

Sensitivity of Woman Research Scholars Studying in State Agricultural Universities towards Climate Change

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ABSTRACT

Women comprise half of the human resources and they have been identified as key agents of sustainable development. In India, women constitute 90.00 per cent of total marginal work force of the country and 78.00 per cent of rural women are engaged in agriculture. In developing countries like India, women play a key role in conservation of basic life supporting systems. All these women activities are directly associated with nature and affected by climate change. This creates difficult situations for women by amplifying their time for daily activities. In this developing world it is a common practice, that all extension and training services are primarily directed towards men. Female farmers receive only five per cent of agricultural extension services and that only 15 per cent of the world's extension agents are women. In addition to this, cultural constraints and over burden of work restricts women awareness, knowledge and concern and they become more sensitive towards climate change. In this regard, SAUs have increased their efforts through research, education, extension and management. To perform extension work efficiently, women scientists and educationists of SAUs need to update their knowledge to educate the major part of marginal women work force. Hence, the study confirms that respondents have positive attitude towards climate change and demonstrated excellent climate change concern, but they have a relatively average level of knowledge towards climate change, it leads to average level of sensitivity towards climate change among women research scholars studying in SAUs.

Key words: Sensitivity; Women research scholars; Knowledge; Attitude; Concern; Climate change;

Climate change is the most expensive global environmental problem experienced by human community. It is the most serious environmental challenge to the world for economic growth, industrial capitalism, technological development and material prosperity. The scientific investigations indicated that human activities are highly accountable for altering the climate. Agriculture is having reciprocal interaction with climatic conditions. Variation in climate like temperature, precipitation and carbon dioxide levels effects drastically the agricultural production and productivity. The changed climatic condition impacts on agriculture being witnessed across the world (Wani *et al.* 2010). Countries like India are more vulnerable in view of their large population depending on agriculture, excessive pressure on natural

resources, poor cropping mechanism, limited environmental knowledge, regional differences, unsustainable resource consumption, differential effects on men and women in access and control of natural resources, their low participation in decision-making and lack of scientific technology and input delivery systems. Within a span of one year, the country is experiencing severe droughts and floods in the same region posing serious problems to the farmers, agricultural scientists and extension staff (FAO, 2008).

Women comprise half of the human resources and they have been identified as key agents of sustainable development (Pardeer, 2010). In India, women constitute 90.00 per cent of total marginal work force of the country and 78.00 per cent of rural women are engaged in

agriculture (*DARE/ICAR, 2003*). In developing countries like India, women play a key role in the conservation of basic life supporting systems such as land, water, plants, animals and environment, because Indian women have major responsibilities to maintain healthy family as they ensure quality and timely food, water and nutrients. All these women activities are directly associated with nature and affected by climate change; creates difficult situations for women by amplifying their time for daily activities in fulfilling their family needs (*FAO, 2010*).

In this situation women suffered a great extent by malnourishment particularly in low-income group of traditional societies because; they are lack of opportunities to access resources in climate change situations (*FAO, 2007*). In Bangladesh, it was reported that more females died than males during the floods in 1990 due to lack of accessibility for resources to females at the time of emergency. These studies indicated that unchanged cultural patterns in traditional societies restrict the women to access resources at the time of emergency which may be due to lack of awareness, knowledge and concern leading to women becoming more sensitive to climate change.

Considering the negative impact of climate change on agriculture, agencies involved in agricultural development have started their efforts to minimize both the negative impacts through their research, education, extension and management. The State Agricultural Universities (SAUs) of India are primarily responsible in growth and development of agriculture through generating and training existing and upcoming human resources for agricultural education, research and extension activities. To perform the works of teaching, research and extension more efficiently as per the demand, it is expected that students, scientists and educationists of SAUs, needs to be updated with latest knowledge about the impacts of climate change on agriculture.

Many experts have suggested that to develop agriculture as whole, there is need to encourage women entrepreneurs, educationists, women researchers, women extension educationists and women agricultural administrators to motivate and contribute significantly to develop half of woman force involved in agriculture. However, since last two decades, considerable woman research scholars have shown their interest to be a part of agricultural education, research and extension

activities. It is high time to give confidence and build up capabilities amongst woman agricultural scholars. With this back ground the study, examines the sensitivity of woman research scholars studying in state agricultural universities towards climate change.

METHODOLOGY

The study was conducted in Gujarat state, and it includes four states agricultural universities (SAUs) located in different agro climatic zones by covering entire state. Anand Agricultural University (AAU), Anand, situated in the middle Gujarat, Junagadh Agricultural University (JAU), Junagadh located in western part of Gujarat, Navsari Agricultural University (NAU), Navsari situated in south Gujarat and Sardarkrushinagar Dantiwada Agricultural University (SAU), Sardarkrushinagar situated in north Gujarat. Based on the availability of post graduate research scholars in the year 2014, total 200 respondents were selected across the four universities by using proportionate simple random sampling method.

Components of sensitivity: The sensitivity of woman research scholars towards climate change was measured considering their receptive behaviour towards respondent's physical or emotional behaviour towards climate change and its impact. In the study, sensitivity of women research scholars towards climate change contains three components, knowledge, attitude and concern (Fig. 1).

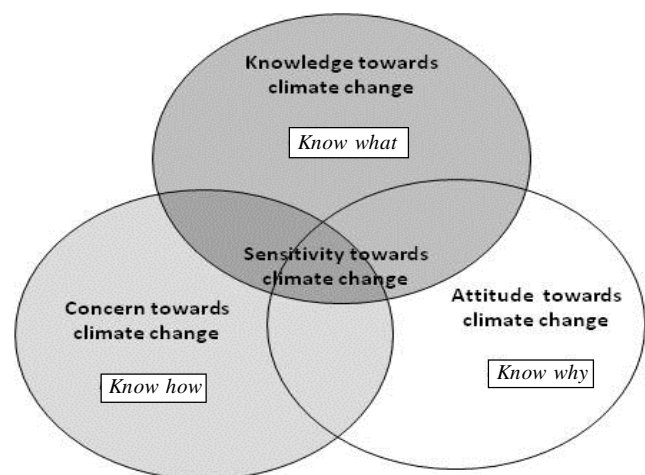


Fig. 1. Indicators of Sensitivity towards climate change

These three components of sensitivity were identified based on the physical and emotional characteristics of respondents towards climate change. From the research, a list of 50 physical and emotional

components were identified and circulated to 50 judges. The responses of the judges were collected in two ways relevant and non-relevant for each component. Among them 90 per cent of the experts were selected and knowledge, attitude and concern were identified as important components for sensitivity of women research scholars towards climate change.

Measurement of knowledge : Knowledge was measured considering the degree of understood information possessed by woman research scholars about various aspects of climate change. To identify the level of knowledge, 200 multiple choice questions were framed. The basic, simple and useful questions related to climate change were selected from the review of literature and courses they completed in their UG and PG programme. The selected questions related to climate change were categorised under different headings. Each category indicates the knowledge of respondents separately. Overall score of the respondents were calculated to know the average level of knowledge towards climate change. The respondent's level of knowledge was calculated by combining all the categories of the scores.

Measurement of attitude : Scale was developed to measure the attitude component of the respondents. The scientific scale product method was used to develop the scale. This method combines the *Turnstone's Technique (1928)* of equal appearing interval scale for selection of items and *Likert's technique (1932)* of summated rating for ascertaining the response on the scale as proposed by *Eysenck and Crown (1949)*. Equal appearing interval method was used for selection of statements regarding climate change and its problems. These statements were modified based on the *Edward and Kilpatrick (1948)* criteria and circulated to experts for their opinion. Based on the expert's opinion Important statements were selected using the quartile deviations. After that reliability of the scale was worked out using Rulon's formula (*Guilford 1954*) and validity of the scale was determined based on the content validity method to finalise the attitude scale.

Measurement of concern : Concern is an action taken by respondents during their everyday life to minimize adverse effect of climate change. A maximum list of different activities towards climate change concern was listed from the review of literature and their course curriculum. Same was circulated to the respondents

who were asked to rank each and every activity on three point continuum. Based on the ranks given average score of climate change concern of respondents was calculated. **Sensitivity of women research scholars :** The overall sensitivity of the women research scholars was calculated by using average scores of experts and scores received by respondents for each indicator by using this formula.

$$S = \frac{R_K}{M_K} \times W_K + \frac{R_A}{M_A} \times W_A + \frac{R_C}{M_C} \times W_C$$

Where,

R_K, R_A and R_C = Score received by respondents for the indicators Knowledge (K), Attitude (A) and Concern (C).

M_K, M_A and M_C = Maximum score one can get for each indicator.

W_K, W_A and W_C = Mean weightage score of each indicator received from experts.

RESULTS AND DISCUSSION

Knowledge, attitude and concern are the important components of sensitivity towards climate change. Increase in knowledge leads to higher sensitivity in general. In the present study, majority (51%) of the respondents were having average level knowledge towards climate change (Table 1). Another 38.00 per cent of the respondents were having low and 10.50 per cent of respondents were having poor knowledge towards climate change.

Table 1. Respondents level of knowledge towards climate change (N=200)

Knowledge Level	Score range (%)	No.	%
Poor	up to 20	21	10.50
Low	21 to 40	76	38.00
Average	41 to 60	102	51.00
Good	61 to 80	00	0.00
High	Above 80	01	0.50

Unfortunately, from the data it was identified half of the women research scholars were having only average knowledge and rest of them were having deprived knowledge towards climate change. It was important to note that only one person was having elevated knowledge towards climate change issues and none of them possessed good level of knowledge.

Attitude is one of the important components of climate change sensitivity. In the present study, there were 31.00 per cent of respondents having highly positive attitude towards climate change, which was followed by

positive (60.00 %) and neutral (8.50 %) (Table 2).

Table 2. Respondents level of attitude towards climate change (N=200)

Attitude Level	Score range (%)	No.	%
Highly negative	up to 20	00	0.00
Negative	21 to 40	01	0.50
Neutral	41 to 60	17	8.50
Positive	61 to 80	120	60.00
Highly positive	> 80	62	31.00

It was found that 0.50 per cent of the respondents were having negative attitude towards climate change. From the results it was important to note that more than 95 per cent of the respondents were having positive attitude towards climate change.

Higher level of concern leads to higher sensitivity towards climate change. In the present study, there were 73.50 per cent of respondents with excellent level of concern towards climate change which indicates they are ready to take care of their environment (Table 3).

Table 3. Respondents level of concern towards climate change (N=200)

Concern Level	Score range (%)	No.	%
Poor	up to 20	01	0.50
Below average	21 to 40	01	0.50
Average	41 to 60	00	0.00
Good	61 to 80	51	25.50
Excellent	> 80	147	73.50

There were 25.50 per cent of respondents with good level of concern. From the results it's declared that 99.00 per cent of the respondents having admirable concern levels towards climate change.

Sensitivity is the receptive behaviour of an individual towards climate change. By combining the knowledge, attitude and concern components, the sensitivity of women research scholars was grouped into five levels (Table 4).

Table 4. Respondents level of sensitivity towards climate change

Sensitivity level	Score range (%)	No.	%
Poor	Up to 20	0	0.00
Below average	21 to 40	11	5.50
Average	41 to 60	46	23.00
Above average	61 to 80	141	70.50
High	> 80	2	1.00

In this study, 70.50 per cent of respondents were

above average level of sensitivity, which was followed by 23.00 per cent of women research scholars having average level of sensitivity towards climate change. Unfortunately, only one per cent of the woman research scholars were having high level of sensitivity as they possessed both master and doctoral degree. The overall sensitivity of It was common that in doctoral degree, respondents were having higher the age as well as knowledge that leads to increase.

Table 5. Association between Sensitivity and its components (N=200)

Components of Sensitivity	Correlation Coefficient
Knowledge	0.818**
Concern	0.750*
Attitude	0.434*

*Significant at 1 % & ** Significant at 5 %

Knowledge was highly associated with the sensitivity of women research scholars in the Table 5. From the results it was identified that increase in the knowledge leads to increase in the sensitivity of the respondents towards climate change and followed by concern and attitude. From the table it was concluded that knowledge was the important component of climate change. Knowledge increases automatically women research scholar's sensitivity towards climate change will increase. But in the study respondents climate change knowledge was poor that leads sensitivity of women research scholars towards climate was also average.

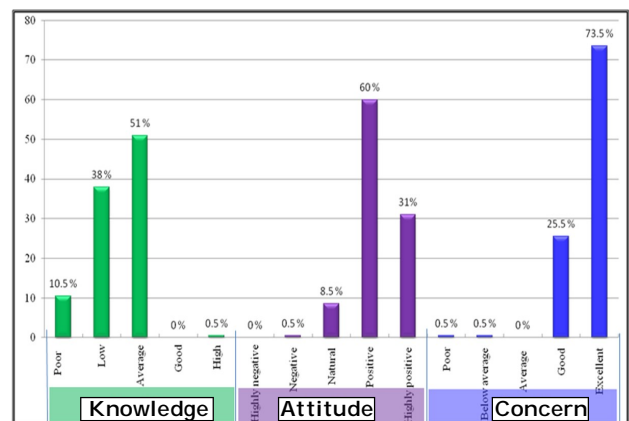


Fig. 2. Level across the components of sensitivity

Fig. 2 depicts that the maximum number of women research scholars were having positive attitude and high concern towards climate change but the respondents were having inadequate knowledge. Maximum incorrect responses were lack of factual knowledge due to

incomplete understanding of topics towards climate change issues. The questions selected for the survey may not be representative of the women research scholars' true range of knowledge. Although the questions represent the important topics but they might be beyond the area of information to which they have been exposed.

Maximum number of women research scholars was having positive attitude and high concern towards climate change but the respondents were having inadequate knowledge. *He et al. (2011)* reported low levels of environmental knowledge, but had positive environmental attitudes and were willing to commit to environment-friendly behaviour among the Chinese students. Maximum incorrect responses were lack of factual knowledge due to incomplete understanding of topics towards climate change issues. The questions selected for the survey may not be representative of the women research scholars' true range of knowledge. Although the questions represent the important topics but they might be beyond the area of information to which they have been exposed. Higher number of incorrect responses to the questions may be due to confusion about climate change with other environmental issues such as green house effect, ozone depletion and glacier melting. Finally, lower level of knowledge might be associated with the limitations of teaching materials and approaches to climate change education in formal educational system.

Unfortunately, only one per cent of the woman research scholars were having high level of sensitivity as they possessed both master and doctoral degree. The overall sensitivity of it was common that in doctoral degree, respondents were having higher the age as well as knowledge that leads to increase.

Maximum number of respondents belonged to above average level of sensitivity towards climate change. These women research workers are the future extension workers for scientific training of farm women and these respondents should have high level of sensitivity. The respondents were having excellent level of concern and positivity attitude towards climate change but they were having lack of knowledge towards climate change. *He et al. (2011)* identified that students have higher levels of environmental knowledge, more environmentally positive attitudes and were more likely to behave

environmentally responsible way in future. Climate science is so difficult to understand and also communicate, it often involves technical terminologies. The researchers and social scientists together make the climate science simple, clear, understandable and communicable to the respondents. The accurate, simple, factual and timely information should be available for every researcher through social networkers, leaflets, posters, emails and mobiles by establishing climate change information cell in the University campuses. This increased accessibility of information augments the knowledge by changing the attitude and concern levels of the respondent's that leads to increase in the sensitivity of the women research scholars towards climate change.

CONCLUSION

On the basis of this survey, the study assesses the climate change sensitivity of the postgraduate women research scholars studying in SAUs of Gujarat. Sensitivity towards climate change is measured by examining the knowledge, attitude and concern of the women research scholars. The results show that respondents have positive attitude towards climate change and demonstrated excellent climate change concern, but have a relatively average level of knowledge of climate change facts, it leads average level of sensitivity towards climate change among women research scholars studying in SAUs of Gujarat. Knowledge, attitude and concern components are high and positively significant towards women research scholars' sensitivity towards climate change. Knowledge may not directly change sensitivity levels, but it is required to understand the implications of attitudes and concern towards climate change. We believe that the major cause for average level of sensitivity is due to lack of knowledge among the women research scholars. It is suggested that there is a need to increase the knowledge of woman research scholars towards climate change issues to make them feel the reality of dangerous impact of climate change problem for future development. To enhance the climate change education in university should introduce the climate change curriculum for the women research scholars that important information and practical skills. Along with this the University should emphasis on local climate change issues and encourage them to participate in climate change protection activities at the local or community levels.

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