6
Yellow mosaic	35	23	29	19	17	11
Alternaria leaf spot	65	43	45	30	27	18
Fruit rot	27	18	21	14	12	8

*Multiple Responses

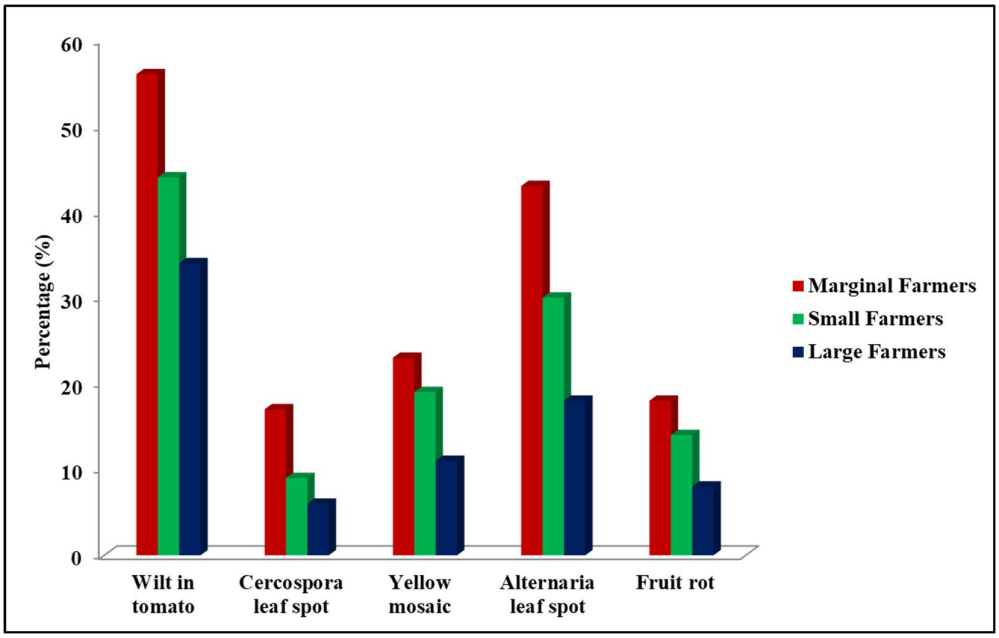


FIGURE 6

DISEASES IDENTIFIED IN THE FIELD

Tomato crop diseases exhibit distinct patterns among marginal, small, and large households, with varying degrees of difficulties encountered by each group. Wilt in tomato plants was most prevalent in marginal households, accounting for 56 percent, despite the fact that small and large households report lower rates of 44 and 34 percent, respectively. The prevalence of Cercospora leaf spot was lower, appearing in marginal households at a somewhat higher incidence of 17 percent compared to nine percent in small households and 6 percent in large households.

The yellow mosaic disease affects a substantial proportion of tomato crops, with a prevalence of 23 percent in marginal households, 19 percent in small households, and 11 percent in large households. Alternaria leaf spot exhibits a higher incidence in marginal households (43 percent), followed by 30 percent in small households and 18 percent in large households. Fruit rot, while present in all categories, was more pronounced in marginal households (18 percent), compared to 14 percent in small households and eight percent in large households. Wan et al., (2021) also quoted that in major tomato-growing districts of Karnataka, there is a high incidence of bacterial wilt caused byRalstonia solanacearum, which is one of the most destructive bacterial diseases of economically important crops. Across all the tomato cultivars under evaluation, the disease incidence in plants ranged from nine percent to 39 percent whereas the incidence in seeds ranged from four percent to 18 percent.

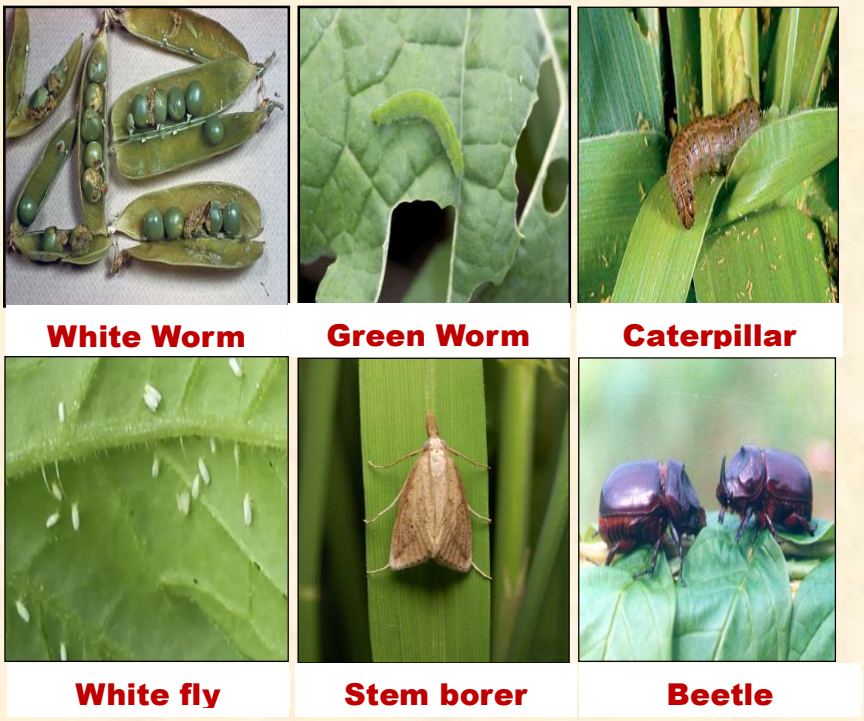


PLATE 14: COMMON PEST IDENTIFIED IN THE FIELD

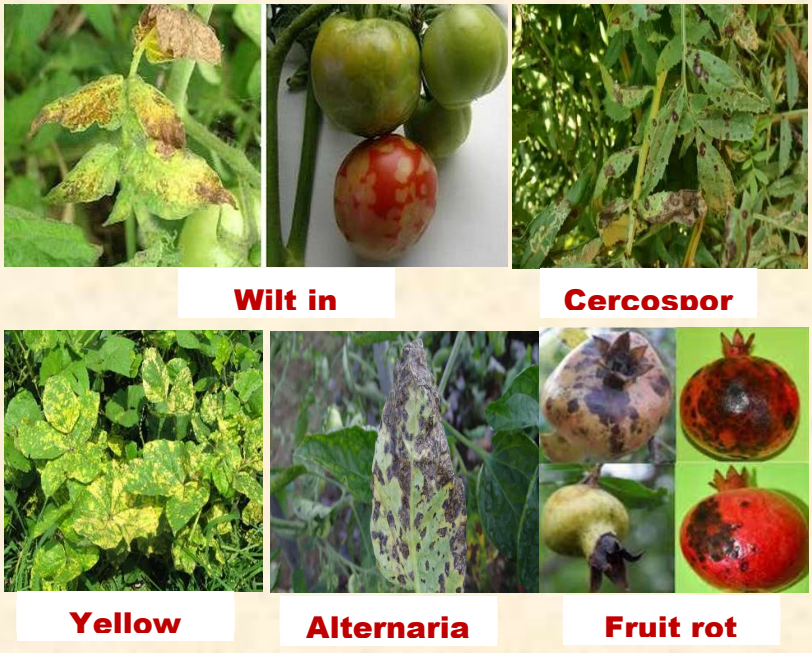


PLATE 15: COMMON DISEASES IDENTIFIED IN THE SELECTED FIELD

i. Pesticides Used to Control Insects and Pests

Pesticides are chemicals used to kill, repel, or control animal and plant life, including herbicides for lawns, insecticides for agriculture, and fungicides for controlling fungi and protecting crops. They are commonly used in agriculture, industry, and businesses. All categories of farmers were using chemical methods to control insects and pests. Table XI shows the pesticides used by the selected households to control pests.

TABLE XI

PESTICIDES USED TO CONTROL INSECTS AND PESTS

Pesticides used*	Marginal (150)		Small (150)		Large (150)	
	N	%	N	%	N	%
Copper sulphate	128	85	123	82	134	89
Deltamethrin	108	72	116	77	122	81
Glyphosate	114	76	119	79	132	88
Aluminum phosphate	101	67	107	71	113	75

*Multiple Responses

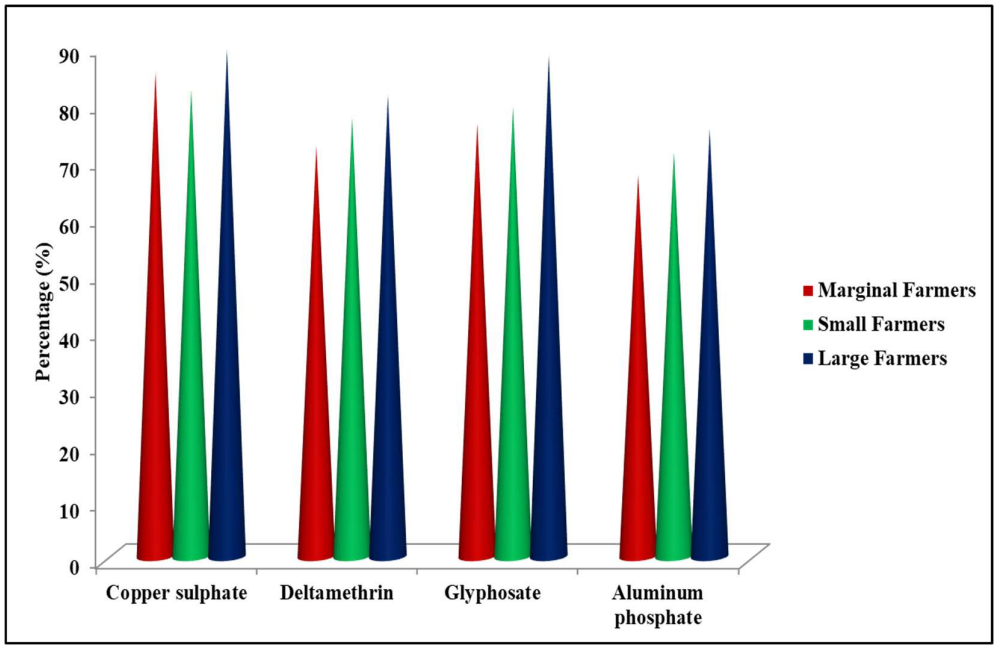


FIGURE 7

PESTICIDES USED TO CONTROL INSECTS AND PESTS

Pesticide application in marginal, small, and large households showed distinct patterns. All categories widely use copper sulphate, a common pesticide, with proportions reflecting 85 percent in marginal households, 82 percent in small households, and 89 percent in large households. The pesticide deltamethrin was prevalent, increasing proportionally with household size, reaching 81 percent in large, compared to 72 percent in marginal and 77 percent in small households.

Glyphosate, a widely used herbicide, had a noticeable prevalence, with percentages rising from 76 percent in marginal households to 88 percent in large households, indicating a greater reliance on this particular input in larger agricultural settings. Aluminium phosphate and other pesticides showed consistent use, with aincrease from 67 percent in marginal households to 75 percent in large households

j. Average Pesticides used and its Costs per Cropping

Chemical control methods play a significant role in pest and disease management within the realm of agricultural research for development. These methods involve the use of various chemical substances to combat pests and diseases that pose threats to crop yields. The average amount spent on pesticides to control insects, pests, and diseases is given in Table XII.

TABLE XII

AVERAGE PESTICIDES USED AND ITS COSTS PER CROPPING

(N=450)

S. No	Name of the pesticides	Quantity and its Money value					
		Marginal (150)		Small (150)		Large (150)	
		Quantity in kg/lt	Money value in `Rs	Quantity in kg/lt	Money value in Rs`	Quantity in kg/lt	Money value in Rs`
1.	Copper sulphate	15 kg	2850	19 kg	3610	36 kg	6840
2.	Deltamethrin	3lt	1950	6lt	3900	11lt	7150
3.	Glyphosate	2t	1300	4lt	2000	12lt	6000
4.	Aluminium phosphate	5lt	3800	8lt	6080	13lt	9120
	Total		**9,900**		**15,590**		**29,110**

According to the above data, chemical pesticides were purchased by marginal, small, and large households for around Rs. 9,900, Rs. 15,590, and Rs. 29,110, respectively, to control diseases and pests in the field for each crop. The farmers said they were still unable to fully protect the food crops from insect infestations, despite the fact that they were using chemical pesticides to combat the pests.

Comparable to the 2020 study by Kilic et al., conventional agricultural (CA) farms applied 142.3 kg, 81.2 kg, and 3.7 kg of nitrogen, phosphorus, and potassium on average per hectare. The Good Agricultural Practices (GAP) farms had lower levels by 31.1%, 49.4%, and 18.9%, in that order. Insecticide, fungicide, and herbicide applications on CA farms averaged 0.8 kg, 0.4 kg, and 0.1 kg per hectare; in contrast, GAP farmers applied 50.0%, 25.0%, and 70.0% less of these substances, respectively. Due to the use of fewer inputs, switching to GAP reduced yields in the range of 3.3%–20.6% and gross profits in the range of 2.0%–14.3%, depending on the kind of crop. Consequently, in order to boost farmers' acceptance of GAP, it is crucial to provide government subsidies and assistance programs to make up for the declines in yield and gross profit. The GAP program's social advantage is that it lessens the harm that pesticides do to consumers and the environmental impact that agricultural operations cause, making them more sustainable.

k. Problems Faced by Using Inorganic Fertilizers and Pesticides

Fertilizers, though one of the most essential inputs for increasing agricultural production, are a leading cause of nitrous oxide emissions from agriculture, contributing significantly to global warming. Therefore, understanding factors affecting farmers' use of fertilizers is crucial to developing strategies to improve their efficient use and minimize their negative impacts. Table XIII and Figure 8 explains the risk factors experienced by the selected farmers when using inorganic fertilizers and pesticides.

TABLE XIII

PROBLEMS FACED BY USING INORGANIC FERTILIZERS AND PESTICIDES

(N=450)

Problems*	**Number**	**Percentage**
Head Ache	132	88
Eye Irritation	129	86
Rashes and Itching	120	80
Nausea and Vomiting	99	66
Allergy	96	64
Wheezing	72	48
Diarrhoea	51	34

*Multiple Responses

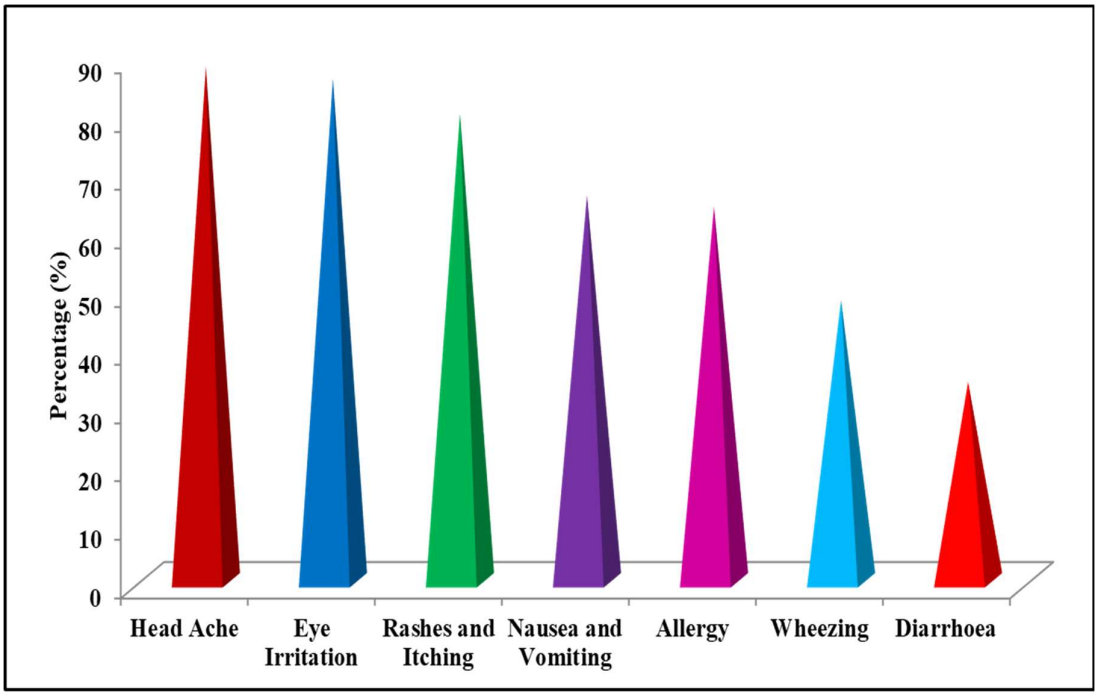


FIGURE 8

PROBLEMS FACED BY USING INORGANIC FERTILIZERS AND PESTICIDES

Individuals in the study reported various health problems. Headaches were the most frequently mentioned issue, with a prevalence of 88 percent, followed closely by eye irritation at 86 percent and rashes and itching at 80 percent. Sixty-six percent of the participants reported experiencing nausea and vomiting, while 64 percent reported allergies. 48 percent of farmers reported wheezing, while 34 percent reported diarrhoea. Bassi et al. (2016) also pointed out that most farmers experienced reddening of the eyes and allergies such as sneezing and rheumatoid arthritis when they used inorganic agrochemical fertilizers on their farms.

l. Food grains losses during storage

According to the farmers in the selected households, pests, dampness, mould, fungus, and insects cause 5–15% of food grain losses during storage on average. They were merely using frequent sun drying as a technique. They occasionally turned the damaged grain powder into animal feed. If the grain was completely ruined, farmers would discard it.

m. Existing Organic Agricultural Practices in the Selected Households

India's growing population has led to increased use of high-yielding crops, resulting in increased use of fertilizers and irrigation. This has led to weeds, insects, and pests, affecting crops and produce. The country's economy relies on rain-fed agriculture, which feeds humans, animals, and the environment. However, this approach destroys soil health, increases environmental pollution, and increases pesticide toxicity. Researchers are considering organic farming as a sustainable alternative to chemical farming, which can generate high-quality feed while conserving soil and environmental health. Table XIV shows the existing organic agricultural practices in the selected households.

TABLE XIV

EXISTING ORGANIC AGRICULTURAL PRACTICES IN THE SELECTED HOUSEHOLDS

(N=450)

Existing Organic Agricultural Practices*	Particulars	Marginal (150)		Small (150)		Large (150)	
		N	%	N	%	N	%
Preserve Soil Fertility	Fertilization	18	12	24	16	12	8
	Crop Rotation	38	25	32	21	23	15
	Intercropping	3	2	8	5	17	11
	Tillage	17	11	23	15	27	18
Fertilizers Used	Livestock Manure	8	5	18	12	23	15
	Poultry Manure	3	2	8	5	8	5
	Green Manure	23	15	29	19	32	21
Control Weeds	By Burning Plant Residues after Harvesting	84	56	90	60	105	70
	By Grazing Through Animals	105	70	120	80	128	85
	By Mechanical Weeding (Tillage, Mowing and Manure)	126	84	113	75	90	60
	By Crop Rotation and Intercropping	0	0	8	5	15	10

*Multiple Responses

Organic agricultural practices vary across different households, with different approaches to soil fertility preservation, organic fertilizer usage, and weed control. Fertilization methods were adopted by 12 percent of marginal, 16 percent of small, and eight percent of large households. Crop rotation was adopted by 25 percent, 21 percent, and 15 percent of these households, respectively.

Intercropping was practiced by two percent, five percent, and 11 percent, while tillage methods were used by 11 percent, 15 percent, and 18 percent of marginal, small and large households, respectively. Livestock manure was used by 12 percent of small households, while

poultry manure was used by five percent. Weed control methods varied, with burning plant residues after harvesting being the predominant practice.

The reasons provided by the selected households for not adopting organic farming practices were higher costs, lower yields, fewer pest control options, certification procedures, market competitors, soil fertility management, and limited crop possibilities. Uncertain markets demand labour-intensive infrastructure, as well as help to mitigate climate and environmental transition risks. As a result, it is necessary to enhance household knowledge and give training on how to use natural resources and organic waste as inputs for organic farming. This will result in delivering quality food to humans on a zero-budget basis.

iii. Organic Waste Management Practices in the Selected Household

Waste poses a serious risk to hygiene and public health in rural areas. Even though the waste produced is mostly organic, improper disposal can cause major issues, such as a rise in vector- and water-borne illnesses. These days, waste is regarded as one of the main environmental issues facing the modern world. Effective waste management is one of the main goals of environmental preservation because of the growing quantity of trash produced by human activity. The problem of garbage could be extremely burdensome for future generations if it is not adequately controlled. Since citizens are the main producers of utility waste, it is important to educate them about the necessity for proper waste management (Rathee and Dalal, 2018).

The management of household organic waste plays a crucial role in promoting sustainable development and environmental protection. To minimize the volume of this waste and utilize it effectively, it is essential to foster collaboration among governments, businesses, and citizens. However, research is needed to accurately measure the amount of household organic waste produced in various communities. This data is fundamental for developing reliable models to predict the supply of organic materials, which in turn supports the design and optimization of waste collection and processing systems tailored to the needs of different neighbourhoods (Tryhuba et al., 2023; Reetsch et al., 2020).

The selected households' existing organic waste management practices are discussed under the following headings:

a. Average Quantity of Wastes Produced by the Selected Households
b. Types of Containers Used for Collecting Organic Waste
c. Frequency of Waste Disposal
d. Methods of Disposing of Household Waste
e. Problems Faced due to the Accumulation of Household Waste
f. Methods of Reusing Household Waste
g. Reasons for Improper Disposal of Waste
h. Need for Clean Environment

a. Average Quantity of Wastes Produced by the Selected Households

In general, the developed countries generate much higher quantities of waste per capita compared to the developing countries of the region. However, in certain circumstances, the management of even small quantities of waste is a significant challenge (Brunner and Rechberger, 2015). The waste is generally classified into two types: organic and inorganic waste. The average quantity of waste produced by each household per day as per the record maintained in Sathyamangalam Block is presented in Table XV.

TABLE XV

AVERAGE QUANTITY OF WASTES PRODUCED BY THE SELECTED HOUSEHOLDS

(N=450)

Block	Inorganic waste generated Kg/ HH/ day	Organic waste generated Kg/ HH/ day
Sathyamangalam	0.268	0.523

*HH – Households

The above table indicates that almost half a kilogram of organic waste was produced by households per day in the selected blocks At the same time, inorganic waste generation was less than half a kilogram per day. A household generates, on average, 16 kilograms of organic waste and 8 kilograms of inorganic waste each month. Discarding all this waste without proper

treatment endangers the ecosystem. Thus, proper waste management is now more important than ever.

b. Types of Containers Used for Collecting Organic Waste

Invariably, all the selected households collected the waste in the plastic container for a variety of reasons, including ease of availability, lower cost, easy handling, and maintenance.On par with our research, Evode et al. (2021) found that respondents primarily stored solid waste in plastic containers, old buckets, polythene bags, and dustbins.

c. Frequency of Waste Disposal

The amount of waste produced determines the frequency of waste disposal. One-third of the households were disposing of kitchen waste every day, 66 percent were disposing of garden waste on alternative days, and 24 percent were disposing of the same every week.

d.Methods of Disposing of Household Waste

Among the selected households, 72 percent of the homemakers were responsible for disposing of household waste. Individuals' disposal practices provide insight into their waste management habits.

The method used for household waste disposal is depicted in Table XVI and Figure 9.

TABLE XVI

METHODS OF DISPOSAL OF HOUSEHOLD WASTE

(N=450)

Sl. No	Disposal practices*	Number	Percentage
1	Burning	350	78
2	Throwing in the empty plots	338	75
3	Use of government dust bins	252	56
4	Throwing in the road sides	110	24
5	Converted into Compost	36	8

* Multiple responses

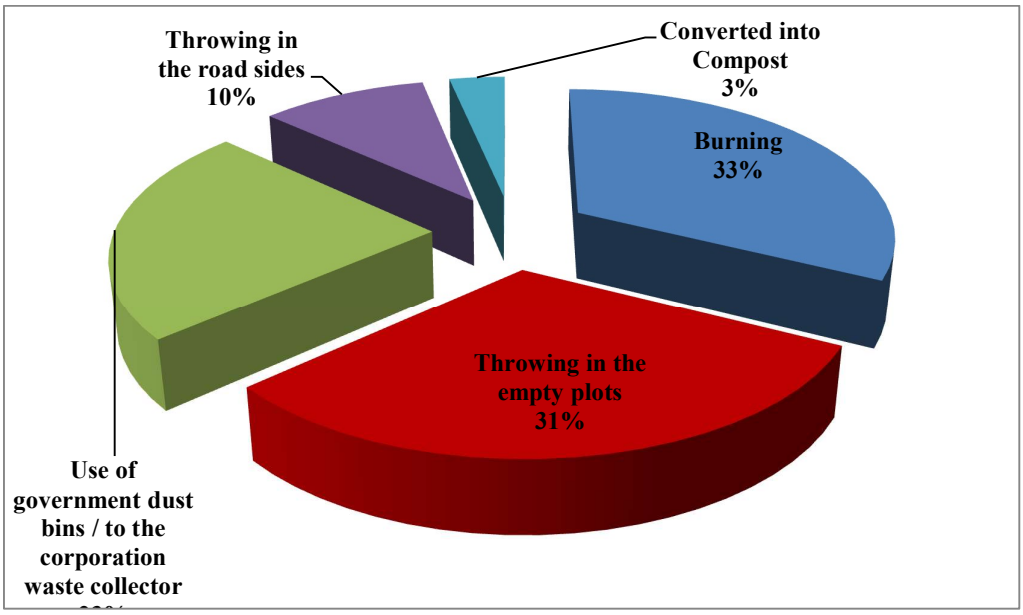


FIGURE 9

METHODS OF DISPOSAL OF HOUSEHOLD WASTE

Among the listed practices, the most common method of disposal was burning(78 percent)followed by dumping of waste in empty plots (75 percent). The use of government dustbins and waste collection by corporations ranks as the third most prevalent practice (56 percent). Throwing waste on roadsides was noted as the fourth most common practice, constituting 24 percent. The least practice observed was the conversion of waste into compost, with only eight percent**.** There are serious risks and environmental contamination from waste that is dumped into the surroundings. Numerous studies show that materials that flow during run-off and leachate from open garbage dumping contaminate surface and groundwater. Furthermore, exposure to open garbage dumps exposes people to large concentrations of potentially dangerous compounds, which is an issue for public health. Locals frequently burn their rubbish, which exposes them to hazardous chemicals and poisonous fumes all the time.

Furthermore, gas produced by open dump sites is freely released into the atmosphere, contributing to climate change. In addition, the smells emanating from open dumpsites create pain, headaches, and respiratory issues for the surrounding people.

Before the training and awareness, only information about current household trash disposal practices and methods of waste reuse was gathered by the investigator. Following the training programme, marginal farmers began making organic fertilizers using compost bags because it was an affordable, manageable, and easy method of upkeep. Because Silpaulin sheets

were portable, small farmers were ready to create fertilizers with them, whereas large farmers were drawn to compost pits because they had more available space.

The data emphasizes the need to promote responsible waste disposal practices and highlights the existing diversity in individual choices. Addressing potential discrepancies will ensure a more accurate understanding of these practices for effective environmental interventions.

e. Problems Faced due to the Accumulation of Household Waste

Rural areas are facing serious environmental degradation and public health risks due to uncollected disposal of waste on streets and other public areas, clogged drainage systems by indiscriminately dumped waste, and contamination of water resources near uncontrolled dumping sites. Table XVII and Figure 10 represents the problems faced by the selected households due to the accumulation of household waste.

TABLE XVII

PROBLEMS FACED DUE TO ACCUMULATION OF HOUSEHOLD WASTE

(N=450)

Problems Faced*	**Number**	**Percentage**
Unpleasant odour	446	99
Breeding places for insects, mosquitoes, flies, and rodents	437	97
Unhygienic surroundings	432	96
Street dogs problems	387	86
Environmental pollution	378	84
Overflows of drainage	288	64
Health problems	126	28
Polluted water supply	95	21

*Multiple Responses

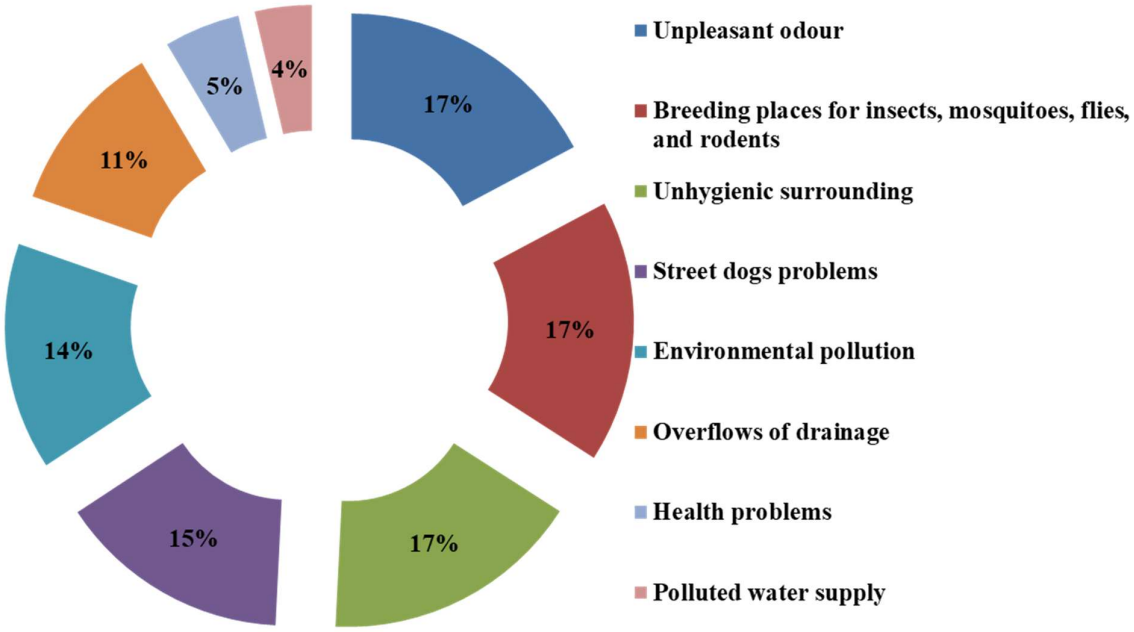


FIGURE 10

PROBLEMS FACED DUE TO ACCUMULATION OF HOUSEHOLD WASTE

The reported problems faced by individuals highlight a range of challenges in their living environment. A substantial 97 percent express concerns about breeding places for insects, mosquitoes, flies, and rodents, emphasizing the prevalence of pest-related issues. Additionally, 96 percent mentioned unhygienic surroundings, indicating widespread challenges in maintaining cleanliness. Eighty four percent mentioned environmental pollution, emphasizing its impact on the overall quality of the living environment. Unpleasant odours were the most common concern, with 99 percent reporting discomfort as a result.

In terms of infrastructure challenges, 21 percent reported polluted water supplies, indicating potential issues with water quality. Twenty eight percent of individuals mentioned health problems, while 86 percent and 64 percent expressed significant concerns about street dog problems and overflows of drainage, respectively. The current study relates to Douti et al.'s (2017) research. He stated that 44.67 percent of respondents stored household waste within their home premises in buckets, baskets, and bins devoid of protective covers for four to seven days before dumping it. These conditions, along with unsanitary waste collection and delayed removal of communal containers, may cause disease-carrying pests to multiply and create serious public and environmental health risks.

This comprehensive overview of reported problems emphasized that there is a need for community interventions to address environmental and health-related issues, with a focus on improving sanitation, waste management, and infrastructure to enhance overall living conditions.

f. Methods of Reusing Household Waste

Reducing, reusing, and recycling waste helps save landfill space by keeping useful materials. Reducing the amount of energy and natural resources required to produce or collect the raw materials and manufacture the product. Households adopt methods for reusing household waste, as summarized in Table XVIII.

TABLE XVIII

METHODS OF REUSING HOUSEHOLD WASTE

(N=450)

Methods	Number	Percentage
Kitchen waste		
Throwing	414	92
Composting	36	8
Newspaper*		
Sold to vendor	450	100
Wrapping articles	243	54
Cleaning glass	54	12
Bottles*		
Sold to vendor	450	100
Storing items	82	18
Plastic covers*		
Reused- carry bag, keeping vegetables	450	100
Using as dustbin	329	73
Sold to vendor	23	5

*Multiple Responses

Individuals' waste management methods reveal diverse practices, providing insight into the handling of different types of waste. Regarding kitchen waste, a significant 92 percent opt for the conventional method of throwing it away, while a smaller yet environmentally conscious eight percent engage in composting.

Newspapers hold value in the recycling chain, as a notable percentage were sold to vendors. Additionally, newspapers find secondary uses, with 54 percent utilized for wrapping articles and 12 percent for cleaning glass. Bottles were consistently recycled by being sold to vendors (100%). Interestingly, 18 percent were also repurposed for storing items, showcasing dual functionality. Plastic covers exhibit versatile applications, with a remarkable percent being reused as carry bags or for keeping vegetables. Furthermore, 100 percent found a second life as dustbins, contributing to sustainable practices, while a smaller five percent were sold to vendors.

In 2020, Zand et al ., stated in their study that more than 83.6% of the generated MSW in Iran is disposed in unsanitary landfills or dumpsites. Food wastes account for 75% of the MSW, but only 8% of them are recycled.

The aforementioned table emphasises how crucial it is to educate rural households about the benefits of recycling kitchen garbage into compost rather than disposing of it outside. It contributes to a pollution-free environment, which inevitably results in healthier living.

g. Reasons for Improper Disposal of Waste

There are various reasons for improper waste disposal. Shortening some of the reasons helped analyze the cause behind the environmental degradation in the selected block. Table XIX presents reasons for improper disposal of wastes in the selected villages.

TABLE XIX

REASONS FOR IMPROPER DISPOSAL OF WASTE

(N=450)

Reasons for Improper Disposal of Waste*	Number	Percentage
Laziness of managing waste in a proper manner	383	85
Lack of environmental awareness	369	82
Lack of knowledge on disposal of waste	351	78
Lack of space and provision for disposal	324	72
Mishandling of dustbins	261	58
Improper collection of waste by government agency	171	38

*Multiple Responses

A significant 85 percent attribute improper waste management to laziness in adopting proper practices, emphasizing the need for behavioural changes and motivation. Additionally, 82 percent identify a lack of environmental awareness, highlighting the importance of educational initiatives to instil a sense of responsibility towards the environment.

Laziness in managing waste in a proper manner and lack of environmental awareness were considered the top reasons for improper disposal of waste.The data further reveals that 78 percent of individuals feel a lack of knowledge on proper waste disposal methods, emphasizing the importance of informative campaigns. Seventy-two percent of households cited space and disposal provisions as constraints, emphasizing the need for improved infrastructure to accommodate waste management needs.

Fifty-eight percent recognized the mishandling of dustbins, highlighting the importance of ensuring proper usage of available facilities for effective waste disposal. Moreover, 38percent express dissatisfaction with the government's waste collection practices, indicating a potential area for systemic improvements in waste management.

In summary, the reasons for improper waste disposal encompass individual attitudes, awareness levels, and systemic challenges. Addressing these factors through awareness and training programmes can contribute to fostering responsible waste management practices within the community.

h. Need for Clean Environment

The environment is a place where humans, plants, and animals live. It is necessary to keep the environment clean to get fresh air, reduce pollution, and so on. An unclean environment leads to a bad condition in society, the onset of diseases, and many other related problems. Table XX represents the farmer's opinion on the importance of maintaining a clean environment.

TABLE XX

NEED FOR CLEAN ENVIRONMENT

(N=450)

Need for Clean Environment	Percentage
Good health	100
Clean atmosphere	92
Good and neat surrounding	79
Mental relaxation	90
Life satisfaction	89

The unanimous agreement, with a 100 percent consensus, highlights the universal recognition of the crucial role a clean environment plays in various aspects of well-being. Individuals prioritize cleanliness for its positive impact on good health. Ninety-two percent of the households reported that the clean atmosphere and Seventy- nine percent neat surroundings provided a healthy living environment. Ninety percent of households stated mental relaxation, and 89 percent stated overall life satisfaction. People value a clean environment for its numerous benefits.

B. Impact of Awareness on Organic Waste Management for Organic Farming

The term "impact" in training courses refers to the expected benefits or outcomes. The evaluation of training impact is crucial in verifying the quality of training actions and assessing their effectiveness in meeting the objectives. It involves identifying targeted training needs, applying successful training techniques, and tracking ongoing follow-through to calculate measurable training results. Participants view training courses as chances to disrupt and reinvigorate their understanding and situational transformation. Short-term improvements in participants' skills and their increased awareness of their training needs demonstrate the impact of training courses. However, it is important to note that training courses alone are not sufficient, and ongoing support through follow-up and supervision is necessary for sustained impact.

A course content was developed to teach organic farming methods and waste management techniques for agricultural and environmental sustainability based on the results of the household survey. 450 farmers who were willing to serve as front-line farmers and spread the knowledge they had gained to their fellow members—men and women alike—were given a six-day awareness training during the first phase.

During the second phase, the whole population of the 15 selected villages was taught about organic waste management and organic farming for five days each, for a total of 75 days. The researcher subsequently made regular visits to the areas she had chosen to work with, supporting farmers in the conversion of organic waste into fertilisers, growth boosters, and insecticides.

The training and awareness programmes included lectures, interactive discussions, displays, seminars, field visits, and demonstrations. Visual aids used throughout the exercise included charts, posters, brochures, booklets, and a training manual.

The impact of raising knowledge about organic waste management and organic farming among chosen rural households was evaluated and reported in the following headings:

I. The Impact of the Awareness Programme on Organic Waste Management for Organic Farming on Frontline Farmers

II. The Impact of the Awareness Programme on Organic Waste Management for Organic Farming on Selected Households.

I. Impact of the Awareness Programme on Organic Waste Management for Organic Farming among selected Frontline Farmers

The impact of Awareness on organic waste management and organic farming practices on the frontline farmers was evaluated on the following lines,

a) Effectiveness of Teaching Methods as expressed by the Frontline Farmers
b) Change of Knowledge towards Awareness Programme
c) Change of Attitudes towards Awareness Programme
d) Acceptance to Practice Organic Waste Management and Organic Farming Practices

a). Effectiveness of Teaching Methods as Expressed by the Frontline Farmers

The principles of effective teaching are to build relationships, have clear expectations, create deep participant engagement, and gain feedback from participants and other members. We will make changes based on feedback to ensure an optimal learning experience that aligns with the objectives. Table XXI explains the effectiveness of teaching methods as expressed by the frontline farmers.

TABLE XXI

EFFECTIVENESS OF TEACHING METHODS AS EXPRESSED BY THE FRONTLINE FARMERS

S.No	Teaching methods	In Percentage					
		Marginal (150)		Small (150)		Large (150)	
		S*	NS*	S*	NS*	S*	NS*
1	Group discussion	98	2	100	-	100	-
2	Lecture	77	23	77	23	92	8
3	Field visit	95	5	92	8	91	9
4	Demonstration	69	31	92	8	86	14
5	Meeting	54	46	62	38	46	54
6	Exhibition – using posters and charts	46	54	62	38	69	31

***S- Satisfied; NS- Not Satisfied**

Over 98 percent of the frontline farmers believed that group discussion was the best method and easiest way to communicate organic waste management for organic agricultural practices, primarily because it placed responsibility on every individual to think about the adoption process, clarify doubts, and contribute to its solution (Plate 16).

Ninety to 95 percent of farmers stated field visits were really beneficial. A field visit enables farmers to assess the true reality with proof. Farmers were escorted to an organic agricultural area to learn about the techniques used to make organic fertiliser, boosters, and pesticide. (Plates 17, 18, 19 and 20). Brown et al. (1979) observed that the true picture is more visible and effective. It proves that a picture is equivalent to 1,000 words.

Ninety-two percent and 86 percent of farmers stated the lecture and demonstration approaches were good, respectively, since lectures helped them learn background information while demonstrations allowed for engagement and observation (Plates 21, 22, and 23)

Fifty-four percent, 62 percent, and 46 percent of marginal, small, and large frontline farmers indicated that the meeting helped them comprehend the facts from specialists (Plate 24).Okunade (2017) states that the effectiveness of extension teaching methods in acquiring knowledge, skills, and attitudes among farmers in Osun State was investigated. The result implied that age, farming experience, and level of education had an impact on the effectiveness of extension teaching methods, which, by implication, is a determinant of acquiring knowledge, skills, and attitude. Therefore, it becomes imperative that these significant variables determine factors determining the effectiveness of the extension teaching methods in achieving the main tasks of extension service.

PLATE 16: GROUP DISCUSSIONS ON ORGANIC WASTE MANAGEMNT AND ORGANIC FARMING

FIELD VISITS

PLATE 17: LECTURES CUM DEMONSTRATIONS ON ORGANIC WASTE MANAGEMENT FOR ORGANIC FARMERS

FIELD VISITS

PLATE 18: DEMONSTRATION ON SOIL TESTING BY TNAU EXPERTS

FIELD VISITS

PLATE 19: FRONTLINE FARMERS GIVING TRAINING TO OTHER FARMERS IN THEIR VILLAGES

PLATE 20: AWARENESS CREATION THROUGH STREET PLAY ON ORGANIC WASTEMANAGEMENT

PLATE 21: DEMONSTRATION ON FIELD COMPOSTING – PORTABLE METHOD

PLATE 22: DEMONSTRATION ON FIELD COMPOSTING – PERMANENT METHOD

PLATE 23: MEETINGS ON ORGANIC WASTE MANAGEMENT PRACTICES BY THE SUBJECT EXPERT

b) Change of Knowledge towards Awareness Programmes

Any adjustment must be carried out with knowledge. To measure the knowledge of frontline farmers, 45 knowledge assessment questions were developed and accepted by DC members and topic specialists. in order to evaluate the expertise of front-line farmers. The knowledge assessment included questions about their overall perspective on organic waste management, environmental hygiene, inorganic and organic farming, the health risks associated with inorganic manures, fertilisers, and pesticides, the financial benefits of converting organic waste into organic fertiliser, boosters, and pesticides, and organic and inorganic farming practices. Knowledge tests were administered both before and after the awareness activities. Table XXII and Figure 11 indicate changes in front-line farmers' understanding of awareness initiatives.

TABLE XXII

CHANGES OF KNOWLEDGE TOWARDS AWARENESS PROGRAMMES

(N= 450)

S.No.	Farmers	Maximum score	Before Training	After Training	Difference	't' value
1	Marginal	45	52.69±4.28	90.00±.00	37.31±4.28	106.668**
2	Small	45	51.64±3.34	90.00±.00	38.36±3.34	140.816**
3	Large	45	56.38±3.32	89.99±0.08	33.61+3.24	124.331**

**Significant at 1% level

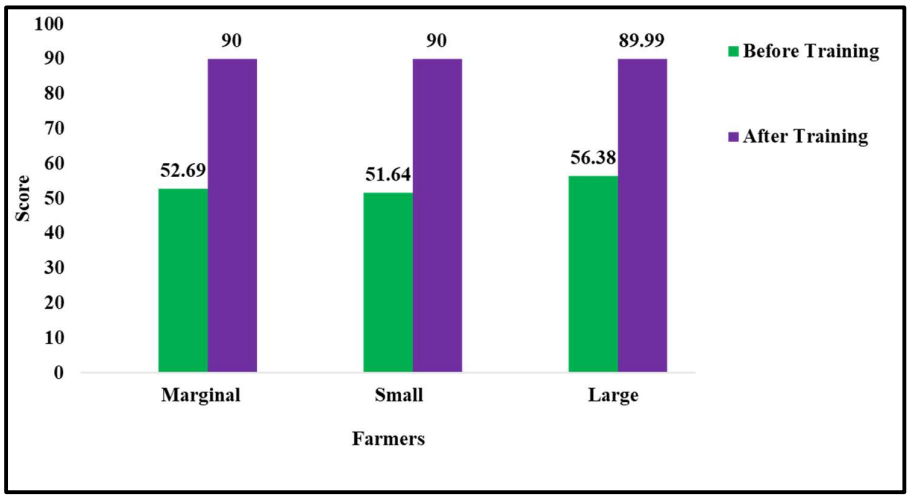


FIGURE 11

CHANGES OF KNOWLEDGE TOWARDS AWARENESS PROGRAMMES

Hypothesis I :The average knowledge scores will not confirm any significant differences before and after the awareness programme.

The average values for each experiment before and after the awareness programme were computed and shown as mean ± mean ± SD (standard deviation) for each data set. According to the data in the table above, the 't' value for the knowledge score was 106.668, 140.816, and 124.331 for marginal, small, and large farmers, respectively, which were statistically significant at the 1% level. **As a result, the hypothesis based on average knowledge scores, which revealed no significant differences before and after the awareness programmes, was rejected.**

It might be inferred that all farmers, regardless of their landholding, demonstrated an improvement in their knowledge score. However, small farmers recorded the highest score with a mean increment of 38.36, followed by marginal farmers with a mean increment of 37.31. This could be explained by the fact that they have a large agricultural and environmental network, are more exposed to organic farming and waste management, and are interested in learning and implementing new ideas and technologies to improve agricultural production, environmental hygiene, food grain conservation, and the generation of additional family income.

Furthermore, Grimm and Luck (2020) discovered that the training intervention had a statistically significant favourable impact on the usage of organic input. Their study's additional results demonstrate beneficial and statistically significant treatment effects with regard to understanding how people see organic farming. All things considered, their research points to intensive instruction as a potentially effective tool for boosting the adoption of organic waste management practices for sustainable agriculture.

c).Change of attitude towards Awareness Programmes

Change in attitude is regarded as an essential element in any intervention programme. An attitude level is evolved to assess the frontline farmers attitude towards organic waste management andorganic farming before and after the awareness programme. Based on the responses obtained against each attitude , a total attitude scores was obtained. Changes in attitude of the farmers before and after the awareness programmes is presented in Table XXIII and Figure 12.

TABLE XXIII

CHANGE OF ATTITUDES TOWARDS AWARENESS PROFRAMMES

(N=450)

S.No.	Farmers	Maximum score	Before Training	After Training	Difference	't' value
1	Marginal	25	30.63±9.07	45.39±7.89	14.76±-1.18	18.813**
2	Small	25	29.88±8.70	44.67±8.81	14.79±0.11	18.026**
3	Large	25	29.73±8.88	45.56±8.18	15.83±-0.7	19.053**

**-significant at 1% level

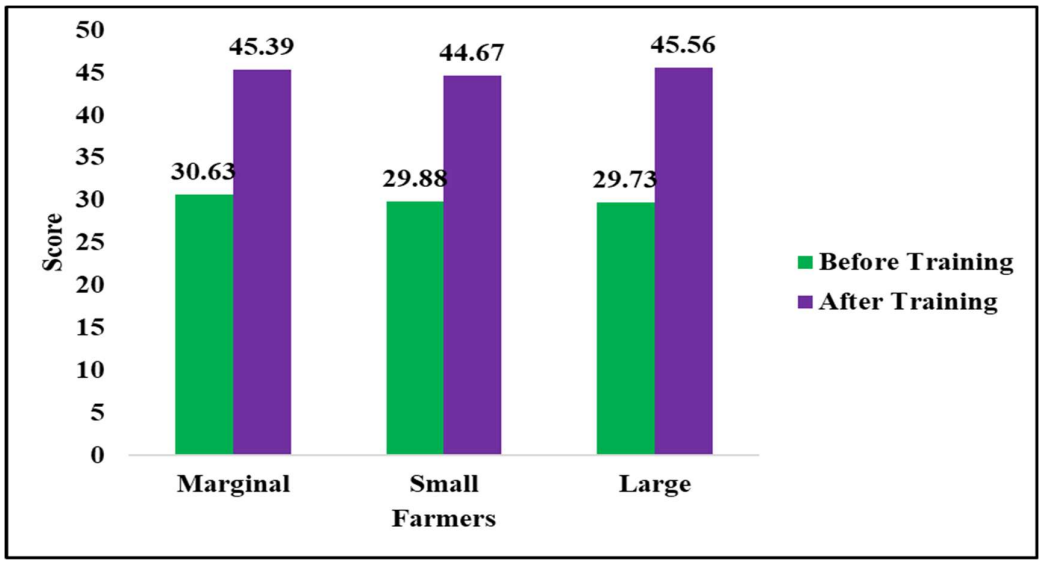


FIGURE 12

CHANGE OF ATTITUDES TOWARDS AWARENESS PROGRAMMES

Hypothesis II :The average attitude scores will not prove any significant differences before and after the awareness programme

The mean values for each experiment before and after awareness were calculated and presented with the mean ± mean±SD (standard deviation) value for each data set. The data in the above table clearly reveals that the attitude scores of all the frontline farmers, irrespective of

the landholding, improved and showed significant 't' values of 18.813, 18.026 and 19.053 for marginal, small and large farmers, respectively. Therefore, it can be inferred that the awareness programme had a positive impact on the attitude of farmers towards the awareness programme. **Hence, the hypothesis was accepted.**

The data above clearly showed that the farmers knew that organic farming and waste management were better for the environment and customers. However, the majority of them were ignorant of the financial advantages, government assistance, organic certifying organisations, and the production of organic fertilisers and insecticides.

In order to convert farmers from conventional farming to organic farming, it was crucial to educate them about the system that yields a larger quantity in organic farming and the high degree of market support that organic products enjoy in the local market.

After the awareness programme, the farmers attitude towards organic farming has been changed to a great extent, and they also understood the economic and environmental benefits of practising organic farming by using organic inputs.The schemes that were provided by the government, as well as the details regarding the organic certification bodies and the demand for organic products in the market, were taught to the participants, and they were benefitted to a large extent. The overall attitude of the farmers towards organic farming has risen after the training programme. In 2021, Sharifzadeh and Abdollahzadeh stated that farmers had limited knowledge and attitudes about pesticide safety prior to the intervention; their knowledge and attitude scores improved satisfactorily after the interventions. Furthermore, all the techniques had a good effect on attitude.

d). Acceptance to Adopt Organic Waste Management Practices and Organic Farming

Organic recycling is the process of converting organic waste materials into compost or other valuable products that can be used to improve soil health, reduce the amount of waste sent to landfills, and mitigate greenhouse gas emissions. Most people understand this as composting. But they felt it was not possible to practise. This process is an important part of the larger effort to transition to a more sustainable and circular economy.

Organic farming can be defined as an agricultural process that uses organic fertilizers and pest control acquired from animal or plant waste. Organic farming aims to address the environmental harm caused by chemical pesticides and synthetic fertilizers. In other words, organic farming is a new system of farming or agriculture that repairs, maintains, and improves the ecological balance by using organic inputs . As a result, an acceptance to adopt organic waste

management and organic farming practices is required to determine the effectiveness of the awareness programme conducted in the selected villages. Table XXIV and Figure 13 show acceptance to adopt organic waste management and organic farming practices.

TABLE XX1V

ACCEPTANCE TO ADOPT ORGANIC WASTE MANAGEMENT PRACTICES AND ORGANIC FARMING

(N=450)

S.No.	Farmers	Maximum scores	Before Training	After Training	Difference	't' value
1	Marginal	25	32.42±2.13	39.91±3.83	7.49±1.7	28.152**
2	Small	25	32.52±1.49	45.96±3.74	13.44±2.25	37.777**
3	Large	25	35.92±2.82	46.81±3.59	10.89±0.77	22.089**

** Significant at 1% level

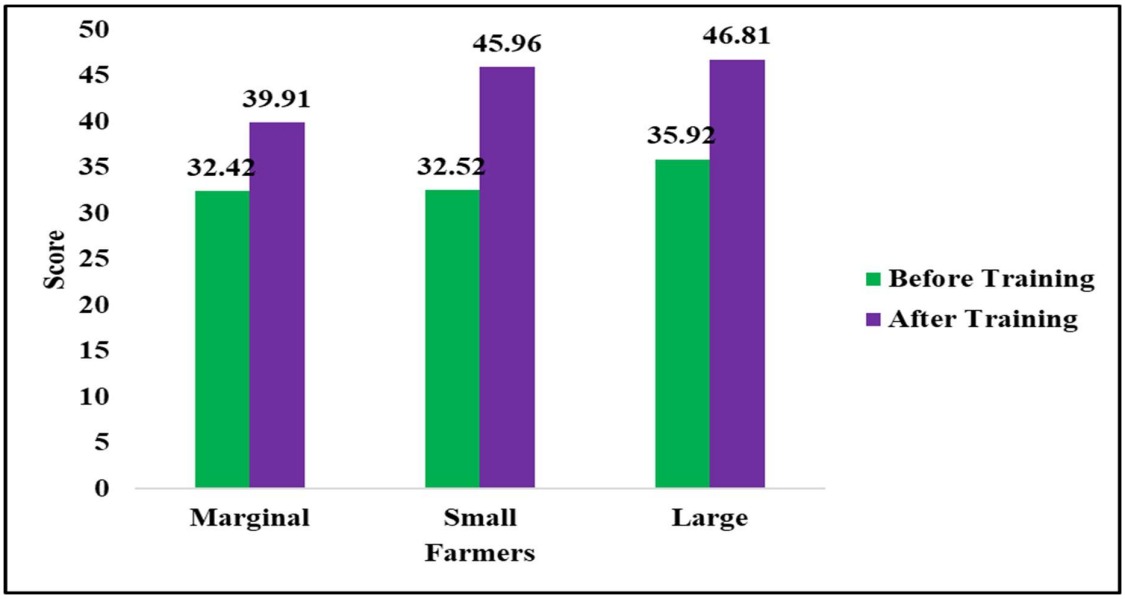


FIGURE 13

ACCEPTANCE TO ADOPT ORGANIC WATE MANAGEMENT PRATICES AND ORGANIC FARMING

Hypothesis III: Awareness programmes will significantly improve the acceptance to adopt organic waste management practices and organic farming.

It is clear from the above table that following the training session, the chosen farmers' adoption of organic farming and organic waste management techniques has increased noticeably (by 1%). As a result, it was decided that the awareness-based hypothesis would greatly increase the popularity of organic farming and waste management techniques. Hence the hypothesis was accepted.

According to the results, farmers agreed that using organic waste as organic farming inputs is a good approach to keep the environment clean, save money, consume high-quality food, prevent pests and diseases, and teach the next generation the value of natural resources. It inevitably results in a higher level of living

Baker et al., 2020 found that the Improved awareness and understanding of the histories and benefits of organic and IPM, goals and priorities shared by organic and IPM proponents and practitioners, and opportunities for accelerating adoption of biological approaches have potential to improve our combined effectiveness in overcoming these barriers. Strategies to speed adoption include increased education and extension on proven, ready-to-use biological control options; full cost and benefit accounting for biologically-based alternatives to chemical controls; and public and private sector policies to encourage biological control and reduce reliance on chemical controls.

In general, the acceptance level was similar in all categories of farmers, which may perhaps be due to the availability of resources, simple technology, and lower cost, along with their health consciousness.

II. Impact of Awareness on Organic Waste Management for Organic Farming among Selected Rural Households

The adoption level of organic waste management for organic farming practices by the selected households was assessed for a period of one year, that is , the period necessary for one cropping. The adoption level was periodically monitored by frequent visits of the investigator to the selected villages.In addition , evaluation was also done through direct observation of the knowledge put into practice by the selected households.

Economic benefits observed through the reduction in expenditure on chemical fertilizers, pesticides and its money value per cropping was calculated. The percentage of food

grain losses before and after and its money value , quantum of vegetables and greens produced and its money value were also assessedwhich was arrived based on the experience of the farmers.

a. The Total Number of Farmers Benefited during the Village-Level Training
b. Adoption of Organic Fertilizers by the Selected Households
c. Adoption of Organic Growth Boosters by the Selected Households
d. Adoption of Organic Repellenst during Pre-harvesting
e. Adoption of Organic Repellents during Post-harvesting
f. The percentage of Food Grain Losses during Storage
g. The Average Quantity of Food Grains Saved and its Money Value per Cropping
h. The Average Economics Benefits of Organic Waste Management in Organic Farming
i. Opinion Regarding the adoption of Organic Waste Management in Organic Farming
j. Suggestions for Better Adoption of Organic Waste Management in Organic Farming

a. The Total Number of Farmers Benefited during the Village-Level Training

To provide a thorough insight into various aspects related to organic waste management and organic farming, a 5-day awareness programme was conducted at each village to inculcate sound knowledge of the latest developments in the field of organic waste management and organic farming with a practical approach. Table XXV shows the total number of farmers who participated in the village-level training and awareness programme.

TABLE XXV

TOTAL NUMBER OF FARMERS BENEFITED DURING THE VILLAGE-LEVEL TRAINING

S.No	Type of Farmers	Number of participants			
		Men	**Women**	**Youth**	**Total**
1.	Marginal	506	302	99	**907**
2.	Small	309	218	134	**661**
3.	Large	458	123	83	**664**
	Total	**1273**	**643**	**316**	**2232**

As shown in the data, male participation was higher than that of females and young individuals. Males were more enthusiastic about acquiring knowledge and employing new concepts and methods, as reflected. Despite the limited number of youthful participants, their intense enthusiasm for engagement was remarkable.

The findings showed that, despite certain hurdles, rural farmers are interested in organic farming. With the correct instruction, they may be able to use organic waste as a natural resource for fertiliser, stimulants, and pesticides in organic farming; they may understand this and transition from conventional to organic farming on a tight budget

b. Adoption of Organic Fertilizer by the Selected Households

Microorganisms, generally bacteria and fungi, break organic waste into simpler forms during composting. The organisms use the waste carbon as an energy source. The degradation of the nitrogen-containing materials transforms the original materials into a more uniform product suitable for soil amendment. The heat generated during the process kills many unwanted organisms, such as weed seeds and pathogens. The advantages of composting include reducing waste volume, eliminating heat-killed pests, and developing a beneficial and marketable material.

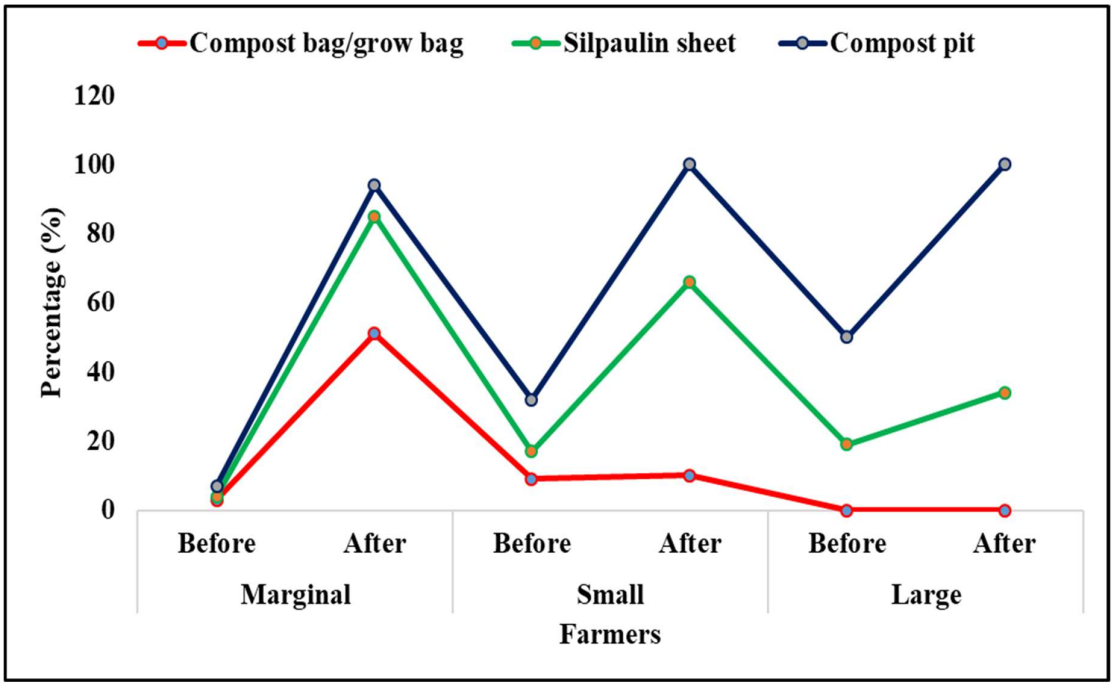
Adding compost to the soil increases the organic matter content. This, in turn, improves many soil characteristics and allows for the slow release of nutrients for crop use in subsequent years. Small-scale composting can be achieved in a small plastic bucket or compost bag. Large-scale composting can be done using a silpaulin sheet and compost pit. Table XXVI, Figure 14 and Plate 24 depict the methods of composting and organic fertilizers used by the selected households.

TABLE XXVI

ADOPTION OF ORGANIC FERTILIZERS BY THE SELECTED HOUSEHOLDS

(N=450)

Method of Composting	Percentage of Households											
	Marginal (150)				Small (150)				Large (150)			
	Before		After		Before		After		Before		After	
	No	%	No	%	No	%	No	%	No	%	No	%
Compost bag	4	3	76	51	12	9	14	10	-	-	-	-
Silpaulin sheet	2	1	52	34	11	8	78	56	27	19	48	34
Compost pit	4	3	22	9	21	15	48	34	43	31	92	66



IGURE 14

ADOPTION OF ORGANIC FERTILIZERS BY THE SELECTED HOUSEHOLDS

The table above demonstrates an improvement in vermicomposting adoption by using a silpaulin sheet and compost pit. Marginal and small farmers have improved their home composting by producing compost bags from discarded polythene bags. These bags are cost-effective, simple to maintain, and easy to manage. Due to the renewed focus on organic farming, vermicompost plays a crucial role in agriculture. Farmers have recognized vermicomposting as an effective way to recycle animal waste, agricultural leftovers, and agro-industrial waste.

PLATE 24: ADOPTION OF ORGANIC FERTILIZERS

c. Adoption of Organic Growth Boosters by the Selected Households

Organic growth booster, also known as organic fertilizer or plant food, is a natural and sustainable way to provide essential nutrients to plants. Unlike synthetic fertilizers, which are chemically produced and can harm the environment, organic growth boosters are made from natural materials such as plant and animal waste, bone meal, fish emulsion, and compost.

Organic growth boosters provide a balanced and complete nutrient package for plants, including essential macronutrients such as nitrogen, phosphorus, and potassium, as well as micronutrients such as calcium, magnesium, and iron. In addition to nutrients, organic growth boosters also contain beneficial microorganisms that help improve soil health, such as mycorrhizae, bacteria, and fungi. After training, encourage the farmers to prepare and use the organic growth boosters. Table XXVII and Plate 25 shows the selected households' adoption of organic growth boosters.

TABLE XXVII
ADOPTION OF ORGANIC GROWTH BOOSTERS BY THE SELECTED HOUSEHOLDS

(N=450)

Organic Growth boosters*	Percentage of households					
	Marginal (150)		Small (150)		Large (150)	
	Before	After	Before	After	Before	After
Neem Cake	10	80	22	89	36	100
Egg Rasam	-	56	-	60	-	43
Organic Manure Tea	-	83	-	43	-	58
Jeevamirtham	-	12	2	18	7	42
Amuthakaraisal	-	14	-	26	-	78
Panchakaviyam	0	12	0	23	0	26
Fish Amino Karaisal	0	12	2	18	7	28
Theymorukaraisal	0	14	0	26	0	37
Lemon and Egg Karaisal	0	23	8	26	12	38
Egg and onion Karaisal	0	21	0	30	0	39
Arapumorukaraisal	0	23	0	38	0	40

*Multiple responses

Following the awareness campaign, organic growth boosters were used by farmers of all kinds. Because of its cost-effectiveness, efficiency, and ease of access to the raw material (neem), farmers in all categories favoured employing neem cake. Due mainly to financial and material limitations, marginal farmers used organic manure tea at a greater rate (83 percent) than Jeevamirtham and Amuthakaraisal. Large farms have begun to prepare and use Amuthakaraisal

and Jeevamirtham since the raw ingredients are easily accessible. Propensity score matching, according to Dube and Gelgo (2016), showed that farmers' per hectare agricultural revenue rose when organic growth boosters were adopted.

Additionally, they recommend that farmers be encouraged to use organic growth boosters. This could be accomplished if the government and other interested parties provided more training programmes to improve extension services and increase access to information about the adoption of organic growth boosters.

d. Adoption of Organic Repellents during Pre-harvesting

Pre-harvest losses occur before the process of harvesting begins and may be due to insects, weeds, and rusts. Harvest losses occur between the beginning and completion of harvesting and are primarily caused by losses due to insect pests and diseases. Pathogens and pests constantly challenge food security and safety worldwide. Plant protection products are used to manage them, raising concerns about human health, the environment, and economic costs. Basic substances are active, non-toxic compounds that are not predominantly used as plant protection products but hold potential for crop protection. Basic substances are garnering increasing attention due to their safety and cost-effectiveness.

The use of plant protection products, such as fungicides, insecticides, and herbicides, is crucial for controlling diseases and pests in agriculture, but their safety, costs, and availability are a growing concern. According to FAO Transforming Food and Agriculture to Achieve Sustainable Development Goals (SDGs), available online: https://www.fao.org/sustainability/en/ (accessed on 26 July 2023), sustainable food and agriculture should contribute to the three dimensions of sustainability: environmental, social, and economic. In this context, the management of crop pests and diseases should not only consider the costs of protection but also the efficacy of protection, which influences the yield and, consequently, the economic dimension of sustainability.

PLATE 25: ADOPTION OF ORGANIC GROWTH BOOSTERS

The awareness programme encouraged the farmers to adopt organic waste management practices for organic farming. Table XXVIII and Plate 26 show the adoption level of organic repellent during the pre-harvesting periods.

TABLE XXVIII

ADOPTION OF ORGANIC REPELLENTS DURING PRE-HARVESTING

(N=450)

S.No.	Methods*	Percentage of households					
		Marginal (150)		Small (150)		Large (150)	
		Before	After	Before	After	Before	After
1.	**Physical methods** Light trap	-	43	-	54	-	68
2.	Yellow sticky trap	-	31	-	39	-	48
3.	Bird perches	5	97	7	99	18	98
4.	Hand picking method	5	7	6	8	-	5
5.	**Organic methods** Seed treatment with cow's urine	-	87	-	38	-	98
6.	Neem kernel extract to control pest	-	28	-	18	-	23
7.	Neem leaf extract to control pest	2	89	-	68	-	53
8.	Garlic, Chilli, Ginger extract	3	18	-	22	-	20
9.	Cow dung extract spray	5	86	-	92	-	98
10	Akniasthiram	0	53	0	65	0	79
11	Neemasthiram	0	42	0	48	0	56
12	Brahmastra	7	89	10	92	20	96

*Multiple Responses

Out of all the physical approaches, the light trap and bird perch methods were the most popular, as seen in the above table. According to farmers, the most effective way to manage

pests and diseases during the pre-harvest period was to use neem leaf powder and extract. This was followed by spraying cow dung extract and treating seeds with cow urine. Farmers started using Brahmastra, Neemasthiram, and Akniasthiram to manage pests and illnesses during the pre-harvest phase. The usage of light traps, yellow sticky traps, cow urine seed treatment, neem kernel extract for pest management, akniasthiram, and neemasthiram was unknown to all kinds of farmers prior to the knowledge.

Following the awareness campaign, about 50% of the chosen homes consistently began using organic repellents to keep illnesses, pests, and insects at bay. Soni et al. (2012) discovered that, in the Talwara block of the Banswara district, only 8.88 percent of the respondents had a positive opinion of organic farming prior to training, but that number rose to 28.88 percent following training. Therefore, it may be said that the awareness programme is positively impacted.

e. Adoption of Organic Repellents DuringPost-Harvesting

The term "post-harvest losses" refers to a decline in the quantity and quality of agricultural produce from harvest to final consumption. These losses occur at various stages, such as harvesting, sorting, shipping, processing, and storage. The losses can broadly be categorized as weight loss due to spoilage, quality loss, nutritional loss, seed viability loss, and commercial loss. Hence, post-harvest processing ensures the preservation of quality, extends shelf life, reduces losses, adds value, promotes food safety, and opens up new market opportunities. The adoption of organic repellents to prevent and control insects and pests during post-harvesting is given in Table XXIX.

PLATE 26: ADOPTION OF ORGANIC METHODS TO PREVENT AND CONTROL PESTS AND DISEASES DURING PRE-HARVESTING

TABLE XXIX

ADOPTION OF ORGANIC REPELLENTS DURING POST-HARVESTING

S.No	Organic practices*	Percentage of households					
		Marginal (150)		Small (150)		Large (150)	
		Before	After	Before	After	Before	After
1	Treatment of gunny bags and polythene bags with neem leaf extract	-	100	-	100	-	100
2	Coating pulses with red soil	30	60	58	86	92	100
3	Neem leaf powder to control insects and pests	-	48	-	54	-	87
4	Pungamleaf powder to control insects and pests	-	40	-	48	-	38
5	Nochileaf powder to control insects and pests	-	28	-	54	-	48

*Multiple Responses

Following enlightenment, all kinds of farmers treated polythene and gunny sacks with neem leaf extract to keep insects and pests away during post-harvest times, as the above table showed. Interestingly, following the training, neem leaf powder was used by 48%, 54%, and 87% of marginal, small, and large households to control insects and pests during food grain storage.

Baker et al., 2020, found that the improved awareness and understanding of the histories and benefits of organic and IPM, goals and priorities shared by organic and IPM proponents and practitioners, and opportunities for accelerating adoption of biological approaches have the potential to improve our combined effectiveness in overcoming these barriers. Strategies to speed adoption include increased education and extension on proven, ready-to-use biological control options; full cost and benefit accounting for biologically-based alternatives to chemical controls; and public and private sector policies to encourage biological control and reduce reliance on chemical controls.

f. The Percentage of Food Grain Losses Before and After the Awareness Programme

During the post-harvest period, all the farmers, irrespective of the category, clean the grains before storage and use neem-treated dunnage for proper circulation and to avoid wet

surfaces. Following education and training, all categories of farmers used neem leaf extract-treated gunny bags and polythene bags. On the other hand, marginal farmers used neem leaf extract to disinfect storage rooms and structures at a rate of 100% after education. At the same time, the same was true for 97 and 98 percent of small and large farmers, respectively. Neem leaf powder proved to be the most effective organic repellent for controlling pests during storage, followed by coating the pulses with the red soil coating.

Pests can be a major problem for farmers , but there are many organic ways to control them. Organic pest control methods use natural materials and substances to repel, kill, or disrupt pests. They are often safer for the environment and for people than synthetic pesticides.Common organic pest control methods are physical barriers, trapping, biological controlandplant extracts. Post-harvest losses account for about 10% of total food grains due to unscientific storage, insects, rodents, micro-organisms, etc.

In India, annual storage losses have been estimated at 14 million tonnes worth Rs. 7,000 crores, in which insects alone account for nearly Rs. 1,300 crores. The major economic loss caused by storage insect pests is not always by consumption but also by the amount of contamination. (IGMRI, 2019). Adopting organic methods of insect and pest management can considerably minimise the loss. Table XXX and Figure 15 show the percentage of food grain loss before and after the awareness programme as expressed by the selected farmers.

TABLE XXX

PERCENTAGE OF FOOD GRAINS LOSSES DURING STORAGE

(N=450)

S.No	Food crops*	Percentage of losses					
		Marginal(150)		Small(150)		Large(150)	
		Before	After	Before	After	Before	After
1	Paddy	10	6	9	6	9	5
2	Maize	11	5	9	6	9	5
3	Black Gram	11	8	12	8	10	5
4	Green Gram	9	6	9	5	10	6
5	Horse Gram	10	5	10	6	9	4

***** Multiple Responses

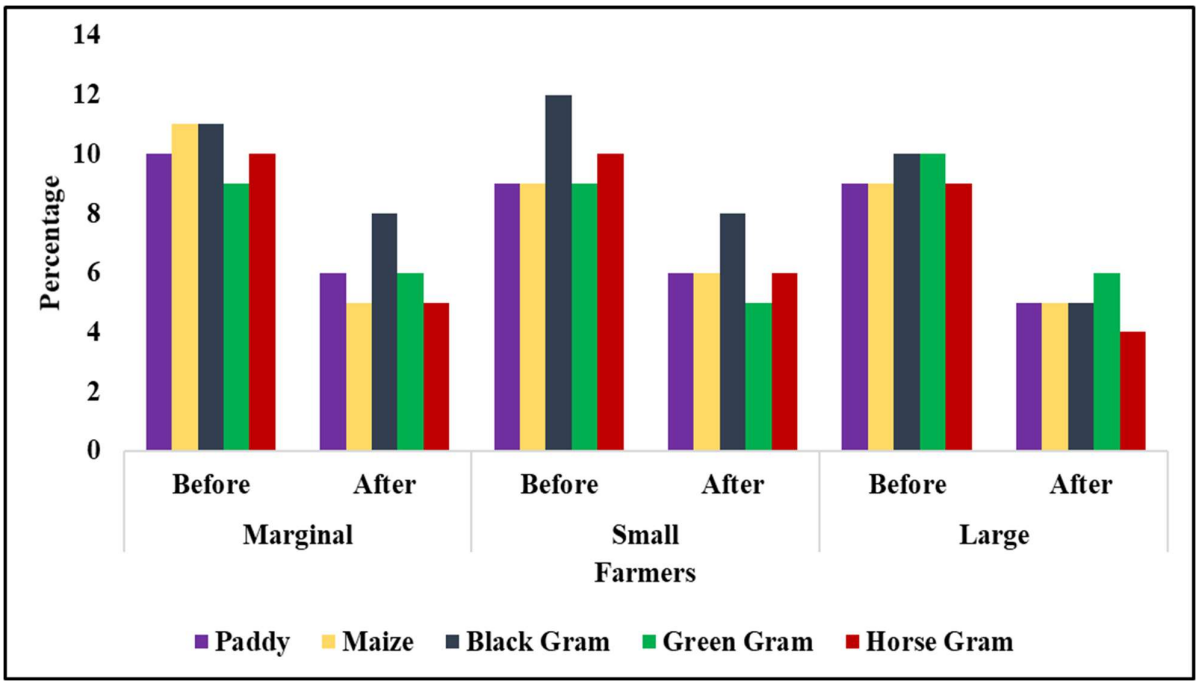


FIGURE 15

PERCENTAGE OF FOODGRAIN LOSSESS DURING STORAGE

It is evident from the above table that, after the training programme, the food grain losses declined due to organic agricultural practices.

The magnitude of food grain losses for all categories of farmers had declined considerably. Large farmers could significantly reduce their food grain losses compared to marginal and small farmers, implying a greater adoption of organic agricultural practices. Adopting organic fertilizer, growth boosters, and pesticides contributed to the overall reduction in food grain losses.

Manna et al ., (2021) states that In the last few decades, significant improvements were noted in Indian agriculture and national food production quantities, which were achieved through the better use of organic farming. However, second generation problems have become apparent due to improper use of fertilizers, frequent application of chemical fertilizers, depletion of essential soil nutrients, visible nutrient deficiency symptoms in many crops due to the removal of nutrients from soil at greater rates than their addition.

g. The Average Quantity of Food Grains Saved and its Money value Per Cropping

The quantity of food grains stored, the quantity of food grains saved from insects and pests, and its money value by adopting organic storage practices by the selected households are given in Table XXXI.

TABLE XXXI

THE AVERAGE QUANTITY OF FOOD GRAINS SAVED AND ITS MONEY VALUEPER CROPPING

	Marginal			Small			Large		
Types of food grins	**Quanity stored in kg**	**Quantity saved in kg**	**Money value in Rs**	**Quantity stored in kg**	**Quantity saved in kg**	**Money value in Rs.**	**Quantity stored in kg**	**Quantity saved in kg**	**Money value**
paddy	700	35	805	1500	75	1,725	5000	250	5,750
Maize	200	5	100	300	6	120	300	6	120
Black gram	100	2	176	100	2	176	300	6	528
Green gram	100	2	150	200	4	300	400	8	600
Horse gram	100	2	84	200	4	168	200	4	168
Total	**1200**	**46**	**1,315**	**2,300**	**91**	**2,489**	**6200**	**274**	**7,166**

Paddy –Rs. 23/- Maize—Rs.20/- Black gram -Rs.88/- Green gram-Rs75/- Horse gram-Rs.42/-

It is worth mentioning that transforming organic waste into organic repellent might help reduce insect and pest assaults on stored grains. On average, marginal, small, and big farmers may save 46 kg, 91 kg, and 274 kg of food grains, respectively. The equivalent monetary values are Rs 1,315, Rs 2,489, and Rs 7,166 for marginal, small, and large farmers, respectively.

Following the awareness campaign, farmers came to understand the value of organic storage methods, which have several advantages, such as better soil health, increased food safety, and environmental sustainability through the use of natural techniques that reduce chemical residues and foster biodiversity.

h. The Average Economic Benefits of Organic Waste Management in Organic Farming

Switching to organic pest and disease management methods offers numerous benefits, including quality food, a healthy atmosphere, a safe environment, and economic benefits. Table XXXII shows that the adoption of organic pest and disease management methods yields economic benefits.

Oelhaf in 2018, concluded that although production cost differences between conventional and organic farming are small there are substantial health and environmental benefits to be gained from a widespread adoption of organic farming.

Economic benefits were calculated based on the farmer's records of the amount spent on fertilizers and pesticides before and after the training programme.

TABLE XXXII

THE AVERAGE ECONOMIC BENEFITS OF ORGANIC WASTE MANAGEMENT IN ORGANIC FARMING

(N=450)

S. No	Items	Small Farmers(150)			Marginal Farmers(150)			Large Farmers(150)		
		Amount Spent (Rs.)		Amount saved (Rs.)	Amount Spent (Rs.)		Amount saved (Rs.)	Amount Spent (Rs.)		Amount saved (Rs.)
		Before training	After training		Before training	After training		Before training	After training	
1	Fertilizer	3370	1700	1,670	5680	3000	2,680	10,300	5,000	5,300
2	Pesticides	9900	5000	4,900	15,590	8000	7,590	29,100	9,700	19,400
3	Food grains saved and its money value	-	-	1,315	-	-	2,489	-	-	7,166
	Total	13,270	6,700	**7,885**	21,270	11,000	**12,759**	39,400	14,700	**31,866**

From the above table, it was clear that, after adopting organic waste management for organic farming practices, the farmers derived economic benefits by reducing their expenditure on chemical fertilizers and pesticides and saved food grain losses during storage. The results also emphasized that marginal and small farmers could reduce food crops and grain losses by about 50 percent. Large farmers can save 75 percent of their expenditure because they have more organic resources to produce organic fertilizers, boosters, and pesticides. On average, marginal, small, and large farmers could save an amount of Rs. 7,885, Rs. 12,759, and Rs. 31,866 per crop, respectively. The adoption not only resulted in economic benefits, but it also reduced the use of chemicals, thereby providing health benefits.

Farmers attributed the reduction of food crops and grain losses to adopting organic fertilizers, growth boosters, and organic pesticides. Farmers could save a significant amount of grain if they continued to adopt such effective practices.

i. Opinion Regarding the Adoption of organic waste management in organic farming

Training and awareness programmes provide individuals with opportunities to acquire and develop new knowledge, relevant skills, technical expertise, problem-solving skills, and leadership abilities. Organic farming training improvesfarmers' skills and knowledge in areas such as planting techniques, irrigation, organic fertilizers, growth boosters, pesticides, crop rotation, and crop storage after harvest. These skills enable farmers to improve yields, protect their crops against weather-related shocks, and smooth their incomes year-round. To enhance the effectiveness of the organic farming training programme, it is crucial to gather information and opinions on the adoption of organic waste management for organic farming among the selected households. Therefore, the adoption of organic farming practices was assessed, and the results were presented in Table XXXIII.

TABLE XXXIII

OPINION REGARDING ORGANIC WASTE MANAGEMENT IN ORGANIC FARMING

(N=450)

S.No.	Opinion*	Percentage of households		
		Marginal (150)	Small (150)	Large (150)
1	Low cost	100	100	100
2	Convenient to apply	99	94	97
3	Easy availability	99	95	92
4	Suitability	90	90	90
5	More satisfaction	90	90	90
6	Quality product	90	85	80
7	Safe Food	80	85	95

* Multiple responses

All marginal, small, and large farmers unanimously agreed that it was cost-effective. The majority of marginal (99 percent), small (94 percent), and large farmers (97 percent) expressed that it was convenient to apply. Ninety-nine percent of marginal farmers, 95 percent of small farmers, and 92 percent of large farmers stated that it was easy to access. Ninety per percent of marginal farmers, 85 percent of small farmers, and 80 percent of large farmers opined that it was a chemical-free product for consumption and also very tasty to eat without fear. According to Lopez et al. (2018), he stated that the farmers felt that food is safe and healthy to consume when it is harvested through organic farming.

The majority of organic farmers claimed that they employed self-made inputs such as seeds, manures such as Panchakavyam and Jeevamirtham, leaf extract, ginger-garlic-chilli extract, green manure, vermicompost, farm compost, and natural plant protectors rather than purchasing expensive inputs from the market. Because manure application encourages the use of rotations and other soil fertility-preserving practices, producers see soil nutrient augmentation as one of the major advantages of organic farming.

j. Suggestions for Better Adoption of Organic Waste Management in Organic Farming

A proposal is a thought or plan presented by someone for consideration or future action, indicating a possible course of action for others to consider. Farmers who are now practising organic farming with organic waste have the capacity to provide ideas that will lead to future industry advancements. As a consequence, Table XXXIV shows the proposals gathered from the selected families for improving the adoption of organic waste management in organic farming.

.TABLE XXXIV

SUGGESTION FOR BETTER ADOPTION OF ORGANIC WASTE MANAGEMENT IN ORGANIC FARMING

(N=450)

S.No.	Suggestions	Percentage of households		
		Marginal (150)	Small (150)	Large (150)
1	Regular awareness campaigns	99	99	99
2	Support in marketing the product	99	97	98
3	Technical guidance	99	95	89
4	Organic materials processing centre	95	90	80
5	Provision of subsidy	90	80	70

The majority (99 percent) of farmers in all categories proposed holding an awareness campaign on a regular basis to inspire and communicate information to farmers about the use of organic inputs to manage diseases and pests before and after harvesting. Ninety-nine per percent, 97 percent, and 98 percent of marginal, small, and large farmers, respectively, requested assistance in marketing their goods at fair prices.

Other recommendations include giving technical assistance, constructing organic materials processing facilities, and offering subsidies to purchase raw materials and infrastructure required for the implementation of organic agriculture techniques. All of these proposals ought to be implemented by the government and extension organisations.

"Waste less, smile more."
"Be a friend to the Earth—sort your waste."
"Waste care saves lives everywhere."
"Smart waste management for a cleaner world."