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Review Paper

Gender Perspective review on the impact of Climate Change in Agriculture and farm-households

Abstract

Climate change is greatest global challenges of our time. Impact of climate change can be felt in many areas including agriculture. Agriculture is primary occupation of a human being. Among all the human activities, agriculture being the mostly weather dependent is physically and economically more vulnerable to climate change. With climate change looming in the scene, agriculture and livelihood of the farm-households are also affected. Vulnerability to climate change is determined by many factors of which gender and poverty are important ones. The contribution and significance of women in agriculture and livelihood cannot be undermined. What impact climate change has, how much vulnerable people are and what adaptation and mitigation strategies they adopt varies with gender. Women, in developing countries, are responsible for household food production, in general, they use and manage natural resource differently than their men counterparts and degradation of the natural resource will also affect them differently with certain loss or alteration of natural resource due to climate change. When climate change related natural disaster strikes, women are the ones more affected. In certain cases, they are the one's custodians of solutions when such disaster happens. This paper reviews the relationship between climate change, agriculture, and gender roles & relations. Gender mainstreaming of climate change adaptation and mitigation interventions is the need of the time.

Keywords: Climate change, Gender, and Agriculture.

Introduction:

Climate Change major environmental problem facing the globe. There is strong evident that climate is changing due to human activities. Agriculture also indirectly affected by climate change through influenced emergence and distribution of crop pests and livestock diseases, exacerbated frequency and distribution of adverse weather conditions, reduced water supplies and irrigation; and enhanced severity of soil erosion [1] [2]. It challenges the sustainable development with broad impacts not only on the environment but also on economic and social development. Its effect is not equal but different among region, occupations, generations, income

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groups and also between men and women. But its adverse and significant impact is mostly seen in developing countries with lower adaptive capacities and people living in poverty. In rural areas of developing countries women and men when highly dependent on natural resources for their livelihood are found to be more vulnerable to climate change [3]. Roles and responsibility differs from gender to gender. The individual compared to their counterparts charged with primary household activities faced the greatest challenge and also when coupled with unequal access to resources and decision making processes, limited mobility places, they disproportionately bear cost of disaster [4] [5] [6] [7] [8]. Even though women were more vulnerable to climate change; domestic and sexual violence aftermath of disaster [9] [10] on the other hand they were also effective actors or agent of change in relation to both mitigation and adaptation [3].

Important climate change phenomenon and its effects on agriculture and farm households

Population explosion which is the one of most serious problem of this time has brought immense pressure on Earth surface, for food, shelter, fodder, and fuel. It exploits the natural setting of the surrounding environment, increase global warming, natural disaster and, reduction in biodiversity. One of the most obvious effects of global warming is the increase in temperatures around the world. It is projected with extreme weather events, such as heat waves, droughts, blizzards and rainstorms [11]. Agriculture plays a crucial role in an economy and is backbone of economic system. It accounts around one-third of the gross domestic product [12]. Agriculture not only provides food and raw material but also employment opportunities to a very large proportion of population [13]. Agriculture solely depends on natural environment. If the global temperature rises plants will find harder to survive, will die [14] and there will be outbreak and increase in pest and diseases. Around 78 per cent of world's poor population resides in rural area and depend largely on agriculture/farming for their livelihood. It was predicted that the warm climate can cut the yield of crop by more than 25 per cent [12]. And impact of climate change on agricultural productivity in low income countries is relatively higher compared to other sectors of their economy [15] [16]. There was also evident that droughts in 2001 and 2008 damaged more than a third of the cropping areas in Tajikistan [17] and [18]. A report from Kenya shows that about 36 to 66% of the households in agro-ecological zones (AEZs) receiving limited rainfall is likely to lose from climate change [19]. It is expected that the impact of climate change on Brazilian crop to be overwhelming negative. The negative effect is considered to be 1 to 6 per

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cent [20]. Floods are considered to be one of the most common and widespread of all natural disasters due to climate. India is one of the highly flood prone (around 40 million hectares of land) countries in the world. Frequent flooding decreases the peoples productivity, it restricts people from their work and mobility due lack of transportation facility; when land flooded with sea water leads to corrosion in exposed equipment made from metals, damage to electronic goods, fences and documents [21]. A study in Bangladesh predicted that due to climate change overall access to the natural capital, physical capital and financial capital for the farmer group will be reduced from 75% to 54%, 63% and 30% from the present condition respectively, annual work days of farm laborers to 40% less than their present situation. Fishing activities of the fisherman group will be reduced to 25%. Access of woman group to natural capital will go down by 30% and their income generating activities will be reduced. Moreover, access to the financial capital of the women group will be reduced from 50% to 40% due to climate change [22].

Differential impact on gender:

It is considered that climate change is recognized phenomenon which affects the natural environment, intensely experienced by the individual of both the gender and has a great impact on them. However, there are several gender roles and responsibility as accepted by society. Women and men having different roles and responsibility also had to face the impact of climate change differently. Most of the literatures suggests that rural women in developing countries are among the most vulnerable groups [23] [24] because they are responsible for the most climate-sensitive activities, such as water collection and fuel wood collection and, in many instances, agricultural activities [4] [25]. But in Brazil and Peru female-headed households tend to be slightly less vulnerable to the effects of climate change than male-headed households [20].

Cyclone: It is estimated that 35 per cent of the world's population is affected by cyclones [26] and has also a great impact on agriculture, sanitation, transportation and drinking water facilities etc [27]. The report also highlights that 90 per cent of death due to cyclone occurred from Asian water [28]. Mostly primary cause of mortality in the cyclone is found due to drowning. It has been reported that men were associated with increased mortality risk in developed countries while in case of women they experience higher mortality in developing countries [29]. Around 90 per cent of the 14,000 fatalities were found to be women, during 1991cyclone in Bangladesh [30].

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Flood: Floods are considered to be one of the most common and widespread of all natural disasters due to climate. Flood does not affect equally for everyone but it affects women differently from men. Women in Cambodia are the most disadvantaged groups and they were more prone to natural disaster as their socio-economic status is being very critical, moreover, they also reside at vulnerable locations (houses and farms in the communities). Women and women headed households are found to be more disproportionately affected by this disaster. Percentage of unemployment was reported more compare to man after the end of disaster as they were involved in both agriculture and other sectors; also more involved in pre-flood and after flood activities, productive work during flood and psychological stress, to protect the household stuff and family members whereas men become more vigorous during flood and commute out for food and cash [31]. In Amhara, women, and women headed household was found to be more exposed and vulnerable to food insecurity, water-borne diseases violence, loss or reduction in income generating opportunities and children to malnutrition and dropping out from school to help household cope during a flood; whereas men leave in search of migratory labour. They also don't get the same access to resources compare to their men counterpart to rebuilt asset base and restore livelihoods after flood strike [32].

Rainfall and Drought: Developing countries are found more vulnerable to irregular rainfall and drought. When the drought strikes it affects the livelihood of the vulnerable population very badly. Adequate availability of quality water can improve health and prevent disease through better sanitation and hygiene, and contribute to productive livelihoods. But women and children are found to be more vulnerable to drought as were left behind by their counterpart in search of water, food and grazing land. They also face challenges to loss of income, prolonged separation of their families increased the prevalence of diseases related to the drought, and loss of educational opportunities, and malnutrition [33] [34] [35]. Women during the drought they have to walk a long distance in search of water [36], as a result, they contribute less to household duties which forced the young girls of the family to take the burden of household responsibility and distance themselves from education [33].

Mitigation and adaptation strategies adopted by men and women:

Natural disasters are unavoidable. But in order to compete and remain alive on Earth surface one has to take up strategies either it is mitigation or adaptation strategy to cope up with the

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destruction caused by climate change. To cope up with drought most of men farmer commit suicide or migrate to cities, run away in shame as they were unable to feed their family; in such condition the women member of the family also had to migrate to cities or force themselves to odd job like prostitution to pay back their debt money lender back in the village or to feed themselves and their family [37]. Nearly 300,000 Indian farmers, in the past 20 years had lost their lives by either by consuming pesticides or hanging themselves [38]. It is believed that women are responsible for our food security, provision of water and energy for household use but a study in Northern Ghana shows that female household heads are more likely to result in no adaptation to cope with drought [39]. In India biodiversity based organic farming with selected local climate-resilient crops by women from Jharkhand; salt-tolerant varieties, flood-tolerant varieties, drought-tolerant varieties, by Odisha women were considered the best solution for adaptation to climate change. The coping strategy used by the women of Bangladesh were use of sugar to reduce soil salinity , raise cultivable land to save it from water inundation during floods and spring surges, reconstruct houses by buying new tins or collect tins from NGOs or union members as relief during loss of housing, Use traditional medicine for water-borne diseases, take a loan from money lenders at very high interest during Submerged or eroded homes and homesteads etc. Both men and women use their local knowledge to adapt to the climate change effects in Kenya [40].

Need and strategies of gender mainstreaming of climate change

Women make up an average of 43 percent of the global agricultural workforce [41]. Several reviews and literature supported that women were regarded more vulnerable group to impact of Climate Change, they have challenged critical barriers including cultural constraints, limited skills including swimming and tree climbing, weak physical strength than men and influencing stereotypes [42]; failing to address women's needs in climate change policy threatens global food security [43]. They have less access to land and resources and less participation in decision-making. This unequal participation of women in decision making processes and labour market compound inequalities prevents women from fully contributing to climate-related planning, policy-making and implementation. It is believed that women can play a critical role in response to climate change as they have enough local knowledge of and leadership in e.g. sustainable resource management and/or leading sustainable practices at the household and community level.

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So, if policies or projects are implemented without women's meaningful participation it can increase existing inequalities and decrease effectiveness [44]. Involvement and equal participation of both the gender in all the policy, programme, decision-making process, providing training and awareness related to climate change could provide a better strategy to overcome the consequences of climate change.

Mitigation and adaptation in agriculture and farm households

Mitigating to climate change phenomenon and natural disaster are difficult to implement and often required a huge investment. Farming practices should, therefore, adapt to the changing environment. Agricultural adaptation to climate change refers to adjustments to farming systems in response to actual and/or anticipated climatic and non-climatic stimuli and conditions in order to avoid or to alleviate related risks or to realise potential opportunities [45]. New crop varieties and livestock species, crop and livelihood diversification, changing planting dates, planting trees [39], irrigation, soil and water conservation and migration [38] are the most common adaptation measures in agriculture for addressing climate change and variability as reported by several literature [46] [47] [48] [49]. The generic adaptation strategies (ex-post strategies and ex-ante strategies) have been identified for the agricultural sector in Gujarat, India to cope up with drought. Ex-post strategies include crop diversification, changing cropping intensity, crop mix, crop type and location whereas ex-ante strategies include crop insurance, pricing reform, opening up of trade and investment, extension services, income diversification, food reserve and storage, migration, improving weather forecasting, land-use change, and the development and adoption of new technologies [50]. Farmers from Gaibandha District in Bangladesh practices floating garden and cage fish culture to turn the threat of flood into opportunity. And to cope up with storm and cyclones they take shelter in flood shelter constructed by Gana Unnayan Kendra [51].

Conclusion:

The result of this review paper shows how climate brings immense change in agriculture, farm household and alters the life of farmers. It gives the ground level reality of women and men when disaster strikes, it forces women to work hard before and the aftermath of the disaster and also take up odd job, like prostitution to feed their stomach, family and pay off a loan taken by the men member of the family. It also highlights how the men farmer faces intense pressure for a

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loan when the crop fails, commits suicide, run away from family and migrate to cities for a better job as coping strategy. It is thus important to focus and find gender-sensitive strategies for responding to human security need, and environmental crisis caused by climate change. Effort should also focus on reducing women's vulnerability and men's susceptibilities; promoting gender-sensitive emergency responses; and enlisting women as key environmental actors in natural disaster management decision-making processes, alongside men, tapping on women's skills, resourcefulness and leadership in mitigation and adaptation efforts [52].

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