A study on awareness for climate variability and effects on water resources among farm women

Abstract

The present study entitled "A study on awareness for climate variability and effects on water resources among farm women " was conducted in three districts of Punjab. A sample of 120 farm women was interviewed. Majority of the farm women were fully aware that pollution, deforestation, paddy straw burning and cultivation of paddy were the reasons for climate change. Most of them were fully aware that increase in temperature and variation in rainfall were due to change in climate. Majority of them were fully aware that change in climate is leading to stress on water resources in Punjab and more area under paddy cultivation was the major factor responsible for depleting groundwater. Most of the farm women were fully aware that water is wasted while performing various household tasks like washing of clothes, utensils, cleaning the floor, bathing animals with water pipes etc. It was further concluded that majority of the farm women had medium level of awareness regarding reasons of climate change whereas most of them had low level of awareness regarding factors accountable for depletion of water. They had high level of awareness regarding wastage of water while performing household tasks. There is need to evolve compatible water saving technologies, its effective extension and enacting proper legislation to prevent exploitation of water at household level.

***Key Words**:* climate change, awareness, farm women, household activities

Introduction

Punjab has been the top food producer in the country for a very long time. In order to maximize grain productivity vast areas have been put under intensified rice and wheat cropping system. Paddy occupies 28.51 lakh hectares (81.71%), out of which 29.82 lakh hectares (72.5%) is irrigated by tubewells and remaining area of 11.33 lakh hectare (27.5%) is irrigated by canals (Anonymous 2014). The number of electric tubewells had increased 13 times from 1970-71 to 2013-14 i.e 0.91 lakh in 1970-71 to 12.35 lakh in 2014-15. (Anonymous 2015)

There is no denying the fact that there has been a significant increase in agricultural production and productivity in Punjab. However, intensive agricultural practices have also led to the depletion of natural resources (Sidhu, 2002; PSFC, 2013). Up to 1995, the average fall of water table in Punjab was about 23 cm per year (Khepar *et al* 2001) which during the next 6 years (1997-2003) increased to 53 cm per year (Hira *et al* 2004) and 51.5 cm per year during 1998-2006 (Kaur *et al* 2011).

The dropping water levels are largely attributed to unsustainable consumption of groundwater for irrigation and other uses along with increased runoff and/or evapo-transpiration, which is exacerbated by climate change. These climatic changes present an additional burden on the world's economy, especially on agricultural and natural resource systems which are already coping with the growing food demand driven by population growth and higher purchasing power. Every year, farmers set paddy stubble ablaze to prepare ground for next crop, thereby damage soil quality and cause pollution. Further increased use of generators, industrialization, mechanization etc is accountable for climate change.

Not only agriculture but household activities performed by farm women during bathing, cleaning the floor, washing clothes are too responsible for declining water and climate change. Keeping this in view, the present study was conducted with the objective to assess the extent and level of awareness for climate among farm women on climate change.

MATERIAL AND METHODS

The three agro climatic zones of Punjab i.e. North-east zone, Central zone and South-west zone were selected purposively. One district from each of the zone was selected randomly viz. Ropar, Ludhiana and Faridkot. One village each from selected district was selected randomly namely *Sandhua, Talwandi Khurd* and *Ransingh Wala*. A sample of 40 farm women was randomly selected from each village, comprising a sample of 120 farm women for the study. The data was collected with the help of interview schedule and analyzed with the statistical tools like frequency and percentages. Extent of awareness was measured on three point continuum i.e. fully aware, somewhat aware and not at all aware with the scoring of 2, 1 and 0 respectively. Level of awareness was further calculated as high, medium and low.

Fig.1 Location of selected villages in different agro-climatic zones

RESULTS AND DISCUSSION

Socio-personal characteristics

The scrutiny of data in Table 1 revealed that about half of the respondents (46.66%) were young belonging to age group of 18-38 years while 44.16 per cent belonged to the age group of 39-59 years. Nearly ten per cent of the respondents were old (60-80 years).

Majority of the respondents (90%) were literate out of which nearly one fourth respondents had educational qualification up to primary (25%) and up to matriculation (28.33%). A large majority of the respondents (96.66 %) belonged to general category while 2.5 per cent belonged to other backward class (OBC).

Data further revealed that majority of the respondents (84.16 %) belonged to joint family whereas only 15.83 per cent of the respondents belonged to nuclear family. The results were in agreement with the findings of Latha and Chandrakumar (2012), Kalra *et al* (2012), Baite (2014) and Kaur (2014) which shows that joint family system is still widely prevalent in rural areas.

With regards to family size, most of the respondents (61.67 %) had a family size of 2-6 members while 35 per cent had a family size of 7-11 members. It was satisfying to relate that although 84.17 percent families were joint but majority had comparatively smaller family size.

Table 1: Socio-personal characteristics of the respondents n=120

Characteristics	Frequency	Percentage
Age(years)		
18-38	56	46.66
39-59	53	44.17
60-80	11	9.17
Education		
Illiterate	12	10.0
Primary	30	25.0
Middle	10	8.33
Matric	34	28.33
Secondary	17	14.17
Graduates	17	14.17
Caste		
General	116	96.67
Backward Caste	1	0.83
OBC	3	2.5
Family type		
Nuclear	19	15.83
Joint	101	84.17
Family size (No. of members)		
2-6	74	61.67
7-11	42	35.0
12-16	4	3.33

Extent of awareness about reasons of climate change

A perusal of data in Table 2 showed that majority of respondents (86.67%) were 'fully aware' that pollution was major reason responsible for climate change while 64.17 per cent respondents were 'fully aware' that deforestation was responsible for climate change followed by burning of paddy straw (62.5%) and paddy cultivation (54.17%) as other reasons of climate

change. Vani and Kumar (2016) conducted study in Rangareddy district of Telangana. They reported that 32.5 per cent of the respondents perceived climate change as being caused by deforestation and bush burning.

Table 2: Distribution of respondents according to the extent of awareness about reasons of climate change **n=120**

Reasons	Fully aware	Somewhat aware	Not at all aware
Paddy cultivation	65 (54.17)	1(0.83)	54 (45.00)
Burning of paddy straw	75 (62.50)	5(4.17)	40 (33.33)
Increased use of generators	15 (12.50)	1 (0.83)	104 (86.67)
Pollution	104 (86.67)	4 (3.33)	12 (10.00)
Industrialization	23 (19.17)	3 (2.50)	94 (78.33)
Mechanization	52 (43.33)	4 (3.33)	64 (53.33)
More use of pesticides	25 (20.83)	4 (3.33)	91 (75.83)
Deforestation	77 (64.17)	4 (3.33)	39 (32.50)

*Figures in parentheses indicates percentages

Majority of the respondents were 'not at all' aware that increased use of generators (86.67%), industrialization (78.33%) and more use of pesticides (75.83%) also played major role in climate change. This may be due to fact that farm women of Punjab are not directly involved in farming and their awareness is based upon their personal daily experiences.

Awareness about effects of climate change

The data in figure 2 indicated the awareness of farm women regarding various effects of climate change. It revealed that majority of the respondents were aware that increase in temperature (90%), variation in rainfall (73.33%) and shifting of season (58.33%) were due to changes in climate. The findings were supported by Mandleni and Anim (2011), Oduniyi (2013) and Vani and Kumar (2016) who reported that majority of the farmers perceived increase in temperature and rainfall was due to climate change. It further revealed that change in soil moisture (25%) and increased risk of drought (28.33%) were other effects of climate change regarding which awareness was less. The findings were in tune with the study conducted by Vani and Kumar (2016) who reported that very low percentage of farmers perceived raise of soil temperature and fast evaporation of soil moisture as other effects of climate change. The table concludes that very few farm women were fully aware about different reasons of climate change.

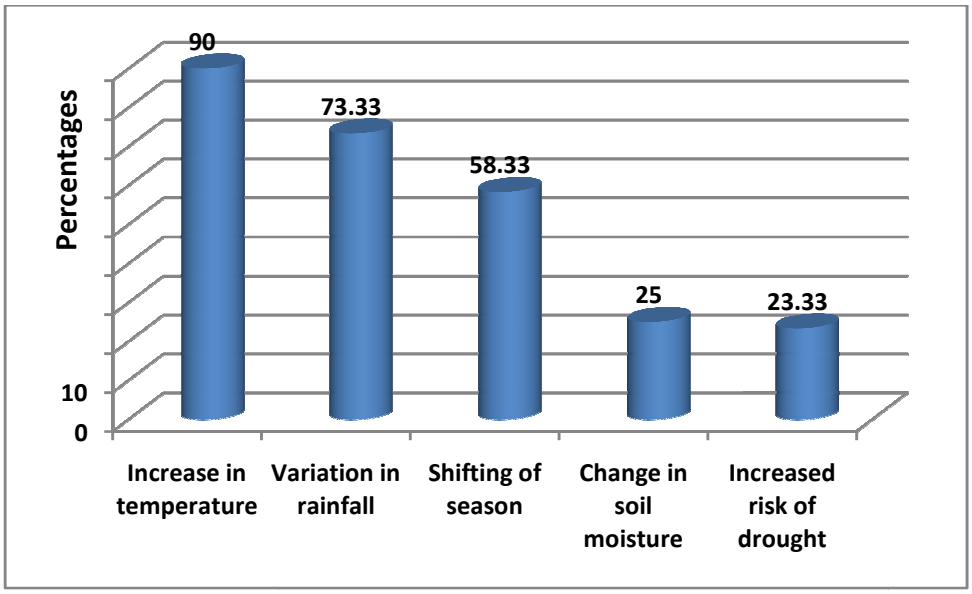

Fig.2: Awareness of farm women about effects of climate change

Extent of awareness about effect of climate change on water resources

The data in Table 4 indicated that majority of the respondents (80%) were 'fully aware' that water table depletion was the result of followed by variation in rainfall (66.67%) and increase in number of tubewells (47.5%). Report of Central Groundwater Board (2014) also reported that in Punjab number of over exploited blocks have rapidly increased in last few decades.

Table 4: Distribution of respondents according to the extent of awareness about effect of climate change on water resources **n=120**

Effects	Fully aware	Somewhat aware	Not at all aware
Water table depletion	96 (80.00)	6 (5.00)	18 (15.00)
Variation in rainfall	80(66.67)	8 (6.67)	32 (26.66)
Increase in number of tubewells	57 (47.50)	8 (6.67)	55 (45.83)

*Figures in parentheses indicates percentages

Extent of awareness about factors responsible for depletion of water

A scrutiny of the data in Table 5 revealed that majority of the respondents (63.33%) was 'fully aware' that more area under paddy cultivation was major factor responsible for depletion of water. However, only one-third respondents were 'fully aware' that increase in number of

tubewells (37.5%) and declining trend of rainfall (36.67%) were also accountable for depletion of water.

Table 5: Distribution of respondents according to the extent of awareness about factors responsible for depletion of water n=120

Factors	Fully aware	Somewhat aware	Not at all aware
More area under paddy cultivation	76 (63.33)	-	44 (36.67)
Over irrigation of crop	15 (12.50)	1 (0.83)	104 (86.67)
Wrong practices of irrigation	7 (5.83)	-	113 (94.17)
Early transplanting of paddy	19 (15.83)	3	98 (81.67)
Stick to rice-wheat rotation only	8 (6.67)	1(0.83)	114 (95.00)
Increase in number of tubewells	45 (37.50)	4(3.33)	71 (59.17)
Declining trend of rainfall	44 (36.67)	2 (1.67)	74 (61.67)

*Figures in parentheses indicates percentages

It was further revealed that most of the respondents were not at all aware about other factors responsible for depletion of water such as wrong practices of irrigation (94.17%), sticking to rice-wheat rotation (95%), over irrigation of crop (86.67%) and early transplanting of paddy (81.67%) which is a matter of concern. It can be concluded from the results of Tables 4 and 5 that although majority of the farm women were fully aware that water table depletion is one of the effects of climate change but most of them were not at all aware about various factors responsible for it. Here the role of extension agents is very important in creating awareness about various factors contributing to water table depletion.

Extent of awareness about wastage of water while performing household tasks

Table 6 depicts the awareness of farm women about wastage of water while performing household tasks. It showed that a large majority of the respondents (98.33%) were 'fully aware' that water is wasted during performing various household tasks like washing of clothes and utensils, cleaning the floor, bathing animals with water pipes etc. It was interesting to find that 90% farm women were fully aware that water is wasted during household activities which mean

that despite awareness they waste water in performing these activities that shows need to train them regarding ways to save water.

Table 6: Distribution of farm women according to the extent of awareness about wastage of water while performing household tasks **n=120**

Tasks	Fully aware	Somewhat aware	Not at all aware
Washing of clothes directly under running tap	118 (98.33)	2 (1.67)	-
Washing of utensils directly under running tap	118 (98.33)	2 (1.67)	-
Washing of vegetables directly under running tap	116 (96.67)	4 (3.33)	-
Over flowing of water tanks	113 (94.17)	6 (5.00)	1 (0.83)
Cleaning the floor with water	118 (98.33)	2 (1.67)	-
Bathing under shower	109 (90.83)	8 (6.67)	3 (2.50)
Running the water tap continuously while brushing, shaving etc.	114 (95.00)	6 (5.00)	0
Washing household and agricultural machinery with water pipes	117 (97.50)	3 (2.50)	-
Cleaning/washing animal shed with water pipes	111 (92.50)	7 (5.83)	2 (1.67)
Bathing animals with water pipes	118 (98.33)	2 (1.67)	-
Leakage of water taps and pipes	116 (96.67)	-	4 (3.33)
Children play under running water	113 (94.67)	5 (4.17)	2 (1.67)

*Figures in parentheses indicates percentages

Level of awareness regarding climate change

The data was analyzed on four parameters viz. reasons of climate change, effect of climate change on water resources, factors responsible for depletion of water and wastage of water while performing household tasks. The data showed that majority of the farm women

(59.17%) had medium level of awareness regarding reasons of climate change followed by effect of climate change on water resources (45%) but most of the respondents (80%) had low level of awareness regarding factors responsible for depletion of water. It was interesting to note that awareness level was high (97.5%) w.r.t. wastage of water in performing household tasks (fig.3.). This showed that people were aware that lot of water was wasted during washing clothes, bathing etc. still no action is taken to manage the wastage of water for future generation. It shows the need of easy to use water saving technologies as people use easy way to complete their task/work inspite of awareness regarding its after effects.

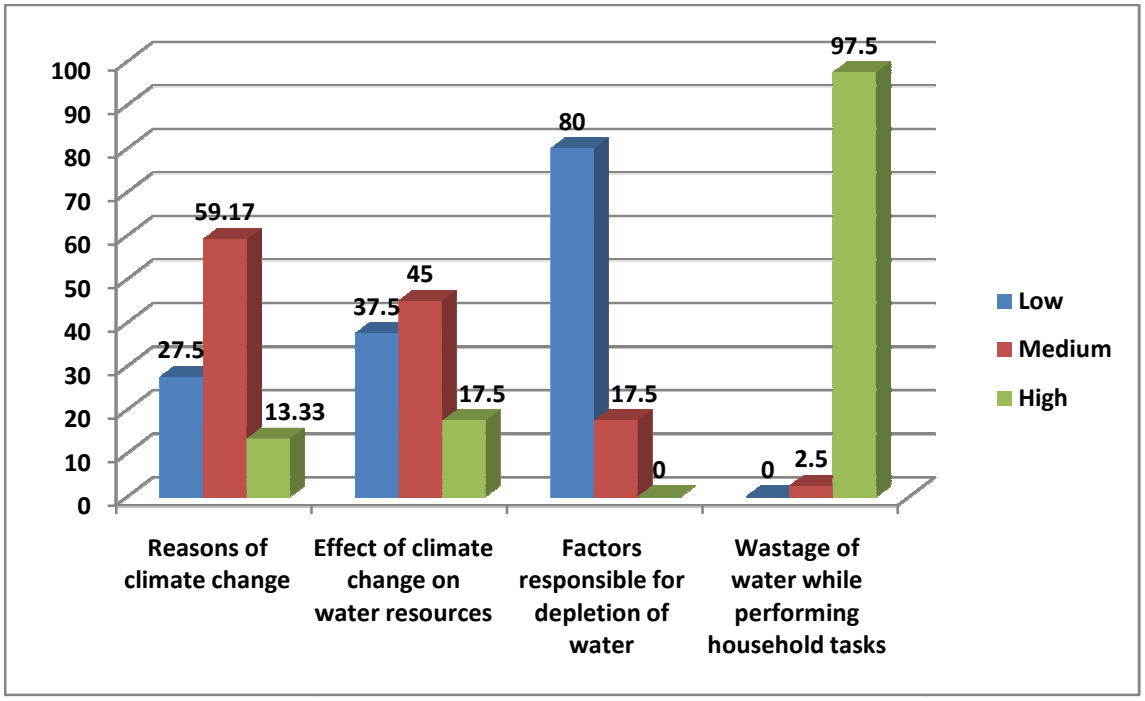

Fig.3: Distribution of farm women according to level of awareness regarding climate change

Suggestions to save water resources from depletion

Suggestions to save water resources from depletion were recorded through open ended questions are discussed in Table 8. The data revealed that about half of the respondents (48.33%) suggested that wastage of water at home should be avoided while 37.5 per cent suggested that bucket should be used for washing clothes and utensils rather under running taps. Nearly one third of the respondents (33.33%) suggested avoiding running taps when not in use and closing

the tap after use. Approximately one fourth of the respondents suggested that bathing under shower should be avoided rather use bucket and mug.

Table 8: Solutions suggested by farm women to save water at household level

n=120

Suggestions	Frequency	Percentage
Avoid wastage at home	58	48.33
Use bucket for washing clothes and utensils	45	37.50
Avoid running taps and close the tap after use	40	33.33
Avoid bathing under shower and use bucket and mug for bathing	29	24.17
Use bucket and mop for cleaning the floor	22	18.33
Remaining water should be used to water the plants	9	7.50
Crop diversification should be adopted	8	6.67
Bath animals at two days interval	7	5.83
Keep check at children and teach them not to waste water	7	5.83
Use alarm bell to fill the tank	6	5.00
Bath animals in ponds or use bucket and mug while bathing animals	5	4.17
Avoid flushing the toilet unnecessarily	5	4.17
Save rain water (rain water harvesting)	5	4.17
Avoid washing of car with pipes	4	3.33
Wash vegetables in utensils	3	2.50
Wash clothes by hand	3	2.50
Use remaining water of filter for other purposes	2	1.67
Ban on paddy cultivation	2	1.67
Remaining water should be used to clean the floor and animal shed	2	1.67
Wash utensils at end	1	0.83

*Multiple response

Conclusion

The study concluded that farm women were fully aware about few of the reasons of climate change like pollution, deforestation, paddy straw burning etc. but majority of them had medium level of awareness. Majority of them were fully aware about effects of climate change in water

resources but most of them had low level of awareness about factors responsible for depleting water table. The findings suggested that there is a need to spread full awareness regarding reasons and effects of climate change through media and extension functionaries. Findings further suggested that farm women had high level of awareness regarding wastage of water during performing household tasks which raised need of evolving compatible water saving technologies and educating farm women in using these techniques. Role of extension functionaries/ home scientists increases to train farm women in reducing the effects of climate change by adopting appropriate technologies.

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