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Assessment of Constraints Faced by Farm Women in Adaptation Strategies towards Climate Change

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Abstract

The present study was conducted in Bikaner district of Rajasthan during 2020–21 to identify constraint faced by farm women in adaptation strategies towards climate change. The district is surrounded by Sri Ganganagar district to the North and lies in the Thar Desert. The study was conducted with sample size of 280 farm women. A total of two *Panchayat Samities* were selected by lottery method i.e., *Khajuwala* and *Kolayat*. Thus, a total of four *Gram Panchayats* was selected for the study. Further, two villages from each *Gram Panchayat* were selected by simple random sampling method. Hence, a total of eight villages were selected for the present study purpose. Further, Thirty five farm women from each (eight) villages will be selected for the final sample size of the study through random sampling. The primary data was collected personally with the help of an interview schedule which was prepared to identify the socio-economic characteristics, communication characteristics and constraints. Ranking method was used based on percentage of the constraints for the analysis of data. Overall twenty six constraints were listed out. The results of the present study revealed the major constraints faced by farm women which were inadequate/ limited knowledge concerning climate change and adaptation measures and lack of access to weather forecasting technology (Rank I), Lack of training programs on adaptation to climate programs (Rank II), Lack of knowledge about government policies/ programs and poor extension services related to climate change assigned Rank III.

Keywords: Climate change, constraints, adaptation measures, farm women, agriculture

1. Introduction

Climate change has been measured as the most vital issue affecting the survival of the human race in the 21st century. Climate change and agriculture are interrelated processes (Parry et al., 2007). Studies indicate that Indian agriculture will be negatively affected by climate change (Aggarwal et al., 2009). The evidence for rapid climate change now seems overwhelming. Participatory researches conducted by World Bank in a number of African countries revealed that rains have become lesser in duration and areas are becoming hotter and drier (Maddison, 2007). Global temperatures are predicted to rise up to 4°C by 2100, with associated alterations in precipitation patterns. Assessing the consequences for biodiversity, and how they might be mitigated, is a Grand Challenge in ecology (Thuiller, 2007). There are numerous studies reported on rural adaptation to climate change reveal that climate is one of the major factors influencing local adaptation strategies (Nielsen and Reenberg, 2010; Mertz et al., 2011; Diallo et al., 2012; Dieye and Roy, 2012). Agriculture and allied sectors like forestry and fisheries accounted 13.7%

of the GDP in 2013, and employed 50% of the workforce (Dhawan, 2017). Agriculture in India mostly depends on south west monsoon which contributes about 75% of the rainfall.

Women's contribution to agriculture has been found to be considerable, the major contribution being in livestock-based activities (60–90%). Agriculture employs 60% of the total female working population in South Asia (ILO, 2016). Emerging literature in the area of climate change adaptation and gender in agriculture has been increasingly highlighting the need to focus on women farmers (Nyasimi and Huyer, 2017; Kristjanson et al., 2017). Women make necessary contributions to agricultural as well as rural economies in all the developing countries. Rural women in particular are reported to be at high risk of negative impacts from climate change (Kakota et al., 2011). Their roles differ significantly between and within regions which are changing rapidly in numerous parts of the world, because they have less access to agricultural resources such as land, extension services and inputs with which to adapt to variability and change, and because gendered social norms and roles can inhibit



women's adaptive capacity (Doss, 2011; Anonymous, 2011; Kakota et al., 2011; Nelson and Stathers, 2009; Peterman, et al., 2010; Wright and Chandani, 2014) where the economic and social forces are changing the agricultural sector. Women play a crucial role in all farm-related activities from land preparation to marketing. They contribute a higher proportion of labor in agricultural sector than men. The increasing role that rural women are playing in smallholder agriculture provides an important opportunity to positively impact food production and security in a changing climate (Carvajal-Escobar et al., 2008). Rural women perform various labor-intensive jobs such as weeding, hoeing, grass cutting, picking, cotton stick collection, seed separation from fiber, livestock keeping and its other associated activities such as milking, milk processing, preparation of ghee, etc. Farm women face multiple constraints for production, including those related to social and gender norms and limited resource access, which are further magnified in the wake of climate change (Nyasimi and Huyer, 2017). The studies also show that women have developed a huge number of strategies to deal with climate change conditions as the women are reacting to changes the best they can. It is known that climate change impact not only intensifies poverty, it also strengthens the existing gender inequalities related to access to resources necessary to cope with climate change (Demetriades and Esplen, 2008).

Therefore, the objective of the study is to assess the constraints faced by farm women in adaptation strategies towards climate change.

2. Materials and Methods

2.1. Study site

Present study was conducted during 2020–21 in Bikaner district of Rajasthan. The district is surrounded by Sri Ganganagar district to the North and lies in the Thar Desert (Dhawal, 2019). It has a hot semi-arid climate with very slight rainfall and extreme temperatures. In summer temperatures can exceed 48°C, and during the winter they may dip below freezing. The climate in Bikaner is characterized by significant variations in temperature. It is very hot in summer season when the temperatures lie in the range of 28–53.5 °C (82.4–128.3°F). It is fairly cold in winters with temperatures lying in the range of –4–23.2°C (24.8–73.8°F). Annual rainfall is in the range of 260–440 mm. According to Brien et al. (2004) most vulnerable map, purposively as it comes in the Thar Desert where impact of climate change is seen.

2.1.1. Selection of panchayat samities

Total seven Panchayat Samities are there in Bikaner district which are namely–Bikaner, Khajuwala, Kolayat, Lunkaransar, Nokha, Sridungargarh & Panchu. A total of two Panchayat Samities i.e. Khajuwala and Kolayat have been selected by lottery method.

2.1.2. Selection of gram panchayats and villages

Two Gram Panchayats from each selected Panchayat Samities

had taken. Thus, a total of four Gram Panchayat was selected for the study. Further, two villages from each Gram Panchayat were selected by simple random sampling method. Hence, a total of eight villages were selected for the present study.

2.1.3. Selection of respondents

The population for present study comprised of farm women from Bikaner district of Rajasthan state. Thirty five farm women from each (eight) village was selected for the study through random sampling. Therefore, a total of 280 farm women have been selected for the present study.

2.2. Method of data collection

The primary data was collected personally with the help of an interview schedule and the farm women were selected through simple random method. The interviews were conducted on farm women's homes through face-to-face contact (Bayarta and Bonnel, 2015). The interview schedule was prepared to study the socio-economic characteristics like age, education, farm size and farming experience as well as communication characteristics like extension personnel contact, mass media utilization and social participation and constraints faced by farm women with the help of literature review, discussion with experts of relevant department. A total of 26 constraints were listed out and were asked in Yes/No format and were calculated with the help of frequency and percentage. The constraints were ranked on the basis of the percentage who reported respective constraint.

3. Results and Discussion

3.1. Socio-economic characteristics

The socio-economic characteristics were mainly concerned with the social and economic aspects of the farm women such as age, education, farm size and farming experience. Differences of these factors are accountable for the variations in these characteristics of the farm women.

The data presented in Table 1 showed that majority of respondents (42.5%) were from the age group of 30 to 41 years followed by 26.8% respondents were from age group of 42 to 53 years. Further, 17.1% and 13.6% of respondents were from age group above 53 years and below 30 years of age respectively.

The majority of the farm women (38.6%) were illiterate, followed by 33.6% of farm women who had primary level of education, 12.1% had middle level of education and 7.9% had high school level of education. Further, 6.4% and only 1.4% of farm women had intermediate and degree level of education respectively. The result was similar to Bishnoi (2013) who found majority of farm women were illiterate.

The majority of the respondents (45.7%) had small farm size, followed by 29.3% and 13.2% had marginal and semi medium farm size respectively. Moreover 8.6% of the respondents had medium farm size. Very few i.e. 3.2% of them were having large farm size. The result was in support with Rastogi and



Table 1: Distribution of Socio-economic characteristics of the respondents

Sl. No.	Categories	Frequency (n = 280)	Percentage
1. Age			
	Below 30 years	38	13.6
	30 to 41 years	119	42.5
	42 to 53 years	75	26.8
	Above 53 years	48	17.1
2. Education			
	Illiterate	108	38.6
	Primary	94	33.6
	Middle	34	12.1
	High school	22	7.9
	Intermediate	18	6.4
	Degree	4	1.4
3. Farm size			
	Marginal (1 ha or less)	82	29.3
	Small (1 to 2ha)	128	45.7
	Semi medium (2 to 4 ha)	37	13.2
	Medium (4 to 10 ha)	24	8.6
	Large (more than 10 ha)	9	3.2
4. Farming experience			
	Below 4 years	35	12.5
	4 to 9 years	132	47.1
	10 to 13 years	54	19.3
	Above 13 years	59	21.1

Hasan (2014) and Raghuvanshi (2014) who reported that the majority of the respondents were having small size land holding.

Majority of the respondents (47.1%) were having 4 to 9 years of farming experience, followed by 21.1% and 19.3% were having above 13 years and 10 to 13 years of farming experience. Moreover only 12.5% respondents had farming experience below 4 years.

3.2. Communication characteristics

In the study of communication characteristics, mass media utilization, extension personnel contact and social participation were studied. The data is represented in Table 2.

It was found that majority (78.6%) of respondents had medium level of mass media utilization, followed by 12.1% and 9.3% of respondents had high and low level of mass media utilization respectively. The findings are in line with the findings of Raghuvanshi (2014) who also found that majority of the respondents had medium level of mass media utilization.

The majority (76.8%) of farm women had medium extension personnel contact; followed by 14.3% and 8.9% respondents had high and low extension personnel contact respectively. Similar results were found by Garai (2007), Gaikwad (2010) and Singh et al. (2012) where majority of the respondents had medium level of extension contact.

It is conspicuous from the Table 2 that majority of the respondents (67.1%) had medium extent of social participation, followed by 21.1% and 11.8% had high and low extent of social participation. The result was similar to Yadav (2011) who found that maximum farmers had a medium level of social participation.

Table 2: Distribution of communication characteristics of the respondents

Sl. No.	Categories	Frequency (n = 280)	Percentage
1.	Mass media utilization	26	9.3
	Low (Less than 9)	220	78.6
	Medium (9 to 14)	34	12.1
	High (More than 14)		
2.	Extension personnel contact		
	Low (Less than 11)	25	8.9
	Medium (11 to 18)	215	76.8
	High (More than 18)	40	14.3
3.	Social participation		
	Low (Less than 11)	33	11.8
	Medium (11 to 18)	188	67.1
	High (More than 18)	59	21.1

3.3. Constraints faced by farm women

Table 3 indicates the data of constraints faced by farm women in adoption of adaptation strategies related to climate change. The farm women reported the constraints such as inadequate/limited knowledge concerning climate change & adaptation measures and lack of access to weather forecasting technology were ranked I with 75.7%. The findings are similar with the findings of Nzeadibe et al. (2011), Nayak (2018) and Maddison (2007) who identified lack of knowledge as main constraints faced by respondents. Lack of training programs on adaptation to climate programs was ranked II with 68.6%. The findings are similar with the findings of Nayak (2018), Yadav (2018) who found lack of training programs as major constraints. Lack of knowledge about government policies/programs and poor extension services related to climate change were assigned rank III by respondents with 65.4%. The findings are similar to the findings of Nayak (2018), Mutturaj (2017) who found poor extension service on climate risk management as major constraints. Non availability of extension officers/ workers or trainers on climate risk management was assigned rank IV by respondents with 63.9%. The findings are similar to Nzeadibe

Table 3: Distribution of respondents according to constraints in adaptation strategies towards climate change (n = 280)

Sl. No	Constraints	Frequency (n = 280)	Percentage	Rank
1.	Inadequate/ limited knowledge concerning climate change and adaptation measures	212	75.7	I
2.	Lack of access to weather forecasting technology	212	75.7	I
3.	Lack of training programs on adaptation to climate programs	192	68.6	II
4.	Lack of knowledge about government policies/programs	183	65.4	III
5.	Poor extension services related to climate change	183	65.4	III
6.	Non-availability of extension officers/workers or trainers on climate risk management	179	63.9	IV
7.	Low level of literacy rate	177	63.2	V
8.	Lack of adequate resources for adaptation	151	53.9	VI
9.	Needed information not received on time	150	53.6	VII
10.	Traditional beliefs and cultural norms	148	52.9	VIII
11.	Inadequate or high cost of irrigation facilities	147	52.5	IX
12.	Non availability of timely inputs (seeds, chemicals, fertilizers etc.)	146	52.1	X
13.	Lack of feedback between extension, research and clients/end users	145	51.8	XI
14.	Distant location or poor access to the market	145	51.8	XI
15.	Shortage of green fodder or grazing lands	143	51.1	XII
16.	Lack of institutional support for cope up measures	143	51.1	XII
17.	Small size and fragmented landholdings	141	50.4	XIII
18.	High cost and poor transportation facility	140	50	XIV
19.	Shortage and high cost of agricultural input	139	49.6	XV
20.	Poor knowledge on scientific dairy and livestock management	131	46.8	XVI
21.	Higher labor wage rate or shortage of labor	130	46.4	XVII
22.	Lack of access to improved crop varieties to cope up climate variability	129	46.1	XVIII
23.	Problems of soil and water erosion	128	45.7	XIX
24.	Low price for produce in the markets	122	43.6	XX
25.	High cost of concentrate feed	122	43.6	XX
26.	Difficult to work in the fields due to severe temperature	52	18.6	XXI

et al. (2017) who found irregularities of extension services as major constraint faced by respondents. Low level of literacy rate was assigned rank V by respondents with 63.2%. The findings are similar to Nayak (2018) and Shankar et al. (2013) who also found lack of literacy as a major constraint.

Lack of adequate resources for adaptation ranked VI with 53.9%. Needed information not received on time was the constraints which were assigned rank VII by respondents with 53.6%. Traditional beliefs and cultural norms was ranked VIII with 52.9%. Inadequate or high cost of irrigation facilities was ranked IX by the respondents with 52.5%. Non availability of timely inputs (seeds, chemicals, fertilizers etc.) ranked X with 52.1%. Lack of feedback between extension, research

and clients/end users and distant location or poor access to the market ranked XI with 51.8%. Shortage of green fodder or grazing lands and lack of institutional support for cope up measures were ranked XII with 51.1%. Small size and fragmented landholdings ranked XIII with 50.4%. High cost and poor transportation facility ranked XIV with 50%. Shortage and high cost of agricultural input ranked XV with 49.6%. Poor knowledge on scientific dairy and livestock management ranked XVI with 46.8%. Higher labor wage rate or shortage of labor ranked XVII with 46.4%. Lack of access to improved crop varieties to cope up climate variability ranked XVIII with 46.1%. Problems of soil and water erosion ranked XIX with 45.7%, similarly low price for produce in the markets and

high cost of concentrate feed were ranked XX with 43.6%. Difficult to work in the fields due to severe temperature was ranked XXI with 18.6%.

4. Conclusion

Farm women had faced major constraints in adaptation strategies towards climate change like inadequate/ limited knowledge concerning climate change & adaptation measures, lack of access to weather forecasting technology, lack of training programs on adaptation to climate programs, lack of government policies for preparedness and poor extension services related to climate change. Knowledge and skills should be provided to farm women regarding climate change and adaptation strategies by organizing training programs.

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