ADOPTION OF RECOMMENDED SUSTAINABLE PADDY FARMING PRACTICES IN TELANGANA STATE, INDIA

ABSTRACT

Agriculture had a significant negative impact on environment for many decades. More land, fertiliser and pesticides had been used to increase the yield. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. According to research, a number of factors can affect farmers' decisions to effectively implement sustainable practises. This present investigation was undertaken during 2021-2023 to specify the item wise adoption of recommended sustainable Paddy farming practices in three districts namely Nizamabad, Khammam and Nalgonda districts representing North, Central and South agro climatic zones of Telangana state, respectively as these three districts account for more Paddy area from amongst the respective zones. Purposive sampling technique was employed for data collection from 216 Paddy farmers. Findings revealed that item wise adoption of recommended sustainable practices, depicts the partial adoption of listed components such as (puddling had complete adoption), selection of variety, selection of certified seed, seed rate, seed treatment (chemical methods had no adoption, pre-germination of Paddy seeds had complete adoption), nursery seed bed raising (sowing at recommended time had complete adoption), age of seedling (maintaining closer spacing of aged seedlings and increasing number of aged seedlings per hill had complete adoption), time of transplanting (transplanting in (first fortnight of June-July Kharif), (October -November-Rabi) had complete adoption), method of transplanting (transplanting the recommended number of seedlings per hill had complete adoption), row spacing (maintaining the recommended spacing between the two hills had complete adoption), fertilizers application, weed management, integrated pest and disease management, time of harvesting (harvesting crop at the recommended time had complete adoption) and method of harvesting (harvesting through combine harvester, drying Paddy after harvesting for one to two days and crop rotation like growing legumes before cereals to enhance farms biological stability had complete adoption). It may be a result of the farming experience, farming commitment, education, economic motivation, achievement motivation, connections with extension services, risk orientation and innovativeness in their farming methods drive for success. The aforementioned pattern of findings was also influenced by the efforts of line departments and front-line extension organisations like the District Agricultural Advisory and Transfer of Technology Centre and Krishi Vigyan Kendra's.

Keywords: Adoption, Paddy farmers, Paddy farming sustainability, recommended sustainable farming practices.

1. INTRODUCTION

Sustainable Agriculture has been the buzz word nowadays. The Food and Agriculture Organization defined Sustainable Agriculture, as "the management and conservation of natural resource base and orientation of technological and institutional change to ensure the attainment and continued satisfaction of human needs for present and future generations" (FAO 2006). The Asia-Pacific Region, which is home to more than 56 % of the world's population, adds 51 million new rice consumers each year. It is unclear whether the present 524 million tonnes of rice produced annually will be expanded to 700 million tonnes by 2025 using less land, fewer people, less water and fewer pesticides. The US Department of Agriculture assessed worldwide rice availability in the 2019-2020 marketing season at 67.10 million tonnes in its November report. In 2013-14, India ranked first in rice area (43.9 million hectares) and second in rice production (106.5 million tonnes) (Agricultural Market Intelligence Centre 2021). Taking all of this into account, annual production must be boosted from 586 to 756 million metric tonnes by 2030. Since the previous two decades, various countries have recognised its significance and adjusted their trade policies, increased area under high yielding varieties and developed methods of producing efficiently with soil and water.

The available sustainable practices include direct seeding, alternate wetting and drying (water smart), alley ways formation (pest and disease smart), climate resilient technologies (climate smart) and recommended agronomic practises such as effective crop and soil management, improved inputs, land levelling and biomass removal etc. The informal supply of seed mostly consists of farmer-to-farmer exchange and farm conserved seeds, which are important sources of seeds for resource-poor farmers (Prabhavathi *et al..*, 2020). Found favourable relationship between adoption of sustainable practises and environmental attitude and claimed that, perception is vital component in influencing whether or not sustainable practises will be adopted (Serebrennikov *et al..*, 2020). Agriculture accounts for 17 % of greenhouse gas emissions that contribute to global climate change (Lynch *et al..*, 2021). During last three decades, Paddy demand steadily increased and had role in strategic food security, as well as in planning and development of policies across many nations (FAO 2021). A variety of factors contribute to spread of pests and plant ailments. Increased temperature and precipitation promote pest species establishment and spread by providing warm, humid habitat and hydration for development. Agrochemicals used to combat pests and diseases which can contaminate freshwater, marine habitats, atmosphere and soil (Sen *et al.*., 2021). While agricultural productivity has expanded, change from natural farming to agriculture reduced soils' ability to sustain, resulting in negative impacts on soil erosion, compaction, soil structure loss, etc., this causes soil deterioration and changes in hydrological conditions (Srinivasarao *et al.*., 2021). Paddy grown in 152 million hectors around the world and yields 586 million tonnes. Asian countries cover more than 90 % of Paddy area, accounting for over 92 % of global production, while Asians consume approximately 90 % of global consumption. China, India, Indonesia, Bangladesh, Thailand, Japan, Pakistan, Burma and Brazil are among the fastest expanding economies (Papademetriou 2022). Paddy SRR in Uttar Pradesh's Chandauli district reduced yield under irrigated conditions due to lack of adoption of sustainable practises such as reduced SRR. Farmers with advanced technical expertise rely heavily on sustainable practises such as crop rotation, land rotation, green and organic manures, integrated pest management (IPM), rotational grazing, seed bed preparation and cultivation for weed control (Ouattara *et al.*., 2022).

2. MATERIALS AND METHODS

The research investigation employed Ex-post-facto-research design as the event has already happened. The present study aimed to assess item wise adoption of recommended sustainable farming practices which includes 53 items comprising the data from three different zones of Telangana state. Three districts namely Nizamabad, Khammam & Nalgonda from each zone of Telangana state were selected for the purpose during the year 2021-2023 as these three districts account for more Paddy area compared to other districts. Purposive sampling technique was employed for data collection from 216 Paddy farmers by using standardized interview schedule. Two blocks from each district were selected based on more Paddy area which constitutes a total of six blocks. Again, from each block, three villages were selected by using simple random technique comprising 18 villages. In each identified village, 12 farmers were selected by using simple random technique. About seventy two respondents were selected from each district. Thus, the total respondents constituted for the purpose was two hundred and sixteen farmers. Adoption is a process through which an individual passes from first hearing of an innovation to its final adoption. Adoption was operationalized as practising the recommended practices by the farmers as per recommendations. The response of each statement was rated on three-point continuum namely complete adoption, partial adoption, no adoption with the scores of 3, 2 and 1 for positive statements and 1, 2 and 3 for negative statements, respectively. Thus, the possible score for adoption ranges between minimum of 53 and maximum of 159. Both descriptive and inferential statistics such as means, per cent, frequency and rank were employed.

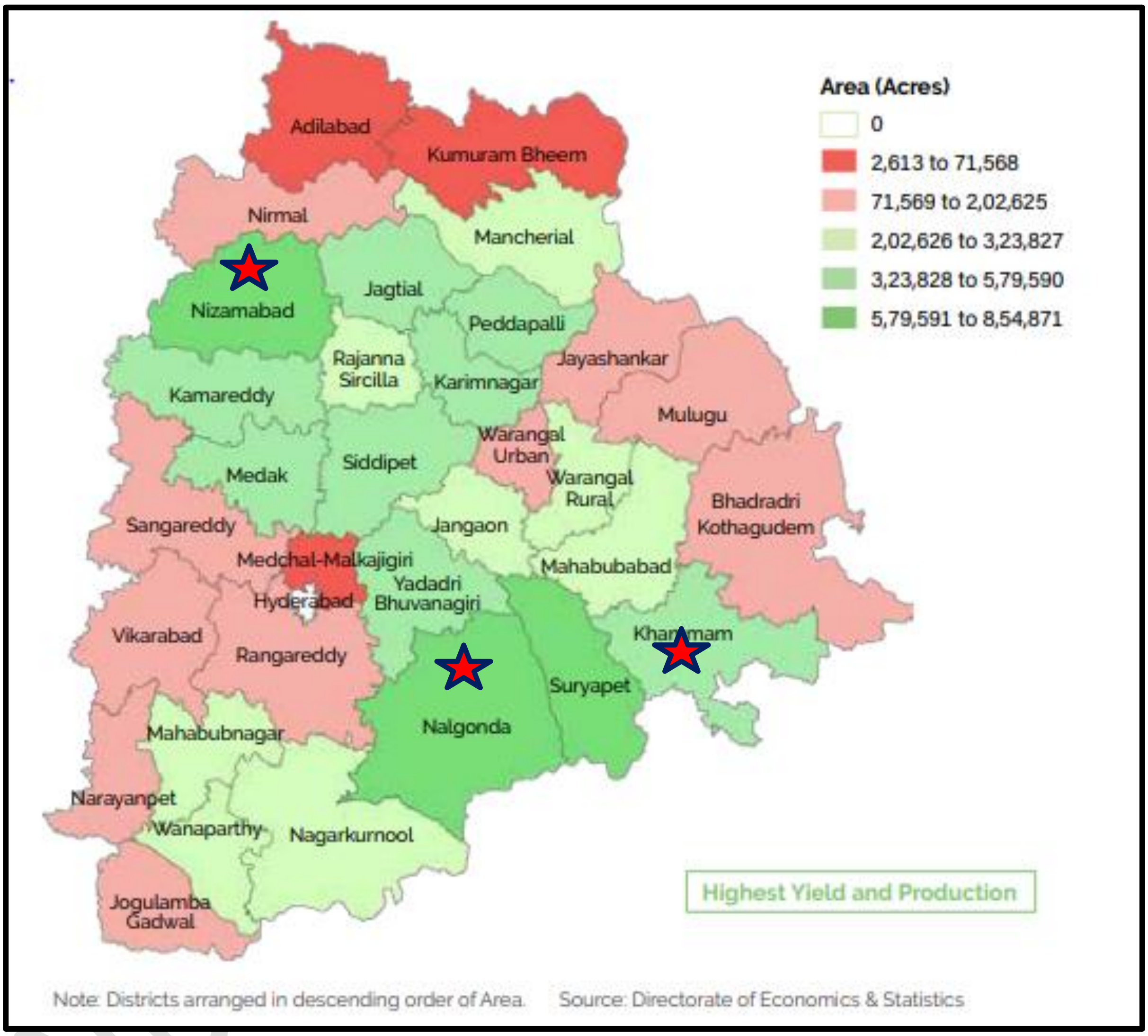

Fig. 1. Map of Telangana state showing selected districts.

3. RESULTS AND DISCUSSIONS

The results are explained along with the inferences drawn to the objectives set forth for the investigation.

3.1 Puddling

The results revealed that, majority of the farmers (92.59 %) were having complete adoption on the practice of 4-5 cm standing water for puddling, followed by partial adoption (07.41 %) and no adoption (00.00 %). Puddling is the basic operation for Paddy cultivation and this may be the reason why majority of them are resorting to puddling. Similar findings were quoted by Matto (2014), Kesha (2015), Karangami (2017) and Manjunath (2018).

3.2 Selection of variety

It was reported that, (50.92 %) of farmers fall under partial adoption, followed by complete adoption nearly two fifth (35.19 %) and no adoption (13.89 %) on selection of variety according to market demand.

Slightly more than half of growers 53.24 per cent were having partial adoption on selection of variety *i.e.* based on pest and disease tolerance, while 27.77 and 18.99 per cent of them had complete and no adoption, respectively.

Half of the farmers 51.85 per cent had partial adoption, while 31.49 and 16.66 per cent of them had complete and no adoption on selection of variety *i.e.* based on duration, respectively.

Nearly two fifth of farmers 39.36 per cent were having partial adoption of sowing the recommended varieties in their area, while 30.55 and 30.09 per cent of them had no adoption and complete adoption, respectively. Hence, the probable reason for the above trend might be due to field extension officers and functionaries do have interactions with farmers to manage the crop planning, production, various aspects of seed selection and marketing activities and re-orient level of crop management practices. This finding was in tune with the results of Matto (2014), Kesha (2015) and Karangami (2017).

3.3 Selection of certified seed

62.97 per cent expressed that partial adoption on use of quality certified seeds, while 18.98 and 18.05 per cent were falling under the complete and no adoption, respectively.

Slightly more than half of farmers (53.25 %) were having partial adoption, followed by complete (34.72 %) and no adoption (12.03 %) on selection of certified seed which is based on seed size and seed germination.

It was indicated that two third of farmers 66.68 per cent were having partial adoption of sowing Paddy as per the recommended methods *i.e.* transplanting method, while 19.44 per cent of them had complete adoption, whereas 13.88 per cent had no adoption. This might be due to farmer's confusion with private and government subsidy seed material. Some dealers were selling poor quality seed material and extension functionaries had looked after this issues and addressed the same in study areas. The results were in agreement with the findings of Matto (2014), Kesha (2015) and Karangami (2017).

3.4 Seed rate

It disclosed that little less than half of farmers 47.24 per cent had partial adoption of the recommended seed rate, while only 38.88 per cent of the farmers had complete and 13.88 per cent of the farmers had no adoption on recommended seed rate. The probable reason for this trend might be due to own practice gives higher yield rather than recommended seed rate due to weather and climate change constraints from time to time and region to region. Similar results were observed in the studies of Matto (2014), Kesha (2015) and Karangami (2017).

3.5 Seed treatment

It presents that nearly half of farmers (47.22 %) were not adopting seed treatment with fungicide or bioagents (Trichoderma, Azosprillum), whereas a little over one fourth (37.04 %) and (15.74 %) had partial and complete adoption, respectively.

Half of the farmers (82.88 %) were having complete adoption, followed by partial (13.42 %) and no adoption (03.70 %) on pre-germination of Paddy seeds. The pertinent reasons may be that, most of the farmers had felt that pre-germination of Paddy seed is good rather than other chemical methods of seed treatment. This result is in accordance with the results of Matto (2014), Kesha (2015), Karangami (2017) and Manjunath (2018).

3.6 Nursery seed bed raising

It states that two third of them had 66.21 per cent of partial adoption on soil test-based fertilizer application, whereas 22.68 and 11.11 per cent had no adoption and complete adoption, respectively.

It concluded that half of the farmers 56.95 per cent were having partial adoption on raise size of seed bed at 100 m^2 for seedling, whereas 25.00 and 18.05 per cent of them had complete and no adoption, respectively.

Slightly more than the three fifth 61.12 per cent were having partial adoption, whereas 24.07 per cent and 14.81 per cent of them had complete and no adoption on raising seed bed at 5 to 6 cm for seedling, respectively.

Half of the respondents (80.11 %) were having partial adoption of preparing seed bed during (1st week of June-Kharif), (1st week of October-Rabi), followed by complete (17.12 %) and (02.77 %) of them had no adoption.

It stated that majority of them 62.97 per cent were having partial adoption, whereas 20.83 and 16.20 per cent of them had no adoption and complete adoption on applying 20 kg of neem or castor cake; 0.5-1.0 kg N, 0.5 kg P_2O_5, 0.5 kg k_2O or 50 gms ammonium sulphate, 37 gms single super phosphate per seed bed at the time of seed bed preparation, respectively.

Three fourth of farmers 75.46 per cent were having complete adoption on practice of sowing at the recommended time, kharif-for transplanting method: 3rd week of May to 1st fortnight of June, October-rabi, while 19.92 and 04.62 per cent of them had partial and no adoption, respectively.

It was found that majority of users 50.01 per cent were having partial adoption on applying the recommended dosage of fertilizers at the time of nursery preparation, 275 g Urea, 450 g DAP per 100 m^2, 200 g MOP, whereas 43.05 and 06.94 per cent of them had complete and no adoption, respectively.

Large majority of farmers (70.84 %) were having partial adoption, followed by no adoption (17.59 %) and complete adoption (11.57 %) of sowing 40-50 kg seed on raised bed of 100 m^2.

It indicated that more than two fifth (43.53 %) were having partial adoption of sowing seed at 10 cm apart rows across the raised bed length, followed by no adoption (39.35 %) and complete adoption (17.12 %). The probable reasons might attribute to most farmers unaware of importance of soil health card given by soil health card scheme through extension workers, on time preparation of nursery seedbed, nursery bed preparation practices were done as per their convenience in the field, sowing on the recommended time and applying the fertilizers at the time of nursery preparation with very few recommendations. Findings were in line with the Hosseini *et al.* (2005), Singh and Barman (2011), Matto (2014), Kesha (2015), Karangami (2017) and Manjunath (2018).

3.7 Age of seedling

79.18 per cent of farmers were having partial adoption of transplanting 25 to 40 days old seedling, while 15.27 per cent and 05.55 per cent of them had complete and no adoption, respectively

It disclosed that large numbers of the respondents (69.91 %) were having partial adoption, followed by complete (26.85 %) and no adoption (03.24 %) on trimming of top aged seedlings before late transplanting.

92.60 per cent of them were having complete adoption on maintaining closer spacing of aged seedlings, followed by equal per cent of partial adoption 03.70 per cent and no adoption 03.70 per cent.

It found that majority of respondents (91.67 %) had complete adoption, followed by partial adoption (04.63 %) and no adoption (03.70 %) on increasing number of aged seedlings per hill. The reason for this might be due to labour shortage during peak season as most of the farmers does sowing at the right time to avoid yield loss and some farmers expressed that due to other crops activities also coincide sometimes to perform the field operation practices. This finding was in tune with the results of Matto (2014), Kesha (2015) Karangami (2017) and Manjunath (2018).

3.8 Time of transplanting

It stated that majority of the farmers 90.74 per cent had complete adoption on recommended time of transplanting, while 05.56 per cent had partial and only 03.70 per cent of the farmers had no adoption on recommended time of transplanting in (first fortnight of June-July-kharif) and (October-November-rabi). The pertinent reasons may be that most of the farmers had good contact with extension functionaries of line department and private companies as a result they could have participate actively in various extension activities for gathering the recent information and to know the worth of technologies. The results were in agreement with the findings of Matto (2014), Kesha (2015) and Karangami (2017).

3.9 Method of transplanting

It reveals that half of the farmers 89.81 per cent were having complete adoption on transplanting the recommended number of seedlings per hill *i.e.* 2-3 seedlings per hill, while 06.49 per cent and 03.70 per cent of them had partial and no adoption, respectively. The farmers had realized to avoid gap filling in later stages if any damage of seedlings per hill. Similar results were observed in the studies of Matto (2014), Kesha (2015) and Karangami (2017).

3.10 Row spacing

Regarding the recommended spacing between the two hills, a majority 53.71 per cent of the farmers had complete adoption, followed by two fifth 45.83 per cent and 00.46 per cent had partial and no adoption on recommended spacing, respectively. Most farmers had realized to avoid pest and disease in further stages of crop growth and nutrition competition. In fact, to get proper sun light to entire crop. This result is in accordance with the results of Matto (2014), Kesha (2015) Karangami (2017) and Manjunath (2018).

3.11 Fertilizers in transplanted paddy

Slightly more than half of the farmers 50.47 per cent had partial adoption of recommended basal dose *i.e.* ½ dose of N and full dose of P2O5, K2O and ZnSO4, followed by top dressing: remaining ½ dose of N in 2 splits: -1st at early tillering stage (15-18 Days After Transplanting), -2nd at panicle and flag leaf initiation (30 Days After Transplanting), while 46.29 per cent and 03.24 per cent of them had complete and no adoption, respectively.

Two third of the farmers had partial adoption *i.e.* 68.07 per cent, while 27.31 and 04.62 per cent of them were having complete and no adoption on applying the recommended dosage of nutrients for the crop *i.e.* farm yard manure @ 10 T/ha, N @ 120 kg/ha, P2O5 @ 60 kg/ha, K2O @ 40 kg/ha, ZnSO4 @ 10-15 kg/ha, respectively.

Nearly three fifth 59.74 per cent of them were having partial adoption on application of 250 g of ammonium sulphate after transplanting of 8-10 days and 15-18 days, whereas 35.64 and 04.62 per cent of them had complete and no adoption, respectively. The probable reason for the above trend might be that as per requirement of fertilizers farmers followed the same. Findings were in line with the Matto (2014), Kesha (2015) Karangami (2017) and Manjunath (2018).

3.12 Weed management in transplanted paddy

Slightly more than three fifth of farmers 61.59 per cent had partial adoption of recommended weed management, whereas nearly two fifth 35.64 per cent and 02.77 per cent of the farmers had complete and no adoption on recommended weed management with the statement of applying 1.5-2.0 kg a.i ha^{-1} butachlor at 4 to 7 DAT for weed control, respectively.

With the statement of start weeding at 45 to 50 days after transplanting concluded that farmers were having partial adoption 84.27 per cent, while 11.11 per cent and 04.62 per cent of them had complete and no adoption, respectively. Reason for partial adoption of weed management is based on availability of weedicides in the particular block and farmers practiced their own field operations accordingly. The results were in agreement with the findings of Hosseini *et al.* (2005), Matto (2014), Kesha (2015), Karangami (2017) and Manjunath (2018).

3.13 Integrated pest and disease management

With respect to the item, cultural practice of stem borer *i.e.* collection and destruction of stubbles in field shows that, half of the farmers 73.62 per cent were having partial adoption, while 13.42 per cent and 12.96 per cent of them had no adoption and complete adoption, respectively.

It indicated that nearly three fifth 59.73 per cent of the farmers had partial adoption of the mechanical practice such as removal and destruction of infested plant parts, whereas only 23.61 per cent of the farmers had complete and 16.66 per cent of the farmers had no adoption on mechanical practice *i.e.* removal and destruction of infested plant parts.

Slightly more than half of the farmers 54.18 per cent had partial adoption, followed by 27.31 per cent and 18.51 per cent had complete and no adoption of cultural practice viz., a) applying Carbofuran 10 kg/ac, respectively.

Half of the farmers opined that 55.57 per cent had partial adoption on recommended application of Chlorpyriphos 2.5 ml/l of water, whereas 30.55 per cent and 13.88 per cent had complete and no adoption, respectively.

51.86 per cent of farmers were having partial adoption, while 31.94 per cent and 16.20 per cent of them had complete and no adoption on recommended application of chlorantraniliprole 4 kg/ac, respectively.

It was concluded that, more than half of the farmers 52.32 per cent had partial adoption on the cultural practice of brown plant hopper like a) spraying Monocrotophos 2.2 ml/litre of water/ac, whereas only 30.09 per cent of them had complete and 17.59 per cent of them had no adoption.

With regard to item like b) spraying Acephate 1.5 gms/litre of water revealed that majority of respondents were having partial adoption (81.49 %), followed by complete adoption (12.96 %) and no adoption (05.55 %).

It was stated that, two third of farmers 65.29 per cent were having partial adoption on cultural practice in leaf folder *i.e.* collection and destroying eggs and larvae, while 26.38 per cent and 08.33 per cent of them were having complete and no adoption, respectively.

62.97, 25.92 and 11.11 per cent of them had partial, complete and no adoption of cultural practice *i.e.* (a) spraying Monocrotophos 1.6 ml/litre of water, respectively.

It found that slightly more than the three fifth of farmers 63.44 per cent were having partial adoption, whereas 29.62 and 06.94 per cent of them were (b) spraying chloripyriphos 2.5ml/litre of water/ac. had complete and no adoption, respectively.

It observed that more than half of the farmers 58.80 per cent were having partial adoption, while 30.09 and 11.11 per cent of them had complete and no adoption of cultural practice in Blast *i.e.* a) spraying Tricyclazole @ 0.6 gms/litre of water, respectively.

More than two fifth of the farmers 61.12 per cent were having partial adoption of cultural practice in Bacterial leaf blight *i.e.* (a) spraying strepthocycline (200 ppm) 0.2

gms/litre of water or (b) spraying Copper oxycloride solution 3 gms/litre of water, followed by complete 28.24 per cent and no adoption 10.64 per cent.

It showed that more than half of the farmers 54.18 per cent were having partial adoption, while 34.25 and 11.57 per cent of them had complete and no adoption of cultural practice in false smut *i.e.* (a) spraying Hexaconazole 2ml/litres of water, respectively.

Little less than half of the farmers 44.45 per cent were having partial adoption of (b) spraying Propiconazole 1 ml/litres of water, whereas 31.94 and 23.61 per cent of them had complete and no adoption, respectively.

It was observed that, most farmers were having partial adoption 47.23 per cent, while 39.81 and 12.96 per cent of them had complete and no adoption on cultural practice in sheath blight of (a) spraying Hexaconazole 2ml/l, respectively.

It was stated that majority of farmers had partial adoption on (b) spraying Propiconazole 1 ml/litres of water (55.11 %), followed by complete adoption (27.77 %) and no adoption (17.12 %).

It indicates that nearly half of them were having partial adoption 62.97 per cent, whereas 25.00 and 12.03 per cent of them had complete and no adoption on (c) spraying Azoxystrobin + Tebuconazole 0.4 gms/l, respectively. Reason might be due to many aspects, like based on availability of agrofertilizers in particular block varies with region to region and trade name of agrochemicals get changes accordingly farmers practiced the field operations. This result is in accordance with the results of Hosseini *et al.* (2005), Matto (2014), Kesha (2015) Karangami (2017) and Manjunath (2018).

3.14 Time of harvesting

Table 1. indicates that half of the farmers 82.40 per cent were having complete adoption on time of harvesting, whereas 11.11 and 06.49 per cent had no and partial adoption on time of harvesting at the recommended time, respectively. The pertinent reasons may be that in order to avoid monsoon occurrence during harvesting time and to save their yield on conserved basis. Findings were in line with the Matto (2014), Kesha (2015) and Karangami (2017).

3.15 Method of harvesting

It observed that majority of them stated that with the statement *i.e.* harvesting manually or machine was 87.96 per cent of farmers were having complete adoption, while 08.34 per cent and 03.70 per cent of them had partial and no adoption, respectively.

Half of the farmers opined that 87.50 per cent were having complete adoption, whereas 08.80 and 03.70 per cent had partial and no adoption on drying Paddy after harvesting for one to two days, whereas 85.64 per cent them fall under complete adoption category on crop rotation (growing legumes before cereals) to enhance farms biological stability followed by partial adoption 10.64 per cent and no adoption 03.72 per cent. Most farmers preferring combine harvester to avoid yield loss in the field and high cost of labour charges during peak season time. This result is in accordance with the results of Hosseini *et al.* (2005), Matto (2014), Kesha (2015) Karangami (2017), Manjunath (2018) and Lather (2020).

Table 1. Item wise Adoption of recommended sustainable Paddy farming practices.

S. No.	Practices	CA	PA	NA	Mean score	Overall Rank
		f&%	f&%	f&%		
1.	**Puddling**					
1.1	4-5 cm standing water for puddling	192 (92.59)	16 (07.41)	0 (00.00)	2.925	01
2.	**Selection of variety**					
2.1	Selection of variety according to market demand	76 (35.19)	110 (50.92)	30 (13.89)	2.213	25
2.2	Selection of variety based on pest and disease tolerance.	60 (27.77)	115 (53.24)	41 (18.99)	2.083	40
2.3	Selection of variety based on duration	68 (31.49)	112 (51.85)	36 (16.66)	2.148	31
2.4	Sowing the recommended varieties in your area.	65 (30.09)	85 (39.36)	66 (30.55)	02.00	47
3.	**Selection of certified seed**					
3.1	Use of quality certified seed material	41 (18.98)	136 (62.97)	39 (18.05)	2.004	46
3.2	Selection of certified seed based on seed size and seed germination.	75 (34.72)	115 (53.25)	26 (12.03)	2.232	20
3.3	Sowing Paddy as per the recommended methods? -Transplanting Method -Direct Sowing Method	42 (19.44)	144 (66.68)	30 (13.88)	2.604	12
4.	**Seed rate**					
4.1	Use the recommended seed rate? -For Transplanting: Kharif - 60-80 kg/ha, Rabi-80-100 kg/ha.	84 (38.88)	102 (47.24)	30 (13.88)	2.251	19
5.	**Seed treatment**					
5.1	Seed treatment with fungicide or bio-agents (Trichoderma, Azosprillum).	34 (15.74)	80 (37.04)	102 (47.22)	1.688	53
5.2	Pre-germination of Paddy seeds	179 (82.88)	29 (13.42)	08 (03.70)	2.790	09

6.	**Nursery seed bed raising**					
6.1	Soil test based fertilizer application	24 (11.11)	143 (66.21)	49 (22.68)	1.883	51
6.2	Raise size of seed bed at 100 m^2 for seedling	54 (25.00)	123 (56.95)	39 (18.05)	2.069	43
6.3	Raise seed bed at 5 to 6 cm for seedling	52 (24.07)	132 (61.12)	32 (14.81)	2.093	37
6.4	Prepare seedbed during (1st week of June- kharif), (1^{st} week of October- rabi)	37 (17.12)	173 (80.11)	6 (02.77)	2.144	33
6.5	Apply 20 kg of neem or castor cake; 0.5-1.0 kg N, 0.5 kg P_2O_5, 0.5 kg k_2O or 50 gms ammonium sulphate, 37 gms single super phosphate per seed bed at the time of seed bed preparation	35 (16.20)	136 (62.97)	45 (20.83)	1.953	49
6.6	Sow on the recommended time of Sowing? Kharif-For transplanting method: 3rd week of May to 1st fortnight of June, October-Rabi	163 (75.46)	43 (19.92)	10 (04.62)	2.711	11
6.7	Apply the recommended dosage of fertilizers at the time of nursery preparation? -275 g Urea -450 g DAP per 100 m^2 -200g MOP	93 (43.05)	108 (50.01)	15 (06.94)	2.362	15
6.8	Sow 40-50 kg seed on raised bed of 100 m^2.	25 (11.57)	153 (70.84)	38 (17.59)	1.939	50
6.9	Sow seed at 10 cm apart rows across the raised bed length.	37 (17.12)	94 (43.53)	85 (39.35)	1.776	52
7.	**Age of seedling**					
7.1	Transplant 25 to 40 days old seedling	33 (15.27)	171 (79.18)	12 (05.55)	2.093	37
7.2	Trimming of top for aged seedlings before late transplanting	58 (26.85)	151 (69.91)	07 (03.24)	2.232	20
7.3	Maintaining closer spacing of aged seedlings	200 (92.60)	08 (03.70)	08 (03.70)	2.888	02
7.4	Increasing number of aged seedlings per hill	198 (91.67)	10 (04.63)	08 (03.70)	2.879	03
8.	**Time of transplanting**					
8.1	Transplant in (first fortnight of June-July-Kharif), (October-November-Rabi)	196 (90.74)	12 (05.56)	08 (03.70)	2.869	04

9.	**Method of transplanting**					
9.1	Transplant the recommended number of seedlings per hill? 2-3 seedlings per hill	194 (89.81)	14 (06.49)	08 (03.70)	2.860	05
10.	**Row spacing**					
10.1	Maintain the recommended spacing between the two hills? -15 x 15 cm	116 (53.71)	99 (45.83)	01 (00.46)	2.534	13
11.	**Fertilizers in transplanted paddy**					
11.1	Apply fertilizers as per the recommended? • Basal Dose: ½ dose of N & full dose of P2O5, K2O and ZnSO4 • Top Dressing: Remaining ½ dose of N in 2 splits: -1st at early tillering stage (15-18 DAT) -2nd at panicle and flag leaf initiation (30 DAT)	100 (46.29)	109 (50.47)	07 (03.24)	2.432	14
11.2	Apply the recommended dosage of nutrients for crop? • FYM @ 10 T/ha • N @ 120 kg/ha • P2O5 @ 60 kg/ha • K2O @ 40 kg/ha • ZnSO4 @ 10 – 15 kg/ha	59 (27.31)	147 (68.07)	10 (04.62)	2.227	22
11.3	Apply 250 g of ammonium sulphate after transplanting of 8-10 days and 15-18 days.	77 (35.64)	129 (59.74)	10 (04.62)	2.311	17
12.	**Weed management in transplanted paddy**					
12.1	Apply 1.5-2.0 kg ai ha^{-1} butachlor at 4 to 7 DAT for weed control	77 (35.64)	133 (61.59)	06 (02.77)	2.330	16
12.2	Start weeding at 45 to 50 days after transplanting	24 (11.11)	182 (84.27)	10 (04.62)	2.065	45
13.	**Integrated pest and disease management**					
13.1	**Stem borer** - CLP- Collect and destruct stubbles in field.	28 (12.96)	159 (73.62)	29 (13.42)	1.995	48
13.2	MP- Removal and destruction of infested plant parts.	51 (23.61)	129 (59.73)	36 (16.66)	2.069	43

13.3	CP- a) Apply Carbofuran 10 kg/ac	59 (27.31)	117 (54.18)	40 (18.51)	2.088	39
13.4	b) Apply Chloripyriphos 2.5 ml/t of water	66 (30.55)	120 (55.57)	30 (13.88)	2.167	29
13.5	c) Apply chlorantraniliprole 4 kg/ac.	69 (31.94)	112 (51.86)	35 (16.20)	2.158	30
13.6	**Brown plant hopper –** CP – a) Spray Monocrotophos 2.2 ml/litre of water/ac	65 (30.09)	113 (52.32)	38 (17.59)	2.125	35
13.7	b) Spray Acephate 1.5 gms/litre of water	28 (12.96)	176 (81.49)	12 (05.55)	2.074	42
13.8	**Leaf folder** - CLP- Collect and destroy eggs and larvae.	57 (26.38)	141 (65.29)	18 (08.33)	2.181	27
13.9	CP- a) Spray Monocrotophos 1.6 ml/litre of water	56 (25.92)	136 (62.97)	24 (11.11)	2.148	31
13.10	b) Spray Chloripyriphos 2.5ml/litre of water/ac.	64 (29.62)	137 (63.44)	15 (06.94)	2.227	22
13.11	**Blast** – CP – a) Spray Tricyclazole @ 0.6 gms/litre of water	65 (30.09)	127 (58.80)	24 (11.11)	2.190	26
13.12	**Bacterial leaf blight** – CP - a) CP- Strepthocycline (200 ppm) 0.2 gms/litre of water b) Spray Copper oxycloride solution (3 gms/litre of water	61 (28.24)	132 (61.12)	23 (10.64)	2.176	28
13.13	**False smut** – a) CP-Spray Hexaconazole 2ml/litres of water	74 (34.25)	117 (54.18)	25 (11.57)	2.227	22
13.14	b) Spray propiconazole 1 ml/litres of water	69 (31.94)	96 (44.45)	51 (23.61)	2.083	40
13.15	**Sheath blight**- CP- a) Spray Hexaconazole 2ml/l	86 (39.81)	102 (47.23)	28 (12.96)	2.269	18
13.16	b) Spray propiconazole 1 ml/litres of water	60 (27.77)	119 (55.11)	37 (17.12)	2.106	36
13.17	c) Spray Azoxystrobin +	54 (25.00)	136 (62.97)	26 (12.03)	2.130	34

	Tebuconazole 0.4 gms/l					
14.	**Time of harvesting**					
14.1	Harvest crop at the recommended time? -At physiological maturity stage when leaves and panicles turn yellow.	178 (82.40)	14 (06.49)	24 (11.11)	2.720	10
15.	**Method of harvesting**					
15.1	Harvest manually or machine	190 (87.96)	18 (08.34)	08 (03.70)	2.841	06
15.2	Dry Paddy after harvesting for 1 to 2 days	189 (87.50)	19 (08.80)	08 (03.70)	2.837	07
15.3	Crop rotation (growing legumes before cereals) to enhance farms biological stability.	185 (85.64)	23 (10.64)	08 (03.72)	2.818	08

f = frequency of farmers, Per cent = %, CA = Complete adoption, PA = Partial adoption, NA = No adoption, (Figures in parentheses indicate per cent), CLP= Cultural practice, CP = Chemical practice, MP = Mechanical practice.

4. CONCLUSION

Increasing use of inputs such as fertilizer application and equipment, recommended sustainable practices adoption has become necessary for sustainable farming. Sustainable practices boost output, while having no detrimental influence on environment. The simultaneities among adoption of recommended sustainable practices can be examined in future research. This may help policymakers to understand factors influencing on farmers while adopting recommended sustainable practices. Results revealed that farmers' adoption choices are heavily influenced by availability of advisory services, agrochemicals, organic fertilizers, farming experience, farming commitment, education, economic motivation, achievement motivation, innovativeness, level of aspiration and risk orientation. As line departments and governments should make it possible for farmers to learn more about recommended sustainable farming practices through various means and methods at on or off campus activities.

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Image 1. Glimpse of Data collection using standardized interview schedule.