



## A study on extent of adoption of paddy farmers about the integrated nutrient management technologies in Nagapattinam district of Tamil Nadu

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### Abstract

Paddy has shaped the culture, diets and economics of thousands of million people. For more than half of the humanity "paddy is life". In India paddy occupies the first place both in area and production. Nagapattinam district in Tamilnadu was purposively selected because of majority of the farmers, farm women and agricultural labourers are directly or indirectly involved in rice crop cultivation which forms the basis for the agrarian economy of Nagapattinam district. Nagapattinam district has eight taluks. Paddy is being grown in all eight taluks. The Eight taluks are Sirkali, Nagapattinam, Mayiladuthurai, Vedaranyam, Tharangambadi, Kilvelur, Kuthalam, Thirukkuvalai. Mayiladuthurai taluk was randomly selected for the study. Six villages namely Kiloy, Manalmedu, Mudigandanallur, Kesingan, Attur, Kadalangudi were selected for the study. Sample size of 120 respondents was selected by using proportionate random sampling technique. More than half of the respondents majority of the respondents (55.00 per cent) fell under medium category followed by high (34.17 per cent) and low (10.83 per cent) categories.

**Keywords:** adoption, integrated nutrient management, practice wise adoption

### Introduction

Paddy (*Oryza sativa*) is the staple food for 65% of the population in India. Among the food grains paddy is the largest consumed calorie source which meets 31% of the total calorie requirement of the population. With a per capita availability of 73.8 kg. India is the second largest producer of rice in the world next to China. In India paddy occupies the first place both in area and production. An Integrated approach of plant nutrient management has gained momentum and importance in recent years. The integrated nutrient management concept has to be applied through different approaches by the best blending of the trio-modes based on their availability and suitability for different crops and soils, Incorporation of organic- compost, night soils, farm yard manure, coir pith, green manure/ green leaf manures fortification enrichment of these organics with bio-inoculants/ chemicals are some of the common approaches followed in this concept for enhancing nutrient use efficiency of chemical fertilizers, higher yields of crops and for sustaining soil fertility.

The Gross Cropped Area in Tamil Nadu is around 58.43 lakh hectares of which the Gross irrigated Area is 33.09 lakh hectares which is 5700 and the balance 4300 of the area are under rainfed cultivation. Major efforts are required to increase the productivity of rainfed crops by overcoming the various challenges such as; erratic monsoon rains, soil with low nutrient and organic contents / poor water holding capacity, soil and water erosion, etc. The labour scarcity especially during the peak cropping season is also causing difficulty to the farmers to take-up timely field operations. In respect of agricultural crops, the crop cultivation is taken up in two to three seasons annually. In Nagapattinam

district, paddy is the main cereal crop. During few centuries back, paddy crop was given top most priority but the extent of cultivation was limited as there was no reservoir to store up water. However, strong stone masonry anicuts have been constructed with great skill across the rivers to impound and divert the water to feed the blocks of wetland on either bank of the rivers. Naturally paddy crop gets top priority and importance and therefore, the wetlands were highly priced. Almost half of the wetlands were owned by temples and the temple authorities. Under certain terms and conditions these wetlands were distributed by the authorities to the local farmers for cultivation. In India paddy occupies the first place both in area and production. Nagapattinam district in Tamilnadu was purposively selected because of majority of the farmers, farm women and agricultural labourers are directly or indirectly involved in rice crop cultivation which forms the basis for the agrarian economy of Nagapattinam district.

### Research Methodology

Primary objective of this study was centered on the Knowledge level of respondents about the Integrated Nutrient Management technologies in Nagapattinam district. Nagapattinam district has been administratively divided into seven taluks and fifteen blocks. Nagapattinam district has eight taluks. Paddy is being grown in all eight taluks. The eight taluks are Sirkali, Nagapattinam, Mayiladuthurai, Vedaranyam, Tharangambadi, Kilvelur, Kuthalam and Thirukkuvalai. Mayiladuthurai taluk was randomly selected for the study. Mayiladuthurai block was selected as the researcher is familiar with the culture and dialects of this block. Out of 61 villages, six villages were selected from the

block on the maximum number of farmers engaged in agriculture. Thus, a total of six villages were identified for the study.

The list of farmers from each selected village was obtained from the gram panchayat office. For the selection of the respondents based on the proportionate random sampling technique was followed to select a sample size of 300 respondents.

A well prepared, pre-tested interview schedule is used to collect data from the respondents. Scores were allotted for each question and the scores obtained by the respondents were summed up for the respondent. The respondents were categorized into low, medium and high by using cumulative frequency. Further, the percentage analysis was worked out for the relationship between profile characteristics and adoption level of paddy growers.

## Results and Discussion

**Table 1:** Distribution of respondents according to their overall adoption level on Integrated Nutrient Management technologies (n=120)

S. No	Category	Number	Per cent
1.	Low	13	10.83
2.	Medium	66	55.00
3.	High	41	34.17
Total		120	100.00

It may be seen from the Table 1, that majority of the respondents (55.00 per cent) fell under medium category followed by high (34.17 per cent) and low (10.83 per cent) categories. As majority of the respondents possessed medium level of adoption on INM and high level of innovativeness, it is quite natural for majority of them to fall under medium category of adoption.

**Table 2:** Distribution of respondents according to their Practice-wise adoption level on Integrated Nutrient Management technologies (n=120)

S. No	Adoption technologies	Number	Per cent
I. Soil sample			
a	Micronutrient	25	20.83
b	Macronutrient	28	23.33
Mean percentage			22.08
II. Nursery			
1	Seed treatment with bio-fertilizer		
a	Quantity of bio-fertilizer per acre	96	80.00
2	Organic manure application		
a	Quantity of green leaf manure per acre	85	70.83
b	Quantity of FYM per acre	70	58.33
Mean percentage			64.58
3	Application of DAP		
a	Quantity of DAP per acre	53	44.16
b	Foliar application per acre	58	48.33
Mean percentage			47.25
4	Root dipping		
a	Name of the bio-fertilizer	93	77.50
b	Quantity of bio-fertilizer per acre	72	60.00
Mean percentage			62.73
Overall Mean percentage			63.64
III. Main field			
1	Incorporation of stubbles	68	56.67
2	Incorporation of green manure	96	80.00
3	Organic manure application		
a	Quantity of green manure	87	72.52
b	Quantity of FYM applied per acre	75	62.50
c	Quantity of compost applied per acre	35	29.16
Mean percentage			54.72
4	Application of inorganic fertilizers		
a	Name of N,P,K fertilizers used	105	87.50
b	Quantity of N applied per acre	95	79.16
c	Quantity of P applied per acre	80	66.66
d	Quantity of K applied per acre	84	70.00
Mean percentage			75.83
5	Application of bio-fertilizers		
a	Quantity of azospirillum applied per acre	70	58.33
6	Application of micronutrients		
a	Quantity of Znso4 used per acre	58	48.33
7	Foliar application of urea		
a	Quantity per acre	62	51.66
8	Application of potassic fertilizer		
a	Quantity applied per acre	50	41.66
9	Top dressing with chemicals		
a	Quantity applied per acre	80	66.66

10	Application of phosphatic fertilizer		
a	Quantity applied per acre	73	60.83
11	Application of gypsum		
a	Quantity used per acre	47	39.16
12	Basal application		
a	Quantity of neem cake applied per acre	12	10.00
b	Quantity of gypsum applied per acre	62	51.66
	Mean percentage		30.83
13	Zinc deficiency	101	84.16
	Overall mean per cent		57.13

### Soil sample

It could be observed from the Table 20, that one-fifth of the respondents (20.83 per cent) had tested soil sample for macronutrient and soil sample for micronutrient (23.33 per cent) respectively. Most of the respondents were unaware of testing the soil. This in turn would have resulted with less adoption of this practice. This finding gains support from the findings of Rajasekaran (2015) <sup>[4]</sup>.

### Nursery

Out of the four technologies, majority of the respondents had adopted the practices viz., seed treatment with bio-fertilizer (80.00 per cent) followed by root dipping with bio-fertilizers (68.75 per cent) and organic manure application (64.58 per cent). Only 46.24 per cent of the respondents had applied the recommended DAP. This might be due to the low knowledge on DAP among the respondents. This finding gains support from the findings of Poovarasan (2018) <sup>[3]</sup>. The mean adoption percentage under nursery technologies was found to be 62.73.

### Main field

Regarding the main field practices, majority of the respondents (80.00 per cent) have incorporated of green manure in their main field followed by 56.67 per cent of respondents who had incorporated stubbles. Most of the respondents had knowledge about greenmanures. This would have resulted with high level of adoption of green manure. This finding gains support from the findings of Janakirani, (2004) <sup>[1]</sup>.

### Organic manure

Among the three technologies under organic manure application, nearly three-fourth (72.50 per cent) of the respondents have adopted the recommended quantity of green manure. While nearly two-third of the respondents (62.50 per cent) had adopted the recommended quantity of FYM per acre, whereas the recommended quantity of compost was adopted only by 29.16 per cent of the respondents. The inadequate availability of compost in time might be the reason for their low adoption. This finding gains support from the findings of Santhi (2017) <sup>[6]</sup>.

### Inorganic manure application

Among the four technologies, most of the respondents (87.50 per cent) had adopted the recommended N, P, K fertilizers, recommended quantity of N applied (79.16 per cent), recommended quantity of N applied per acre (70.00 per cent), while two-third of the respondents had adopted the recommended quantity of P (66.66 per cent). A majority of the respondents possessed knowledge on inorganic manures and the availability was not a problem. This could be the reason for the high adoption of inorganic manure

technologies. This finding gains support from the findings of Poovarasan (2018) <sup>[3]</sup>.

### Application of bio-fertilizer

A majority of the respondents (58.33 per cent) had adopted the recommended bio-fertilizer in their main field. The respondents have already applied bio-fertilizer in the nursery stage itself and also the availability of bio-fertilizer was inadequate. This might be the reason for medium level of adoption of this technology. This finding gains support from the findings of Natarajan (2016) <sup>[2]</sup>.

### Micronutrient application

Only less than half of the respondents (48.33 per cent) had used micronutrients in their main field. Non-availability of micronutrients at the required time in the government depot might be the reason for their low adoption. This finding gains support from the findings of Santhi (2006) <sup>[5]</sup>.

### Foliar application of urea

Nearly half of the respondents (51.66 per cent) adopted foliar application of urea. Majority of the respondents had knowledge on foliar application of urea and this would have led to higher adoption. This finding gains support from the findings of Santhi (2017) <sup>[6]</sup>.

### Application of potassic fertilizer

Two-fifth of the respondents (41.66 per cent) had adopted potassic fertilizer in their main field. The probable reason for the medium adoption of this technology might be due to high cost. This finding is in contradictory with the findings of Rajasekaran (2015) <sup>[4]</sup>.

### Top dressing with chemicals

Majority of the respondents (66.66 per cent) had adopted top dressing with chemicals. The respondents had adequate knowledge on this technology and this would have resulted with high adoption. This finding derives support from the findings of Santhi (2006) <sup>[5]</sup>.

### Application of phosphatic fertilizer

60.83 per cent of the respondents had adopted the recommended phosphatic fertilizer in their field. Availability of phosphatic fertilizer was adequate and further the reason for high adoption might be due to the knowledge gained about the effect of Phosphatic fertilizer by the respondents. This finding derives support from the findings of Rajasekaran (2015) <sup>[4]</sup>.

### Application of gypsum

Nearly two-fifth of the respondents (39.16 per cent) had adopted application. Lack of knowledge and weak extension service might be attributed as the reasons for low adoption.

This finding gains support from the findings of Natarajan (2016) [2].

District, Unpublished M.Sc (Ag.) Thesis, Annamalai University, Annamalainagar, 2017.

### **Basal application**

Regarding basal application, a majority of the respondents (51.66 per cent) had applied the recommended quantity of gypsum. Only 10.00 per cent of the respondents had adopted the recommended quantity of neem cake in their field. It may be due to their inadequate knowledge, weak extension service and lack of visible impact. This finding gains support from the findings of Poovarasana (2018) [3].

### **Zinc application**

Majority of the respondents (84.16 per cent) had applied zinc in their field, Most of respondents had more conviction about the benefits of application of zinc to overcome the nutrient deficiency and also they possessed more knowledge about this management practice, This might be the main reason for their high adoption level.

The adoption mean percentage for the main field technologies in the descending order was found to be 84.16 for zinc application, 75.83 for application of inorganic fertilizers, 68.33 for incorporation of stubbles and green manure, 54.72 for organic manure application, 51.66 for foliar application of urea, 49.94 for application of gypsum, 48.33 for application of micronutrients 41.66 for application of potassic fertilizer and 30.83 for basal application. This finding gains support from the findings of Janakirani, (2004) [1]. The mean adoption percentage for main field technologies was found to be 57.31, while the overall mean adoption percentage for INM technologies was found to be 60.02.

### **Conclusion**

According to the adoption level on INM technologies, majority of the respondents (55.00 per cent) fell under medium category followed by high (34.17 per cent) and low (10.83 per cent) categories. As majority of the respondents possessed medium level of knowledge on INM and high level of innovativeness, it is quite natural for majority of them to fall under medium category of adoption.

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