



Awareness, Knowledge and Adaptation Practices of Farm Women in Relation to Climate Change in Northern Transitional Zone of Karnataka

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Authors' contributions

This work was carried out in collaboration with all authors. All authors together collected the data, analysed and prepared the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Anthropogenic climate change is the topmost contemporary global issue. Climate change can potentially upset the rhythm of nature threatening the very existence of life on earth. Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century. Further, relative to 1986-2015, warming is projected between 2.6 to 4.8°C under RCP8.5 (Representative Concentration Pathway) by the end of 21st century. So, climate change is the biggest threat to agriculture in countries around the globe as well as in India. Farmers in India are not fully aware of climate change and its indicators, causes, and impacts. Therefore, this study was conducted to know the awareness level, knowledge and adaptation practices of farm women regarding climate change. This study was conducted during 2018-19 under All India Co-ordinated Research Project on Home Science in Sulla village of Dharwad district. Simple random sampling technique was used to select 100 farm women in the village. A pre tested interview schedule was used to collect the data. Descriptive statistics were used for analysis of the data. The study revealed that all of the

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respondents were not aware about the increase in melting of glacier, cold wave and frequent flood. It was observed from the study that, 36 per cent of the farm women belonged to low category of awareness on indicators on climate change. It was also noticed that all of the women were not aware about changes in farming system in present climate condition. Results show that women were not aware about rapid urbanization, use of pesticides, natural disaster, burning of fossils and farm waste, use of electrical appliances and global warming as the causes of climate change. Moreover, all of the women adopted change in planting calendar, adoption of crop rotation and adoption of intercropping.

Keywords: Climate change; adaptation; women's knowledge and awareness; farms.

1. INTRODUCTION

Agriculture and climate change are internally correlated with each other in various aspects, as climate change is the main cause of biotic and abiotic stresses, which have adverse effects on the agriculture. The United Nations Framework Convention on Climate Change (UNFCCC) defined "Climate change" as a change which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere [1]. Moreover, according to the Intergovernmental Panel on Climate Change (IPCC) [2], "Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000 years. Agriculture is inherently sensitive to climatic changes and is one of the most vulnerable sectors. Climate change directly affects agriculture production and production efficiency. It affects agriculture in terms of productivity, agricultural practices, environmental effects, rural space and adaptation. Now-a- days due to industrialization men are moving towards urban areas and agricultural activities are taken up by women in the rural areas Farm women experienced the changing climatic conditions in their life but they are still not aware about the term climate change. To cope up with changing climate, there had been a change in agronomic practices and varieties to cope up with it. A better understanding of how farmwomen perceive changing climate and the factors influencing the awareness level of farmwomen is needed to formulate appropriate policies and programmes aimed at promoting successful awareness of farmwomen and adaptation strategies to cope up with climate change. In order to gather insight into these issues, the present research study was undertaken to find out farmwomen awareness about climate change, their

knowledge about the indicators of climate change and adaptation measure to minimize the negative impact of agriculture productivity.

2. METHODOLOGY

This study was conducted during 2018-19 under All India Co-ordinated Research Project on Home Science. The study was carried out in Sulla village of Hubli block and Dharwad district of Karnataka. Simple random sampling technique was used to select 100 farm women in the village. A pre tested interview schedule was used to collect the data. Suitable statistical tools were used whereby, Hejase et al. [3] contend that informed objective decisions are based on facts and numbers, real, realistic and timely information. Furthermore, according to Hejase and Hejase [4], "descriptive statistics deals with describing a collection of data by condensing the amounts of data into simple representative numerical quantities or plots that can provide a better understanding of the collected data". Therefore, this study analyzed data collected with descriptive statistics such as frequencies and percentages supported with probability distribution tables for clarity. The study area lies in Northern Transitional Zone of Karnataka which receives annual rainfall in the range of 618 mm to 1303 mm with 800 to 900 in major areas and 450 to 800 mm in remaining areas and dominated by shallow to medium black clay soils and red sandy loamy soils in equal proportion.

3. RESULTS AND DISCUSSION

Table 1 reveals that, hundred per cent of the respondents were not aware about the increase in melting of glacier, cold wave and frequent flood. The probable reason might be that they are not facing these in their areas. It was also clear from the table that, 42% and 58% of the farm women were fully aware and somewhat aware about the changes in water level,

respectively and 69% were somewhat aware about irregular and erratic rainfall. Also, 55% and 58% were somewhat aware of short winter and long summer, respectively. This may be due to the fact that these changes are more visible and are being experienced by the farm women. The study also finds support from the findings of Kemausuor et al. [5] who reported that large majority (93%) of farmers were of the opinion that the timing of the rains is not only irregular but erratic and unpredictable. The other probable reason might be due to their linkage KVK and India Metrological Department of UAS, Dharwad from these agencies they are receiving messages about the climatic conditions. It was also noticed that all of them were fully aware about increase in temperature. This might be due to the fact that changes are being experienced by the farm women. The study also supported by Baul et al. [6] who observed that 84 percent of farmers perceived that temperatures have increased.

It was observed from the Table 2 that, 36 per cent of the farm women belonged to low category of awareness on indicators on climate change, followed by high (34.00%) and medium (30.00%) categories.

Data presented in Table 3 shows the awareness of farm women regarding the climate variables influencing production. All (100%) of the women were not aware about changes in farming system in present climate condition, 77 per cent of them were not aware about increase in pest due to climate change, 71 per cent of them were not aware about increase in disease of crop and 61

per cent of them were aware about the ill effects of pesticides. The probable reason might be that in small land holding families agricultural activities are usually carried out by both men and women hence around only 30 per cent of the farm women are aware about the variables influencing crop production.

Table 4 depicts the knowledge of women for causes of climate change. Results also show that women were not aware about rapid urbanization (58%), use of pesticides (59%), natural disaster (75%), burning of fossils and farm waste (92%), use of electrical appliances and global warming (94%). Further, 85% of the respondents were somewhat aware that industries and factories are the causes for climate change, followed by pollution (82.00%), increase in number of vehicles (62.00) and over population (54.00%). The probable reason might be that, due to lack of education and less exposure to mass media and social Medias.

It was clear from Table 5 that 43% of the women belong to low category of knowledge level regarding the causes of climate change, followed by high (29.00%) and medium (28.00%) categories.

Data presented in Table 6 reveal the knowledge of women on climate variable influencing production. Results show that 88% and 74% of the women said that flood and change in growing season has never influenced the production. Around 85 per cent and 52 per cent of the women mentioned that drought and increased temperature moderately influence the production.

Table 1. Respondents' level of awareness on indicators on climate change (n =100)

Indicators /Phenomenon	Level of awareness in Percentage (%)		
	Fully aware	Somewhat	Not aware
Increase in melting of glacier	-	-	100.00
Increase in temperature	100.00	-	-
Changes in water level	42.00	58.00	-
Irregular and erratic rainfall	31.00	69.00	-
Change in length of season			
Short winter	45.00	55.00	-
Long summer	42.00	58.00	-
Change in intensity and frequency of storm	7.00	20.00	73.00
Decline of soil productivity	22.00	24.00	54.00
Occurrence of extreme event			
Cold wave	-	-	100.00
Heat wave	9.00	17.00	74.00
Heavy fog	9.00	12.00	79.00
Frequent flood	-	-	100.00

Table 7 represents the adaptation practices of farm women regarding climate change. It was clear from the table that, 100% of the women adopted changes in planting calendar, adoption of crop rotation and adoption of intercropping. The reason might be that due to irregular and erratic rainfall, to improve the soil fertility, to avoid pest and disease and to overcome the financial crisis if one crop fails. 88% of the respondents adopted integrated farming system from mono cropping in order to earn the income throughout the year and to attain the nutritional security of the family. This was followed by shift from traditional irrigation methods (57.00%) to

modern methods like drip, sprinkler and farm pond which help them to provide irrigation during critical stage of the crop. More than 80 per cent of the respondents did not adopt agronomic practices, change in use of chemical fertilizers and pesticides and soil health cards. This might be due to the fact that they are stuck to the old age traditional practices in cultivating the crops. Use of chemical fertilizers and pesticides help them to get more yields hence they are not ready to adopt the non-chemical treatments. The other reason might be that in farming most families decisions related to agriculture are taken up by men and women lack adaptation practices.

Table 2. Respondents' awareness on indicators on climate change (n=100)

Level of awareness	Percentage (%)	Mean	+SD
Low	36.00		
Medium	30.00	21.62	3.14
High	34.00		

Table 3. Respondents' awareness on climate variables influencing production (n=100)

Statement	Aware (%)	Not aware (%)
Changes in farming system in present climate condition	-	100.00
Increase of disease of crop	29.00	71.00
Increase in infestation of pest due to climate change	23.00	77.00
Awareness about the ill effect of pesticides	61.00	39.00

Table 4. Respondents' level of knowledge causes of climate change (n=100)

Statement	Level of knowledge		
	Fully aware (%)	Somewhat (%)	Not aware (%)
Increase in number of vehicles	38.00	62.00	-
Overpopulation	8.00	54.00	38.00
Industries and factories	15.00	85.00	-
Use of Pesticides	8.00	33.00	59.00
Burning of fossils and farm waste	-	8.00	92.00
Use of electrical appliances	-	6.00	94.00
Pollution	18.00	82.00	-
Global Warming	-	6.00	94.00
Natural Disaster	5.00	20.00	75.00
Rapid urbanization	8.00	34.00	58.00
Any other	-	-	-

Table 5. Respondents' knowledge level on causes of climate change (n=100)

Level of awareness	Percentage (%)	Mean	SD
Low	43.00		
Medium	28.00	15.9	1.67
High	29.00		

Table 6. Respondents' level of knowledge on climate variable influencing production

Incidence	Degree of change in percentage (%)			
	Extreme (%)	Moderate (%)	Negligible (%)	None (%)
Drought	15.00	85.00	-	-
Flood	-	-	12.00	88.00
Increased temperature	48.00	52.00	-	-
Change in growing season	-	10.00	16.00	74.00

Table 7. Respondents' adaptation practices for climate change (n=100)

Adaptation strategies	Yes (%)	No (%)
Diversification of crop type	-	100.00
Diversification of crop varieties	30.00	70.00
Change in planting calendar	100.00	-
Change in use of chemical fertilizers	17.00	83.00
Change in use of chemical pesticides	17.00	83.00
Implementing soil conservation methods	28.00	72.00
Adopting water harvesting techniques	45.00	55.00
Change in agronomic practices..mulching of soil	14.00	86.00
Changing the traditional irrigation method	57.00	43.00
Switching from mono cropping to integrated farming systems	88.00	12.00
Adoption of crop rotation	100.00	-
Adoption of intercropping	100.00	-
Use of soil health cards	20.00	80.00
Preventing/reducing soil erosion	55.00	45.00
Reducing energy consumption by switching to LED bulbs	28.00	72.00

4. CONCLUSION

The world's major surface irrigation systems lose between half and two-thirds of the water in transit between the source and the crops. Unsustainable use of irrigation water lowered the groundwater table level significantly in the IGP of India [7]. Therefore, practices that increase water productivity will have significant climate-change adaption potential for all land production systems.

The energy sector, which produces nearly 60% of CO₂ emissions, is the largest contributor to climate change [8]. Agriculture and energy have always been closely interlinked. Therefore, improving energy use efficiency of agricultural production is an effective way to reduce production costs and lower emissions.

Recommendations that emerge from different scenarios of the impact of climate change on Agriculture include changing the cropping pattern, promoting drought-resistant crop varieties and shifting to perennial horticulture and agro-forestry. Specific recommendations include the following: i) promoting crops with low water requirements in districts that are likely to face droughts, ii) growing short-duration vegetables,

iii) introducing rain-fed horticulture in areas that are likely to face low rainfall, iv) changing the sowing window and growing periods in some districts by using crop weather calendars generated for different districts, v) planning for contingencies by supporting early decision-making by farmers, vi) replacing the usual crops with other, more suitable, crops where required and vii) re-sowing with short to medium-duration varieties in the event of floods, viii) providing protective irrigation using run-off water collected in farm and harvesting grain crops earlier so that they can be used at least as fodder in the event of prolonged droughts. So, the extension agencies/ workers should focus on these aspects while planning for the appropriate corrective measures and re-orienting their advisory services to mitigate the climate change related risks and uncertainties. The need of the hour is to empower the farming community so that they evolve suitable mechanism for short term and long term adaptation strategies to take care of climate change related risks and uncertainties.

CONSENT

As per international standard or university standard guideline participant consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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