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### A study on the knowledge and adoption behaviour of certified organic rice farmers in the Krishna–Godavari zone of Andhra Pradesh

<sup>1</sup>Venkata Pattabhi Ramayya J, <sup>2</sup>K Atchuta Raju, <sup>3</sup>M Venkataramulu and <sup>4</sup>B Aparna

<sup>1</sup>M.Sc., Agriculture Student, Department of Agriculture Extension Education, ANGRAU-Agricultural College, Bapatla, Andhra Pradesh, India

<sup>2</sup>Coordinator, ANGRAU-DAATTC, Bapatla, Andhra Pradesh, India

<sup>3</sup>Senior Scientist (Extension), ANGRAU-AI & CC, Lam, Guntur, Andhra Pradesh, India

<sup>4</sup>Assistant Professor, Department of Agricultural Economics, ANGRAU-Agricultural College, Bapatla, Andhra Pradesh, India

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Corresponding Author: Venkata Pattabhi Ramayya

#### Abstract

The present study was conducted in state of Andhra Pradesh using an Ex-Post Facto research design. Four districts from Godavari-zone and four districts from Krishna-zone were selected purposively based on highest rice cultivation area (A.P. e-panta report, 2024). 15 respondents were selected from each district by simple random sampling thus making a total of 120 respondents. A semi-structured interview schedule was prepared in the light of objectives of the study. Frequencies, adoption quotient, mean and standard deviation were employed for analysis of data. It was observed a majority (43.33%) of the certified organic rice farmers had a high level of knowledge, followed by medium (39.17%) and low (17.50%). Also nearly half (45.83%) of the certified organic rice farmers had a medium level of adoption of ANGRAU recommended organic rice cultivation practices, followed by high (34.17%) and low (20.00%).

**Keywords:** Organic farming, knowledge, adoption, rice farmers

#### 1. Introduction

Organic farming is one of the most dynamic and rapidly-growing sectors of the global food industry. India's rank 2<sup>nd</sup> in terms of world's organic agricultural land and 1<sup>st</sup> in terms of total number of producers. India produced around 3.6 million metric tones (2023-24) of certified organic products with total export volume of 2,61,029 MT with an export value of 494.80 million USD (APEDA, 2024). Rising consumer demand for certified organic produce is supported by two certification systems—NPOP (APEDA) for exports and PGS-India (NCONF) for the domestic market. Andhra Pradesh State is known as "The Rice Bowl of India". Andhra Pradesh is one of the leading producers of rice which ranks 5<sup>th</sup> position in production and produces 12.6 million metric tons during 2022-2023. It is accounting for 5.85 percent of all rice produced in the country. The Krishna and Godavari zones produce 7.1 million metric tons of rice, making up 56.00% of the state's production. The three most significant rice-producing districts in Andhra Pradesh and all of India are the erstwhile districts of West Godavari, East Godavari and Krishna. West Godavari and East Godavari districts were once regarded as Andhra Pradesh's "Rice Bowl" (Ganesh *et al.*, 2023) [7]. Keeping in view the importance and the demand as well as high prices for organic food in India as well as in developed countries and also to make organic rice farming more profitable, it becomes important to know the extent of knowledge and

adoption of organic rice farmers. On the basis of above consideration, a study entitled "Study on knowledge and extent of adoption of ANGRAU recommended organic rice cultivation practices by certified organic rice farmers in Krishna-Godavari zone" has been planned with following objectives.

1. To assess the level of knowledge and extent of adoption of ANGRAU recommended organic rice cultivation practices by certified organic rice farmers.

#### 2. Materials and Methods

The present study was conducted during 2024-25 in Krishna and Godavari zones of Andhra Pradesh. Out of twenty-six districts in Andhra Pradesh, Four districts from Godavari zone (East Godavari, Eluru, Kakinada and Dr. B.R. Ambedkar Konaseema) and four districts from Krishna zone (Krishna, NTR, Guntur and Bapatla) were selected purposively based on highest rice cultivation area (A.P. e-panta report, 2024). From each selected district 15 respondents were selected by following simple random sampling procedure, thus making a total of 120 respondents. An ex-post facto research design was adopted for the study. Data was collected through personal interviews, systematically organized and analyzed to derive meaningful results and conclusions. The analysis utilized appropriate statistical tools such as adoption quotient, frequency distributions, percentages and standard deviation.

### 3. Results and Discussion

#### 3.1. Knowledge level of certified organic rice farmers on ANGRAU recommended organic rice cultivation practices

It is evident from the Table 1 that 43.33 per cent of the certified organic rice farmers were with high level of knowledge, followed by those with medium (39.17%) and low (17.50%) level of knowledge.

The probable reason for this might be the fact that the majority of the certified organic rice farmers were educated, possessed considerable farming experience, maintained regular contact with extension agencies, attended training programs on organic farming and accessed timely information through mass media, all of which contributed to

their medium to high level of knowledge regarding ANGRAU-recommended organic rice cultivation practices. The finding was in line with the results of Sihan *et al.* (2023) <sup>[11]</sup> and Shijagurumayum (2022) <sup>[10]</sup>.

**Table 1:** Distribution of the certified organic rice farmers according to their level of knowledge on ANGRAU recommended organic rice cultivation practices (n=120)

| S. No.                 | Category               | Frequency | Percentage |
|------------------------|------------------------|-----------|------------|
| 1.                     | Low (<22.54)           | 21        | 17.50      |
| 2.                     | Medium (22.54 - 25.98) | 47        | 39.17      |
| 3.                     | High (>25.98)          | 52        | 43.33      |
| Total                  |                        | 120       | 100.00     |
| Mean = 24.26 SD = 1.72 |                        |           |            |

**Table 2:** Content analysis of level of knowledge on ANGRAU recommended organic rice cultivation practices by the certified organic rice farmers

| S. No. | Particulars*                                                                                                                                  | Knowledge |        |           |       |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|-----------|-------|
|        |                                                                                                                                               | Correct   |        | Incorrect |       |
|        |                                                                                                                                               | F         | %      | F         | %     |
| 1      | For newly acquired fields, the conversion period is 24 months (2 years) in case of annual and biennial crops.                                 | 46        | 38.33  | 74        | 61.67 |
| 2      | The optimum paddy seed rate recommended is 25kg per acre.                                                                                     | 108       | 90.00  | 12        | 10.00 |
| 3      | Recommended dosage of <i>Pseudomonas fluorescens</i> for seed treatment is 10g per kg seed.                                                   | 75        | 62.50  | 45        | 37.50 |
| 4      | Seed treatment can be done with Beejamrutham.                                                                                                 | 120       | 100.00 | 0         | 0.00  |
| 5      | Irrigation water should not be flowed from adjacent conventional farming fields.                                                              | 120       | 100.00 | 0         | 0.00  |
| 6      | Recommended rate of application of FYM @3tons or compost @4tons per acre at the final ploughing.                                              | 84        | 70.00  | 36        | 30.00 |
| 7      | Sunhemp, dhaincha, pillipesara are examples of green manure crops.                                                                            | 107       | 89.17  | 13        | 10.83 |
| 8      | At flowering stage green manure crop should be incorporated in field.                                                                         | 104       | 86.67  | 16        | 13.33 |
| 9      | The recommended time of application of bio fertilizers like Azolla and PSB are at with in the 3-4 days after transplanting (DAT).             | 79        | 65.83  | 41        | 34.17 |
| 10     | Azolla, Azotobacter and Rhizobium are nitrogenous bio fertilizers.                                                                            | 62        | 51.67  | 58        | 48.33 |
| 11     | The recommended dosage of PSB is 500ml for one acre of paddy.                                                                                 | 48        | 40.00  | 72        | 60.00 |
| 12     | Application of micro nutrients like zinc, iron, calcium, copper etc. are allowed in organic farming.                                          | 60        | 50.00  | 60        | 50.00 |
| 13     | Weeds can be controlled by performing manual weeding twice, at 25 and 50 days after transplanting (DAT).                                      | 120       | 100.00 | 0         | 0.00  |
| 14     | Clipping the tips of paddy seedlings before transplanting can help reduce stem borer infestations.                                            | 95        | 79.17  | 25        | 20.83 |
| 15     | For monitoring pest incidence, set up 8 pheromone traps per acre for timely control measures.                                                 | 54        | 45.00  | 66        | 55.00 |
| 16     | To control leaf folder, boil 5 kg of neem leaves and 2 kg of custard apple leaves in 10 litres of cow urine, then filter and use the extract. | 100       | 83.33  | 20        | 16.67 |
| 17     | Alley ways of 20cm are made for every 2m length for BPH management.                                                                           | 110       | 91.67  | 10        | 8.33  |
| 18     | BPH can be controlled by spraying Thutikada kashayam (Datura leaves+cow urine).                                                               | 105       | 87.50  | 15        | 12.50 |
| 19     | Brahmastra is prepared from five types of bitter leaves.                                                                                      | 110       | 91.67  | 10        | 8.33  |
| 20     | Blast, sheath blight and stem rot can be controlled by <i>Pseudomonas fluorescens</i> .                                                       | 48        | 40.00  | 72        | 60.00 |
| 21     | Bael leaves extract ( <i>Maredu akulu kashayam</i> ) is used to control paddy stem rot.                                                       | 98        | 81.67  | 22        | 18.33 |
| 22     | Rice blast can be controlled by spraying of solution containing fermented butter milk (1lit.), cow urine (1lit.), water (8lit.).              | 97        | 80.83  | 23        | 19.17 |
| 23     | Yellow sticky traps are used for monitoring and controlling insect pests.                                                                     | 120       | 100.00 | 0         | 0.00  |
| 24     | Paddy leaf blight can be controlled by spraying asafoetida 10.00 per cent solution along with cow urine (Inguva in telugu).                   | 101       | 84.17  | 19        | 15.83 |
| 25     | Harvesting of paddy to the ground level prevents pest incidence.                                                                              | 70        | 58.33  | 50        | 41.67 |
| 26     | After harvesting organic produce and non organic produce should be stored separately without mixing.                                          | 120       | 100.00 | 0         | 0.00  |
| 27     | Quantity of jaggery and gram flour used in preparation of Jeevamrutham is 200g each per 1lit. of cow urine.                                   | 109       | 90.83  | 11        | 9.17  |
| 28     | Jeevamrutham gets ready for use in 5-7 days.                                                                                                  | 112       | 93.33  | 8         | 6.67  |
| 29     | Calcium sulphate (lime) is used for preparation of Beejamrutham.                                                                              | 114       | 95.00  | 6         | 5.00  |
| 30     | Dashpathri kashayam is to be kept for 45 days for fermentation.                                                                               | 96        | 80.00  | 24        | 20.00 |
| 31     | Neemastra is prepared by adding 5kg of neem paste in 10 litres of cow urine.                                                                  | 120       | 100.00 | 0         | 0.00  |

(\*Multiple Response Format)

A glance at Table 2 revealed that knowledge is uniformly high regarding simple and widely practiced methods of organic rice cultivation. All farmers (100%) correctly responded regarding seed treatment can be done with Beejamrutham, irrigation water should not be flowed from adjacent conventional farming fields, weeds can be controlled by performing manual weeding twice at 25 and

50 days after transplanting (DAT), yellow sticky traps are used for monitoring and controlling insect pests, after harvesting organic produce and non organic produce should be stored separately without mixing and Neemastra is prepared by adding 5 kg of neem paste in 10 litres of cow urine. These findings indicate that certified organic rice farmers were well acquainted with fundamental and easily

demonstrable practices integral to organic farming.

It is also evident that a considerable proportion of farmers (ranging from 75.00 to 99.00 per cent) had sound knowledge on several other important organic practices. The percentage rank order of their decreasing knowledge is: calcium sulphate (lime) is used for preparation of Beejamrutham (95.00%), followed by Jeevamrutham gets ready for use in 5–7 days (93.33%), alley ways of 20cm are made for every 2m length for BPH management (91.67%), Brahmastra is prepared from five types of bitter leaves (91.67%), quantity of jaggery and gram flour used in preparation of Jeevamrutham is 200g each per 1lit. of cow urine (90.83%), the optimum paddy seed rate recommended is 25kg per acre (90.00%). Sunn hemp, dhaincha, pillipesara are examples of green manure crops (89.17%), BPH can be controlled by spraying thutikada kashayam (87.50%), paddy leaf blight can be controlled by spraying asafetida 10.00 per cent solution along with cow urine (84.17%), to control leaf folder, boil 5 kg of neem leaves and 2 kg of custard apple leaves in 10 litres of cow urine, then filter and use the extract (83.33%), bael leaves extract (Maredu akulu kashayam) is used to control paddy stem rot (81.67%), rice blast can be controlled by spraying of solution containing fermented buttermilk (1lit.), cow urine (1lit.), water (8lit.) (80.83%), Dashpathri kashayam is to be kept for 45 days for fermentation (80.00%) and clipping the tips of paddy seedlings before transplanting can help reduce stem borer infestations (79.17%). This distribution suggests that most farmers possessed good practical knowledge of cultural, botanical, and nutrient management practices relevant to organic farming.

A moderate level of knowledge (ranging from 50.00 to 74.00 per cent) is observed with respect to more technical aspects of organic rice cultivation. The percentage rank order of their decreasing knowledge is: recommended rate of application of FYM @3 tons or compost @4 tons per acre at the final ploughing (70.00%), followed by the recommended time of application of bio fertilizers like Azolla and PSB are at within the 3–4 days after transplanting (DAT) (65.83%), recommended dosage of *Pseudomonas fluorescens* for seed treatment is 10g per kg seed (62.50%) and harvesting of paddy to the ground level prevents pest incidence (58.33%). Relatively lower knowledge is observed on Azolla, Azotobacter and Rhizobium are nitrogenous bio fertilizers (51.67%) and application of micro nutrients like zinc, iron, calcium, copper etc. are allowed in organic farming (50.00%). This indicates that while farmers are familiar with the basic uses of bio fertilizers and organic compounds, their detailed understanding regarding dosages, timings and nutrient management remained less consistent, showing limited understanding of technical areas.

Knowledge pertaining to certain specialized organic practices remained low, with less than 50.00 per cent of farmers being aware of them. These included for monitoring pest incidence, set up 8 pheromone traps per acre for timely control measures (45.00%), the recommended dosage of PSB is 500ml for one acre of paddy (40.00%). Blast, sheath blight and stem rot can be controlled by *Pseudomonas fluorescens* (40.00%) and for newly acquired fields, the conversion period is 24 months (2 years) in case of annual and biennial crops (38.33%). The limited awareness in these areas highlights the knowledge gap in technical pest and disease management practices, which require more scientific understanding and hands-on training.

### 3.2. Extent of adoption of ANGRAU recommended organic rice cultivation practices by the certified organic rice farmers

An overview of Table 3 indicates that 45.83 per cent of the certified organic rice farmers had a medium extent of adoption, followed by high (34.17%) and low (20.00%) extent of adoption of ANGRAU recommended organic rice cultivation practices.

The possible reason for the majority of farmers falling under the medium level of adoption might be due to the fact that while they had good awareness of basic organic practices such as seed treatment, weed control, use of botanicals and post-harvest handling, they faced constraints in fully adopting advanced and technical practices like bio-fertilizer application, micronutrient management and pest monitoring techniques. High adoption could be attributed to farmers with better access to training, extension services and organic input availability, whereas the presence of farmers in the low adoption category may be due to lack of proper technical guidance, limited resources and inadequate exposure to organic methods.

This trend may be attributed to the fact that most farmers possessed medium to good knowledge of the recommended organic rice cultivation practices, which enabled them to adopt these practices to a considerable degree. The above findings are in conformity with the findings of Shelar (2023)<sup>[9]</sup> and Karthiga (2021)<sup>[8]</sup>.

**Table 3:** Distribution of the certified organic rice farmers according to their adoption of ANGRAU recommended organic rice cultivation practices

|        |                         |               | (n=120)    |
|--------|-------------------------|---------------|------------|
| S. No. | Category                | No of farmers | Percentage |
| 1.     | Low (<71.82)            | 24            | 20.00      |
| 2.     | Medium (71.82 - 105.54) | 55            | 45.83      |
| 3.     | High (>105.54)          | 41            | 34.17      |
|        | Total                   | 120           | 100.00     |
|        | Mean=88.68 S=16.86      |               |            |

**Table 4:** Content analysis of extent of adoption of ANGRAU recommended organic rice cultivation practices by the certified organic rice farmers (n=120)

| S. No                  | Recommended Practice                | Adoption      |        |                   |       |             |       | Adoption<br>quotient (A.Q.) | Rank |
|------------------------|-------------------------------------|---------------|--------|-------------------|-------|-------------|-------|-----------------------------|------|
|                        |                                     | Fully Adopted |        | Partially Adopted |       | Not Adopted |       |                             |      |
|                        |                                     | F             | %      | F                 | %     | F           | %     |                             |      |
| I. Agronomic Practices |                                     |               |        |                   |       |             |       |                             |      |
| 1                      | Deep summer ploughing.              | 34            | 28.33  | 30                | 25.00 | 56          | 46.67 | 60.56                       | VII  |
| 2                      | 2-3 puddlings for land preparation. | 120           | 100.00 | 0                 | 0.00  | 0           | 0.00  | 100.00                      | I    |
| 3                      | Seed rate @ 25kg per acre.          | 59            | 49.17  | 37                | 30.83 | 24          | 20.00 | 76.39                       | IV   |

|                                                 |                                                                                                                        |     |        |    |       |     |        |        |      |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----|--------|----|-------|-----|--------|--------|------|
| 4                                               | Transplantation should be completed by June and November for Kharif and Rabi respectively.                             | 35  | 29.17  | 30 | 25.00 | 55  | 45.83  | 61.11  | VI   |
| 5                                               | Maintaining clean and weed free bunds.                                                                                 | 67  | 55.83  | 42 | 35.00 | 11  | 9.17   | 82.22  | III  |
| 6                                               | Planting yellow-flowering species like marigold, sunflower and sesamum along the bunds of rice field.                  | 45  | 37.50  | 53 | 44.17 | 22  | 18.33  | 73.06  | V    |
| 7                                               | Maintaining buffer zone between organic and inorganic farming fields.                                                  | 77  | 64.17  | 27 | 22.50 | 16  | 13.33  | 83.61  | II   |
| <b>II. Weed Management Practices</b>            |                                                                                                                        |     |        |    |       |     |        |        |      |
| 8                                               | Manual weeding twice, at 25 and 50 days after transplanting (DAT).                                                     | 120 | 100.00 | 0  | 0.00  | 0   | 0.00   | 100.00 | I    |
| 9                                               | Usage of cono weeder or power weeder for weed control.                                                                 | 20  | 16.67  | 26 | 21.67 | 74  | 61.67  | 51.67  | II   |
| <b>III. Water Management Practices</b>          |                                                                                                                        |     |        |    |       |     |        |        |      |
| 10                                              | Always use clean water for irrigation.                                                                                 | 83  | 69.17  | 21 | 17.50 | 16  | 13.33  | 85.28  | I    |
| 11                                              | Formation of high bunds around the boundaries of organic field to restrict the flow of water from conventional fields. | 47  | 39.17  | 50 | 41.67 | 23  | 19.17  | 73.33  | II   |
| <b>IV. Nutrient Management Practices</b>        |                                                                                                                        |     |        |    |       |     |        |        |      |
| 12                                              | Growing of green manure crops like Sunhemp, Dhaincha, Pillipesara, etc.                                                | 120 | 100.00 | 0  | 0.00  | 0   | 0.00   | 100.00 | I    |
| 13                                              | Green manure seed rate @15kg per acre.                                                                                 | 61  | 50.83  | 45 | 37.50 | 14  | 11.67  | 79.72  | V    |
| 14                                              | Incorporation of green manure crop at flowering stage.                                                                 | 85  | 70.83  | 23 | 19.17 | 12  | 10.00  | 86.94  | III  |
| 15                                              | Application of FYM @4tons or vermicompost @2tons per acre at final ploughing.                                          | 26  | 21.67  | 82 | 68.33 | 12  | 10.00  | 70.56  | VI   |
| 16                                              | Application of micro nutrients(Zn,Cu,Fe,Mn) and mineral fertilizers(rock phosphate, gypsum, lime, plant ashes).        | 28  | 23.33  | 34 | 28.33 | 58  | 48.33  | 58.33  | VIII |
| 17                                              | Crop residues should not be burned.                                                                                    | 79  | 65.83  | 24 | 20.00 | 17  | 14.17  | 83.89  | IV   |
| 18                                              | Application of Azolla @100kg per acre 3-4DAT and incorporation into the soil after 2-3 weeks.                          | 27  | 22.50  | 47 | 39.17 | 46  | 38.33  | 61.39  | VII  |
| 19                                              | Application of Jeevamrutham@200 lit. per acre in 3 installments.                                                       | 104 | 86.67  | 16 | 13.33 | 0   | 0.00   | 95.56  | II   |
| <b>V. Pest and Disease Management Practices</b> |                                                                                                                        |     |        |    |       |     |        |        |      |
| 20                                              | Seed treatment with <i>Pseudomonas fluorescens</i> @10g per kg seed.                                                   | 29  | 24.17  | 55 | 45.83 | 36  | 30.00  | 64.72  | XII  |
| 21                                              | Seed treatment with Beejamrutam @30ml per lit.                                                                         | 120 | 100.00 | 0  | 0.00  | 0   | 0.00   | 100.00 | I    |
| 22                                              | Seedling root dip in PSB@10g per litre of water.                                                                       | 3   | 2.50   | 20 | 16.67 | 97  | 80.83  | 40.56  | XV   |
| 23                                              | Clipping the tips of paddy seedlings before transplanting.                                                             | 52  | 43.33  | 54 | 45.00 | 14  | 11.67  | 77.22  | VI   |
| 24                                              | Set up 40 bird perches per acre for pest control.                                                                      | 0   | 0.00   | 64 | 53.33 | 56  | 46.67  | 51.11  | XIV  |
| 25                                              | Set up 8 pheromone traps per acre for pest control.                                                                    | 9   | 7.50   | 49 | 40.83 | 62  | 51.67  | 51.94  | XIII |
| 26                                              | Installation of Trichocards having 40000 <i>Trichogramma japonicum</i> eggs per acre for control of stem borer.        | 0   | 0.00   | 0  | 0.00  | 120 | 100.00 | 33.33  | XVI  |
| 27                                              | Spraying an extract prepared from neem leaves, green chilli and cow urine to control stem borer.                       | 90  | 75.00  | 29 | 24.17 | 1   | 0.83   | 91.39  | III  |
| 28                                              | Spraying of neem oil(1500ppm) @5ml per lit. to control pest.                                                           | 41  | 34.17  | 58 | 48.33 | 21  | 17.50  | 72.22  | IX   |
| 29                                              | Spraying of extraction prepared from neem, custard apple leaves and cow urine to control leaf folder.                  | 59  | 49.17  | 55 | 45.83 | 6   | 5.00   | 81.39  | V    |
| 30                                              | Sprayingof BT @2ml per lit of water after 30-40 DAT To control the leaf folder.                                        | 0   | 0.00   | 0  | 0.00  | 120 | 100.00 | 33.33  | XVI  |
| 31                                              | Formation of alley ways of 20cm for every 2m length.                                                                   | 120 | 100.00 | 0  | 0.00  | 0   | 0.00   | 100.00 | I    |
| 32                                              | Spraying of Thutikada kashayam(Datura leaves+cow urine) to control BPH.                                                | 100 | 83.33  | 19 | 15.83 | 1   | 0.83   | 94.17  | II   |
| 33                                              | Spraying of bio pesticides like Metarhizium or Beauveria 5g per lit. twice in an interval of 10days to control BPH.    | 0   | 0.00   | 0  | 0.00  | 120 | 100.00 | 33.33  | XVI  |
| 34                                              | Soil application of <i>Pseudomonas fluorescens</i> @2kg per acre to control soil borne diseases.                       | 45  | 37.50  | 40 | 33.33 | 35  | 29.17  | 69.44  | X    |
| 35                                              | Drain the field to reduce sclerotia of stem rot.                                                                       | 49  | 40.83  | 30 | 25.00 | 41  | 34.17  | 68.89  | XI   |
| 36                                              | Spraying of Bael leaves extract (Maredu akulu kashayam) to control paddy stem rot and blast.                           | 49  | 40.83  | 55 | 45.83 | 16  | 13.33  | 75.83  | VII  |
| 37                                              | Spraying of asafetida (10%) (Inguva in telugu) solution along with cow urine to control rice blast.                    | 48  | 40.00  | 48 | 40.00 | 24  | 20.00  | 73.33  | VIII |
| 38                                              | Spraying of fermented butter milk (1lit) and cow urine (1lit) along with 8lit of water to control rice blast.          | 59  | 49.17  | 60 | 50.00 | 1   | 0.83   | 82.78  | IV   |
| <b>VI. Harvesting and Storage Practices</b>     |                                                                                                                        |     |        |    |       |     |        |        |      |
| 39                                              | Drying the harvested paddy until its moisture content reaches 13% for safe storage.                                    | 40  | 33.33  | 79 | 65.83 | 1   | 0.83   | 77.50  | II   |
| 40                                              | Storage of organic and inorganic produce separately without mixing in clean gunny bags.                                | 120 | 100.00 | 0  | 0.00  | 0   | 0.00   | 100.00 | I    |

The results from the Table 4 denoted the adoption of ANGRAU recommended organic rice cultivation practices by certified organic rice farmers. The practices were ranked based on their Adoption Quotient (A.Q.). The adoption of agronomic practices by certified organic rice farmers revealed that '2-3 puddlings for land preparation' with an A.Q. of 100.00 (rank I), 'Maintaining buffer zone between organic and inorganic farming fields' with an A.Q. of 83.61 (rank II) and 'Maintaining clean and weed free bunds' with an A.Q. of 82.22 (rank III) were the most widely adopted practices. Moderate adoption was observed in 'Seed rate @25 kg per acre' with an A.Q. of 76.39 (rank IV) and 'Planting yellow-flowering species like marigold, sunflower and sesamum along the bunds of rice field' with an A.Q. of 73.06 (rank V). Comparatively lower adoption was reported in 'Transplantation should be completed by June and November for Kharif and Rabi respectively' with an A.Q. of 61.11 (rank VI) and 'Deep summer ploughing' with an A.Q. of 60.56 (rank VII).

The adoption of weed management practices indicated that 'Manual weeding twice, at 25 and 50 DAT' with an A.Q. of 100.00 (rank I) was universally adopted. In contrast, 'Usage of cono weeder or power weeder for weed control' with an A.Q. of 51.67 (rank II) was less preferred by farmers.

With respect to water management, 'Always use clean water for irrigation' with an A.Q. of 85.28 (rank I) was the most adopted practice, followed by 'Formation of high bunds around the boundaries of organic fields to restrict the flow of water from conventional fields' with an A.Q. of 73.33 (rank II).

In nutrient management, 'Growing of green manure crops like sunn hemp, dhaincha and pillipesara' with an A.Q. of 100.00 (rank I) and 'Application of Jeevamrutham @200 litres per acre in 3 installments' with an A.Q. of 95.56 (rank II) were the most highly adopted practices. These were followed by 'Incorporation of green manure crop at flowering stage' with an A.Q. of 86.94 (rank III) and 'Crop residues should not be burned' with an A.Q. of 83.89 (rank IV). Moderate adoption was observed in 'Green manure seed rate @15 kg per acre' with an A.Q. of 79.72 (rank V) and 'Application of FYM @4 tons or vermi compost @2 tons per acre at final ploughing' with an A.Q. of 70.56 (rank VI). Relatively lower adoption was recorded in 'Application of Azolla @100kg per acre 3-4DAT and incorporation into the soil after 2-3 weeks' with an A.Q. of 61.39 (rank VII) and 'Application of micro nutrients (Zn, Cu, Fe, Mn) and mineral fertilizers (rock phosphate, gypsum, lime, plant ashes)' with an A.Q. of 58.33 (rank VIII).

The adoption of pest and disease management practices showed that 'Seed treatment with Beejamrutam @30 ml per litre' with an A.Q. of 100.00 (rank I) and 'Formation of alley ways of 20 cm for every 2 m length' with an A.Q. of 100.00 (rank I) were universally practiced. These were followed by 'Spraying of Thutikada kashayam (Datura leaves + cow urine) to control BPH' with an A.Q. of 94.17 (rank II), 'Spraying an extract prepared from neem leaves, green chilli and cow urine to control stem borer' with an A.Q. of 91.39 (rank III) and 'Spraying of fermented buttermilk and cow urine solution' with an A.Q. of 82.78 (rank IV). Moderate adoption was noted for 'Spraying of extraction prepared from neem and custard apple leaves with cow urine to control leaf folder' with an A.Q. of 81.39

(rank V), 'Clipping the tips of paddy seedlings before transplanting' with an A.Q. of 77.22 (rank VI) and 'Spraying of Bael leaves extract to control paddy stem rot and blast' with an A.Q. of 75.83 (rank VII). Lower adoption was observed for 'Soil application of *Pseudomonas fluorescens* @2kg per acre to control soil borne diseases' with an A.Q. of 69.44 (rank X), 'Drain the field to reduce sclerotia of stem rot' with an A.Q. of 68.89 (rank XI) and 'Seed treatment with *Pseudomonas fluorescens* @10 g per kg seed' with an A.Q. of 64.72 (rank XII). Very low adoption was noted in 'Set up 8 pheromone traps per acre for pest control' with an A.Q. of 51.94 (rank XIII), 'Set up 40 bird perches per acre for pest control' with an A.Q. of 51.11 (rank XIV), 'Seedling root dip in PSB@10g per litre of water.' with an A.Q. of 40.56 (rank XV).

On the other hand, it was also noticed from Table 4 that, several practices were not adopted at all, which included 'Installation of Trichocards having 40000 *Trichogramma japonicum* eggs per acre for control of stem borer' with an A.Q. of 33.33 (rank XVI), 'Spraying of BT @2ml per lit of water after 30-40 DAT To control the leaf folder' with an A.Q. of 33.33 (rank XVI) and 'Spraying of bio pesticides like Metarhizium or Beauveria 5g per lit. twice in an interval of 10days to control BPH' with an A.Q. of 33.33 (rank XVI).

The adoption of harvesting and storage practices revealed that 'Storage of organic and inorganic produce separately without mixing in clean gunny bags' with an A.Q. of 100.00 (rank I) was universally adopted, followed by 'Drying the harvested paddy until its moisture content reaches 13% for safe storage' with an A.Q. of 77.50 (rank II).

This overall tendency reveals that while farmers are committed to basic organic cultivation methods, there remains a considerable knowledge and practice gap in specialized plant protection and nutrient management techniques, indicating there is a strong need for capacity building, continuous training and effective extension support to improve the adoption of complex organic farming techniques.

#### 4. Conclusion

The study concludes that less than half (43.33%) of the certified organic rice farmers were with high level of knowledge, followed by those with medium (39.17%) and low (17.50%) levels of knowledge on ANGRAU recommended organic rice cultivation practices. The overall pattern suggests that certified organic rice farmers possessed strong knowledge of basic and widely adopted organic practices, while their understanding declined as the practices became more technical and required greater scientific expertise. The high knowledge levels for simple methods may be attributed to their practical nature, frequent demonstrations and ease of application, whereas the relatively lower awareness of bio fertilizer dosages, micronutrient use and advanced pest and disease management reflects a need for continuous training, field-level demonstrations and strengthened extension support to bridge these knowledge gap.

Also less than half (45.83%) of the certified organic rice farmers had a medium extent of adoption, followed by high (34.17%) and low (20.00%) extent of adoption of ANGRAU recommended organic rice cultivation practices.

Overall, the findings indicate that certified organic rice farmers demonstrated high adoption of simple, low-cost practices, while the adoption of more technical and knowledge-intensive practices remained partial or low. The medium adoption levels of several practices might be attributed to factors such as limited knowledge of certain biological control measures, non-availability of organic inputs like Trichocards and bio-pesticides, high labour requirements and lack of timely technical guidance. Furthermore, a few critical eco-friendly plant protection practices involving Trichocards, BT sprays and bio-pesticides were completely neglected.

This overall tendency reveals that while farmers are committed to basic organic cultivation methods, there remains a considerable knowledge and practice gap in specialized plant protection and nutrient management techniques, indicating there is a strong need for capacity building, continuous training and effective extension support to improve the adoption of complex organic farming techniques.

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