Climate change and women in South Asia: a review and future policy implications

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Abstract

Purpose – South Asian region is a focal point owing to its vulnerabilities to climate-sensitive diseases, dependence on climate-sensitive livelihoods, projected levels of crop decline in the region, and high rates of poverty and malnutrition. Women are particularly vulnerable to climate change and this affects women disproportionately during different extreme events. The purpose of this paper is to understand the issue of climate change and its impact, and climate resilience among women in South Asia. Further, it also identifies the gaps and suggests future policy implications.

Design/methodology/approach – Climate change is increasingly being recognised as an alarming issue and the present review is important when South Asian countries are facing the brunt of climate change impacts. This paper tries to understand the issue by review of the literature and conceptual framework methodology. To understand women's vulnerability due to climate change and its aftermath, the authors conducted both offline and online desk reviews for this study.

Findings – The findings of this study show a clear linkage between climate change and women's vulnerabilities in South Asia. Climate change has significant socio-economic impacts on women, and it affects them disproportionately in various domains of agriculture, livelihood, food security, both physical and mental health, water and sanitation in the South Asia region.

Practical implications – The paper also highlights that the programmes that aim at combating the effects of climate change require a gender-sensitive approach so that climate change does not obstruct the development and reduction of poverty in the region.

Social implications – The findings of this paper will add value in helping families to come out of poverty by undertaking adaptive measures with proactive assistance from the government and grassroots level organisations.

Originality/value – The present study also advocates for more gender- and climate-sensitive measures from governments, and implementation of intervention- and evidence-based research in the South Asian countries.

Keywords Women, Resilience, Climate change, South Asia, Extreme events

Paper type Literature review

1. Background

Climate change is a serious cause of concern in our time, owing to the catastrophic impact of natural hazards on the lives of people, destruction of the environment and devastation of the economy. Climate change is expected to amplify disaster risk by leading to an increase in the frequency, intensity and duration of natural hazards, intensifying vulnerability and exposure (IPCC, 2012). Climate change is a global challenge that burdens the whole humanity

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but not equally. The increase in frequency of extreme events deteriorates the living conditions of people, especially in developing countries that are already bearing disproportionate burden of climate change impacts. Island countries and African countries are anticipated to be most vulnerable to climate change by 2030. Althor *et al.* (2016) showed that among the 36 highest greenhouse gas (GHG) emitting countries, around 20 countries are least vulnerable to dismissive impacts of future climate change, and contrastingly, 11 of the 17 low or moderate GHG emitting countries are highly susceptible to dismissive impacts of climate change. Countries having higher GHG emissions are aware about their detrimental impacts on the world's environment. However, many of them are consciously emitting higher GHGs just to drive their economic growth and development (Zhang, 2016; Zhang *et al.*, 2018). Other studies also confirm that developing countries are the most vulnerable due to climate change and its impact on water, livelihood, food security and health (Halsnæs and Trærup, 2009).

Although climate change is certainly an environmental phenomenon that necessitates scientific research and innovation, it also has a security, economic development and human rights imperative. An IPCC report stated that the vulnerability of communities may heighten in response to the effects of climate change, because resources are invested in dealing with its impact instead of using it for development activities (IPCC, 2012). By 2050, climate change is anticipated to be higher compared to a rise in the risk of hunger by about 10 per cent, whereas child malnutrition is projected to be 20 per cent higher (Halsnæs and Trærup, 2009). The primary vulnerable sections to be effected by climate change include women, children, disabled and the elderly. Although the nexus between women and environment in general has been an issue for many years, it has only started to receive attention in the last 10 years. Several publications have analysed various connections, specifically the differentiated impacts of climate change and the absence of women in climate change policy, in addition to the role women could play if they would be fully involved (Masika, 2002). Studies show that the world's poor, the majority of whom are women, are susceptible to climate change effects (Vinke *et al.*, 2017; UNDP, 2013; Lambrou and Piana, 2006) and have lesser capacity to cope, as they have inadequate access to resources (Vinke *et al.*, 2017; Demetriades and Esplen, 2008; IUCN, 2015).

1.1 Justification

Literature show that women count among the most vulnerable sections that have been impacted by climate change, and climate change has a varying impact on women and men owing to existing gender inequalities. The impact of climate change can aggravate existing gender inequalities, and the ability to adapt to climate change is also affected by inequality (UNDP, 2013; IUCN, 2015), as women are disproportionately affected by disasters (Ramachandran, 2013; IUCN, 2015). Inequalities exist in the form of sexual division of labour in poor communities such that women traditionally have many responsibilities, which increase owing to climate change effects. Women in the family generally have the responsibility for fetching water and producing food and climate change makes performing these tasks challenging (IUCN, 2015). Whenever there is an outbreak of disease, women are expected to take the responsibility of caring for ailing family members, which increases their responsibilities and burden of work. Additionally, male migration due to the extreme events further increases the workload for women. In developing countries, the adaptive capacity of women gets curtailed, as they often do not have control over land (Lambrou and Piana, 2006).

In many of these contexts, women are more vulnerable to the effects of climate change than men – primarily as they constitute the majority of the world's poor (around 70 per cent) and are more dependent for their livelihood on natural resources that are threatened by climate change (UNDP, 2013). Despite women being disproportionately affected by climate change, they play a crucial role in climate change adaptation and mitigation. Women have the knowledge and understanding of what is needed to adapt to changing environmental

conditions, thereby coming up with practical solutions. However, restricted land rights, lack of access to financial resources, training and technology and limited access to political decision-making spheres often prevent them from playing a full role in tackling climate change and other environmental challenges. Unleashing the knowledge and capability of women represents an important opportunity to craft effective climate change solutions for the benefit of everyone (Costello *et al.*, 2009; IUCN, 2015). Women's empowerment and advancing gender equality can deliver greater results across a variety of sectors, including food and economic security and health. It can also lead to more environmentally friendly decision making at household and national levels (Haines *et al.*, 2006; Neumayer and Plümper, 2007; Neelormi, 2009). In particular, women make an important contribution to disaster reduction, usually informally, by participating in disaster management and acting as agents of social change (McMichael and Bertollini, 2009). It is, thus, important to identify gender-sensitive strategies to respond to the environmental and humanitarian crises caused by climate change (UN: 52nd Session of the Commission on the Status of Women, 2008; WHO, 2008). Climate change has been the central agenda of many governments' planning and policies, particularly in South Asia. However, the focus on gender is not clear so far and has not been given due attention. South Asia has always been a hotspot for natural calamities due to its geographical location dependence on agriculture, weather dependency, extreme poverty and other factors (UNDP, 2013; Ramachandran, 2013). Indeed, there is a gap regarding women-centric dimensions of climate change in the previous research works. There is limited evidence available, which has highlighted the nexus between climate change and women in South Asia. In order to create gender awareness for improving adaption strategies towards climate change and reducing environmental disaster risks, it is necessary to look further into women's roles within different household structures. Research suggests that incorporation of a women-centric analysis can increase the effectiveness of measures to protect people from climate variability and change (Yadav and Lal, 2018; World Bank, 2019). Taking these points forward, in current scenario, it is necessary to explore the climate change issue in the context of women, which can probably help us explore how climate change disproportionately affects women in South Asia. The main objective of this review is to investigate the relationship between climate change and women, with a special focus on impacts and climate resilience in South Asia, thus making recommendation for future policy implications.

1.2 Conceptual framework for climate change and women

The conceptual framework given below gives us an overview of the leading concepts in this research, the foundation for the present study's main objective, research questions and results. It presents the definition and concepts behind the key terms used in the present study. Figure 1 serves as a guide to bridge disciplines and to comprehend key concepts related to women and climate change. The framework proposed by the International Food Policy Research Institute and partners (Goh, 2012) shows how women's greater access and control of key household assets could be useful in bringing about improvements in their well-being, particularly in the context of climate change. This framework is built up against the vulnerability context, which includes a set of interrelated factors including women's background characteristics, biophysical characteristics, information and technology, besides institutional arrangements. In addition, the roles of relations, structures and agency are explained in this framework. This framework presents a thorough understanding of vulnerability and adaptation, as well as the interaction between climate change and women. This paper draws from CARE's (2010) and Brayan and Behrman's (2013) approach on adaptation and vulnerability in the context of climate change and women.

Background characteristics of women represent the fact that some people or groups of people may be more susceptible to the effects of climate change owing to livelihood activities,

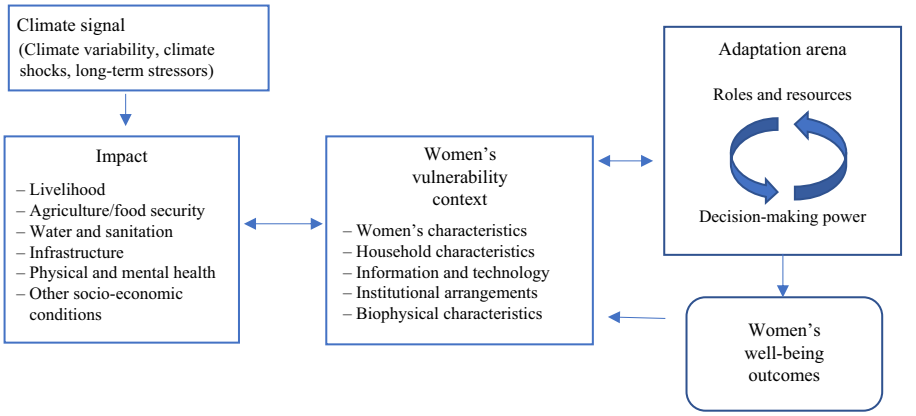

Figure 1.
Climate change and women conceptual framework

Source: Referred from Brayan and Behrman (2013) and CARE (2010)

assets they possess (broadly defined), socio-cultural norms and/or cognitive ability. Biophysical characteristics explain the sensitivity exhibited by the physical or ecological systems, for instance agricultural systems on which individuals, households or communities rely. Information and technology refers to the access actors have to information about climate-related risks and pertinent responses, whereas institutional arrangements encompass markets, laws, policies and socio-cultural norms, which may shape the ways through which women are affected by and respond to climate change. Across these factors, a climate signal such as long-term changes in climate conditions, changes in climate variability patterns or extreme weather events (such as droughts, floods or hurricanes) may affect women differently in terms of their assets and adaptation decisions or strategies (or lack thereof) in the adaptation domain, with different well-being outcomes at different geographical and temporal scales.

To see that how this framework can help us to understand the gender differentiated impacts of climate change, a hypothetical example may be that a climate signal such as flood occurs in a rural agricultural environment, causing losses of agricultural crops, jobs and economy (biophysical characteristics). The failure of subsistence crops may force women to sell off their assets such as small livestock or even seek other means (in some cases engage in risky sexual behaviour) in order to generate income for their family. These impacts exhibit differently with women's characteristics in the vulnerability context.

In context of the adaptation domain, households with a larger asset base, adequate access to information on climate risks and responses, and/or with proper institutional support may be able to change farming practices or diversify their crops to better withstand flood conditions. However, the ability to adopt these adaptation strategies may be different for women compared to men, depending on the assets they can access or have control of, besides the socio-cultural context, which can determine their rights, roles, and responsibilities. There could be many factors that may play a pivotal role in determining how climate change affects the well-being of women differently. For example, in most households, power dynamics between men and women may influence their responses to climate shocks differently (Carr, 2008; Goh, 2012). Additionally, social factors that include ethnicity, race, religion and caste (Ahmed and Fajber, 2009) or demographic factors such as age, education, wealth and size of household (Deressa *et al.*, 2009) intersect further with the gender dimension.

Furthermore, we used the analytical framework of CARE (2010) and Bryan and Behrman (2013) to direct the purpose of the research questions. The vulnerability of women to climate change also differs because of socially and culturally constructed gender roles and

power relations. However, given the power relations and the male bias in decision making, attention needs to be paid to the specific situation of women, which is otherwise neglected. Factors such as inequality (men vs women) and their relevance to climate change include gender bias in power and decision making, gender division of labour, gender differentials in income and assets, gender roles and cultural patterns, for instance mobility, education, attitudes, means of communication and sex-related factors and physical differences of women and men. Gender differentials are interwoven with other factors such as race/ethnicity, class, age, health status, etc., and vice versa, for each of these factors that affect power dynamics, the gender dimension contributes to existing inequalities (Ahmed and Fajber, 2009; Alber, 2011).

1.3 Climate change and women in South Asia

Population growth, natural resource degradation, high poverty rates and lack of food insecurity have rendered South Asia as one of the most vulnerable regions to the effects of climate change (Sivakumar and Stefanski, 2011).The impact of climate change on the South Asian region is such that women are affected in a higher degree compared to men in terms of mortality and their ability to survive following the disasters. In most countries, more women are killed in disasters than men, thereby impacting the life expectancy of women (Neumayer and Plümper, 2007).

Social norms play a significant role in the way women react to disasters, as their mobility is typically limited, for instance studies indicate that women are not able to swim during disasters (MacDonald, 2005; UNDP, 2013). Women's chances of survival in rapid-onset climate events are weakened by social norms and family responsibilities. Even when women survive a natural hazard, they encounter violence and sexual harassments (Ahmad, 2012). Another study shows that violence against women is aggravated during disasters in Sri Lanka owing to the violence that already exists even prior to disasters (Fisher, 2010). The impact of climate-induced migration of men is such that in the event of a disaster in Bangladesh, women do not go to emergency shelters as they do not have men to accompany them (UN Women, 2015). Another study shows that women who migrate across borders from Nepal and Bangladesh to India because of climate change impact are vulnerable to trafficking. They are promised by agents to find work as maids but are instead forced to work in brothels (Action Aid, 2016).

In the long-term following disasters, women in South Asia face hurdles owing to existing laws and norms that inhibit their ability to adapt to climate change impacts. In Bangladesh, women's vulnerability is aggravated owing to poor access to courts and inheritance laws, because they lose access to property after their father or husbands are killed in disasters. This burdened with the loss of assets and limited capacity to get loans (Ahmad, 2012). Women are among the vulnerable sections during disasters in Bangladesh, as they are mainly dependent on their husbands for decision making and have less knowledge about cyclone warnings, making it difficult for them to evacuate in time (Kabir *et al.*, 2016). Women in Pakistan are more severely affected during disasters, as their mobility outside the village is restricted and they become dependent on men for their survival during disasters. Wife beating becomes common during the period of rehabilitation (Bari, 1998). Poor rural women in Afghanistan find it difficult to access financial services, hindering their capacity for employment opportunities or adjusting to climate change impacts (UNEP, 2009).

2. Methodology

To understand women's vulnerability due to climate change and its aftermath, we conducted both offline and online desk reviews for this study. The desk review integrates knowledge on culture and context, the epidemiology and aetiological theories of socio-economic, political, health and psychosocial problems faced by women in the areas affected by climate change,

existing policies and services available to combat and mitigate the climate change effects and their gender sensitivity and mainstreaming in South Asian countries. This review incorporates data from multiple sources, specifically the peer-reviewed literature, thematic books, governments and non-government agency's reports, and thematic communication with people engaged in the climate change responses. The primary research question is as follows:

RQ1. What are the empirical research works available on the impact of climate change on livelihood, food security, health, water, sanitation, etc., among women, particularly focusing in South Asian region?

A second line of enquiry examined the resilience and coping mechanisms adopted by people, women in particular, and the government policies associated with the issues reported. We focussed on climate-related extreme weather events that occurred in South Asian countries and included situations such as heatwaves, temperature, rainfall, droughts, floods and cyclones, and excluded situations such as war, epidemics and technological disasters. We searched for peer-reviewed as well as grey literature through Google Scholar, PubMed, government websites and other online databases. The main keywords searched were climate change, extreme weather events, natural disasters, livelihood, climate change and women, gender, impact, resilience, adaptation, coping mechanism, policy, programme, strategy, South Asia, etc.

3. Impacts

3.1 Impact of climate change on livelihood of women

Climate change has socio-economic impacts on South Asia. Livelihoods are dependent on natural resources in the South Asia and are therefore climate sensitive. A study in Bhutan showed that some of the threats to organic farming originated from a change in climate, reduction in sources of organic manure and decrease in yield (Tashi and Wangchuk, 2016). Sea-level rise, rise in flooding, thermal and water stress are anticipated to affect agriculture and aquaculture. In the event of monsoon failure, rain-fed agriculture, which is the biggest source employment of most economies, will impact the landless and the poor who are dependent on this sector and allied activities (Kelkar and Bhadwal, 2007). However, the dependence on climate-sensitive livelihoods can exacerbate the vulnerability of people to disasters. It was found that anthropogenic factors were the primary factors that led to the degradation of Indo-Malayan mangroves, which has increased the vulnerability of coastal communities in India and Bangladesh to natural disasters. Coastal agriculture and shrimp farming have been responsible for harming the mangroves in this region (Das Gupta and Shaw, 2013). Other studies across South Asian countries clearly highlighted how natural disasters affect the livelihood of women. For example, in India, drought intensifies the vulnerability and marginalisation of women owing to the loss of livelihood (Singh *et al.*, 2013). Similarly, women and men in Pakistan are assigned varying rights, roles and responsibilities as per the sexual division of labour. Women's role is ascribed in the private sphere as mothers/wives, whereas men are assigned the role of breadwinner in the public sphere. This results in denying women the access to resources. Although women are involved in multiple activities such as domestic work, child care and working on the farms, they are yet excluded from decision making in the public and private spheres (Bari, 1998). In Nepal, Dalit women further face a double whammy, as both caste and gender identities work to their detriment. They have less access to employment compared to men, poor access to health care and lack of access to disaster relief (UNFPA & WEDO, 2009). Climate change is putting pressure on women in Bhutan who undertake the primary role in procuring seeds for the subsequent season and conservation of crop, but they lack knowledge of agricultural extension service and control of productive resources such as land and financial capital (Government of Bhutan 2011). According to a study conducted on smallholder farmers in Sri Lanka, female-headed households were less profitable relative to men. One of the reasons

attributed by the authors was probable discrimination faced by women on selling the produce (Kurukulasuriya and Ajwad, 2007).

Climate change has adversely affected South Asia and is increasingly emerging as one of the foremost reasons for migration. Frequent disasters destroy people's savings, livelihoods and homes, and they are hence left with no option but to move to another place for employment. Because of migration of men in Nepal, women are burdened with farm work (Action Aid, 2016) and there is an increasing feminisation of agriculture. Owing to cultural factors, women are unable to take up ploughing, which is a probable reason for the reduced size of farms/farm income (Jaquet *et al.*, 2016). In Bangladesh, women face difficulties after the migration of men, as in some communities, they cannot leave the house owing to social norms. In some areas, women encounter assault and violence (Action Aid, 2016). Most of the women in Bangladesh stated that they do not get enough support from husbands who have migrated. Whereas some women worked to support their families, others were not able to do so and had to struggle with hunger and nutrition crisis and were not able to sustain their families (UN Women, 2015).

3.2 Impact of climate change on food security of women

Women in South Asia not only have the responsibility of maintaining household food security but they are also tremendously burdened with other responsibilities such as caring for the old and sick. They also end up managing the farm on their own after men migrate for work. Climate change increases the time taken by women to access essential resources, which takes a toll on the caring function, since malnutrition is generally attributed to lack of caring. All these factors have severe implications on food security (Ramachandran, 2013). A study showed that in Bangladesh, women were harassed when they went to collect relief and food after cyclones for their families. Women often starved and suffered physically, as they gave their food to the children (Kabir *et al.*, 2016). Another study showed that owing to crop failure and poor production, women in Nepal resorted to eating millet and chino, which was relatively preferred less in comparison to rice, which is usually associated with wealth class in Nepal (Gentel and Maraseni, 2012). Several droughts have occurred in the past two centuries in India, which have threatened the food security of the people (Gupta *et al.*, 2011). In a study conducted in major drought-affected states in India, it was found that the percentage of acutely malnourished pregnant women was greater in comparison to the prevalent WHO cut-off values (UNICEF, 2016). Food security is a serious concern in Afghanistan and droughts have sent food prices spiralling upwards by as much as 50 per cent. Poverty makes it difficult for people to get adequate measure of calories, and children and women suffer the maximum in the event (Loewenberg, 2009).

3.3 Impact of climate change on women's health, water and sanitation of women

Climate change has an adverse impact on water availability, which, in turn, affects sanitation facilities, thereby making the area conducive for the spread of diseases. The availability of freshwater in South Asia, already under pressure owing to population growth and land-use changes, will further be affected due to climate change (Kurukulasuriya and Ajwad, 2007). Studies show that women travel long distances to fetch water in the aftermath of climate-induced disasters (Kabir *et al.*, 2016; UNICEF, 2016). The availability and/or quality of water in the aftermath of climate-induced disasters create hygiene problems resulting in urinary tract infections (Ahmad, 2012; UNICEF, 2016). In India, caste forms a barrier with respect to access to disaster relief. A study shows that following floods in Tamil Nadu in November 2015, relief camps were set up in areas that Dalits could not access owing to fear of discrimination and violence. The problem of Dalit women was compounded owing to the absence of the provision of menstrual kits and temporary toilets (NCDHR, 2015). In Pakistan, norms of the "purdah" made it challenging for women displaced by floods to

access latrines, emergency supplies and doctors, which were potential health and hygiene issues (Birkeland *et al.*, 2011).

Evidence show that disasters lead to increase in cases of depression and suicides among women in the Maldives due to displacement and destitution. Women become susceptible to psychological problems due to collapse of social support networks (ADB, UN and World Bank, 2005). In a study conducted 18 months after an earthquake in Pakistan, a higher percentage of women had post-traumatic stress disorders than men (Naeema *et al.*, 2011). In Bangladesh, pregnant women suffered physical and mental trauma in the aftermath of Cyclone Aila and Sidr, and many of them gave birth to disabled children (Kabir *et al.* 2016). One of the causes of mental illness in women in rural Maharashtra included drought (Kermode *et al.*, 2007). The lack of access to clean water and food, sanitation and adequate shelter put pregnant women at risk of contracting diarrhoea, hepatitis, typhoid, viral fever and dysentery. Safe delivery conditions were leading concerns for pregnant women in the wake of Tsunami in the Maldives, as health facilities were destroyed (ADB, UN and World Bank, 2005). A study done in a village that suffered under the impact of cyclone in Bangladesh showed that women suffered from irregular menstruation, anaemia and infertility. Teenaged girls and women could not use toilets owing to problems of privacy and paucity of sanitation products (Kabir *et al.*, 2016).

Between 2015 and 2016, India had the highest number of people affected by natural disasters in the South Asian region (Table I). The South Asian region is impacted by a range of climate-sensitive diseases. In most South Asian countries, barring Sri Lanka and the Maldives, women are affected in higher numbers by diarrhoea (disability-adjusted life years). In the case of malaria, the gender difference is stark in the case of India, Afghanistan and Pakistan. The latter countries (Afghanistan and Pakistan) also have higher percentage of people staying below poverty line in the South Asian region, hence ranking low in the Human Development Index (HDI). Within the South Asian region, Afghanistan has the highest percentage of people living below the poverty line. Maternal mortality ratio (MMR) is highest in Afghanistan, followed by Nepal and Pakistan. Even though countries such as Sri Lanka and the Maldives rank relatively high among South Asian countries in HDI (as seen in Table I), literature in this paper indicates that women in both countries suffer disproportionately during natural disasters and encounter abuse and violence similar to women from the rest of the South Asian countries that rank low in HDI indicators.

4. Climate resilience of women in South Asia

Women in South Asia adopt strategies to cope with climate change impacts. Studies show that women made portable mud stoves in Bangladesh for use in the future. Productive assets such as ploughs, fishing nets and other valuables were kept under the soil by women to protect them from cyclones. Women also built elevated platforms for family members with disabilities (Dankelman *et al.*, 2008). According to a study done in Sri Lanka, the workload of women increased in the event of deforestation, as they had to spend additional time on searching fuelwood. They coped with this issue by reducing the frequency of trips and increasing the load in addition to involving men in the activity (Awumbila and Momsen, 1995).

Some of the coping strategies adopted by women in drought-affected states in India included skipping meals, whereas few others had two instead of three meals per day. Women from landless labour families in Marathwada reduced the quantity of food consumed (Kermode *et al.*, 2007). In Pakistan, women skipped meals to cope with floods and there was a rise in the use of communal latrines and open defecation (WFP, 2010). In the wake of migration of men, women's income from productive labour has been useful for the survival of families in Bangladesh; however, occupational hazards are a cause of concern. Further, working outside is considered inappropriate for women, leading to disputes in the family (Pouliotte *et al.*, 2009). A study in Afghanistan showed that during drought periods in

Table I.
Selected demographic, development, health and natural disaster indicators in South-Asian countries

Country Reference year	MMR[a,i] 2015	Prevalence (%) of anaemia among women[bj] 2011	Sex Ratio[ck] 2015	Estimated DALY (Diarrhoea) for Male ('000)[dl] 2016	Estimated DALY (Diarrhoea) for Female ('000)[dl] 2016	Estimated DALY (Malaria) for Male ('000)[dl] 2016	Estimated DALY (Malaria) for Female ('000)[dl] 2016	HDI Rank[e] 2015	Proportion (%) of Population Living below the National Poverty Line[f] 2017	Total number of people reported affected by natural disasters[g] 2006–2015	Physicians (per 1000 population)[h] 2010
Afghanistan	396	33.0	106.4	339.5	370.3	6.3	13.1	169	39.1	4,941,176	0.247
Bangladesh	176	43.0	101.9	613.4	777.7	2.0	1.9	139	31.5	45,556,211	0.354
Bhutan	148	44.0	113.4	3.9	4.0	0.0	0.0	132	12	20,028	0.023
India	174	48.0	107.6	8,937.1	10795.5	740.3	939.6	131	21.9	132,164,431	0.663
The Maldives	68	37.0	130.2	0.3	0.2	–	–	105	15	204,649	1.579
Nepal	258	36.0	94.2	142.4	204.2	0.3	0.3	144	25.2	7,806,671	NA
Pakistan	178	51.0	105.6	1963.8	2442.7	29.8	58.1	147	29.5	39,345,332	0.852
Sri Lanka	30	26.0	93.0	20.3	17.8	0.1	0.1	73	6.7	9,725,904	0.726

Notes: NA, Not available; and the symbol "–" denotes DALYs estimates as "0"

Sources: [a]World Health Organisation (2015a); [b]World Health Organisation (2015b); [c]World Data Atlas (2018); [d]World Health Organisation (2018); [e]United Nations Development Programme (2016); [f]ADB (2017); [g]IFRC (2016); [h]World Bank (2018). Definition of selected indicators: [i]Maternal mortality ratio (MMR) is defined as maternal deaths per 100,000 live births; [j]Anaemia among women of age 15–49 years in 2011; [k]Sex ratio is defined as males per 100 females in 2015; [l]DALYs for a disease or health condition are calculated as the sum of the years of life lost (YLL) due to premature mortality in the population and the years lost due to disability (YLD) for people living with the health condition or its consequences

Afghanistan, women were sold into marriage so that the families could buy food to survive (Savage *et al.* 2009). Another study done in Bangladesh shows that many of the poor families in areas that are vulnerable to climate get their daughters and sons married at a young age to cope with climate change effects (Ahmad, 2012).

5. Country-specific climate resilience plan and strategies in South Asia

Evidence show that the government and NGOs in the South Asian countries have undertaken several steps to prepare women for extreme events, thus supporting them in coping with and adapting to climate change impacts.

Nepal: the United Nation Development Programme organised training for disaster preparedness as a part of its Comprehensive Disaster Risk Management Programme, which targeted technical trainings and skill trainings in masonry (e.g. retrofitting buildings) for women in Nepal. As a part of the programme, 30 women were trained (Gurung and Bisht, 2014).

Sri Lanka: some of the initiatives introduced as part of the Small Grants Programme of the Global Environmental Facility in Sri Lanka were small-scale livelihood interventions such as ultra-violet fish dryer and chicken coops after holding consultation with village women on livelihood options. This was supported by the Divisional Secretariat and the Grama Niladhari (village administrative officer) who were instrumental in identifying the beneficiaries and linking them with local markets. Livelihood support was provided to some women in the Barudelpola village in Sri Lanka (UNDP, 2016).

India: a variety of activities such as seed production, making vermicompost, floriculture and horticulture, dairy activities, tamarind business, leaf plate making, making of incense sticks, repair of bicycles and electrical items have been supported in India via the National Rural Livelihoods Programme. The policy has also enabled nearly a million people to rise above the poverty line, and the incomes of women-headed households rose by 92 per cent. With the help of campaigns by self-help groups, about 65 per cent in women in the poorest households in Odisha could get entitlements from government schemes (DFID, 2007).

Pakistan: following an earthquake in Pakistan in 2005, livelihoods were affected. The following case study highlights how women could secure better livelihood opportunities. Training was provided on kitchen gardening, use of pesticides, etc., in areas affected by the earthquake. With this, a woman secured a loan from an NGO, grew vegetables and could sell them in the local market, helping her meet her financial needs. A Gender and Vulnerability Action Plan was formulated as a pre-requisite for a second loan from ADB as a response to an earthquake in Pakistan in 2005. The aim of the action plan included ensuring equitable access of women to housing reconstruction. Houses were built by partners of Earthquake Reconstruction and Rehabilitation Authority (ERRA) for vulnerable groups, mainly widows and women-headed households. People previously staying in mud houses were now staying in brick and block houses built with financial assistance provided under a housing cash grant scheme of ERRA (Ouellette and Ummar, 2009).

Afghanistan: the gender policy of Ministry of Rural Rehabilitation and Development (MRRD), 2010–2014 in Afghanistan, consisted of five components, of which one component had the following aims: improving the participation of women in decision-making and implementation process, and the development of capacity requirements for men and women in the MRRD (Government of Afghanistan, 2014).

Bhutan: the National Adaptation Programme of Action in Bhutan has encouraged equal participation of men and women. In regional consultations, there has been a stress on gender equality (Government of Bhutan, 2006).

Additionally, we have tried to summarise the policy initiatives taken by different South Asian countries in the context of climate change and climate-influenced extreme events (Table II). This table also describes the gaps and challenges faced by these countries in the context of climate change. The traditional approach to climate change in South Asia region

Table II. Key policies on climate change and disaster risk management, their gaps and challenges in South Asian countries

Policy	Implementing agency	Key features	Gaps and challenges
Afghanistan			
Disaster risk management framework, 1980 updated in 2007; Afghanistan National Development Strategy 2008 (ANDS)	1. The Afghanistan National Disaster Management Agency (ANDMA) 2. The National Disaster Management Commission (NDMC) serves as the apex body	Categorised and grouped into six thematic clusters: security, human resource development, infrastructure development, private sector development, agriculture and rural development and governance As environment is a crosscutting theme in the ANDS, it is not surprising that each of the six NPP clusters has aspects relevant to climate change, ranging from the country's governance structures to the adverse impacts of climate change on infrastructure, security, and economic development	1. Decades of war and civil conflict have substantially eroded the capacity of all levels of government. 2. The GoA is not well prepared for climate change and natural disaster emergency, and it highly relies on the international community 3. GoA suffers from low levels of technical capacity at all levels 4. Early warning systems are nonexistent 5. A weak education system and poor national–local linkage in disaster preparedness and response to climate change 6. Policies are yet to adopt a gender-sensitive approach
Bangladesh			
Bangladesh Climate Change Strategy and Action Plan (BCCSAP) The National Adaptation Programme of Action (NAPA, 2005 and 2009) The National Plan for Disaster Management	1. The Ministry of Environment and Forests The National Disaster 2. Management Council 3. The Ministry of Disaster Management and Relief (MoDMR)	The BCCSAP is a "knowledge strategy" built upon the NAPA 2005 and 2009. It sets out 44 programmes to be undertaken by Bangladesh over the short, medium and long term in six strategic areas: food security, social protection and health; comprehensive disaster management; infrastructure; research and knowledge management; mitigation and low carbon development; capacity building and institutional strengthening A common theme throughout of all strategic areas is the focus on the poor and vulnerable and, in particular, women and children. All programmes are expected to provide synergies to the government's Vision 2021	1. Implementation capacity for disaster preparedness and risk reduction plans at the sub-national level is limited 2. In addition, strategies and mechanisms for climate change and disaster risk financing are lacking 3. The threat of an increased risk caused by the impacts of climate change has not been sufficiently addressed

(*Continued*)

Table II.

Policy	Implementing agency	Key features	Gaps and challenges
Bhutan			
The National Adaptation Programme of Action, 2006 The Royal Government of Bhutan (RGoB) is working towards adopting the National Disaster Risk Management Bill	1. The National Environment Commission 2. The Ministry of Home and Cultural Affairs (MoHCA) 3. The Department of Disaster Management (DDM), established in 2008 under MoHCA, leads all DRM activities in the country	As a part of the NAPA process, the country has identified key climate change vulnerabilities by various sectors: forestry and biodiversity; agriculture; natural disaster and infrastructure; water (and energy); human health Bhutan's 10th Five Year Plan highlights the importance of integrating disaster risk management into development planning. Every ministry is to mainstream disaster risk reduction into its development plans; it is required to allocate resources from its budget to finance DRM-related activities	1. The NAPA document needs to be updated to keep it in sync with the priorities of stakeholder agencies 2. Many of the steps to tackle the existing DRM challenges that were proposed in the framework remain to be implemented
India			
The National Action Plan on Climate Change (NAPCC), GOI 2008, which encompasses both climate protection and adaptation India's 11th Five Year Plan (2007–2012) for development makes provisions for a holistic approach to DRM	Ministry of environment and forest, GOI The National Disaster Management Authority (NDMA)	NAPCC defines eight priority areas as National Missions: solar energy; energy efficiency; sustainable housing; water; preservation of ecosystem in the Himalayas; reforestation; sustainable agriculture; and strategic knowledge management In addition, India's Disaster Management Act (DMA) prescribes the establishment of a disaster risk reduction culture to be implemented at the national, state and local level	1. Resources, complete archive of climate data and modelling, skilled manpower 2. Awareness on climate change required at grassroots level 3. India has created a strong leadership for DRM at the centre, but implementation responsibility is left to the states where progress has been uneven 4. Work remains to build a comprehensive disaster risk financing strategy at the national, sub-national and household level 5. Policies are yet to adopt a gender-sensitive approach
Maldives			
Maldives' National Adaptation Programme of Action (NAPA) 2007	The National Disaster Management Centre (NDMC), under the Ministry of Defence and National Security (MDNS)	In 2011, the Maldives announced that it had signed the world's first Strategic National Action Plan that integrates disaster risk reduction and climate change adaptation. Maldives' National Adaptation Programme	1. Slow implementation progress has hampered the achievement of important goals 2. Insufficient human and financial resources and accompanying policy frameworks

(*Continued*)

Policy	Implementing agency	Key features	Gaps and challenges
The Disaster Management Act of 2006		of Action (NAPA) identifies land, beach and human settlements; critical infrastructure; tourism; fisheries; human health; water resources; agriculture and food security; and coral reef biodiversity, as the key areas of climate change-related vulnerabilities	3. Policies are yet to adopt a gender-sensitive approach
Nepal			
Local Adaptation Plans for Action (LAPAs) The Natural Calamity (Relief) Act, 1982	The Central Disaster Relief Committee (CDRC) presided over by the Minister of Home Affairs (MoHA) and comprising 27 ministry secretaries and members of organisations that collaborate with the MoHA in DRM	The LAPA initiative is regarded as a positive step forward to promote location- and context-specific people centric adaptation actions that are identified, prioritised, and implemented by local communities to address climate change impacts In 2008, based on the existing and functioning DRM structures, the GoN began to shift focus from an *ex post* disaster response approach to *ex ante* disaster risk mitigation activities	1. Lack of a broader awareness of the risks of climate change and extreme events, and possible response mechanisms both at public and government level 2. The current approach is limited to a reactive approach to climate events and natural disasters 3. Full potential and enforcement legislation is lacking 4. Policies are yet to adopt a gender-sensitive approach
Pakistan			
The Pakistan Climate Change Act, 2017 The 1958 Calamity Act The National Disaster Management Ordinance (NDMO), 2006	Ministry of Climate Change The NDMA along with the Earthquake Reconstruction and Rehabilitation Authority (ERRA) for DRM	Water is the sector that is most represented in Pakistan's current adaptation initiatives, followed by risk reduction, policy formulation, agriculture, energy, forestry, coastal zones, and nature. In addition, various sectoral strategies, including the National Conservation Strategy, National Environmental Policy, National Water Policy, and National Forest Policy (draft), also make mention of the potential impacts of climate change Pakistan fully recognises that women are powerful agents of change. It is, therefore, vital to ensure participation of women and female gender experts in all policies, initiatives and decisions relating to climate change	1. Lack of capacity within the government, particularly at the sub-national levels in climate change and DRM 2. Lack of resources and skilled manpower at the federal, provincial, and district levels 3. Limited progress on undertaking hazard risk assessments and limitations in collecting and sharing of risk data have led to the absence of a comprehensive understanding of the overall risks and required mitigation interventions

(*Continued*)

Table II.

Table II.

Policy	Implementing agency	Key features	Gaps and challenges
Sri Lanka			
The National Climate Change Policy (NCCP), 2012 National Adaptation Plan (NAP) for Climate Change Impacts in Sri Lanka, 2016–25 The Sri Lanka Disaster Management (DM) Act, No. 13 of 2005	Ministry of Mahaweli Development and Environment The National Council for Disaster Management (NCDM)	The NCCP contains a vision, mission, goal and a set of guiding principles, followed by broad policy statements under Vulnerability, Adaptation, Mitigation, Sustainable Consumption and Production, Knowledge Management and General Statements The NAP has identified agriculture, fisheries, water, human health, coastal and marine, ecosystems and biodiversity, infrastructure and human settlements as the sectors most vulnerable to the adverse effects of climate change The disaster management framework in Sri Lanka is based on emergency preparedness and response	1. Activities pertaining to climate change adaptation are undertaken in an *ad hoc* manner without proper coordination 2. Technical capacity of the agencies to implement a full-fledged national climate change and DRM plan 3. The legal and policy provisions to implement and enforce the national climate change and DRM plan must continue to improve over time 4. Policies are yet to adopt a gender-sensitive approach

has been to focus on responding to events and reconstructing damaged assets in the aftermath of the events. By and large, the response of the major stakeholders has been reactive rather than proactive.

6. Conclusion

In examining the literature across different South Asian countries, we can make several observations of how climate change differentially affects the well-being of women. Pieces of evidence are limited, patchy, varied and highly contextual in nature. However, this review clearly highlights that the relationship between climate change and women is not deniable. The impact of climate change on women in South Asia is adverse, and the women who are poor, pregnant and older, with poor access to resources, and dependent on agriculture and forest livelihoods are vulnerable and at a higher risk of facing impacts of climate change in South Asia. Further, the study highlights that women are strongly affected by climate change compared to men in South Asia due to poverty, gender inequality, insecure land rights, less access to education and information (Yadav and Lal, 2018; World Bank, 2019). At the same time, social norms play a key role in the way women are impacted by climate change, and social constructions associated with gender limit women's response to climate change (Ahmad, 2012). Evidence suggests that women also become particularly vulnerable during climate-induced disasters and they become vulnerable to sexual harassment. Owing to displacement and acute poverty, women get trafficked and pushed into prostitution. The review also shows that social identities such as caste and religion heighten the vulnerability of women during disasters.

An important finding of the review is that despite of having high HDI and GDI, the social structure in Sri Lanka is such that women get disproportionately affected during climate-induced disasters similar to other countries in South Asia that rank relatively low on GDI and HDI. The review suggests that climate change forces people to take extreme steps. For instance, in Afghanistan and Bangladesh, women are sold off in marriages, whereas migration is a strategy adopted by women in dire circumstances, often leading to trafficking and exploitation. The reason why women in other cases do not choose to migrate may be attributable to social norms that restrict their mobility. These restrictions also affect their chances of survival. Another concern is the feminisation of agriculture in the wake of migration of men, resulting in the heightened burden on women. The review documents the importance of addressing social norms that impact women far more than men and inhibit women's capacity to adapt to climate change (Ouellette and Ummar, 2009). The study, thus, shows the importance of introducing gender-sensitive approach to climate change and disaster management plans. Women's status in South Asia requires indispensable changes, as gender-based inequalities both in law as well as in practice, in addition to gender-defined roles in society, increase women's vulnerability to climate change.

Strategies for climate change adaptation have been taken by different governments in South Asian countries, which can be useful for other countries in the region and the learning can be utilised accordingly by other countries. The National Climate Change Policy of Pakistan government acknowledges the contribution and management of natural resources by women and seeks to build adaptation measures on climate change based on indigenous knowledge of women (Government of Pakistan, 2012). In Afghanistan, with the help of basic package of health services of 2002 and essential package of hospital services of 2005, health coverage has improved, and more women have access to antenatal care and skilled birth attendants (Government of Afghanistan, 2014). With the help of training acquired on installation and maintenance of solar energy at Barefoot College in Tilonia, India, rural women from 17 states in India and 15 countries in Africa, South America and South Asia could build a solar electricity system for their villages (UN Women, 2012). This has been of use in saving cost of kerosene and electricity in households. The findings of this current study advocate

gender-sensitive climate change programs and policies in the region, and more evidence-based research on women should be encouraged in the context of climate change.

This review has clearly established the transformation of gender roles and women's susceptibilities in the context of climate change in the South Asia. The evidence suggests that the impacts of climate change, such as increased flood, result in women having restricted access to basic needs such as food, water and land. There were several instances in the review when it was difficult to compare the impacts between women and men. Some differences could be because the literature was either focussed more on women (and less on men) or was based on data and observations that were not disaggregated by gender. In this respect, there is an important need to have systematic and empirical research studies on how climate change impacts women and men, separately and jointly, in terms of their vulnerabilities, well-being and assets, and to understand the contextual factors that mediate these impacts and the ensuing responses. A larger base of such knowledge and the availability of gender-disaggregated data sets would not only help researchers determine the impacts of climate change, but they would also identify common themes, gaps and needs (if any) across countries. A better integration of social sciences with natural sciences to better understand the differences in the way climate change affects women and men could also present a more holistic, nuanced picture of how gender intersects with various other factors (such as biophysical, institutional, technological factors) indifferent settings (Goh, 2012). Further, this study also urges for in-depth research in order to identify and implement strategies regarding climate change in South Asia, considering women as the centre of policy agenda. Organised efforts are required at all levels to find the sustainable solutions for the global problem that is adversely impacting the most vulnerable but critically important members of the society.

6.1 Recommendations and future policy implications

Based on the review, the following recommendations can be highlighted in South Asian region to advocate gender as the primary climate change agenda:

- Climate change manifests itself in a variety of ways: rapid-onset events may destroy property, lives and livelihoods in a single day, whereas slow-onset processes change the landscape for survival gradually over time. It is necessary to collect, organise and analyse gender-disaggregated data, specifically on how men and women contribute to and are affected by climate change. Gender mainstreaming needs to be initiated to ensure women's concerns and needs are integrated into the development agenda.
- Since numerous hurdles are faced by women in accessing resources and benefits of government resources, widows and women-headed households need to be identified to ensure that women get their entitlements and are not deprived because the registration is done in their husband's name. Further reforms and interventions need to be made to ensure that women have equal access to resources. Gender sensitisation programmes need to be conducted for officials/workers of disaster management units so that programmes can respond keeping in mind the vulnerabilities and needs of women (Demetriades and Esplen, 2008).
- In areas that are vulnerable to natural disasters, sanitation facilities need to be improved, and during disasters, mobile toilet vans need to be arranged. Steps need to be taken to ensure that physicians are available in the affected areas and medical supplies are in place. Psychological counselling needs to be provided to women in the event of disasters.
- Adequate security needs to be provided at shelters to protect women from violence and sexual harassment after natural calamities.

- Alternate livelihood options need to be worked upon by provision of resources for employment activities that have scope to develop in specific areas. Self-help groups can be formed to encourage livelihood generation among women. Women also need to be provided access to loans and credit facilities so that they may be able to take up employment opportunities.
- Since women usually have indigenous knowledge of managing the environment and adapting to climate change and climate-induced extreme events, they need to be engaged in local-level strategies for combating the effects of extreme events.
- At a broader level, steps need to be taken to ensure women's participation at the community level and in decision making at all levels of the government. This can be enabled by formal discussions between disaster management committee of the government and the community. Through a participatory approach, women need to be engaged in deliberations and strategies for coping with and adapting to climate change and extreme events affecting the area (Ahmad, 2012; Bryan and Behrman, 2013).
- The governments in India, Afghanistan, Nepal and Pakistan need to improve infrastructure for sanitation, ensuring that people have access to drinking water so as to build resilience against climate-sensitive diseases.
- Afghanistan, Bangladesh, India and Pakistan need to make stringent efforts to improve indicators on MMR, anaemia and climate-sensitive diseases. This can be done if the governments take proactive steps to improve access to education and health services of women and take required steps that can steadily bring a change in social norms that place women at disadvantageous position as compared to men.
- By and large, climate change adaption of different South Asian countries government administrators and policy makers have been reactive rather than proactive, and mainly focussed in strengthening the DRM systems and procedures. This approach has resulted in accumulated casualties and economic losses that were significantly higher than usual. With a recent improvement in awareness and a better understanding of climate change, policy makers in South Asia region should begin to take a more proactive approach on climate change and related risks and should revise the policies in the socio-cultural context. It is imperative that governments should make concerted efforts to mainstream gender and climate risk management into their planning and development processes through both structural and non-structural activities designed to mitigate the overall climate change risk.
- Going forward, local agencies must update information on a regular basis after each extreme event induced by climate change, in accordance with international standards. Accurate and comprehensive loss assessment practices must be implemented. The governments must also allow the data to be archived in geo-referenced and open-source databases that are accessible to stakeholders and that can be of use for women-centric strategic planning on climate change.

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