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Knowledge level of recommended technologies of paddy under tank irrigation in Kancheepuram district of Tamil Nadu

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Abstract

The tank irrigation system is one of the most effective irrigation methods for small and marginal farmers. In India, tank irrigation was adopted by maximum number of farmers, especially in southern Indian states and these states occupy around 60 percent of the total tank irrigated area. Tamilnadu had a maximum area for cultivation of crops under tank irrigation next to Andhra Pradesh. The study was conducted with 120 tank irrigated paddy farmers in the Kancheepuram district. In this district, Paddy (*Oryza sativa* L) is the major cultivated crop under a tank irrigated area of 56,267 ha. With this regard, an attempt was made to assess the knowledge level of recommended technologies paddy under tank irrigation. The overall knowledge level of transplanting paddy results revealed that three fourth (75.00%) of the farmers were under medium level category, while less than two-fifths (39.20 percent) of them had medium level of knowledge about direct seeding paddy technologies in the study area.

Keywords: Tank irrigation, knowledge, tank irrigated paddy farmers, transplanting paddy, direct seeding paddy

1. Introduction

An irrigation tank is a reservoir constructed across the slope of a valley to harvest rainwater in rainy season and to use it for irrigation and other purposes. The tank irrigation system has a special significance to the marginal and small farmers who depend on the tank irrigation (Umamaheshwara. 2009) [16]. In agriculture, tank irrigation combines the conservation agenda of indigenous small-scale irrigation systems and the improvement of farmers' livelihoods through the regeneration of farmer management. Tank irrigation is an attractive proposition to farmers because it is estimated the average net return from tank irrigated hectare area in terms of food grains are about three times higher than those from the un-irrigated hectare area (Sengupta, 1993) [12]. Paddy is one of the major crops cultivated under tank irrigation in south Indian states. Paddy is the staple food crop of world's population and it has got paramount importance to Indian economy. Rice being the important staple food for more than half of the world population, also contributes for Indian food security and enhancing rural economy, paddy being major source of energy, provides 60-70 per cent body calorie intake to the average consumer. (Ravi Shankar Chand Reddy., 2018) [9]. Paddy is cultivated either as a single crop or double crop in tank command areas. To attain maximum field productivity, water must be supplied and regulated in such a way that maximum production could be obtained from the available tank water. This is not happening in the tank command area at present juncture. In fact, the lowest paddy yield per unit area in irrigated land is only from the failed tank irrigated lands (Sivanappan, 1982) [13]. Knowledge about paddy cultivation under tank irrigation plays important role for adoption of paddy production technologies. With this keeping the above points this study was undertaken to assess the farmer's knowledge level of paddy production technologies under tank irrigation.

2. Materials and methods

In this study, Expost-facto research design was followed. The study was conducted in Kancheepuram district of Tamil Nadu. This district occupies second position in total number of tanks and also had maximum number of tank irrigated paddy farmers. In Kancheepuram district, Uthiramerur, Walajabad, Maduranthagam, and Sriperumbudur blocks were selected based on the major area under tank irrigated cultivation. These four blocks covers around 80% of total net irrigated area under tanks and also covers total paddy cultivated area under tank irrigation. The respondents of 120 tank irrigated paddy farmers were selected from four blocks based on proportionate random sampling technique as follows.

Table 1: Distribution of tank irrigated paddy farmers in the selected blocks

S. No	Name of blocks	Number of tank irrigated paddy farmers	Number of farmers selected by Proportionate Random sampling technique
1.	Uthiramerur	8531	37
2.	Walajabad	6724	30
3.	Maduranthagam	6436	28
4.	Sriperumbudur	5431	24
Total		27,190	120

Source: Assistant Director of Agriculture Office of Uthiramerur, Walajabad, Maduranthagam, and Sriperumbudur blocks

The package of practices from sowing to harvesting were collected from literature and based on the discussion made with paddy scientist and the knowledge level was measured among 120 tank irrigated paddy farmers.

3. Result and discussions

3.1 Knowledge level of paddy under tank irrigation

Knowledge is defined as the understanding of a body of facts,

information and skills acquired through experience. In this research, knowledge is applied as 'understanding the body of information, facts, and skills acquired by farmers on recommended paddy technologies in two ways of cultivation practices namely transplanting paddy and the direct seeding under tank irrigation.

The overall knowledge and technology-wise knowledge level analysis was presented in table.no.2 and 3.

3.1.1 Overall knowledge level of paddy under tank irrigation

Table 2: Distribution of respondents according to their overall knowledge level of transplanting paddy and direct seeding paddy under tank irrigation (n=120)

S. No	Category	Transplanting paddy		Direct seeding	
		Number	Per cent	Number	Per cent
1.	Low level of knowledge	17	14.20	27	22.50
2.	Medium level of Knowledge	90	75.00	47	39.20
3.	High level of knowledge	13	10.80	46	38.30
Total		120	100.00	120	100.00

The above table interpreted that three fourth (75.00%) of the tank irrigation farmers had medium level of knowledge in paddy under tank irrigation followed by one seventh (14.20%) and 10.80 per cent of them had low and high level of knowledge about recommended technologies of paddy under tank irrigation. The majority of the tank irrigation farmers had a medium level of knowledge about recommended technologies of paddy under tank irrigation. The main reason behind this, the farmer's main aim is to increase their income through tank irrigated farming, so they highly interested to develop their knowledge through mass media and social participation. And also extension experts disseminate the

knowledge to farmers by conducting the training, meetings, and exhibition, etc. The results of overall knowledge about direct seeding paddy interpreted that less than two-fifths (39.2 percent) of them had a medium level of knowledge about direct seeding paddy in tank irrigation, 38.30 percent and more than one-fourth (22.50 percent) of them had a high and low level of knowledge about direct seeding paddy under tank irrigation. The majority of farmers had a medium to a high level of knowledge on direct seeding paddy under tank irrigation. Reasons behind this, they had medium to high level of awareness about this technology.

3.2 Technology-wise knowledge level of paddy under tank irrigation

Table 3: Practices wise knowledge level of paddy under tank irrigation (n=120)

S. No	Practices	Knowledge	
		Frequency	percent
i).	Transplanting paddy		
I	Crop improvement technology		
	Varieties – ADT 37, ADT38, TKM13, CO52, white ponni, CO48, MDU5	96	80.00
II	Crop production technologies		
	Nursery area - 20cents (800 sq.m)	84	70.00
	Seed rate – 40kg/ha and 60kg/ha	78	65.00
	Seed treatment - Biofertilizers like five packets of Azophos.	108	90.00
	Sowing – uniformly in seedbed	111	92.50
	Seedling age - 18-22 days for short, 25-30 days for medium and 35-40 days for long duration varieties	105	87.50
	Mainfield preparation- 2.5 cm depth water during puddling	99	82.50
	No.of seedlings /hill- 2-3	90	75.00
	Spacing- 15 x 10 cm and 20 x 10 cm	102	85.00
	Gap filling -7 to 10 days	75	62.50
III	Nutrient management		
	FYM/ Green leaf manure- 12.5t/ha	99	82.50
	NPK-150:50:50 kg/ha	75	62.50
	Fertilizer Application time	45	37.50
	Application method- broadcasting	120	100.00
ii)..	Direct sowing paddy		
1.	Varieties – MDU5, CO47, ADT37	57	47.50

2.	Season – july to august	36	30.00
3.	Field preparation-summer ploughing	39	32.50
4.	Seed rate-75kg/ha	45	37.50
5.	Seed hardening-1% kcl	25	20.80
6.	Seed treatment – pseudomonas 10g/kg of seed and Azophos 1kg/ha	48	40.00
7.	Sowing by seed drill	27	22.50
8.	Sowing by drum seeder	69	57.50
9.	Thinning and gap filling- 14 to 21 days after sowing	30	25.00
10.	PPFM (foliar spray 1%)	55	45.80
11.	NPK (75:25:37.5 kg/ha)	26	22.50
IV	Plant protection technologies		
	Weed management		
a.	Hand weeding	120	100.00
	Herbicide –Pre-emergence at 30 DAT	111	92.50
	Rotary weeder - finger type single row and double row	84	70.00
b.	Pests and their Management		
1.	Thrips - (Spray Monocrotophos - 40 ml Thiamethoxam -25% WG 4g	96	80.00
2	Yellow stemborer (spray Carbofuran 3% CG 25 kg)	96	80.00
2	Greenleaf hopper – (Broadcast carbofuran 3% CG 3.5 kg in 20 cents)	99	82.50
3	Brown plant hopper (spray Imidacloprid 70% WG 30-35 kg).	105	87.50
1	Leaf folder (spray Chlorpyrifos 20% EC 1250 ml)	108	90.00
2	Rat (Poison bait at 1 part zinc phosphide with 49 parts popped corn/rice/dry fish).	84	70.00
c.	Diseases and their management		
1	Paddy blast (Spray Azoxystrobin 25 SC @ 500 ml/ha)	87	72.50
2	Bacterial leaf blight (Spray copper oxychloride @ 1.25 kg/ha)	105	87.50
2	Sheath blight(Spray bavistin 1g/litre or Spray carbendazim 50 WP @ 500 g/ha)	97	80.80
3	False smut(Two sprays with propiconazole 25 EC @ 500 ml/ha)	78	65.00
4	Sheath rot (Spray carbendazim @ 500 g/ha)	50	41.70
5	Grain discolouration (Spray carbendazim + thiram + mancozeb (1:1:1) @ 0.2% at 50% flowering stage)	80	66.70
V.	Water management		
1.	Irrigation (30 to 35 days) Irrigate to 5 cm depth.	86	70.00
VII	Harvesting		
1.	Hand harvest (80% of the panicles turn straw colour)	120	100.00
2.	Machine harvest	66	55.00

3.2.1 Knowledge level of transplanting paddy crop improvement technologies under tank irrigation

It could be seen from the table. 4 that four-fifth (80.00%) of farmers knew the varieties of ADT 38, ADT39, TKM13, CO52, white ponni, CO48, and MDU5 for transplanting paddy. Farmer's involvement in all farming and extension activities could be a reason for good knowledge about varieties.

3.2.2 Knowledge level of transplanting paddy crop production technologies

The knowledge level of transplanting paddy crop production technologies presumed that 70.00 per cent of farmers knew the nursery area -20cents (800sq.m), 65.00 per cent of farmers knew seed rate (short-60kg/ha, medium-40kg/ha, long-30kg/ha), farmers with 90.00 per cent knew seed treatment with bio-fertilizers and fungicides and 92.50 per cent of the paddy growers had knowledge about sowing (uniformly in seedbed). The majority (87.50%) of farmers had adequate knowledge about seedling age of 18-22 days for short, 25-30 days for medium and 35-40 days for long-duration varieties, more than two-fifth (82.50%) of them knew main field preparation (2.5 cm depth water during puddling), three-fourth (75.00%) of farmers knew about recommended seedlings per hill, while (85.00%) and more than three-fifth (62.50%) of farmers knew spacing (15 x 10 cm and 20 x 10 cm) and gap-filling (7 to 10 days) respectively.

Tank irrigation farmers had medium to high level of farming experience in paddy cultivation under tank irrigation. This is the reason for farmers had good knowledge about transplanting paddy crop production technologies such as seedling ages, seed rates and spacing.

3.2.3 Knowledge level of transplanting paddy crop nutrient management practices

Regarding nutrient management, the majority (82.50%) of the farmers were knowing about the application of FYM/ Green leaf manure with a dosage of 12.5t/ha, 62.50 per cent of the farmers knew about the application of NPK with dosage of 150:50:50 kg/ha, 37.50 per cent of farmers knew about fertilizer application time and cent percent of the farmers knew about the application of fertilizer by a broadcasting method.

3.2.4 Knowledge level of direct seeding paddy under tank irrigation

More than two fifth (47.50%) of the farmers had adequate knowledge about varieties namely MDU5, CO47, IR64, ADT37 and local land races. More than one- fourth (30.00%) of the farmers knew about the normal season (July to August) for cultivation of direct seeding paddy, 32.50 per cent of the farmers were knowing about field preparation like summer ploughing practices, less than two- fifth (37.50%) of the farmers were knowing about seed rate of 75kg/ha for sowing, nearly one-fifth (20.80%) of the farmers had knowledge about seed hardening practices with 1% kcl for 16 hrs, two fifth (40.00%) of the farmers had knowledge about seed treatment practices with Pseudomonas, Azospirillum and Azophos while 22.50 per cent and 57.50 per cent of the farmers had knowledge about drill sowing and drum seeder method, one fourth of the farmers had knowledge about thinning and gap filling practices while 45.80 per cent of the farmers had knowledge about PPFM culture and less than one- fourth (22.50%) of the farmers had knowledge about NPK dosage in direct seeding paddy.

The reason for less number of farmers had knowledge about direct seeding practices are they had medium to low level of awareness about practices such as PPFM, drill sowing, seed hardening and NPK fertilizers dosage and also most of them interested to obtain knowledge about transplanting paddy technologies only.

3.2.5 Knowledge level of paddy plant protection technologies under tank irrigation

The recommended weed management technology inferred that cent percent of the farmers knew hand weeding in paddy cultivation, the majority (92.50%) of the farmers knew the recommended application of herbicide and 75.00 per cent of the farmers knew rotary weeder.

3.2.6 Knowledge level of paddy pests and their management practices

The results of pests and their control measures showed that majority (80.5%) of the farmers knew about the pest thrips and their recommended management practices, followed by (80.00%) of them knew about the pest yellow stem borer and their recommended management practices, 82.50 per cent of them knew about green leafhopper and their recommended management practices, 87.50 per cent of them knew about brown plant hopper and their recommended management practices, 90.00 per cent and 70.00 per cent of them knew about leaf folder and their recommended management practices and rodent and their recommended management practices respectively.

3.2.7 Knowledge level of paddy diseases and their control measures

Regarding disease management, 72.50 per cent of the farmers knew paddy blast and recommended control measures, 87.50 per cent of them had knowledge about bacterial leaf blight and their recommended control measures, 80.80 per cent of them knew sheath blight and their recommended control measures, 65.00 per cent, 41.70 per cent and 66.70 per cent of them had knowledge about false smut and their recommended control measures, sheath rot and their recommended control measures and grain discoloration and their recommended control measures respectively.

The majority of farmers had good mass media exposure and they had well experienced in paddy cultivation. This could be one of the reasons for farmers had adequate knowledge about plant protection technologies.

3.2.8 Knowledge level of paddy water management and harvest practices

The results of knowledge about Water management and harvest practices indicated that 70.00 percent of farmers had knowledge of first irrigation in 30 to 35 days and also they had knowledge about irrigate water upto 5cm depth. Regarding harvesting, all farmers had knowledge of hand harvesting and that 55.00 percent of them had knowledge of machine harvesting.

The findings were in accordance with Karangami (2017)^[4] and Tangat (2007)^[15].

4. Conclusion

It could be concluded that, overall knowledge level of transplanting paddy confessed that most of the tank irrigated paddy farmers belonged to medium to high level category and for direct seeding paddy revealed that majority of farmers belonged to medium to low level knowledge category. This clearly shows that there is still a huge potential for the agricultural departments to interfere and increase the level of farmers knowledge about farm practices. Therefore,

researcher and subject-matter specialists may conduct training to create knowledge and to make understanding the complex practices in tank irrigated farming. Also extension personal has to conduct the field visits and demonstration and exhibitions to provide first-hand information to motivate them to practice these technologies for higher percentage of adoption in tank irrigated paddy farming.

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