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Research Article

STUDY EXAMINING THE ADAPTATION MEASURES TAKEN BY THE FARMERS TO DEAL WITH CLIMATE CHANGE IN VIJAYPUR DISTRICT OF NORTHERN KARNATAKA

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Abstract: In this study attempt has been made to examining the adaptation measures taken by the farmers to deal with climate change in the Vijayapur district of northern Dry Zone of Karnataka. Based on the existence of high range of variability in rainfall and temperature (since 40 years), the district taluks were selected, accordingly the taluks selected were Bijapur and Sindagi. From each of the selected taluks five villages were selected randomly. By applying simple random sampling technique 150 respondents were selected for the study. The data collected through a detailed interview schedule employing personal interview method. The objective of the study results revealed that with respect to adaptation measures initiated in soil and water conservation practices, about 58.00 per cent of farmers are in high adaptation category followed by medium (25.33%) and low (16.66%) level of adaptation category. Study revealed that, more than 50.00 per cent of the farmers were in high level of adaptation to climate change, initiated in crop production and soil and water conservation practices. It has to be supported by organizing various transfer of technology programmers along with facilitating farmers to adopt climate resilience crop technologies and innovative technology.

Keywords: *Adaptation, Crop production, Soil and water conservation*

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Introduction

Adaptation is a two way process which requires that farmers perceive change in climate in the first stage and act in the second stage through adaptation [1]. Stern (2006) [2] stressed that there is increasing recognition of the need for nations, communities and individuals to adapt to some level of climate change, irrespective of the level of mitigation. Common adaptation methods in agriculture inside: use of new crop varieties and livestock species that are more suited to drier conditions, irrigation, crop diversification, mixed crop livestock farming systems and changing planting dates [3,4]. Thus, the adaptive capacities of a system or society describe its ability to modify its characteristics or behavior to cope better with changes in external conditions.

Brussel (2009) [5] highlighted the possible short to medium term adaptation practices to changes in climate by farmers to include: (i) adjusting the timing of farm operations such as planting or sowing dates and treatments; (ii) technical solutions such as protecting overheads from frost damage or improving ventilation and cooling systems in animal shelters; (iii) choosing crops and varieties better adapted to the expected length of the growing season and water availability and more resistant to new conditions of temperature and humidity; (iv) adapting crops with the help of existing genetic diversity and new possibilities offered by biotechnology; (v) improving the effectiveness of pest and disease control for instance through better monitoring, diversified crop rotations, or integrated pest management methods; (vi) using water more efficiently by reducing water losses, improving irrigation practices and recycling or storing water; (vii) improving soil Management by increasing water retention to conserve soil moisture and landscape management such as maintaining landscape features providing shelter to livestock; (viii) introducing more heat tolerant livestock breeds and adapting diet patterns of animals under heat stress conditions.

Materials and Methods

The study was conducted in Vijayapur district of Karnataka during year 2011-12, Vijayapur district was purposively selected for the study, as it is "drought prone district" It covers five taluks *viz*., Vijayapur, Basavan Bagewadi, Muddebihal, Indi, and Sindagi and these taluks comes under Northern Dry Zone. From each taluk, five villages and from each village, fifteen farmers were selected by applying simple random sampling. The villages selected were Bhutnal, Managooli, Hittinahalli, Ainapur and Rambapur from Bijapur taluk and Almel, Korhalli, Yaragall, Kerur and Rampur from Sindagi taluk. Thus, totally ten villages were selected for the study. List of farmers from each of the ten selected villages was obtained. From each village, fifteen farmers were selected randomly. Thus, the total sample for the study was 150 respondents. In the present investigation, ex-post facto research design was employed. A Relevancy Test was also developed to measure the adaptation of respondents about climate change. The objective behind developing relevancy test was to discriminate respondents in terms of adaptation measures they adopted due to climate change.

The adaptation items were categorized in two groups as 1) Adaptation measures initiated in crop production practices 2) Adaptation measures initiated in soil and water conservation practices. In all 21 statements were formulated after discussing with experts in Meteorology, Department of Horticulture, Department of environmental sciences, KVK specialist, IGFRI Scientists and discussion with some ARS Experts, consultants, and some progressive farmers. The Relevancy test was administrated to respondents and their responses were elicited on 3 points continuum as more relevant, relevant and less relevant.

A numerical score of 2 was assigned to a most relevant response and a score of 1 was assigned to Relevant and a score of 0 was assigned to a less relevant response. The sums of scores of all the items of relevancy test were computed indicating the total Awareness score of the respondent. Thus, maximum and minimum obtainable Adaptation score by the individual respondents was 42 and 0, respectively, It was quite possible that all the seven components identified may not be equally relevant in measuring farmers' awareness of climate change and their adaptations.

Table-1 Adaptation measures undertaken by farmers to deal with climate change in crop production(n=150)

SN	Adaptation measures initiated in crop production	Adaptation measures					
		Initiated		Not initiated			
		Frequency	Percentage	Frequency	Percentage		
1	Changed from long duration to short duration varieties	138	92	12	8		
2	Changed from short duration to long duration varieties	126	84	24	16		
3	Crop diversification	118	78.66	32	21.33		
4	Changed in planting dates	35	23.33	115	76.66		
		Increased		Decreased	No change		
		Frequency	Percentage	Frequency	Percentage		
5	Spacing between rows/plants	133	88.66	10	6.66	7	4.66
6	Adoption of IFS	36	24	93	62	21	14
7	Number of irrigation given	32	32.98	23	23.71	42	43.29
8	Quality of seeds used	16	10.66	30	20	104	69.33
9	Quality of fertilizer application	6	4	40	26.66	104	69.33

Hence, these 29 statements of farmers' awareness and 43 statements of farmers adaptation to climate change were administered to judges to determine the relevancy and their subsequent screening. For this purpose, these statements were subjected to scrutiny by an expert panel. The seven components were distributed to a panel of judges in the field of extension education, communication, administration and dairy entrepreneurs. In all, 60 judges were requested to indicate appropriateness (relevancy) of the components for inclusion in the scale. The responses of judges were secured on three points continuums namely, 'Most relevant', 'Relevant' and 'Not relevant' and a score of 2, 1 and 0 were assigned respectively. In all 30 judges could respond. These responses were used to work out the Relevancy Weightage (RW) of each component by using following formula [6].

Relevancy weightage (RW) = [(Most relevant x 2+ Relevant x 1+ Not relevant) / (Maximum possible score (30 x 2))] x 0

Using the above formula, Relevancy indices were computed for all respondent. Further, they were grouped into three categories by using mean and standard deviation as measure of check. Considering relevancy weightage, the components were screened for their relevancy. Accordingly, components having relevancy weightage of more than 0.75 were considered. Using this process, 30 Statements having more than 0.75 relevancy weightage were selected.

The summated score was worked out by totaling the scores on each of the statements, as adaptation score of an individual. The maximum and minimum score an individual could get on this was 19 and 0 respectively. Based on the total scores of respondents they were further categorized into high adaptation, medium adaptation and low adaptation categories on mean and standard deviation taking into consideration.

Category	Criteria	Score
Low adaptation	<(Mean – 0.425 SD)	< 35.33
Medium adaptation	(Mean ±0.425 SD)	35.33-41.33
High adaptation	>(Mean + 0.425 SD)	> 41.33

Results

Adaptation measures undertaken by farmers to deal with climate change in crop production. The data were collected with respect to adaptation measures initiated by the farmers and presented in the [Table-1], It could be observed that most of the farmers (92 %) have taken adaptation measures like changing of the varieties from long to short duration. On the other hand 84.00 per cent of the farmers have changed from short to long duration, while 78.66 per cent of the farmers initiated crop diversification and 21.33 per cent of the farmers have not initiated the same practice. Majority (76.66%) of the farmers has not changed in the planting dates, and only 23.33 per cent have initiated changes in planting dates. Regarding spacing between rows per plants 88.66 per cent of farmers have increased and very meager proportion (6.66%) decreased and less than five per cent (4.66%) have no changed at all. In case of adaptation of IFS, only 24.00 and 14.00 per cent of the respondents increased and decreased, respectively. Regarding adaptation measures about quantity of seeds used 69.33 per cent of the respondents have not changed the quantity of seeds used, while 20.00 and 10.66 per cent of the respondents have decreased, and increased, respectively. It can also be learnt from the [Table-1], that all the farmers were aware about the information regarding quantity of fertilizer application (69.33%) of the farmers have not changed, whereas (26.66%) decreased and only 4 per cent increased, respectively. Regarding irrigation water given considerable percentage (43.29%) of the respondents were no changed, followed by 23.71 Per cent and 32.98 per cent of the respondents were decreased and increased, respectively. Classification of farmers based on adaptation measures initiated in crop production was depicted in the [Table-2], It is clear data from the table that about 42 per cent of farmers had high level of adaptation, followed by low (35.33 %) and medium (22.66 %) level of awareness.

The findings indicated in [Table-3] revealed that, 32.66 per cent of the farmers have taken up ridges and furrows, while 24.66 per cent and 14.66 of the farmers adopted farm pond and graded bunds in their farms, respectively, whereas 11.33 per cent of the farmers have adopted contour bund. In case of adaptation measures regarding drip irrigation and mulching, less than 10 per cent of farmers have adopted [Table-4] clearly shows that 58.00 per cent of the respondents had high adaptation category in soil and water conservation, followed by 25.33 and 16.66 per cent among medium and low adaptation category, respectively.

Table-2 Overall adaptation measures initiated in crop production by the farmers (n=150)

Categories	Frequency	Percentage
Low Adaptation (<7.17)	53	35.33
Medium Adaptation (7.17-9.26)	34	22.66
High Adaptation (>9.26)	63	42
Mean=8.21	SD=2.46	

Table-3 Adaptation measures initiated in response to climate change in soil and water conservation practices by the farmers (n=150)

Adaptation Measures	Adopted		Not Adopted	
	Frequency	Percentage	Frequency	Percentage
Farm pond	37	24.66	113	75.33
Contour bunds	17	11.33	113	75.33
Graded bunds	22	14.66	128	85.33
Ridges and furrows	49	32.66	101	67.33
Mulching	7	4.66	143	95.33
Drip irrigation	13	8.66	137	91.33

Table-4 Overall adaptation measures initiated in soil and water conservation (n=150)

Categories	Frequency	Percentage
Low Adaptation (< 2.76)	25	16.66
Medium Adaptation (2.76-3.80)	38	25.33
High Adaptation (> 3.80)	87	58
Mean=3.28	SD=1.23	

Discussion

The examination with respect to adaptation measures initiated like change of the varieties from long to short duration or from short to long duration, crop diversification, changes in the planting dates, adoption of IFS spacing between rows and plants, quantity of fertilizer application, quantity of seeds and number of irrigation given due to changes in the climate.

The results of adaptation measures initiated by farmers to deal with climate change are presented in Table 1,2,3 and 4. that Adaptation measures adopted mainly in crop production, soil and water conservation were considered for the study. It is evident from the data that most of the good practices to deal with climate were adopted by the farmers.

Also, more than half of the farmers were in high adaptation categories with respect to crop production and soil and water conservation practices. The possible reasons for this might be high awareness on various aspects of climate change. The farmers were well experienced regarding the consequences of not adopting the adaptation measures. The farmers are also a very good entrepreneur. Hence, they have not left any stone unturned to adopt the suitable measures to deal with climate change.

Conclusion

Based on this study Impacts of climate change are diversified and need to be understood, to workout pragmatic strategies to mitigate ill-effects of climate change. This in turn will cause considerable climate change variations. In this context, the implications for Karnataka in the long run will depend on the trends in climate change and its influence on coping mechanisms, they are improved crop and grass land management like improved agronomic practices, fertilizer use, tillage and residue management and restoration of degraded lands and improved water use efficiency. Despite significant technical potential for mitigation in agriculture, awareness on the practices to be adopted has not reached the farming community. This study revealed that more than half of the farmers were in high level of adaptation to climate change, initiated in crop production and soil and water conservation practices. It has to be supported by organizing various transfer of technology programmes along with facilitating farmers to adopt climate resilience crop technologies and innovative technology in the future.

Application of research: Study of the Adaptation measures taken by the farmers to deal with climate change

Research Category: Agricultural Extension Education

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Cultivar / Variety / Breed name: Nil

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References

[1] Maddison D. (2006) *CEEPA, University of Pretoria, South Africa. CEEPA Discussion paper No*. 10.
[2] Stern N. (2006) *The report for the cabinet office-HM treasury, Cambridge: Cambridge university press*.
[3] Bradshaw B. Dolan H. and Smit B. (2004) *Climatic Change*, (67), 119-141.
[4] Nhemachena C. and Hassan R. (2007) *International Food Policy Research Institute, Washington, D. C. IFPRI, Discussion Paper No*. 00714.
[5] Brussel S. E. C. (2009) *Commission of the European communities, Commission working staff working document accompanying the white paper No.* 147.
[6] Guiford J. (1954) *Psychomatric methods. Tata McGraw Hill Publishing Company Ltd., India.*