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Awareness and Perception on the Issues Arising out of Undesirable Pattern of Rainfall of the Rice Farmers

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ABSTRACT

Farmers' awareness and perception on the erratic pattern of rainfall would help to develop appropriate extension educational strategies to manage these issues systematically. The study was conducted in the Madurai district of Tamil Nadu, India with local extension workers, crop scientists and 50 active rice cultivating farmers selected randomly to analyse respondents' level of awareness and perception. It was reported that high rainfall during nursery stages affects seed germination. Incidences of root rot, chaffy grains formation and soil erosion were also recorded under high rainfall conditions. Leaf mite infestation, mealy bug attack, and bacterial leaf blight disease were more intense during heavy rainfall conditions. Poor rainfall led to, deprived ground water availability, reduction in rice cropped area, intensive weed growth and non-possibility of profitable crop. Erratic rainfall affected growth duration, grain setting, yield and stages of rice crop. At the time of ripening erratic rainfall affected crop growth severely. Based on the findings of the study, a suggestive 'Climate led Transfer of Technology (ToT)' Module has been developed.

Keywords: Awareness, Climate change, Documentation, Perception, Rainfall pattern

INTRODUCTION

Throughout the world there is significant concern about the effects of climate change and its variability on agricultural production. Researchers are much concerned with the potential damages and benefits that may arise in future from climate change impacts on agriculture, since these will affect domestic and international policies, trading pattern, resource use and the average crop yield (Dinar *et al.,* 1998; Cline, 2007; Seo and Mendelsohn, 2008). Climate change will affect agriculture through effects on crops, soils, insects, weeds and diseases and livestock. Small changes in temperature and rainfall could have a significant effect on the quality of cereals, fruits, aromatic and medicinal plants and result in changes in prices and trade patterns. Pathogens and insect populations are strongly dependent upon temperature and humidity. Increases in these parameters will change their population density resulting in loss in yield. (Nguyen, 2012).

Research evidences shows that changes in temperature and rainfall in India could reduce average rice yield by 15 to 25 per cent, average wheat yield by 30 to 35 per cent (Kavikumar and Parikh, 1998) and farm net income by 8 per cent (Mendelsohn *et al*., 1994). According to Nguyen (2012), rainfall pattern is a very important limiting factor for rain-fed rice production. Higher variability in distribution and a likely decrease in precipitation will adversely impact rice production and complete crop failure is possible if severe drought takes place during the reproductive stages. Farmers' awareness and perception on the erratic pattern of rainfall would

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help to develop appropriate extension educational strategies to manage these issues systematically. Preetisharma *et al.* (2018) indicated that majority of the farmers (57.50%) had high level of awareness on the issues of heavy rainfall. The study recommends that there is a need to create awareness among farmers and extension personnel should play important role in educating the farmers about mitigation and adaptation strategies. The studies of Chunera and Amardeep (2018) shows that the major information needs of farmers to manage climatic issues were crop management strategies, drought/ flood tolerant crop varieties, climate change tolerant livestock breeds, climate-smart agriculture practices and insurances. Considering the merit of the above facts, the present study has been formulated with the specific objectives to document the issues arising out of the undesirable pattern of rainfall and to study the awareness and perception level of the rice farmers of these issues.

METHODOLOGY

Madurai district was finalized for the study being prominent rice producing districts of Tamil Nadu and rice farmers are frequently being affected by erratic rainfall. Two villages namely Mangulam and Purasupatti were selected from Madurai East block of Madurai. Twenty five farmers from each identified village were selected by simple random sampling techniques, thus the total sample size was 50 active rice cultivating farmers. 44 local extension workers and 32 rice scientists. The rainfall induced issues were documented on the following two themes viz., common agricultural issues arising out of undesirable pattern of rainfall and pests and diseases induced due to undesirable pattern of rainfall. During the documentation process sixteen common agricultural issues and four issues related to the rainfall induced pests and diseases were identified –(Table 1). On these issues farmers' level of awareness and perception were analysed. Awareness was analysed on two response categories as 'Aware' and 'Not aware' with a score of 2 and 1 respectively. Similarly, perception was assessed on two response categories as 'Agree' and 'Disagree' with a score of 2 and 1 respectively.

Percentage analysis was done to get meaningful interpretation of the results. Cumulative frequency method was used to categorize the respondents into low, medium and high in their level of awareness and perception. Data were collected using structured and standardized interview schedule.

RESULTS AND DISCUSSION

It is observed from the Table 1 that cent percentage of the respondents was aware that high rainfall during cropping causes chaffy grains and there is a reduction in the rice cropping area due to poor rainfall. An equal percentage of the respondents (96.00%) had awareness of the facts such as ground water availability is very much affected because of poor distribution of rainfall, low rainfall during rice cropping leads to intensive weed growth and there is a considerable yield loss due to erratic rainfall. An equal percentage of the respondents (78.00%) were aware that higher rainfall during nursery stage affected seed germination and non possibility of profitable crop because of failure in monsoon shower. A little less than three fourth of the respondents (74.00%) were aware that root rot incidence was a major issue during the time of high rainfall. Majority of the respondents were aware that recommended crop management practices could not be adopted because of erratic rainfall (70.00%) and crop stages affected during the time of erratic rainfall (66.00%). An equal percentage of the respondents (64.00%) were aware that crop submergence and yield loss was a common issue during the times of cyclonic adverse rainfall and erratic rainfall affected growth duration of rice crop under rainfed condition. Almost an equal percentage of the respondents were aware that high rainfall caused crop lodging problem in CO(R) 51 during harvesting stage (58.00%) and the grain setting was severely affected by adverse rainfall during that stage (56.00%). Half of the respondents (50.00%) were aware that erratic rainfall at ripening stage reduces crop growth severely. More than two fifth of the respondents (44.00%) had awareness that soil erosion was a regular issue during higher intensity rainfall.

Regarding the perception, a vast majority of the respondents (96.00%) agreed that due to poor rainfall the rice cropped area had been reduced. An equal

Table 1: Distribution of respondents according to their awareness and perception level on the issues arising out of undesirable pattern of rainfall (n=50)

Common agricultural issues	Awareness		Perception	
	N	%	N	%
Higher rainfall during nursery stage affects seed germination	39	78.00	34	68.00
Soil erosion is a regular issue whenever there is higher intensity rainfall	22	44.00	10	20.00
Crop submergence and yield loss is a common issue during the times of cyclonic adverse rainfall	32	64.00	31	62.00
High rainfall causes crop lodging problem in CO(R) 51 during harvesting stage	29	58.00	12	24.00
High rainfall during cropping causes chaffy grains	50	100.00	47	94.00
Root rot incidence is a major issue during the time of high rainfall	37	74.00	30	60.00
Ground water availability is very much affected because of poor distribution of rainfall	48	96.00	43	86.00
There is a reduction in the rice cropping area due to poor rainfall	50	100.00	48	96.00
Profitable crop is not possible because of failure in monsoon shower	39	78.00	32	64.00
Low rainfall during rice cropping leads to intensive weed growth	48	96.00	42	84.00
Erratic rainfall affects growth duration of rice crop (rainfed)	32	64.00	30	60.00
Erratic rainfall at ripening stage reduces crop growth severely	25	50.00	22	44.00
The grain setting is severely affected by adverse rainfall during that stage	28	56.00	25	50.00
Crop stages are affect during the time of erratic rainfall	33	66.00	32	64.00
Recommended crop management practices could not be adopted because of erratic rainfall	35	70.00	30	60.00
Comparing to the past, there is a considerable yield loss due to erratic rainfall now a days	48	96.00	47	94.00

Table 2: Distribution of respondents according to their awareness and perception level on pests and diseases induced by rainfall (n=50)

Agricultural issues	Awareness		Perception	
	N	%	N	%
Rice leaf mite infestation will be more during the times of heavy rainfall	37	74.00	23	46.00
Rice mite infestation will be more during the times of heavy rainfall	38	76.00	25	50.00
Rice mealy bug attack will be more during the times of heavy rainfall	47	94.00	22	44.00
Bacterial leaf blight disease will be more intense during heavy rainfall conditions	50	100.00	47	94.00

percentage of the respondents (94.00%) agreed that high rainfall during cropping caused chaffy grains and there was a considerable yield loss due to erratic rainfall now a days comparing to the past. Most of the respondents perceived that ground water availability was very much affected because of poor distribution of rainfall (86.00%) and low rainfall during rice cropping led to intensive weed growth. Majority of the respondents opined that higher rainfall during nursery stage affected seed germination (68.00%) and an equal percentage of the respondents (64.00%) felt that profitable crop was not possible because of failure in monsoon shower and crop stages were affected during the time of erratic rainfall followed by 60.00 per cent of the respondents who felt that root rot incidence was a major issue during the times of high rainfall, erratic rainfall affected growth duration of rice crop under rainfed condition and recommended crop management practices could not be adopted because of erratic rainfall. Half of the respondents (50.00%) agreed that the grain setting was severely affected by adverse rainfall during that stage. A little more than two fifth of the respondents (44.00%) agreed that erratic rainfall at ripening stage reduced crop growth severely. Almost one fourth of the respondents (24.00%) agreed that high

Table 3: Distribution of respondents based on their overall awareness level on agricultural issues arising out of undesirable pattern of rainfall (n=50)

Category	Number	Percentage
Low	10	20
Medium	19	38
High	21	42
Total	50	100

Table 4: Distribution of respondents based on their overall perception level on agricultural issues arising out of undesirable pattern of rainfall (n=50)

Category	Number	Percentage
Low	4	08
Medium	31	62
High	15	30
Total	50	100

rainfall caused crop lodging problem in CO(R) 51 during harvesting stage and one fifth of the respondents (20.00%) agreed that soil erosion was a regular issue during higher intensity rainfall.

As far as the awareness and perception of the respondents is concerned on pest and diseases arising due to rainfall (Table 2), cent percent of the respondents were aware about intense bacterial leaf blight disease during heavy rainfall conditions. A vast majority (94.00%) was aware about higher rice mealy bug attack during the times of heavy rainfall. Almost an equal percentage of the respondents were aware about more rice mite infestation (76.00%) and rice leaf mite infestation during the times of heavy rainfall (74.00%). An overwhelming majority of the respondents (94.00%) agreed that higher bacterial leaf blight disease, more rice mite infestation

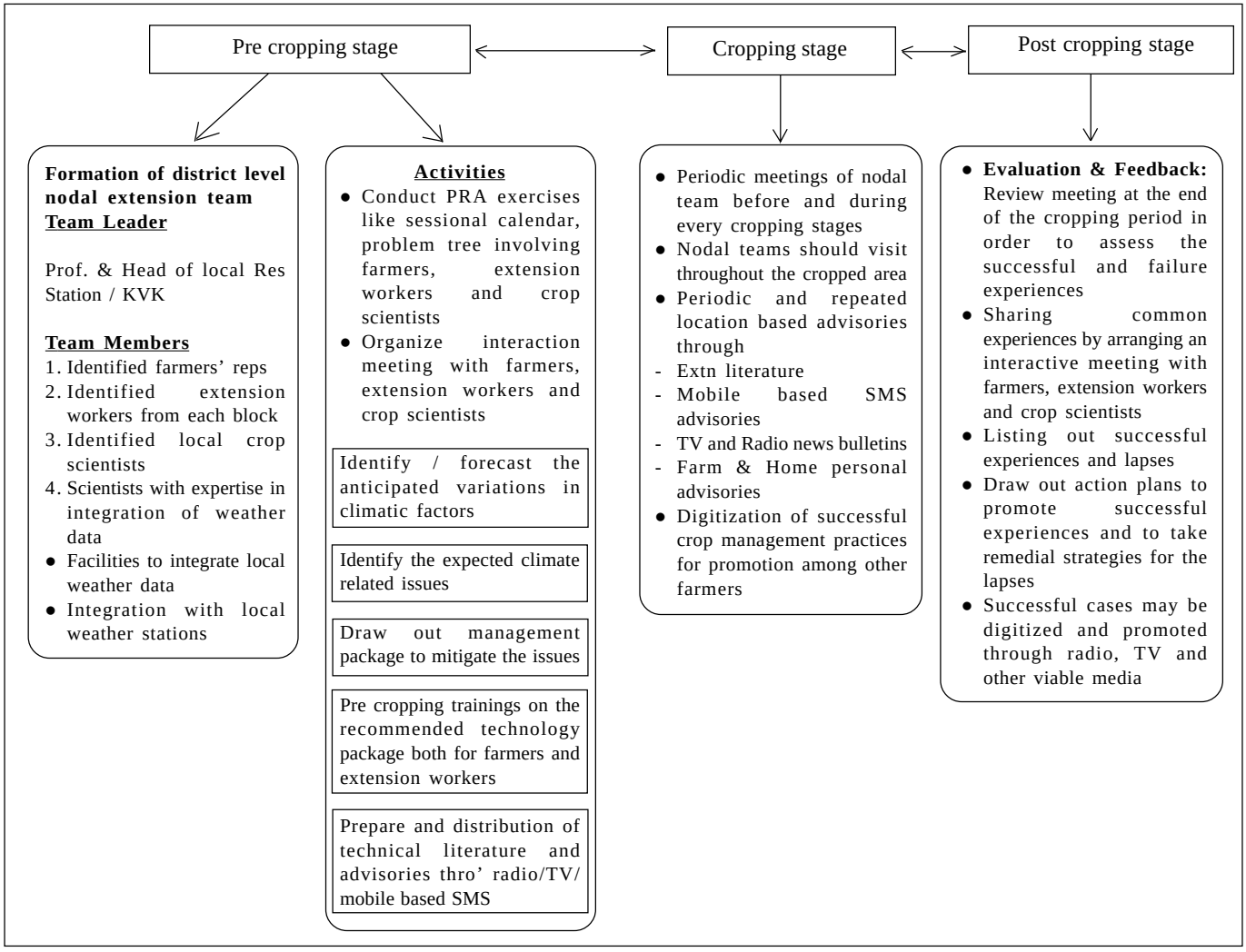

Figure 1: Suggestive transfer technology module for climate led extension activities in the rice eco system

(50.00%) during the times of heavy rainfall. Almost an equal percentage (46.00%) of the respondents perceived higher rice leaf mite infestation and rice mealy bug attack).

Overall level of awareness of the respondents on different agricultural issues, pests and diseases induced by undesirable pattern of rainfall was studied and the findings are given in the Table 3. The Table shows that slight more than two fifth of the respondents (42.00%) had high level of awareness followed by 38.00 per cent of the respondents who had medium level of awareness. Only one fifth of the respondents (20.00%) had medium level of awareness.

Overall level of perception on different agricultural issues, pests and diseases induced by undesirable pattern of rainfall was studied and from the data collected the respondents were categorised and given in the Table 4 which indicate that majority of the respondents (62.00%) had medium level of perception on issue due to undesirable pattern of rainfall. This was followed by more than one fourth of the respondents (30.00%) who had high level of perception. Only 8.00 of the respondents had low level of respondents.

CONCLUSION

High rainfall during nursery stages affects seed germination. Hence, root rot incidences, chaffy grains formation and soil erosion were also recorded under high rainfall conditions. At the time of cyclonic adverse rainfall crop submergence and yield loss is a common issue. CO(R) 51 faced lodging problem during harvesting stage as well. Rice leaf mite infestation, rice mealy bug attack, rice mite infestation and bacterial leaf blight disease were more intense during heavy rainfall conditions. The awareness and perception level of the respondents was almost medium with respect to all the listed out issues. Considering this a formal organized body is to be set up at district level to take care of these issues. This may be addressed as district level nodal extension team. Climate led Transfer of Technology Module' has been suggested on the basis of findings in Figure 1.

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