

# Farm Profile Attributes and Adoption of ITK by Rice-Growing Organic Farmers in Tamil Nadu

## ABSTRACT

**Aims:** Farmers are becoming more aware of organic farming and there is an increase in area for organic cultivation. The present study was conducted in major rice growing districts of Tamil Nadu during May 2024. The farm profile and Indigenous Technical Knowledge (ITK) practices followed by the organic farmers has been documented.

**Place and Duration of Study:** The survey was conducted in the districts of Tamil Nadu where farmers practiced Organic Farming during May 2024

**Methodology:** A total of 60 respondents, 10 farmers selected by snowball sampling were surveyed from the districts of Nagapattinam, Thiruvarur, Thanjavur, Karaikal, Thoothukudi, Ramanathapuram in Tamil Nadu and Karaikal in Puducherry. The purpose of the study was to gather information from organic farmers for crop pest and nutrient management in rice.

**Results:** The study reveals that majority of the farmers having secondary level of education (31.67 %), twenty years of organic farming experience (75 %), contacts with extension officials (45 %), information obtained through mass media (73 %) and actively participating in social activities (45 %). Panchagavya has been used by almost 68 per cent of the farmers for nutrient management and Meenamulam used by majority (68 %) of the farmers. The other commonly used ITK concoctions include Jeevamirtham 20 (ml/lit), Amirthakaraisal 10 (ml/lit), five leaf extract 30 (ml/lit), 3G extract 50 (ml/lit), Themorkaraisal 100 (ml/lit).

**Conclusion:** From this study it is evident that farmers are gaining more knowledge on organic farming and its importance. Anyhow, education has to be provided to those who are in the progress of practising organic farming. Pest management strategies and trainings need to be offered to the farmers and the officials and scientists are willing to provide knowledge to the farmers as this of prime concern in agriculture.

*Keywords: ITK practices, Nutrient management, Organic concoctions, Profile, Rice*

## 1. INTRODUCTION

Rice is a staple food crop grown in South Asian Countries in which 85 per cent of the cropping system falls in the Indo- Gangetic plains [1,2]. India ranks first in terms of rice cultivation (42.5M ha) and second in terms of production (152.6 MT) [3]. The use of synthetic chemicals for crop management since green revolution has led to many adverse effects which includes soil health deterioration, increased cost of cultivation, affecting environment [4]. On the other hand, organic farming relies upon organic waste crop rotations, animal manures, crop residues and biological systems for nutrient mobilization, ensuring optimal plant protection. India ranks first in terms of organic farmers and ninth in terms of area under cultivation [5]. 1.71M ha of land has been certified under organic cultivation which represent about 4 per cent of net sown area (NPOP, 2023). Tamil Nadu ranks 14<sup>th</sup> in organic producing states in the country with 31,627 hectares of organic farm land. This study documents the different pest management strategies used by organic farmers of Tamil Nadu, particularly the ITK techniques, in order to further validate and improve the technique for promotion in IPM packages for organic farming.

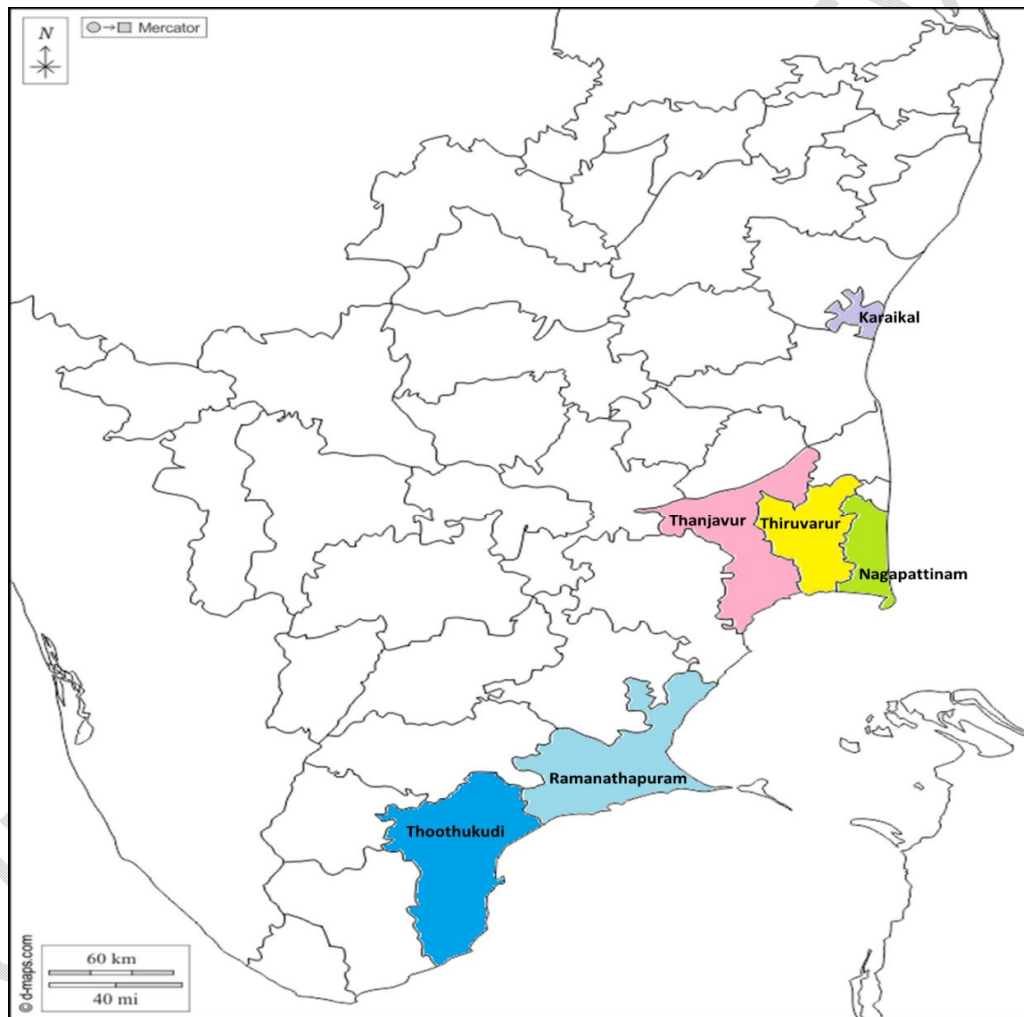
## 2. MATERIAL AND METHODS

Survey and documentation of indigenous technical knowledge (ITK) practices of organic farmers in the districts of Cauvery delta region of Tamil Nadu

The survey was carried out in the districts of Cauvery delta region during June 2024 to comprehend the methods of pest management followed by the organic farmers and questionnaires were prepared to conduct the survey. The questionnaire was designed ensuring that all relevant data has been recorded after discussing with Extension researchers, Scientists and the officials of Tamil Nadu Organic Certification Department (TNOCD), Department of Agriculture, Tamil Nadu. A total of 60 respondents, 10 farmers selected by snowball sampling were surveyed from the districts of Nagapattinam, Thiruvarur, Thanjavur, Karaikal, Thoothukudi, Ramanathapuram in Tamil Nadu and Karaikal in Puducherry. The purpose of the study was to gather information from organic farmers for crop pest and nutrient management in rice.

The questionnaire was designed in major view with the organic traditional practices followed for crop nutrient and pest management. It had three parts comprising general/ personal information of the farmer which includes education, years in farming experience, agencies in contact, mass media source for crop production, social participation farming details which includes area of land, source of irrigation and irrigation methods, crops grown and organic farming practices which includes practices for nutrient and pest management. Figure 1 gives the representation on number of farmers surveyed in different districts.

**Fig 1. Sample distribution of organic farmers surveyed in the districts of Tamil Nadu**



### 3. RESULTS AND DISCUSSION

#### 3.1 Socioeconomic characteristics of organic farmers

##### 3.1.1 General information (Table 1)

The information gathered on education, organic farming experience, ITK awareness obtained by the farmers through external officials/agencies, media exposure and social participation is provided in Table 1. [6] reported on the profile characteristics of farmers following SRI rice cultivation in Nagapattinam district of Tamil Nadu which supports the present study based on their socio-economic and farming details. The organic farmers were categorised according to the features of their selected profile.

### 3.1.1.1 Education

The education level of the farmers was categorized into five groups; Illiterate, Primary (up to fifth class), Secondary (sixth to tenth class), Higher secondary (up to HSLC) and Collegiate. Majority of them were educated up to Secondary level (31.67 %) and Collegiate (26.67 %), followed by Higher secondary level (20 %) and Primary level (18.33 %). The per cent Illiteracy was found to be low (3.33 %) among the respondents. The findings of [7] are found to coincide with that of the present study.

### 3.1.1.2 Farming and Organic Farming Experience

From the responses gathered, it is found that 65 per cent of the respondents have 20 years of experience and 23.33 per cent have 20 to 40 years of experience in farming. Only 11.66 per cent of the farmers have more than 40 years of farming experience. Those who have been following organic farming for a period of 10 years was found to be 75 per cent followed by a period of 20 years by 16.67 per cent. Farmers having more than 20 years of organic farming experience represents only about 8.33 per cent. Of the 60 respondents it is found that only 26.67 per cent of the farmers have been practising organic farming since beginning irrespective of their years of farming experience. The findings of this study are found to be in concordance with that of [8]. From the reports of [9] it shows that the farmers were having positive attitude towards organic farming.

### 3.1.1.3 Extension Officials/ Agencies in contact

About, 45 per cent of farmers were in contact with Agricultural Officers and 20 per cent with Assistant Agricultural Officer. TNAU Scientists are being asked for advice regarding IPM practices by 15 per cent of farmers. In addition, farmers have contact with JDA (8.33 %), ADA (13.33 %), FPO (8.33 %), TNAU Scientists (15 %). Over 18.33 per cent of the farmers seek help from KVK specialists and VAO, where they get involved in trainings and field demonstrations. About 43.33 per cent of the farmers are in contact with any one of the extension officers or scientists followed by 28.33 per cent with two, 6.67 per cent with three and 1.67 per cent with four officials. It is notable that over 20 per cent of the farmers surveyed are not in contact with any of the external agencies.

### 3.1.1.4 Media Sources for Crop Production Information

The mass media exposure of farmers for gathering information on crop production techniques is found to be only 73.33 per cent. Majority (41.67 %) of the farmers were found to use Television followed by Online platform (28.33 %), News Papers (23.33 %), AIR (21.67 %), FM (20 %), and very few (10 %) were found to use Farm Magazine. Over 31.67 per cent are exposed to at least one of the media sources followed by 23.33, 11.67, 3.33, and 1.67 per cent exposed to 2 to 6 media sources respectively and 26.67 per cent of the farmers are not exposed to any source of media information.

### 3.1.1.5 Social Participation

Over 45 per cent of the respondents were found to be in active part of social activities. Majority (21.67 %) of them were found to have been taking part with small social activities, some of them are members (10 %) of certain associations followed by being chairman (5 %) and officers (1.67 %). It is very notable that only half of the respondents are active in social participation. [10, 11] had similar reports on social participation of farmers.

**Table 1. Socioeconomic characteristics of organic farmers in districts of Cauvery delta region (n=60)**

S. No.	Attributes	Frequency	Percentage
I	<b>Education</b>		
1.	Illiterate	2	3.33
2.	Primary	11	18.33
3.	Secondary	19	31.67
4.	Higher Secondary	12	20.00

5.	Collegiate	16	26.67
----	------------	----	-------

**II Farming Experience**

1.	20 years	39	65.00
----	----------	----	-------

2.	21to 40 years	14	23.33
----	---------------	----	-------

3.	41 to 60 years	7	11.67
----	----------------	---	-------

**Organic Farming Experience**

4.	10 years	45	75.00
----	----------	----	-------

5.	11 to 20 years	10	16.67
----	----------------	----	-------

6.	21 to 30 years	5	8.33
----	----------------	---	------

**III Extension Officials/ Agencies in contact**

1.	Joint Directorate of Agriculture	5	8.33
----	----------------------------------	---	------

2.	Assistant Directorate of Agriculture	8	13.33
----	--------------------------------------	---	-------

3.	Agriculture Officer	27	45.00
----	---------------------	----	-------

4.	Assistant Agriculture Officer	12	20.00
----	-------------------------------	----	-------

5.	Farmers Producer Organizations	5	8.33
----	--------------------------------	---	------

6.	TNAU Scientists	9	15.00
----	-----------------	---	-------

7.	Others (KVK, VAO)	11	18.33
----	-------------------	----	-------

**No. of agencies in contact by individual farmers**

8.	None	12	20.00
----	------	----	-------

9.	1	26	43.33
----	---	----	-------

10.	2	17	28.33
-----	---	----	-------

11.	3	4	6.67
-----	---	---	------

12.	4	1	1.67
-----	---	---	------

**IV Media Sources for Crop Production Information**

1.	AIR	13	21.67
----	-----	----	-------

2.	FM	12	20.00
----	----	----	-------

3.	TV	25	41.67
----	----	----	-------

4.	News Paper	14	23.33
----	------------	----	-------

5.	Farm Magazine	6	10.00
----	---------------	---	-------

6.	Others	17	28.33
<b>No. of sources used by individual farmers</b>			
7.	None	16	26.67
8.	1	19	31.67
9.	2	14	23.33
10.	3	7	11.67
11.	4	2	3.33
12.	5	1	1.67
13.	6	1	1.67
<b>V Social Participation</b>			
1.	Chairman	3	5.00
2.	Member	6	10.00
3.	Officer	1	1.67
4.	Others	13	21.67

### 3.2 Farming details followed by Organic Farmers (Table 2)

#### 3.2.1 Land Holdings

The categories of farmers based on their farm size were furnished as marginal (<1 ha), small (1 to 2 ha), medium (2 to 10 ha) and large (>10 ha). About 45 per cent are found to be medium level farmers followed by 26.67 per cent of marginal and 25 per cent of small farmers. Only 3.33 per cent of them are found to be large scale farmers (>10 ha). All the 60 respondents had their own land and only two farmers had leased in land along with their owned lands. Based on the type of land such as wetland, garden land and rainfed it is found that majority (88.33%) had wet land followed by rainfed (8.33%) and garden land (3.33%). The results are found to be the findings of [12]

#### 3.2.2 Source of Irrigation and Irrigation Methods

The source of irrigation found in the study area were categorized as well, borewell and canal in which 41.67 per cent having canals, 31.67 per cent having borewell, 26.67 per cent having well as source and over 10 per cent were found to have any two of the three as the source for irrigation. Majority (86.67%) practised open irrigation followed by moderate (10%) practised drip irrigation and very few (3.33%) practised either rain gun or sprinkler type irrigation method.

#### 3.2.3 Crops Grown

The Cauvery delta zone is a predominant paddy growing area of Tamil Nadu. All the respondents had paddy as their major crop along with some vegetable, pulses, oil seeds, flower and fibre crops like tomato, bhindi, chilli, onion, radish, lab lab, brinjal, black gram, green gram, coconut, jasmine, sesame and cotton. The paddy varieties grown are as follows, Karuppukavunni, Maapillai samba, Jeeraga samba, Aathur kichadi, CR 1009, Poongar, ADT 53, Ponni, ADT 51, IR 20, Thanga samba, Samba, Sanna ragam, Thooyamalli, CO 43, CO 42, Kaatuyaanam, CO 45, CO 54, Soora kuruvai, Nellarasi, CO 57 and Savithri 51. About 41.67 per cent prefer Karuppu kavunni followed by 36.67 per cent prefer Maapillai samba and Jeeraga samba, 16.67 per cent prefer Aathur kichadi, CR 1009 and Poongar, 10 per cent prefer ADT 53 and Ponni and 33.33 per cent grow other listed varieties. The other crops grown are mostly local varieties.

**Table 2. Farming details of organic farmers of the Cavery delta district**

S. No.	Particulars	Frequency	Percentage
--------	-------------	-----------	------------

<b>I Land Particulars based on farm size (ha)</b>			
1.	Marginal (<1 ha)	16	26.67
2.	Small (1 to 2 ha)	15	25.00
3.	Medium (2 to 10 ha)	27	45.00
4.	Large (>10 ha)	2	3.33
<b>Land Holding</b>			
5.	Owned	60	100
6.	Leased IN	2	3.33
<b>Land Type</b>			
7.	Wet land	53	88.33
8.	Garden land	2	3.33
9.	Rainfed	5	8.33
<b>II Source of Irrigation</b>			
1.	Well	16	26.67
2.	Borewell	19	31.67
3.	Canal	25	41.67
4.	Both	6	10
<b>Irrigation Methods</b>			
5.	Open	52	86.67
6.	Drip	6	10.00
7.	Rain gun	1	1.67
8.	Sprinkler	1	1.67

### 3.3 IPM adoption practices by the Farmers (Table 3)

The results furnished in Table 3 shows the information of Integrated Pest Management (IPM) practices. [13] pointed out the necessity of developing non-chemical, indigenous knowledge techniques as alternatives to chemical pesticides. Over 15 per cent of the farmers employed IPM practices like pheromone trap, light and sticky traps along with their organic sources. Around 51 farmers depend solely upon their organic sources and farming methods. The percentage of farmers that are unwilling to adopt new, improved methods is up to 75 per cent.

**Table 3. IPM adoption practices of organic farmers**

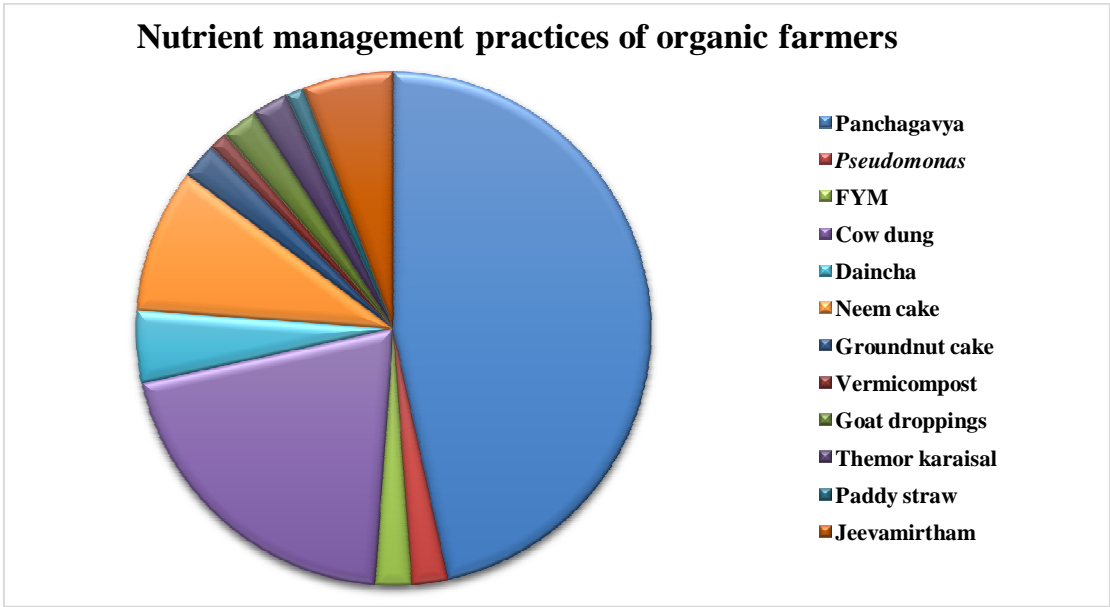
S. No.	Category	No. of Farmers	Per cent
1	ITK practises + IPM packages viz., light and sticky traps	9	15

### 3.4 Nutrient Management Practices for organic crop production (Table 4)

The organic practices of nutrient management adopted by the farmers of delta region are given in Table 4 and Figure 2. Cow dung, goat droppings, buttermilk, paddy straw, daincha, panchagavya, jeevamirtham, Manures like Farm Yard Manure (FYM), neem cake, groundnut cake, vermicompost and bio inoculant like *Pseudomonas* were used for nutrient management of the crops. Panchagavya is being used as a major (68.33 %) nutrient source by the farmers of Nagapattinam, Thiruvarur, Thanjavur, Thoothukudi and Karaikal. The other organic sources which are in moderate usage includes cow dung (30 %) by Thiruvarur, Nagapattinam, Thanjavur and Karaikal farmers; neem cake (13.33 %) by Nagapattinam and Thiruvarur district farmers and jeevamirtham (8.33 %) by Thiruvarur, Nagapattinam and Thoothukudi farmers. Daincha is being used by 6.67 per cent of Karaikal and Thanjavur farmers and Themorkaraisal by 3.33 per cent of Nagapattinam and Ramanathapuram district farmers. FYM is being used by the farmers of Union Territory of Karaikal (3.33 %). The farmers of Thiruvarur are found to be using many nutrient input sources like *Pseudomonas* (3.33 %), Groundnut cake (3.33 %), Goat droppings (3.33 %), and Vermicompost (1.67 %). The usage of these sources varies district wise and it may be because of their economic status.

**Table 4. Nutrient Management Practices of Organic farmers of the Cauvery delta zone**

S. No	Nutrient sources	No. of farmers	Nagapattinam	Thiruvarur	Thanjavur	Karaikal	Thoothukudi	Ramanathapuram	Per cent use
1.	Panchagavya	41	16	14	8	1	2	-	68.33
2.	<i>Pseudomonas</i>	2	-	2	-	-	-	-	3.33
3.	FYM	2	-	-	-	2	-	-	3.33
4.	Cow dung	18	6	7	3	2	-	-	30.00
5.	Daincha	4	-	-	1	3	-	-	6.67
6.	Neem cake	8	1	7	-	-	-	-	13.33
7.	Groundnut cake	2	-	2	-	-	-	-	3.33
8.	Vermicompost	1	-	1	-	-	-	-	1.67
9.	Goat droppings	2	-	2	-	-	-	-	3.33
10.	Themorkaraisal	2	1	-	-	-	-	1	3.33
11.	Paddy straw	1	1	-	-	-	-	-	1.67
12.	Jeevamirtham	5	2	2	-	-	1	-	8.33



**Fig 2. Nutrient management practices for organic crop production**

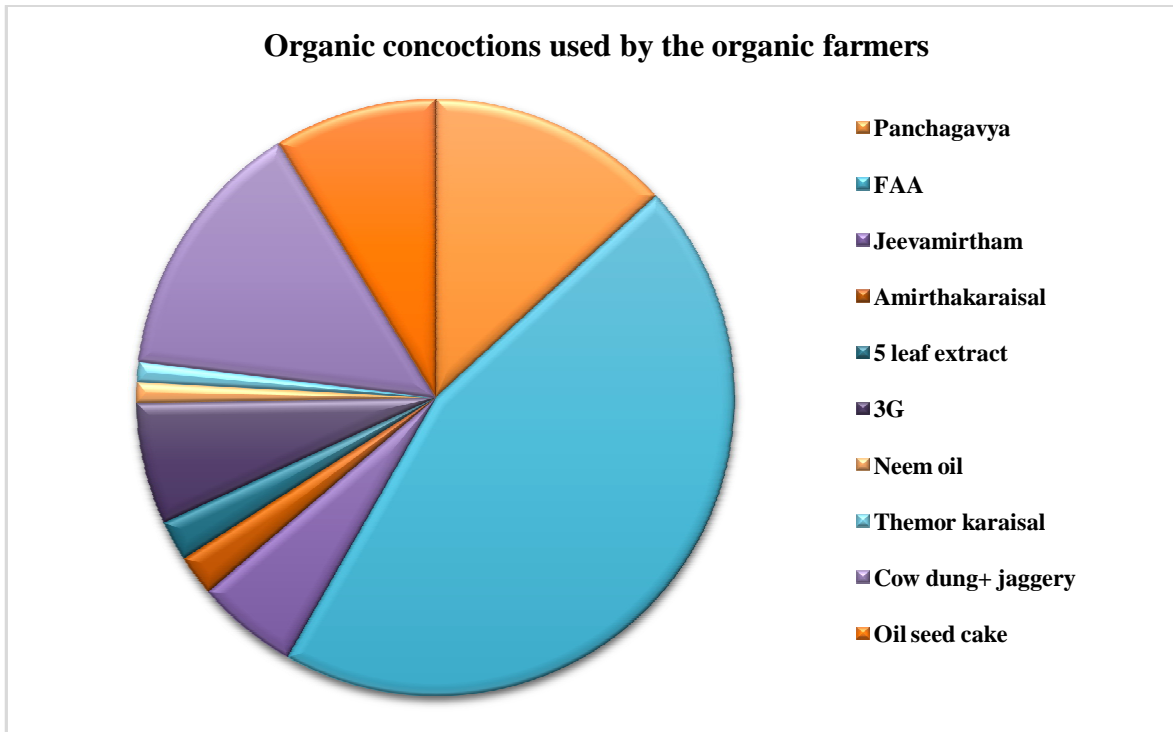
**3.5 ITK based concoctions used by the farmers:**

ITK based organic concoctions used for crop production by the farmers of delta region are given in Table 5 and Figure 3. It is found that the farmers prefer 10 different concoction which includes Panchagavya, Meenamulam, Jeevamirtham, Amirthakaraisal, five leaf extract, 3G extract, Neem oil, Themorkaraisal, Cow dung + Jaggery and Oil seed cake. Meenamulam is found to be used at the rate of 10ml/ lit by majority (68.33 %) of the farmers of Nagapattinam, Thiruvarur and Thanjavur districts. Cow dung + Jaggery (50 ml/lit) is being used by almost all the district farmers (21.67 %). Panchagavya (20 ml/lit) and Jeevamirtham (20 ml/lit) is also used as an ITK concoction by 20 per cent of the farmers of Nagapattinam, Thiruvarur, Thanjavur, Ramanathapuram and Thoothukudi districts. 3G (Ginger, Garlic Green chili – 50 ml/lit) extract is being used by 10 per cent of the farmers. Amirthakaraisal (10 ml/lit), 5 leaf extract (30 ml/lit) by 3.33 per cent and Neem oil (20 ml/lit), Themorkaraisal (100 ml/lit) by 1.67 per cent of the farmers of Thiruvarur, Thanjavur, Nagapattinam and Karaikal respectively. Oil seed cake is being used at 1-2 bags per acre by almost 13.33 per cent of the farmers. It is evident from Table 5 that farmers of Thiruvarur district use most of the ITK concoctions for crop management. [14] has also reported similar ITK practices followed by organic brinjal farmers of Tamil Nadu district.

**Table 5. Organic concoctions used by the organic farmers**

UNDE

S. No	Nutrient sources	Dose	No. of farmers	Nagapattinam	Thiruvarur	Thanjavur	Karaikal	Thoothukudi	Ramanathapuram	Per cent use
1.	Panchagavya	20 (ml/lit)	12	5	4	3	-	-	-	20.00
2.	Meenamilam	10 (ml/lit)	41	18	14	7	-	1	1	68.33
3.	Jeevamirtham	20 (ml/lit)	12	6	3	1	-	1	1	20.00
4.	Amirthakaraisal	10 (ml/lit)	2	-	1	1	-	-	-	3.33
5.	Five leaf extract	30 (ml/lit)	2	-	2	-	-	-	-	3.33
6.	3G extract	50 (ml/lit)	6	3	2	1	-	-	-	10.00
7.	Neem oil	20 (ml/lit)	1	-	-	-	1	-	-	1.67
8.	Themorkaraisal	100 (ml/lit)	1	1	-	-	-	-	-	1.67
9.	Cow dung+ jaggery	50 (ml/lit)	13	4	4	4	1	-	-	21.67
10.	Oil seed cake	1- 2 bags/a	8	3	3	-	2	-	-	13.33



**Fig 3. ITK based concoctions used by the organic farmers**

### **3.6 Problems faced by the farmers**

Seasonal rainfall and scarcity of water is the major problem faced by the organic farmers of Tamil Nadu. Some of the farmers are found to have issues with marketing their produce. Almost 50- 60 percent of the farmers have their crops affected with pests or diseases and very few of them mitigate this issue by the use of organic sources and with the help of extension officials. Farmers also face problems because of non-insect pests like birds and rodents.

## **4. CONCLUSION**

From this study it is evident that farmers are gaining more knowledge on organic farming and its importance. They state that they practice organic farming because of their own willingness, influence from friends, officials of KVK, Nammazhvar Organic Farming system and also because of Nel Jeyaraman. The farmers are found to be in frequent contact with the extension officials, TNAU scientists and also with JDA, ADA, AO. The farmers prepare their own organic concoctions and use them for plant protection. Anyhow, education has to be provided to those who are in the progress of practising organic farming. Pest management strategies and trainings need to be offered to the farmers and the officials and scientists are willing to provide knowledge to the farmers as this of prime concern in agriculture.

## **ETHICAL APPROVAL**

This research was conducted with strict adherence to ethical guidelines to ensure the protection of all participants and the integrity of the research process. Informed consent was secured from all participants, who were made aware that their participation was voluntary and that their personal data would be kept confidential

## **DEFINITIONS, ACRONYMS, ABBREVIATIONS**

ITK- Indigenous Technical Knowledge

## REFERENCES

- Saharawat, Y. S., Ladha, J. K., Pathak, H., Gathala, M., Chaudhary, N., & Jat, M. L. (2012). Simulation of resource-conserving technologies on productivity, income, and greenhouse gas (GHG) emission in rice-wheat system. *Journal of Soil Science and Environmental Management*, 3(1), 9-22. <https://doi.org/10.5897/JSSEM11.140>
- Nawaz, A., Farooq, M., Nadeem, F., Siddique, K. H., & Lal, R. (2019). Rice-wheat cropping systems in South Asia: Issues, options, and opportunities. *Crop and Pasture Science*, 70(5), 395-427. <https://doi.org/10.1071/CP18558>
- Surendran, U., Raja, P., Jayakumar, M., & Subramoniam, S. R. (2021). Use of efficient water-saving techniques for production of rice in India under climate change scenario: A critical review. *Journal of Cleaner Production*, 309, 127272. <https://doi.org/10.1016/j.jclepro.2021.127272>
- John, D. A., & Babu, G. R. (2021). Lessons from the aftermaths revolution on food system and health. *Frontiers in Sustainable Food Systems*, 5, 644559. <https://doi.org/10.3389/fsufs.2021.644559>
- Gamage, A., Gangahagedara, R., Gamage, J., Jayasinghe, N., Kodikara, N., Suraweera, P., & Merah, O. (2023). Role of organic farming for achieving sustainability in agriculture. *Farming System*, 1(1), 100005. <https://doi.org/10.1016/j.farmsys.2023.100005>
- Ashok Kumar, G., Sailaja, V., Satyagopal, P. V., & Prasad, S. V. (2015). Profile characteristics of SRI farmers in Nagapattinam district of Tamil Nadu. *Andhra Pradesh Journal of Agricultural Sciences*, 1(1), 67-72.
- Lamidi, W. A., & Akande, L. O. (2013). A study of status, challenges, and prospects of agricultural mechanization in Osun state, Nigeria. *Journal of Education, Arts and Humanities*, 1(1), 1-8.
- Kumar, M. S., Vasantha, R., & Shivacharan, G. (2017). Profile characteristics of paddy and irrigated dry crop growers of Karimnagar district, Andhra Pradesh. *International Journal of Farm Sciences*, 7(1), 44-48.
- Malik, N., Singh, M. K., Kumar, A., Nain, M. S., & Vashishtha, P. (2023). Farmers' readiness for organic farming: A study of Aligarh District in Uttar Pradesh. *Indian Journal of Extension Education*, 59(1), 42-45.
- Pathade, S. S., Manish, N., Sawant, S. M., Sadashive, K. I., & Pordhiya, R. (2017). Study of socio-economic and psychological characteristics of Self-Help Group members. *Indian Research Journal of Extension Education*, 53(4), 129-131.
- Sandeep, G. P., Ganesamoorthi, S., & Raghuprasad, K. P. (2023). Comprehensive study on the profile characteristics analysis of farmers in Telangana. *The Pharma Innovation*, 12(8), 1569-1573
- Karangami, R. S., Dhenge, S. A., Chavan, P. M., & Anarase, M. S. (2019). Association of profile characteristics of rice growers and adoption of recommended package of practices. *Indian Journal of Extension Education*, 55(2), 48-52.
- Mainali, R. P. (2014). Biology and management of eggplant fruit and shoot borer, *Leucinodes orbonalis* Guenee (Lepidoptera: Pyralidae). *International Journal of Applied Sciences and Biotechnology*, 2(1), 18-28. <https://doi.org/10.3126/ijasbt.v2i1.10102>
- Vishnu Priya, R. (2018). Studies on organic pest management practices in shoot and fruit borer *Leucinodes orbonalis* Guenee in brinjal [B. Sc. (Agri.) Thesis, AC&RI, TNAU, Coimbatore].