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Impact of Climate Change on Animal Husbandry: A Gender Perspective Study in Meghalaya

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ABSTRACT

The impact of climate change on livestock is a matter of serious concern in the state of Meghalaya. Unprecedented drought like situations in the state of Meghalaya has adversely affected the livestock based livelihood of the livestock farmers. The paper demonstrates the impact on livelihood of animal husbandry of South and West Garo Hills of Meghalaya. Extreme climate variability (ECV) affects both the gender but with different consequences according to their roles and responsibilities. Both men and women were of same opinion that there was a change in weather during last 20 years but the response slightly differed between men and women. Overall more than 80 per cent of households reported diseases and mortality in livestock due to drought. The role of wives increases in decision making on selling of livestock during stress period. The time spent on fodder collection also increased during stress period comparative to normal period due to less access of fodder. New livestock breeds, livestock management and land management technique were the mitigating strategies. The study suggest to initiate the new livestock management techniques and high yielding breeds of small and big animal to uplift the livelihood of the people of the study area.

Keywords: Change, Climate, Gender, Husbandry, Impact, NEHR

INTRODUCTION

Animal husbandry an integral part of the farming system in Meghalaya is characterized by low producing cattle with average productivity of 1.34 Litre per day as against the Indian average of 2.77 l/day. Livestock is an important component of mixed farming system in the region due to preference of meat in their daily diets. The whole North-Eastern Hill Region (NEHR) is known as meat consuming zone of India, unlike other parts of India, no social taboo is attached to any type of meat but the most preferred meat is pork and beef (Paul and Chandel, 2010). Population of Cross Bred, sheep, goats and pig in the region has increased and contribution of livestock sector to agriculture GDP has declined over the years. Rearing of small ruminants, *viz*., sheep and goat have good scope for the landless and marginal farmers as they are prolific and require low input (Feroze *et al.,* 2011).

Climate change has significant impact on food security as extreme weather events affected the stability of food supplies. The climate change makes farmers vulnerable to many risks including droughts, floods, diseases on crops and animals (Venkateswarlu, 2009). Even if rainfall is normal at the country level, some regions in the country always suffer from serious deficiency of monsoon rainfall which adversely affects (Chand and Raju, 2009). The impact of temperature variations and rise in temperature negatively affects its

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function and milk production of indigenous, cross breed cattle and buffaloes. Climate change is likely to cause a rise in animal diseases that are spread by vectors and insects mainly due to temperature and humidity rise that favour their spread and growth. In pastoral and agro pastoral systems, livestock is a key asset for poor people, fulfilling multiple economic, social and risk management functions (http://www.climatefrontlines.org/q=enGb/node/525). The dairy sector is attracting entrepreneurship especially among youths in post-harvest management of milk (Das *et al.*, 2020). Unprecedented drought like situations adversely affected the livestock based livelihood and income of whole north eastern hill region of India including Meghalaya.

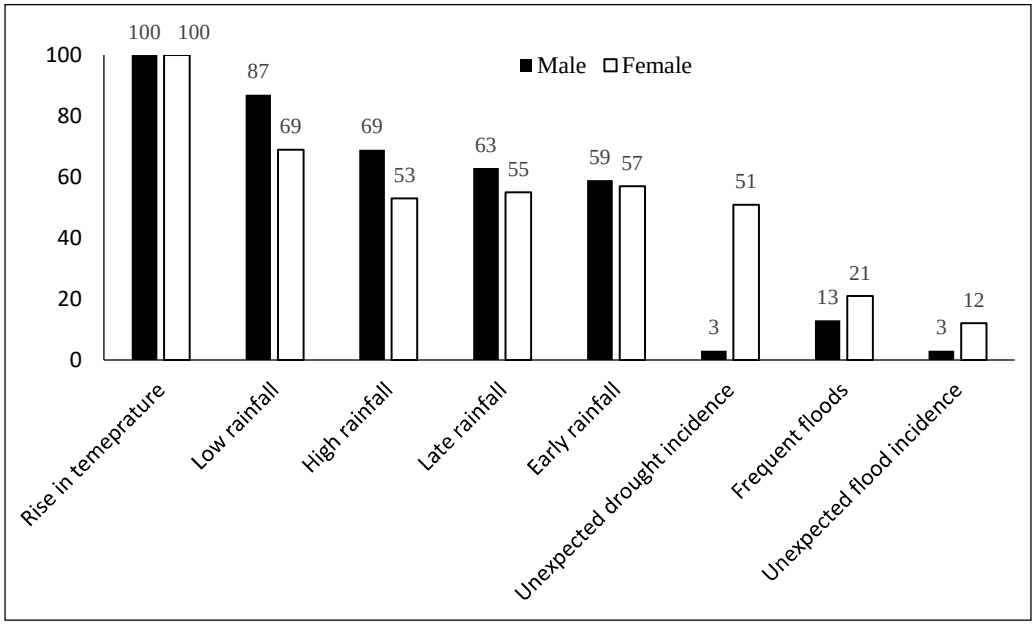
METHODOLOGY

This study was conducted in Meghalaya, state consisting of eleven districts. Two districts *viz,* West Garo (highest livestock population) and South Garo Hills (Lowest livestock population) were selected purposely for the present study. West Garo hills district located in the western part of Meghalaya is mostly hilly with plains fringing the northern, western and the southern borders. The climate of the district is largely controlled by South-West monsoon and seasonal winds. The West Garo Hills being relatively lower in altitude to the rest of Meghalaya experiences a fairly high temperature for most part of the year. This district has livestock population of 29 per cent of the state (GoM, 2010). The total geographical area of South Garo Hills district is 1887 sq.km and receives annual average rainfall of 1993.2 mm and the temperature ranges from 15^{o}C of 38^{o}C. This district has lowest livestock population (5%) of the state (GoM, 2010). Among the eight blocks of West Garo Hills, Selsella block was selected. Gasuapara block was selected among the four blocks of South Garo Hills. Five villages *viz*. Dokagre, Bolsalgre, Gonglanggre, Haldibari and Simbukol from Selsella block and five villages *viz,* Mangkeng Nokat, Ramchengga, Bandapara, Jatrakona and Seempara were selected randomly from Gasuapara block. Three approaches *viz*, Participatory Rural Appraisal (PRA), Focus Group Discussion (FGD) and household survey were used in the study. Primary data were collected from 300 farming households considering 150 female and 150 male respondents through personal interview method. To record the impact of climate change on animal husbandry 'extreme climate variability and normal' approach through frequency analysis for farmers' perceptions was applied.

RESULTS AND DISCUSSION

Both men and women respondents were of the same opinion that there was change in weather in the last 20 years. All of respondents reported on the absolute rise in temperature (Figure 1). Majority of them opined

Figure 1: Perception on change in climatic factors over 20 years



that over the past 20 years rainfall pattern was unpredictable as some times rain was low (87% male and 69% female) and sometimes high (69% male and 53% female), sometimes late (63% male and 55% female) and sometimes early (59% male and 57% female). The perception on drought like situation was negligible as the Meghalaya has been recognized as highest precipitation state in the country. Similar observation was reported by Venkateswarlu (2009). The response of men and women was slightly different because they live in the same ecology. The women respondents opined that they had experienced more droughts and frequent floods. However, unexpected flood were in the rise during the recent years while recalling last 20 years in the study area. Same trends were found by Singh *et al.* (2011). It was observed through PRA that average annual rainfall was 2000 mm and average temperature was around 23 to 25°C during the 50's to 70's h and earthquake occurrence in 1970 destroyed farmers' crop, livestock, property and resulted to the loss of lives of some villagers. Therefore, it was apparent from the collected and analyzed perception of both male and female farmers that climate change has taken place.

Table 1: Perceived change in the average number of livestock owned per household

Livestock	Normal year	Drought year	Change (%)
Cows	3.0	2.0	-33.0
Female buffaloes	2.0	0.0	-100.0
Goats	3.0	2.0	-33.0
Pigs	2.0	1.0	-50.0
Chicken	8.0	6.0	-25.0
Swan	3.0	0.0	-100.0
Duck	2.0	0.0	-100.0

Table 2: Perceptions on the occurrence of livestock disease and mortality during drought (%)

Occurrence of livestock disease	Male	Female	Overall
No	18.0	16.0	17.0
Yes	82.0	84.0	83.0
Higher livestock mortality			
No	18.0	22.0	20.0
Yes	82.0	78.0	80.0

The climate change affected the livestock economy adversely. Farmer respondents reported that they experience changes in the number of livestock owned in normal and drought years (Table 1). Of all the animals commonly raised, female buffaloes, swan and ducks; followed by pigs, goats, cows and chickens were affected by drought (Table 2). Drought affected adversely to livestock of households in the state. About 33 per cent of cows, 100 per cent of buffaloes, 33 per cent of goats, 50 per cent of pigs, 25 per cent of chickens, 100 per cent of swan and 100 per cent of duck have been declined due to drought at the household of the study area. This decrease in livestock was reported due to unavailability of fodder for the livestock due to drought. The finding were in the conformity of earlier research of Singh *et al.* (2012) in which it was concluded that decline in the number of cattle is becoming common in villages due to unavailability of fodder and free grazing land. In the rain-fed lowlands, remains fallow after the rice harvest season. Thus, these lands are available for grazing for large animals *e.g.* cattle and female buffaloes. Animals are let free into the forests for green fodder. However, during drought, green fodder for the animals are scarcer, thus farmers had to look for other sources of green fodder for their animals, besides reducing the number of large animals. Although family members (all male and female including children) collect animal fodder, female spare more time for this responsibility. During drought, collection of fodder becomes more difficult and imposes more pressure and burden more on wives as they have to spend extra time in search of fodder aside from their household, family and farm responsibilities as reflected by Singh *et al.* (2013). Time spent on various activities for livestock management declined for both male and female respondents. Farming households reduced the number of animals they manage due to scarcity of fodder due to drought (Singh *et al.*, 2012). However, women's time in taking care of poultry and goats increased as these were alternative sources of income during drought due to lesser feed requirements

Table 3: Change in time in livestock management activities due to severe drought

Changes	Percent Reporting Change (%)											
	Male				Female				Overall			
	Increase	Decrease	No Change	No response	Increase	Decrease	No Change	No response	Increase	Decrease	No Change	No response
Livestock management												
Collecting FYM		39.0	21.0	40.0	1.0	16.0	34.0	49.0		28.0	27.0	45.0
Cleaning the animal sheds		39.0	20.0	41.0		13.0	39.0	48.0		26.0	29.0	45.0
Collecting green fodder		1.0	1.0	98.0	2.0	6.0	1.0	91.0	1.0	4.0	1.0	94.0
Preparing/chopping green fodder		1.0		99.0		5.0		95.0		3.0		97.0
Grazing large animals	17.0	34.0	1.0	48.0	45.0	7.0	1.0	47.0	31.0	20.0	1.0	48.0
Milking milch cattle		57.0		43.0	1.0	49.0	1.0	49.0	1.0	53.0		46.0
Taking care of poultry	16.0	37.0	3.0	44.0	34.0	15.0		51.0	25.0	26.0	2.0	47.0
Taking care of goats	6.0	31.0	3.0	60.0	27.0	14.0	1.0	58.0	17.0	23.0	2.0	58.0
Selling large animals		23.0		77.0	1.0	35.0	1.0	63.0	1.0	29.0		70.0
Selling of small animals (goats)	3.0	17.0		80.0	1.0	35.0	1.0	63.0	2.0	26.0		72.0
Selling of poultry birds		13.0		87.0		35.0		65.0		24.0		76.0

compared with large animals (Singh *et al.*, 2013). The income through sale of large animals, small animals decreased of 58.91 per cent and 52.94 per cent, respectively due to drought. Similarly, the adverse impact of drought was observed in fish cultivation and income earned through it decreased about 64.06 per cent (Table 4). The drought impacted other sector of rural economy like off-farm income and non-farm income accordingly decrease in household income was observed of 35.43 per cent and 14.61 per cent, respectively.

During drought, farmers tend to sell livestock not only for income but also due to the scarcity of green fodder. The decision taking pattern of household was analyzed on the selling of animals during the drought years. Table 5 shows that the decision for selling of livestock was made by wife during normal as well as in drought situation for most cases. The women have responsibility to run the house hence, mostly decisions were taken by women. Husbands solely make decisions related to selling female buffaloes and swan only. These findings indicate that women's have understanding that the livestock make them less vulnerable to the negative consequences of drought. The respondents were provided with number of livestock management practices which may reduce the negative consequences of extreme climate variability. Their responses in Table 6 shows that male respondents were more willing to try new land management techniques for fodder production as a mitigating strategy, followed by shift to improved livestock-crop production system, animal health management and new livestock breeds. Women were found to be spending more time for collection of fodder for livestock. Hence, they were also willing to try new land management techniques as well as new livestock breeds and animal health management techniques. Thus, there is a scope to initiate new technologies to improve livestock-crop production to mitigate the negative effects of extreme climate variability.

CONCLUSION

The impact of climate change on livestock is a matter of serious concern as majority of livestock in Meghalaya are with resource poor farmers. The climate change affected the production of livestock in the state. The findings indicate that women considered that

Table 4: Average household income by source during normal year and drought year

Sources of income	Normal year (Rs.)	Drought year (Rs.)	Percent change
Sales from large animals	567.0	233.0	58.91
Sales from small animals/poultry	51.0	24.0	52.94
Fisheries	409.0	147.0	64.06
Wages from off-farm income	11,435.0	7,384.0	35.43
Non-farm	46,134.0	39,394.0	14.61
Total	77,481.0	56,674.0	26.85

Table 5: Decision makers in livestock sale during drought years

Animal	Decision –maker (%)							
	Normal Year				Drought Year			
	Husband	Wife	Both Husband and Wife	Elders	Husband	Wife	Both Husband and Wife	Elders
Cows	40.0	42.0	12.0	6.0	40.0	42.0	13.0	5.0
Female buffaloes	100.0	-	-	-	-	-	-	-
Goats	33.0	51.0	8.0	8.0	28.0	56.0	8.0	8.0
Pigs	32.0	47.0	13.0	8.0	31.0	53.0	10.0	6.0
Chicken	36.0	42.0	16.0	6.0	33.0	41.0	22.0	4.0
Swan	100.0	-	-	-	-	-	-	-
Duck		100.0	-	-	-	-	-	-

Table 6: Farmers' willingness for technical interventions to reduce vulnerability to climate variability

Strategies to reduce the negative consequences of ECV	Percent (%)		
	Male	Female	Overall
Use of stress-tolerant crop varieties for fodder	15.0	9.0	12.0
Shift to improved livestock-cropping system	22.0	17.0	19.5
New land management techniques for fodder	35.0	33.0	34.0
New livestock breeds	16.0	29.0	22.5
Animal health management	18.0	11.0	14.5

livestock rearing made them less vulnerable to the negative consequences of drought. The role of wives increased in decision making on selling of livestock during stress period. The time spent on fodder collection also increased during stress period comparative to normal period due to less access of fodder. Thus, initiation of new technologies to improve livestock-crop production and grass-land development at rural level may be way to mitigate the negative effects of extreme climate variability. Study also recommends the policy intervention for female livestock considering the technical intervention to reduce drudgery for them.

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