

Gender and Adaptation Practices against Climate Change Impact on Agricultural Activities in Western Nepal

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Abstract: There is a close association between gender and climate change adaptation practices. Climate change affects everyone but man and woman have different vulnerabilities and unequal capacity to deal with the adverse impact of climate change. The main objective of this paper is to assess the association between gender and adaptation practices against climate change impact on agriculture activities in western Nepal. A survey of 1046 households using semi-structured questionnaire using multistage sampling was used to collect quantitative data from five districts of western Nepal. Focus group discussion (FGDs) was also conducted to collect the qualitative data. Chi-squared test was used to find the association between gender and adaptation practices against climate change impact on agriculture activities in western Nepal. The analyses reveal that more men involve in agricultural activities. Among the several adaptation activities, gender matters for the use of improved irrigation facility, use of chemical fertilizer and use of cropping season.

Keywords: Adaptation, Agriculture activities, Climate change, Gender

Introduction

Adaptation to climate change impact is one of the hot issues discussed in recent years. Adaptation refers to an adjustment in natural or human systems in response to actual or expected climatic conditions or risks and can be regarded as a policy option to contain the negative effects of climate change (Kurukulasuriya & Mendelsohn, 2008). Adaptation is the most efficient way out for them to face the extreme weather conditions associated with climate variations and to minimize the negative impacts of climate change (IPCC, 2013). The

adaptation strategies of farmers employed to mitigate the effect of climate change include varying land size, varying the planting and harvesting dates, soil conservation techniques and mulching. Other adaptation strategies include livestock rearing, mixed cropping, mono-cropping and no adaptation. Similarly, other socioeconomic adaptation measures, which help to combat the underlying causes of vulnerability and improve the adaptive capacity of farmers, must be considered. All these adaptations measures are not only influenced by biophysical and socio-economic factors

but also the social characteristics such as gender, education, marital status, social cohesion/relationship of local communities (Nielsen and Reenberg, 2010).

Among the social variables gender is one of the socio-cultural dimensions related to climate change adaptation practices on agriculture sectors but it is rarely incorporated in adaptation research and planning relates to national adaptation plan of action (NAPA) and local adaptation program of action (LAPA). Climate change affects everyone but man and woman have different vulnerabilities and unequal capacity to deal with the adverse impact of climate change in developing countries. Several visible inequalities can be seen in terms of ownership of land, water, livestock, and empowerment, access to technology, training and other opportunities related to agriculture (Ashby et al., 2011; Doss, 2011; Lambrou & Nelson, 2010). A recent data on woman involvement in agriculture shows that about 25.4 percent of women engage in agriculture around the world and this proportion is 56.0 percent in South Asia (ILO, 2020).

Woman has a significant role in agriculture sectors in Nepal where more than 80 percent of women are employed in this sector (ILO, 2020). The status of women from rural and interior parts of the country is unsafe because they need to bear multiple responsibilities (productive, reproductive and other social works) not only including the family responsibilities but also in farming sectors as well (Kakota et al., 2011). In some rural parts of the country, women have to engage ploughing and marketing of the agricultural products due to labor migration of men (FAO, 2019). The shortage of male labor, woman has put in pressure for continuing agricultural activities. It is obvious that labor intensive and traditional farming techniques further put women at hazardous condition. It may

have direct impact on overall well-being of woman in country.

As in the other developing countries (FAO, 2011), there is an increasing trend on the woman empowerment in terms of land ownership among agriculture landholders in the country (CBS, 2012). However, studies reveal that there is a wide variation in gender-biased wage gap in agriculture throughout the country (FAO, 2019; CBS, 2014a). Likewise, the farms managed by women has less productivity as compared with their male counterparts due to knowledge of technologies, adaptation practices, knowledge on farming techniques, selection of seeds, cultivating, harvesting, access to information and communication technology, constraints in accessing credits and other financial services and processing crops, poor decision making training and other opportunities provided local and federal governments (FAO, 2019; Ashby et al., 2012). Therefore, adaptation practice against climate change impact may be significantly influenced by gender. So it is essential to know the gender differential in adaptation practices against climate change impact on agriculture sector in Nepal. This paper examines the gender difference in adaptation practices against climate change impact in some selected districts of western Nepal.

Data and Methods

This article is a part of a study on “Climate change and its impact on agriculture sector: Evidence from western Nepal” conducted in some selected districts of western Nepal. Five districts (Manang from Mountain, Lamjung, Kaski, and Tanahu from Hill and Nawalpur from Tarai regions) were chosen from western Nepal. These selected districts represent all topographic regions and climatic zones, ranging from 79 meters to 3519-meters height. These districts are more vulnerable in terms of hazards and

have a wide variation in temperature and rainfall. A national adaptation program of action (NAPA) to climate change has identified Lamjung as very high (0.787 - 1.000), Manang as high (0.61 - 0.786), and Kaski, Tanahu, and Nawalparasi as moderate (0.356 - 0.600) vulnerability ranking in the region (MoE, 2010). Also, the majorities of rivers originate directly from Mountain and flow from north to the southern part of the region. Therefore, this area is highly sensitive and important in terms of climate change and its impact on agriculture and hydropower.

For primary data collection, a multistage sampling technique was used. At first, ten village development committees (VDCs) lying on the two parallel traverses that pass through the three topographical regions in north south direction were randomly chosen as the samples from five districts of the western Nepal. At the next stage, altogether 1046 households (57 out of 1448 HHs from Manang, 164 out of 42048 HHs from Lamjung, and 168 out of 125459 HHs from Kaski, 224 out of 78286 HHs from Tanahu, and 433 from out of 128760 HHs from Nawalpur districts) were selected for this study. Finally, household head or a household member of age 45 years and above, residing in that area for the last 15 years at the time of the survey was chosen as a respondent. Only one respondent was selected from a household. To examine the gender difference in adaptation practices against climate change impact, this study uses simple descriptive statistics of percentage difference and non-parametric chi square test.

A rigorous literature review was done for developing research instrument and was also consulted with experts for maintaining the validity. After pre-testing of 55 samples in similar setting, few modifications were made before finalizing the instrument. At first semi-structured questionnaire

was prepared in English and translated in Nepali. For ensuring the quality, content and semantic equivalence of each question back to back translation was done as suggested by Brislin (1970). For understanding the people's perception towards climate change and adaptation practices, eight focus group discussions (FGDs) were conducted at least one from each district.

Results and Discussions

Table 1 shows the socio-demographic characteristics of respondents. Among the respondents, 61.7 percent of were man with mean age 57.4 years and standard deviation as 9.5 years (While mean age of woman was 53.9 years with SD of 8.8 years). Majority of the respondents (man and woman) were married while 2.5 percent were unmarried. Majority of respondents were from Janajati followed by Brahmin and very few were from Muslim caste. Janajati were in majority because it comprises Gurung, Rai, Magar and Tamang castes in the study sites. More than three fifth (61%) of men were from joint family as compared to 52.1 percent of women. Although respondents (man and woman) had more than 30 years of experience in agriculture activities, more than 80.0 percent did not acquire any agriculture skill at the time of the survey. This may be due to the fact that majority of rural farmers follow traditional farming techniques at subsistence level.

Table 1*Socio-demographic characteristics of respondents*

Background Characteristics	Men	Percent	Women	Percent
Age (years)				
Mean=57.4 Years with SD=9.5 years	Mean =53.9 years with S.D. = 8.8 years			
Marital status				
Unmarried	16	2.5	10	2.5
Married	617	87.0	349	87.0
Divorced	12	10.5	42	10.5
Caste/ethnicity*				
Brahmin	149	23.1	92	23.0
Chhetri	48	7.4	35	7.9
Dalit	61	9.5	42	9.8
Janajati	358	55.5	217	55.0
Muslim	5	0.8	3	0.6
Others	24	3.7	12	3.4
Family type				
Joint	394	61.1	229	52.1
Nuclear	251	38.9	172	42.9
Religion				
Hindu	502	77.8	340	84.8
Buddhist	117	18.1	48	11.5
Christian	9	1.4	4	1.0
Muslim	5	0.8	3	0.7
Others	12	1.9	8	2.0
Agriculture skill				
Yes	118	18.3	71	17.7
No	527	81.7	330	82.3
Farming experiences(years)				
Mean= 31.75 years with SD=12.18 years	Mean=30.45 years with SD= 11.9 years			
Education of respondent				
Illiterate	90	14.0	130	32.4
Informal Edu.	185	28.7	143	35.7
Basic Edu.	265	41.1	85	21.2
Secondary Edu.	88	13.3	41	10.2
Higher Edu.	19	2.9	2	0.5
Total	645	100.0	401	100.0

Note:*Janajati includes Gurung, Magar, Rai, and Tamang while Dalit represents Kami, Sharki and Damai

Source: *Field Survey, 2019/2020*

As expected more respondents from Hindu religion were found to be involved in agricultural activities as compared with respondents from other religions. In terms of educational status, about one thirds of woman as compared with 14.0 percent man were illiterate while 2.9 percent of man acquired higher education as compared with only 0.5 percent of woman. This is obvious that majority of illiterate woman engage in agricultural activities in Nepal.

Although there are several options of adaptation practices against climate change impact on agriculture sectors, this paper includes use of improved irrigation facility, use of improved seeds, use of compost fertilizer, use of pesticides and use of cropping season as the main indicators of adaptation practices. Table 2 shows that gender is significant factors for use of improved irrigation facility ($p < 0.01$), use of chemical fertilizer and use of cropping

season ($p < 0.05$). However gender does not matter for other selected indicators of adaptation practices i.e. use of improved

seeds, use of compost fertilizer and use of pesticides for climate change impact on agriculture production.

Table 2

Gender wise adaptation practices against climate change impact on agriculture production

Adaptation Practices	Gender						P-value
	Men		Women		Total		
	Number	Percent	Number	Percent	Number	Percent	
Improved Irrigation Facility							
Never	380	58.9	177	44.1	557	53.3	***
Sometimes	246	38.1	212	52.9	458	43.8	
Always	19	2.9	12	3.0	31	3.0	
Use of improved seeds							
Increase	433	67.1	267	66.6	700	66.9	NS
Decrease	22	3.4	16	4.0	38	3.6	
No Change	114	17.7	63	15.7	177	16.9	
Don't Know	76	11.8	55	13.7	131	12.5	
Use of compost fertilizer							
Increase	315	48.8	194	48.4	509	48.7	NS
Decrease	145	22.5	103	25.7	248	23.7	
No Change	179	27.8	95	23.7	274	26.2	
Don't Know	6	0.9	9	2.2	15	1.4	
Use of chemical fertilizer							
Increase	287	44.5	184	45.9	471	45.0	**
Decrease	187	29.0	90	22.4	277	26.5	
No Change	94	14.6	75	18.7	169	16.2	
Don't Know	77	11.9	52	13.0	129	12.3	
Use of pesticides							
Increase	261	40.5	161	40.1	422	40.3	NS
Decrease	166	25.7	100	24.9	266	25.4	
No Change	82	12.7	52	13.0	134	12.8	
Don't Know	136	21.1	88	21.9	224	21.4	
Cropping season							
Change	242	37.5	175	43.6	417	39.9	**
No Change	403	62.5	226	56.4	629	60.1	
Total	645	100	401	100	1046	100	

Note: $p < 0.05$, $p < 0.01$ and not significant are shown by **, *** and NS respectively

Source: Field Survey, 2019/2020

Thus, among the selected six adaptation strategies, only three are found to be statistically significant. There is a strong association ($p < 0.01$) between gender and utilization of improved irrigation facility. Similarly, there is association between use of chemical fertilizer and cropping seasons. However, there is no association between gender and use of improved seeds, compost fertilizer and use of pesticides. The finding of this study is also supported by other studies around the developing countries (Jost et al. 2016; Mitchell, Tanner and Lussier, 2007; Rohr, 2007).

Woman participants of FGDs clearly stated that woman has less adaptive capacity against climate change impact in agriculture because women had less power to take risk and had to rely on the decision of their male partners.

- One of the widow participants in Lamjung district reported that there was no favorable environment to adapt new ideas against climate change like me in this village because woman had no any opportunity to take any training, less chance to get financial services, low exposure to new technologies that were available in markets. She further reported that the productivity was also low among woman headed households in this area. Likewise, another participant of Nawalpur district expressed her bitter experience that there was a discriminatory practice on utilization of resources between man and woman. Women were less likely to use irrigation facility as compared to man which ultimately reduced the productive capacity.
- Similarly, female participants from Manang and Kaski districts also reacted that there was unequal chance of getting agricultural facilities due to the low bargaining power of woman in our area. Women are less likely to participate in

decision making process in adaptation practices.

From the findings of quantitative and qualitative analyses, it is clear that there is close association between some adaptation practices and gender. There is significant association between gender and adaptation practices against climate change in terms of resource utilization, use of chemical fertilizer and change of cropping seasons.

Conclusion

In sum up, gender matters for the use of improved irrigation facility, use of chemical fertilizer and use of cropping season. However gender does not matter for other selected indicators of adaptation practices such as use of improved seeds, use of compost fertilizer and use of pesticides for climate change impact on agriculture production.

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