

## Research Note

# Adaptation Strategies being followed by Paddy Growers towards Climate Change in Punjab State

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## ABSTRACT

The study was conducted in five agro climatic zones of Punjab. One district from each zone, three blocks from each district and further one village from each block and finally 10 farmers per village having experience of minimum fifteen years of paddy cultivation were selected randomly. Data was collected by using the interview schedule. Majority (91.21%) had adopted short duration crop varieties and 82.43 per cent farmers were availing weather forecasting services. More than three fourth of the respondents opined that by using laser land management practices like leaser leveler they mitigate the effect of climate change during paddy production, while 26.35 per cent by using resource conservation technologies, 28.37 per cent by adopting soil moisture conservation methods, 11.48 per cent by stopping the burning of crop residue and only 10.81 per cent by using insect pest management techniques mitigate the effect of climate on paddy production. More than half of the respondents suggested that resistance varieties to insects-pest and diseases should be developed.

**Keywords:** Adaptation strategies, Climate change, Paddy growers

## INTRODUCTION

The global climate change which has attracted attention of thinkers from almost all fields is threatening to have significant and far reaching impacts on the human society. Agriculture is the one of sensitive areas upon which society depends for the food, feed and fiber that enables sustainable livelihoods. It is one of the sectors that are most vulnerable to climate change. In agriculture, climate can reasonably be considered as a resource and climate change can lead to changes in agricultural productivity of a region (Darwin, 2004). Climate change is expected to influence crop production, hydrological balance, input supplies and other components of agricultural systems. However, the nature of these bio-physical effects and human responses to them are complex and uncertain. Due to its sensitivity, any change

in the climate can have significant alterations in the crop yields (Rosezwerig and Parry, 2007). The recognition that climate change related threats to agriculture also represent threats to quality of life on a global scale which has led to an increasing amount of attention to adaptation and mitigation strategies for agriculture by the farmers (Howden *et al.*, 2007). Adaptation and mitigation are two basic solutions to avoid the ill effects of climate change, but with distinctly different responses. Farmer attitudes toward these two general responses to climate change must be understood. Adaptation to climate change involves changes in agricultural management practices in response to changes in climate conditions. It often involves a combination of various individual responses at the farm-level and assumes that farmers have access to alternative practices and technologies available in the region. To adapt to the climate change, farmers are

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required first to notice that climate has altered and then identify potential useful adaptation measures and implement them. To enhance policy towards tackling the challenges that climate change poses to farmers, it is important to have knowledge of farmers' adaptation measures (Benedicta *et al.*, 2010). With unpredictable weather, the farmers keep changing crop management practices by growing resistant varieties and are prepared for constant change in the farming practices.

### METHODOLOGY

The study was conducted in Punjab state. Five agro-climatic zones were selected, one district was selected from each zone, three blocks were selected from each district and further one village from each block was selected randomly. From each village, ten farmers having experience of fifteen year in paddy cultivation were selected randomly. Thus, a total of 150 farmers were selected but two farmers didn't suppose that climate change is happening so the sample consisted of 148 farmers. The data was collected through personal interview method through structured interview schedule.

Statistical tools like frequency and percentage and z-test were used to analysis the data.

### RESULT AND DISCUSSION

The adaptation strategies of the farmers to reduce the effect of climate change on paddy production are presented in Table 1. The Table revealed majority of the farmers (82.43%) were availing weather forecast they mitigate the effect of climate change in paddy production. More than three fourth (76.35%) of the respondents opined that by using laser land management practices like leaser leveler they mitigate the effect of climate change during paddy production. While 26.35 per cent by using resource conservation technologies, 28.37 per cent by adopting soil moisture conservation methods, 11.48 per cent by stopping the burning of crop residue and only 10.81 per cent by using insect pest management techniques they mitigate the effect of climate on paddy production.

The data in Table 1 also reveal that 23.64 per cent of the farmers mitigate the effect of climate change by using

**Table 1: Distribution of respondents according to adaptation strategies adopted by farmers keeping in view the climate change (n=148)**

Adopted strategies	Frequency*	Percentage	Mean	SD	Z value
Use of resource conservation technologies	39	26.35	0.26	0.442	1.565(NS)
Organic farming (Basmati)	0	0.00	0.00	0.000	0(NS)
Adopting rain harvesting methods	1	00.67	0.01	0.082	46.672*
Adopting soil moisture conservation methods	42	28.37	0.28	0.452	0.981(NS)
Site specific nutrient management	35	23.64	0.24	0.426	2.399(NS)
Using short duration crop varieties	135	91.21	0.91	0.284	25.535*
Fallowing integrated farming system	67	45.21	0.45	0.499	3.254*
Changing planting dates	71	47.97	0.48	0.501	3.903*
Changing the cropping pattern	9	06.08	0.06	0.240	13.238*
Land management practices	113	76.35	0.76	0.426	12.740*
Using insect pest management	16	10.81	0.11	0.312	8.329*
Availing weather forecast service	122	82.43	0.82	0.382	16.176*
Stop burning of crop residue	17	11.48	0.11	0.320	7.853*
Reducing tillage practices	18	12.16	0.12	0.328	7.408*
Reducing usage of chemical fertilizers	13	08.78	0.09	0.284	10.011*
Water management and conservation techniques	57	38.58	0.39	0.488	1.634(NS)

**Multiple responses**, NS=Non-Significant, \*Significant at 0.01 level, \*\*Significant at 0.05 level of significance

site specific nutrient management and 45.21 per cent responded that by following integrated farming system they can mitigate the effect of climate change. Use of short duration varieties (91.21%) and by reducing tillage practices (12.16%) were the other strategies that were adopted by farmers to mitigate the effect of climate change on paddy production. While very few i.e. 6.08 per cent, 0.67 per cent and 8.78 per cent opined that by changing cropping pattern, by adopting rain harvesting methods and reducing the use of chemical fertilizers they mitigate the effect of climate change on paddy production. 38.58 per cent opined to use water management and conservation techniques and near about half (47.97%) opined to change the planting dates to mitigate the effect of climate change. No one opined to practice organic farming to mitigate the effect of climate change. The findings were in agreement with Dobermann *et al.* (2002); Shugart *et al.* (2003); Smithers and Smith (1997); Roncoli *et al.* (2002) and Brar *et al.* (2017).

Data further depict that the five items i.e. use of resource conservation technologies, Organic farming, Adopting soil moisture conservation methods, Site specific nutrient management, Water management and conservation techniques with mean score 0.26, 0.00, 0.28 and 0.39 were found to be non-significant with the strategies towards climate change and Site specific nutrient management with mean score 0.24 were significant at 0.05 level of significance whereas the rest of the statements i.e. adopting rain harvesting methods, using short duration crop varieties, following integrated farming system, changing planting dates, changing the cropping pattern, land management practices, using insect pest management, availing weather forecast service, stop

burning of crop residue, reducing tillage practices, reducing usage of chemical fertilizers, water management and conservation techniques were having mean score 0.01, 0.91, 0.45, 0.48, 0.06, 0.76, 0.11, 0.82, 0.11, 0.12 and 0.09, respectively had significant relation with the adaptation strategies towards climate change.

Suggestion of the farmers regarding mitigation of climate change effects was taken and the same has been presented in Table 2 reveals that more than half of the respondents (52.70%) suggested that there should be varieties that are resistant to various insect-pest and weeds followed by 45.27 per cent respondent those suggested that varieties resistant to lodging should be developed. While 29.05 per cent of respondents suggested to develop varieties that can withstand in adverse weather conditions. 26.35 per cent of respondent suggested promoting techniques like direct seeded rice (DSR) to stable water Table. Very few farmers (8.78%) suggested that government should make policies for paddy straw management and provide subsidies on machinery to mitigate the effect of climate change.

## CONCLUSION

The results showed that climate change is leading the farmers to adapt the mitigation strategies but stress tolerant varieties should be developed, resource conservation technologies like Direct Seeded Rice should be promoted, and enhance farmer capability and improve resilience in response to climate change. Although many useful steps have been taken in the direction of ensuring adequate adaptation in developing countries, much work still remains to fully understand the drivers of past adaptation efforts, the need for future adaptation.

**Table 2: Distribution of respondents according to suggestions to mitigate the effect of climate change**

Suggestions	Frequency*	Percentage
Resistance varieties to insect-pest and diseases should be developed	78	52.70
Varieties resistance to temperature and water stress should be developed	43	29.05
Varieties resistance to lodging should be developed	67	45.27
Techniques like Direct seeded rice (DSR) should be promoted to control decline in water Table	39	26.35
Government should make policies for paddy straw management providing subsidy on recommended machinery	13	08.78

\*Multiple responses

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