

An assessment of gender norms of dietary habits at the time of climate change in Chandigarh, India

Assessment of
gender norms

Suraj Das

*Department of Humanities and Social Sciences,
Indian Institute of Technology (IIT) Roorkee, Roorkee, India*

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Abstract

Purpose – The purpose of this present paper is twofold: (1) to study the role of gender in food preferences and (2) to study the change in food choice due to climate change in Chandigarh, India. Thus, the hypothesis developed are that (1) there is a significant effect of environmental change on the dietary habits of the women and (2) gender norms are significant in the selection of foods in Chandigarh.

Design/methodology/approach – The literature review was done with the help of NVivo 11, and for quantitative data analysis, SPSS version 22 is used.

Findings – The study concluded that societal gender norms were not significant for women in the choice of food. Also, climate change and women are an essential factor in food preferences at the household level.

Originality/value – While framing the adaptation policy and programs at the institutional level, the cultural and traditional knowledge gets little attention. Hence, the present paper will contribute in the policy-making from a gender perspective.

Keywords Society, Gender norms, Climate change, Food choice, NVivo, SPSS

Paper type Research paper

Introduction

The impact of climatic variabilities such as floods and drought is not gender-neutral but affects women differently (Aguilar, 2013; Reggers, 2019). The very reason for such differential impact is the embedded societal norms that are discriminatory to women in society by default (Prentice and Carranza, 2002; Tait *et al.*, 2019). Further, due to unfavourable gender-defined roles of women, the capacity to adapt gets affected. Therefore, the gender-disaggregated approach needs to be integrated to tackle and in capacity building among the vulnerability of various social groups (Arora-Jonsson, 2011; Morchain *et al.*, 2015). The increase in greenhouse gases leads to increased global temperature due to human activity, known as climate change (Meinshausen *et al.*, 2011; Montzka *et al.*, 2011; Ramanathan and Feng, 2009). Furthermore, rising global temperatures have been linked to glacier melting, changes in the precipitation cycle, melting of ice in the Arctic, ozone layer degradation and ocean acidification (Pingali *et al.*, 2019).

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Similarly, according to IPCC usage, climate change can be recognized with the statistical difference in the average and the unpredictability of its properties over a longer period, typically for decades (Cooper *et al.*, 2008; Team *et al.*, 2010; Thompson *et al.*, 2013). Additionally, the variation in the environmental properties is due to natural discrepancy or due to human interference over an extended period (Caminade *et al.*, 2014; Prudhomme *et al.*, 2003). Also, at the World Food Summit in 1996, food security was defined as the availability of nutritious and safe foods that meet the nutritional needs and dietary choices for every person's healthy lifestyle (Borre *et al.*, 2010; Loring and Gerlach, 2009). Additionally, food is socially and economically accessible to people. This definition integrated the three essential concepts of food and nutritional security that are the availability of food, accessibility of food and absorbability of food (Corrigan, 2011; Fanzo, 2014). Hence, the sufficient and adequate production of food alone is an insufficient condition of any country's food security. As a result, one of the top concerns associated with climate change is nutritional security (Chakrabarty, 2016).

The impact of environmental change varies, i.e. the degree of effects depends on multiple factors in a community, namely, age, gender, social group and socioeconomic status (Miller *et al.*, 2003; Van Anders, 2015). Hence, besides gender-sensitive policies for gender equality and women empowerment, technology and financial resources are also significant in addressing the issue associated with climate change (Mbow *et al.*, 2019). The gender perspective is inevitable for a better understanding of the difference in men's and women's adaptation capacities and risk factors due to climate change (Jost *et al.*, 2016; Ngigi *et al.*, 2017; Yaro *et al.*, 2015). Therefore, it is crucial to collect and analyse the sex-disaggregated data with both quantitative and qualitative studies. Also, to study the gender-differentiated impacts due to changing climate and the benefits of gender-specific adaptation practices. Further, agricultural activities are essential to understand men's and women's role in food choices and food security because gender plays a crucial role in producing and processing food (Doss, 2001; Jost *et al.*, 2016; Ragasa *et al.*, 2019).

The Chandigarh region is usually regarded as information deficient due to random, scarce, unreliable and unreachable research work. Although there has been an exponential upsurge of climatic variabilities according to considerable research in the region's recent decades, regional-specific scientific studies are lacking. The impact of environmental change differs according to the differentiated adaptive capacities of males and females. Further, choices of food have always been associated with social and cultural norms of society. Thus, the primary reasons adding to disparities in the climate change associated perception need to be integrated holistically and comprehensively for an inclusive policy to address the issue of food insecurity in the time of global climate change. Therefore, the current study will be an addition to the literature, i.e. the present research will add the novel dimensions of climate change and gender through the lens of food habits at the households levels in a traditional society.

Additionally, it is important to mark and identify the various strategies to cope with climate risk according to the perception of both men and women associated with food security. Sustainable agricultural practices are influenced by social norms, the individual household and the community's decision-making process (Carrigan *et al.*, 2011; Hoang *et al.*, 2006). Therefore, gender perspectives need to be systematically analysed and addressed while framing the policies and programs to tackle the issue of climate change (Gitz *et al.*, 2016). Therefore, the objective of the study was to (1) document and explore the food preference in times of climate change, (2) understand the culturally defined role of women in Chandigarh, India. Thus, the hypothesis developed are that (1) there is a significant effect of environmental change on the dietary habits of the women and (2) gender norms are significant in the selection of foods in Chandigarh.

Material and methodology

Sampling and data collection

A cross-sectional study was conducted to measure the perception and attitudes towards climate change and women's role in food choices (Nigatu *et al.*, 2014; Xiang *et al.*, 2016).

The questionnaires were separated into two portions for this study. Section A contained demographic data of the respondents, such as age, gender and marital status, whereas Section B had questions to be researched for the theoretical framework. We measured the responses on a 5-point Likert scale (1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree). Additionally, a literature review was also done for a better understanding of the phenomena and in-depth analysis. Further, for the pilot study, 70 respondents were interviewed through random sampling in September/October 2020 at Sectors 11, 12, 14 and near Government Medical College Sector 16 in Chandigarh, India. The time duration for each interview was around 45 min for the current primary study.

Data analysis

A thematic approach was used to develop the themes based on the literature with the help of NVivo 11 qualitative data analysis software. Following the research by [Das and Mishra \(2021\)](#), [Sechelski and Onwuegbuzie \(2019\)](#), a combination of keywords was chosen to search the scientific documents related to climate change. The keywords used are (1) climate change; AND (2) gender' AND (3) food choices, OR traditional food, OR dietary habits; AND (4) cultural norms. These keywords were entered into Google Scholar, Web of Science and ScienceDirect to retrieve the related data. Initially, 90 publications were collected. Out of these, some were not relevant, and some data were missing, i.e. unavailability of abstract or no relation to the research topic was excluded, i.e. 25 were excluded. By the end, only 65 documents were incorporated and text mining analysis ([Figure 1](#)). Finally, three broad themes were generated: (1) Gender; (2) Climate Change; and (3) Food Choices.

Further, the data were entered into version 22 of the Statistical Product for Service Solution. For the quantitative data analysis, both descriptive (frequency, percentage, mean and standard deviation) and inferential statistics (independent samples *t*-test and correlation analysis) were used to analyse if gender is significant while food preferences during climate change ([Ho, 2013](#); [Patel, 2009](#)). The independent samples *t*-test was used to compare two independent groups, such as gender, divided into males and females. The *t*-test was run to explore the variation in male's and female's perceptions associated with gender norms of food choices at the 0.05 statistical significance level.

Results and discussion

The demographic (gender and age) and lifestyle (marital status) factors are shown in [Table 1](#), which was used for the present study. The number of females was 28 (40%), and male participants were 42 (60%). Similarly, the 25 (35.7%) respondents were married, and 45 (64.3%) were unmarried. Also, 35 (50%) respondents were in the age group of 14–23 years, 29 (41.4%) were in the 24–33 years group, 3 (4.3%) in the 34–43 years group, 2 (2.9%) were in the age group of 44–53 years and 1 (1.4%) participant was more than 54 years old.

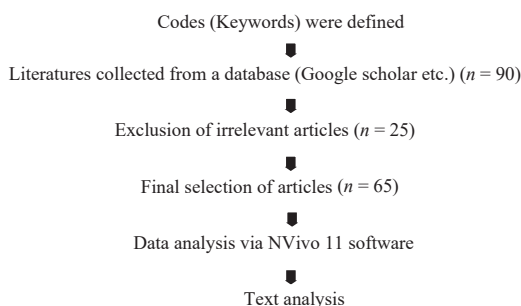


Figure 1.
Sampling and data
analysis

		Frequency	Percent	Cumulative percent
Gender	Female	28	40.0	40.0
	Male	42	60.0	100.0
	Total	70	100.0	
Marital status	Unmarried	45	64.3	64.3
	Married	25	35.7	100.0
	Total	70	100.0	
Age (years)	14–23	35	50.0	50.0
	24–33	29	41.4	91.4
	34–43	3	4.3	95.7
	44–53	2	2.9	98.6
	54+	1	1.4	100.0
	Total	70	100.0	

Table 1.
Demographic (gender and age) and lifestyle (marital status) data

Hypothesis testing: To answer the objectives of the study and to test the significance of the hypothesis, two following null hypotheses were developed:

H1. There is no significant effect of environmental change on the dietary habits of the women in Chandigarh.

Regression analysis was run to determine if there is a significant effect of environmental change on Chandigarh's women's dietary habits. The test was run at a 95% confidence level, i.e. at a 5% level of significance. The results are shown in Table 2. The model summary provides the correlation coefficient and coefficient of determination (R^2) for the regression model. The correlation coefficient (R) value is 0.294 that indicates a weak positive effect of environmental change on the eating choices of women in Chandigarh. The present study's result is in sync with earlier studies (Pingali *et al.*, 2019; Wang *et al.*, 2014) that have observed the significant impact of climatic variabilities on women's dietary habits.

Table 3 shows the ANOVA results to see if the regression model predicts a statistically substantial amount of the variation. It uses a ratio to measure how much the linear regression model estimates the accuracy of simply using the mean of the outcome data as both an estimate. Because the model predicts the results of the analysis, it is statistically significant (if $p = 0.04 < 0.05$) despite the modest correlation.

The regression analysis table gives the values for the regression line. The result predicts an increase of 0.055 on the food choice factor for every climate change factor and a decrease of -0.282 on the food choice factor for every woman factor, as shown in Table 4. From the

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.294 ^a	0.086	0.059	1.087

Note(s): ^aPredictors: (Constant), Women and Climate Change

Table 2.
Model summary

Model		Sum of squares	Df	Mean square	F	Sig.
1	Regression	7.477	2	3.738	3.162	0.049 ^b
	Residual	79.223	67	1.182		
	Total	86.700	69			

Table 3.
ANOVA^a

Note(s): ^aDependent variable: Food Choice; ^bPredictors: (Constant), Women, Climate Change

analysis, the study was able to reject the null hypothesis and concludes that at a 95% confidence level, there is a significant ($p = 0.04 < 0.05$) influence of climate change and women factors on food choice in Chandigarh.

H2. Women and gender norms are no significant in the selection of foods in Chandigarh.

The second research question investigated the effect of demographic variables (age, gender and marital status) on the choice of traditional food. The influence of gender is presented in Table 2. In Table 5, the independent samples *t*-test shows that statistically there was no significant difference in the attitude and perception of male ($M = 4.29$, Std. D = 0.77) and female ($M = 4.18$, Std. D = 1.056) for gender norms [$t(68) = -0.49, p > 0.05$]. Since the *p*-value was greater than 0.05, the study was unable to reject the null hypothesis. Hence, the results showed that gender norms did not affect food choices by women in Chandigarh. The result is inconsistent with (Gitz *et al.*, 2016; Mbow *et al.*, 2019; Wardle *et al.*, 2004), who noticed that gender norms are among the significant factors that affect food choice.

Association between gender, climate change and food choices

Food access is exacerbated in times of climate change due to gender, age, sociocultural norms and economic constraints within a household (Sultana, 2014, 2018). The women are mostly among the disadvantageous group in a family due to the association of inaccurate economic value to the work they perform at household and hence get lesser recognition. The cultural norms and matters related to gender-defined women’s role in society further exacerbate poor accessibility (Agrawal and Agrawal, 2010; Lahelma *et al.*, 2002). Therefore, during unforeseen events such as rainfall cloud bursts and rainfall shocks, women of the household have to suffer due to a reduction in food security (Pingali *et al.*, 2019).

Moreover, the food choice is not only about why we eat the foods we do, but the phenomenon is the complex one that involves the power to decide from the abundance of available food options (Chen *et al.*, 2016; Gyimóthy and Mykletun, 2009). Another important aspect is the food chain phases through which the food passes from production, processing, purchasing and preparation to the final act of ingestion (Kathuria and Gill, 2013; Wood and Bruhn, 2000). Also, the preference for food gets influenced by tastes, cultural norms and so forth during climatic changes (Lake *et al.*, 2015).

The global participation rate of women in the agricultural sector is around 43% of the aggregate working population in the farming sectors and allied activities. Therefore, ensuring gender equality is one of the prominent issues and challenges in the

Model		Unstandardized coefficients		Standardized coefficients	<i>t</i>	Sig.
1	(Constant)	4.978	0.845		5.894	0.000
	Climate change	0.058	0.124	0.055	0.469	0.641
	Women	-0.354	0.148	-0.282	-2.397	0.019

Note(s): ^aDependent variable: Food Choice

Table 4. Coefficients^a

Factor	Gender	Mean	Std. D	<i>t</i>	df	Sig. (2-tailed)
Gender norms	Female	4.18	1.056	-0.49	68	0.289
	Male	4.29	0.774			

Note(s): Std. D, standard deviation; df, degree of freedom; Sig., significant values

Table 5. Mean, standard deviation and *t*-test results

age of climate change for adaptation measures (Meybeck *et al.*, 2018). Considering the gender-specific differences, women and girls are the most vulnerable group exposed to the severe impact of changing climate (Dankelman, 2002; Neumayer and Plümper, 2007). Hence, the need arises for the integration of specific geographical conditions, cultural and socio-economic conditions of the communities (Uns/Scn, 2010). The impact of climate change is visible upon a human in the form of reduced incomes due to sustainable livelihood. Also, cause disruption in trades and negative implications for human health. Besides, it also affects aquaculture, fisheries, crop productivity, livestock, forestry, etc. (Howden *et al.*, 2007; Zougmore *et al.*, 2016). That results in negative impacts on social and economic activity globally (Chakrabarty, 2016).

In modern times, the loss of culturally relevant subsistence practices such as indigenous and local knowledge has led to the loss of significant adaptive capacities (Pascua *et al.*, 2017; Peloquin and Berkes, 2009). Since the cultural beliefs and values are embedded in local food systems; therefore, indigenous knowledge can be beneficial in increasing the resilience of food stem during climate change (Mbow *et al.*, 2019). Additionally, there is a need for recognition and appreciation of indigenous and locally available food options. Furthermore, due to a lack of awareness of the benefit and sustainability of locally produced food, which is in sync with traditional culture, the younger generation suffers due to nutritional insecurities. As a result, the need arises to integrate both traditional and scientific knowledge of dietary habits (Meybeck *et al.*, 2018).

A case study of women in Singapore observed that due to phenomenal economic growth and improved educational level, the women felt empowered. Further, due to more economic power, women from various ethnicities were able to influence families' food choices (Wang *et al.*, 2014). So women were found significant in the selection of food in a household. Similarly, women's belief in weight control and the notion of healthy eating also influence the choice of food; hence the societal influence also plays a significant role (Manippa *et al.*, 2017; Wardle *et al.*, 2004).

Since, at the climate negotiation forums and national debates, gender concerns are missing institutionally, which results in the allocation of budgets and other financial shares (Biswas, 2004; Nilsson, 2017). Therefore, the analysis should incorporate the vulnerability, adaptation and mitigation factors of high-risk populations, especially women and children. Gender inclusion needs to be supported at the policy formation level related to climate change (Ketrish and Dorozhkin, 2016; O'Connell *et al.*, 2020). Accessibility of sustainable energy sources and water in remote and rural areas needs to be focused on at the local and community level. Besides, capacities to deal with changing climate require the administrations' attention and the local governments to make the community more resilient during emergency situations (Pasquini *et al.*, 2015; Qi *et al.*, 2008). The support of international efforts is needed for the policy formation level to integrate the gender policy to address the issue of environmental change (Narain *et al.*, 2009). The summary of the reviewed literature is shown in Table 6, which summarizes the central idea of select studies in defining the dynamics of core concepts, namely, gender, climate change and food choices.

Conclusions

The lack of gender-specific data is one of the primary reasons, which prevents policymakers from acknowledging the significance of women's efforts and responsibilities at the household levels in assuring food security. Therefore, the integration of gender-specific data and perspective must be the first objective for women empowerment and further for the recognition of the role of the female in making food security strategies. Therefore, the present study was conducted, and the study observed that women influence the choice of food in the face of changing climate (Bee, 2014; Burke and Lobell, 2010; Kristjanson *et al.*, 2017). Also, it

Categories	Themes	Description	Authors
Gender	Sociocultural norms	Gender role is associated with sociocultural beliefs systems, age and socioeconomic status affects food choices during climate change	Pingali <i>et al.</i> (2019)
	Social groups	Gender, sexual orientation, age, class, ethnicity, ability/disability and wealth are the factors that significantly influence the impact of climate change among various social groups	Mbow <i>et al.</i> (2019)
	Gender centrality	Sex-disaggregated data are essential for the sex-differentiated impact of climatic variabilities and hence for gender-specific adaptation needs	Gitz <i>et al.</i> (2016)
	Differential impact	The effect of climatic variabilities is not gender-neutral	Narain <i>et al.</i> (2009), Uns/Scn (2010)
	Traditional knowledge	Traditional, indigenous, and local knowledge of food should be integrated during the formation of various adaptation policies	Meybeck <i>et al.</i> (2018)
	Decision makings	Due to economic growth, decision-making power empowered women to make and influence food choices for the household	Wang <i>et al.</i> (2014)
Climate change	GHGs	Climate change refers to the fluctuation in global temperature due to increased greenhouse gas emissions and impacts the human being	Pingali <i>et al.</i> (2019)
	Human and natural activities	Environmental changes due to ecological and human activities	Khan and Hasan (2017)
	Synonyms for climate change	Global change, global environmental change and climate change are interchangeably used for the same phenomena that are climate change	Al <i>et al.</i> (2018)
Food choice	Definition	Food choice is a complex phenomenon that gets influenced at every stage, from production, processing, purchasing and preparation to ingestion	Lake <i>et al.</i> (2015)
	Cultural beliefs	Gendered norms and cultural beliefs in society are significant for drawing coping strategies	Mbow <i>et al.</i> (2019)
	Dimensions	Three main aspects of food security are food availability, accessibility to food and food absorption	Chakrabarty (2016)

Table 6. Summary of the reviewed literature

has been observed that societal gender norms are not a significant factor for women in their decision-making related to Chandigarh's food choices. That is inconsistent with various studies and societies. This study emphasizes the importance of women in traditional households' food choices in the face of climatic variabilities. Thus, based on the preliminary research results, the stress needs to be laid on gender perspective besides the scientific and technological aspects in addressing food insecurity. There are certain limitations for the current study, i.e. since the preliminary research was conducted with a sample size of 70 participants only, so the study's findings may not be generalized. But, the present study is an indication of the changing dynamic of society.

Therefore, future studies should also integrate other factors like role technology, rationality factors, education level, etc., to get a clear picture with a larger sample size. Thus, the current preliminary research finding can aid in making inclusive and integrative strategies by including sociocultural aspects associated with traditional society's dietary choice norms. Also, the present study can be replicated at the macro level for evidence-based policy planning to tackling the problem of food insecurity, especially at times of climate change.

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Corresponding author

Suraj Das can be contacted at: sdas@hs.iitr.ac.in

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