

Sector 1: Climate Change, Agriculture and Food Security

DISCUSSION POINT



Ask the participants what the existing gender dimensions in agriculture and food security sectors are. Focus on highlighting gender roles and barriers in the sector as well as women's limited access to assets, resources and services. As the participants list the issues, write them on the whiteboard in two columns.

Facilitator Clues

Gender Roles and Barriers

- > Women produce 60-80 per cent of domestically produced food.
- > Nearly all rural women (96 per cent) work on family farms, providing 75 per cent of the farm labour and 60 per cent of farm-derived income.
- > With increasing male migration, women have expanded their productive role by adapting techniques to increase yields to earn incomes and ensure living standards above mere survival for their households.
- > Women face more market-related barriers. Even in societies without purdah rules, women are less likely to have personal vehicles and bicycles, relying more on public transportation than do men.
- > For those women who make their livelihood from buying and selling or selling in municipal markets, they often face greater levels of harassment, including sexual harassment, from officials when obtaining marketing permits or space.
- > Women and girls generally eat last and are the first to forgo nutrition in case of shortage.

Access and Control Over Assets, Resources and Services

- > Women-farmers are often not recognized by authorities as "farmers."
- > Their provision of household foods and their land use are often unrecognized and at the end of the hierarchy of agricultural development schemes.

- > Agricultural extension services are often directed to men because they are deemed to be the farmers and heads of households. Women have little technical information necessary to improve their farm and manage water resources.
- > Women also lack access to finance and modern business practices to enhance their farm management, inputs and outcomes.
- > Women have lower rates of membership in producer cooperatives or may be restricted from joining.
- > Women still lack legal and property rights. Lack of land ownership, or at least secure tenure rights, means that women do not have the required collateral for credit or other financial mechanisms from formal financial institutions or meet the requirements for membership in some producer, marketing or water user associations. It also means that in areas where land grabbing is occurring by large-scale, agricultural interests and women's rights are at greater risk.
- > Women are often under-represented in decision-making processes, even if they can make important contributions to these discussions due to the knowledge of ecological and water-related conditions gained as a factor of their societal roles as natural resources managers.

GENDER-BASED VULNERABILITIES

Agriculture and allied activities are not only the major components of food production systems but also the mainstay livelihood activity of most of the world's poor populations who earn their living from subsistence farming – working as wage labourers, farmers, small-scale processors or traders. This is especially true for Asian countries where more than half of the populations are often engaged in agriculture activities. For example, in Cambodia, around 8.8 million people (57.6 per cent of the population) is engaged in agricultural activities, contributing to 32.1 per cent of the country's Gross Domestic Product (GDP) in 2011 (NCCP Cambodia 2013). Similarly, in Vietnam in 2007, agriculture still contributes

21 per cent of the GDP and employs over 47 per cent of the country's labour force (CGIAR n.d.).

Changes in temperature and precipitation patterns, in particular, will have an effect on the agriculture ecosystem, thereby impacting food production; Asia will be particularly impacted by the reduced agriculture production (IPCC-AR5 2014d).

Rural poor women, especially those in developing country, largely rely on subsistence agriculture to feed their families (Aguilar, Granat and Owren 2015). Given their high dependency on agriculture and the already existing gender discrimination in the agriculture sector, these women would be most vulnerable to the climate change risks

and disasters in the agriculture sector. The key impacts on women would include the following:

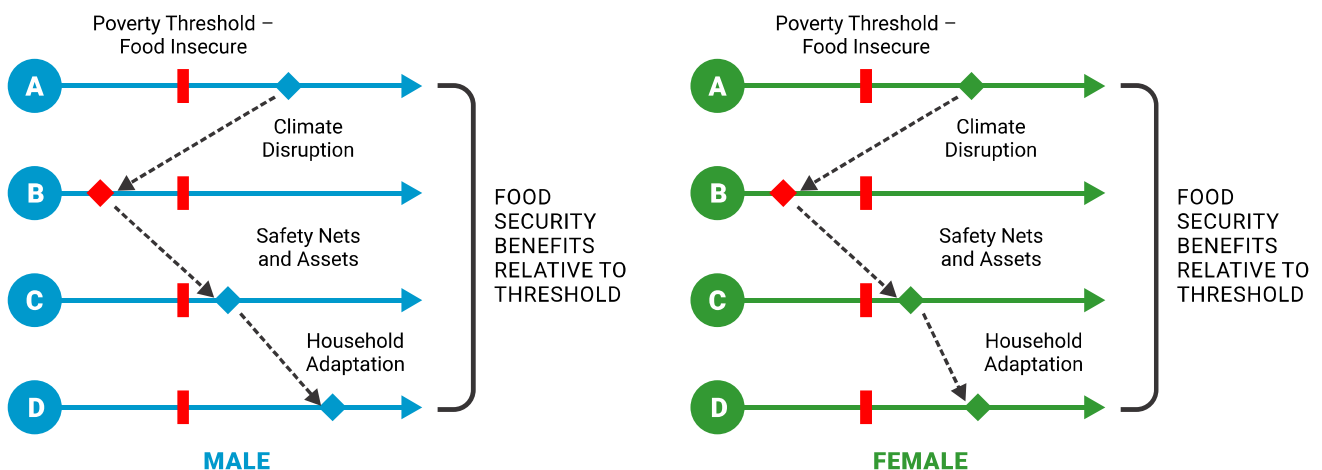
- > Climate change is expected to reduce average yields of most crops, especially rice, wheat and maize. In Cambodia for example, rice production could decline by 10 per cent for every 1 degree Celsius temperature rise (MEF and GSSD Cambodia 2019). Sea level rise also threatens coastal and deltaic rice production areas in Asia, such as those in Bangladesh and the Mekong River Delta. For example, about 7 per cent of Vietnam’s agriculture land may be submerged due to 1-meter sea level rise. In Myanmar, saltwater intrusion due to sea level rise could also decrease rice yield (IPCC-AR5 2014b). Similarly, in India, the Indo-Gangetic Plains are under threat of a significant reduction in wheat yields. This area produces 90 million tons of wheat grain annually (about 14-15 per cent of global wheat production (IPCC-AR5 2014b). In societies where they are mainly involved in food production, especially rice, wheat and maize, the decline in productivity due to the impact of climate change will increase their vulnerability both as farmers and as agriculture labourers. In Vietnam for example, climate change is reducing crop yields, increasing women’s workload
- > as they replant rice crops more often to replace lost production (Oxfam 2009).
- > With reduced yields and production of rice and wheat, there is bound to be a “food production shortfall” in the region. These increasing shortfalls will be further exacerbated during droughts, which are the most serious cause of food shortages, causing 60 per cent of food emergencies (Aguilar, Granat and Owren 2015). Women, who also have the additional responsibility of ensuring food security within their households, will be more exposed to these climate change impacts affecting food, nutrition security and health. Existing social discrimination and cultural practices in many Asian societies result in women and girls eating last and being the first to forgo nutrition in case of shortage. It is not surprising that approximately 60 per cent of chronically hungry people are women and girls. Food shortages resulting from climate change will further exacerbate the insecurities affecting women’s health.
- > Climate change will also increase water stress, which will further increase the work burden of women subsistence farmers who need access to water for food production and preparation. For example, in

TRAINER'S TIP



For the advanced course, you may want to use Figure 4-4 and explain as: “Climate disruption may have the same impact on the food security of male and female – moving down the dotted line from Level A to Level B on food security levels, both men and women will move behind the poverty threshold for insecurity (the vertical red line). Safety nets and assets will help households move ahead of the poverty threshold, as seen in Level C. However, this will not lead to normality; and households will have to take adaptation actions to restore equilibrium. Given the intra-household gender discrimination in food security, however, while men will be better than earlier, women will be left worse off, as seen at Level D.”

FIGURE 4-4: FOOD SECURITY RELATIVE TO POVERTY THRESHOLD – GENDER AND CLIMATE CHANGE IMPACTS



A. households’ normal food security level; B. impact of climate disruption on food security; C. safety nets and assets raising households above the poverty line but not to normality; D. household adaptation is needed to return to equilibrium.

Source: Asfaw and Maggio (2016).

Vietnam, female-headed households are disadvantaged in securing sufficient water for agricultural needs.

Female-headed households report 20 per cent lower rice yields compared to male-headed households due to limited water supplies (Huynh and Resurreccion 2013).

- > Climate Change and subsequent adaptation choices can also affect allied livelihood options like livestock rearing. Unsustainable uses of rangelands with the stress of climate change led to vegetation cover being increasingly undermined by water scarcity, having a detrimental consequence on fodder production. Given women's key role in pastoral lifestyles and livestock rearing, they had to bear most of the brunt of these changes.

Women also tend to be more likely to own small animals, such as chickens, goats and pigs, while men are more likely to own larger animals, such as cows and improved varieties of livestock. In disaster situations, women often end up losing these options, either due to lack of rescue or due to post-disaster sale to meet the family's cash requirements. In the 2015 Myanmar floods, women lost 80 per cent of all animals killed in the floods, while men lost 20 per cent in terms of buffaloes, cattle and pigs (UN Women 2016). Men who most often own large cattle and expensive breeds are also disproportionately affected as cattle are particularly vulnerable to the effects of climate change (Aguilar, Granat and Owren 2015).

Women as Agents of Change

However, women are not just a vulnerable section of the farming community who need to be taken care of. Given the significant role of women in agriculture and food security, they also have the potential to take forward adaptation measures as key agents of change. According to FAO (2011), with equal access to resources and services, women could increase the yields of their farms by as much as 20-30 per cent. This would boost the total agricultural output in developing countries by 2.5 per cent to 4 per cent. The additional yield could feed an additional 100-150 million people. Thus, addressing the differences between women and men in access to financial and productive resources, decision-making, markets and services, land and water, and knowledge and technology can be a major adaptation strategy to boost production.

Women also play an important role as agents of agrobiodiversity conservation and household food security through gardens or small household plots. As migration flows reduce male involvement in farming, women are playing increasingly important roles in maintaining

knowledge about different plant varieties and deciding which crops to plant. In the Philippines for example, the farm roles of female household heads are changing as farms struggle to adapt to floods. Women's farming experience and relatively greater education levels compared to men in this setting are enabling them to take on greater managerial responsibilities, challenging traditional gender roles (Tatlonghari and Paris 2013). With dual roles as farmers and food preparers, women's selection of traditional crop varieties in this region is often influenced by cooking preferences contributing to food security. There is also a growing body of research highlighting the unique role of women in maintaining crop diversity in countries such as Nepal (Gautam, et al. 2009), and Bangladesh (Oakley and Momsen 2005), often through saving and exchanging seeds, and maintaining home gardens, with these becoming key sources of household food security.

Women in rural households also have traditional strategies for ensuring food supplies in the event of disasters like floods and droughts. Women are often responsible for food and seed storage. They generally control small livestock and process their by-products that can be a source of ready cash in emergencies. Dairy products, which are often women's responsibilities, and other animal products (e.g., bees, silkworms) provide families with more regular income than either crops or animal sales. Women may increase their collection of wild plants and game to unsustainable levels to make up for crop and protein shortages.

GENDER-RESPONSIVE ADAPTATION CHOICES AND STRATEGIES

It is important that gender considerations are accounted for in agriculture adaptation processes both for ensuring that women's additional vulnerability is addressed and for involving them as key agents of change. Furthermore, given the existing gender equality situation and discrimination against women, it is highly unlikely that so called "gender-neutral" adaptation measures could yield the requisite results. For example, CCA projects which promote drought, salinity and or flood-tolerant new species to cope with ecosystem changes could displace women farmers if the new crops or varieties are profitable and dominated by men (Aguilar, Granat and Owren 2015). These could also increase the demand on women's productive labour. In Nepal for example, the shift to buckwheat in response to climate disruptions has resulted in women performing much more work than men in order to produce it, reducing time available for other livelihood activities (Onta and Resurreccion 2011).

TRAINER'S TIP



You can also show this short film gender in climate change adaptation and ask the participants to highlight the stages in adaptation action that need gender integration. This film by FAO on "Addressing Gender Concerns in Climate Change Policies

Policies for Agriculture" available at https://www.youtube.com/watch?time_continue=270&v=nsIxsSOXups&feature=emb_title will be useful.

In fact, most may end up affecting women and their families negatively while also increasing gender inequalities. Agriculture adaptation options must be reviewed for gender considerations. This means that the particular needs, priorities, and realities of men and women are recognized and adequately addressed in the design and application of Climate-Smart Agriculture (CSA) so that both men and women can equally benefit. Food and Agriculture Organization of the United Nations (FAO) has proposed a potential matrix for gender considerations within CSA projects. Undertaking such analysis would be the first step to gender-responsive CSA approach especially for project implementers.

Climate-Smart Agriculture (CSA)

"CSA is an approach to developing the technical, policy and investment conditions to achieve sustainable agricultural development for food security under climate change. It integrates the three dimensions of sustainable development (economic, social and environmental) by jointly addressing food security and climate challenges. It is composed of three main pillars: i) sustainably increasing agricultural productivity and incomes; ii) adapting and building resilience to climate change; and iii) reducing and/or removing greenhouse gas emissions, where possible" (Nelson and Huyer 2016).

Women also are more likely to benefit from select livelihood interventions. For example, livestock projects requiring fewer inputs, as is generally the case with smaller animals such as pigs or chickens or locally-adapted breeds of cattle (Hoffmann 2013), may benefit women more (Chanamuto and Hall 2013). Promoting vegetable gardening especially in homestead lands where women have a greater say and control can be another such intervention. These especially help in areas like Cambodia that are prone to flash floods which affect rice harvest. Women's vegetable gardens prove to be a good fallback option. A recent study by Nexus for Development found that in Pursat province in Cambodia, renewables-powered water pumps, biogas digesters, and harvest refrigerators and dryers can greatly benefit women farmers in the long run (UN Women and UNEP 2019).

FIGURE 4-5: POTENTIAL GENDER CONSIDERATIONS FOR CSA-SENSITIVE PROJECTS

CSA-SENSITIVE PRACTICES	GENDER IMPACT	REQUIREMENTS FOR ADOPTION PRACTICE					
	Women's Control of Income from Practice	Relative Amount of Time Until Benefits are Realized	Potential for Women to Benefit from Increased Productivity	Female and Youth Labour Availability	Female Access to and Control of Land	Female Access to Water for Agriculture	Female Access to Cash and Ability to Spend It
Conservation Agriculture	Low	High	High	Low-Medium	High	Low	Low
Improved Home Gardens	High	Low	High	High	High	High	High
On-Farm Tree Planting	Low	High	Medium	High Initially, Low Later	High	High	Medium
Small-Scale Irrigation	Low-Medium	Low	High	Medium	High	High	Medium
Livestock Genetic Improvement	Low-High	High	High	Low-High	Low	High	Medium

Source: Nelson and Huyer (2016).

However, what is also important is to prioritize these practices in allocations of budgets and pursue them actively through implementation strategies especially extension services. Often, extension services and other practices are geared more to men than women. It is as important to have a gendered delivery as it is for the

practices themselves to be gender sensitive (Nelson and Huyer 2016).

Table 4-4 shows some key strategies and practices that can be applied to promote gender-responsive climate-smart agriculture.

TABLE 4-4: STRATEGIES AND PRACTICES FOR CLIMATE-SMART AGRICULTURE

PROMOTING WOMEN'S LIVELIHOODS IN AGRICULTURE	GENDER PREPAREDNESS FOR CLIMATE-SMART AGRICULTURE	ADDRESSING STRUCTURAL CHANGES TO REDUCE GENDER BARRIERS AND DISCRIMINATIONS IN AGRICULTURE
<ul style="list-style-type: none"> > Analyze the impact of introducing new varieties and promote a more equitable distribution of reproductive work. > Adapt promoted practices to the existing gender division of labour for agriculture and livestock management. > Provide training on agricultural extension and climate smart agriculture to women. > Make marketing facilities available. > Institutionalize alternative provisions to accommodate women, women's groups and cooperatives that are unable to provide the collateral needed for accessing agricultural credit. 	<ul style="list-style-type: none"> > Utilize local agricultural knowledge and engage women and men, to ensure indigenous crop varieties are used where possible. > Build community resilience on food security through the establishment of local climate-smart seed banks owned and managed by women. > Involve women and men in conservation of biodiversity. > Provide specific nutritional supplements for women and girls. 	<ul style="list-style-type: none"> > Facilitate equitable access to and control of resources, as well as the distribution of their benefits (including productive resources, jobs, training and credit). > Improve women's land tenure security. > Encourage equity in having access to irrigated land ownership. > Expand access to credit, insurance and other financial mechanisms. > Revise the existing strategies that enable the flow of credit from public/commercial banks and financial institutions to support and increase women's access to credit. > Adapt participation/membership criteria and reduce participation barriers for women's active participation and leadership in decision-making bodies at all levels (i.e., forestry, watershed management, irrigation water, coastal management, biodiversity conservation and disasters).

Sector 2: Climate Change, Public Health and Epidemics

DISCUSSION POINT



Ask the participants what they think about the prevalence and fatality rates of men and women from COVID-19. Ask them what they think are the other gender impacts and risks of COVID-19.

Facilitator Clues

- > Men and women have the same prevalence of COVID-19. However, a study in China shows that men are more at risk for worse outcomes and death, independent of age, with COVID-19 (Jin, et al. 2020). Similar analyses in USA and Italy have also shown that the relative death rate is higher among males.
- > The differences are attributed to sex-based immunological differences due to female hormones, a lower prevalence of smoking in women, and men developing co-morbid conditions such as hypertension at a younger age than women.
- > On the surface, men seem to be more vulnerable to COVID-19 than women. However, there are many other gendered impacts.

First of all, there are demographic anomalies.

- > India, for example, reported higher prevalence among men (with 65 per cent of the case share) but the mortality rate was higher at 3.3 per cent among women compared to 2.9 per cent among men. Then there was the age intersectionality – in the 40-49 age group, 3.2 per cent of the infected women died, compared to 2.1 per cent of men. (Joe, et al. 2020).
- > The social determinants like access to healthcare as well as general health and nutrition status, which are generally worse for women in India than their male counterparts, could explain these differences that defy the global trend (Joe, et al. 2020).

Then, there is an exposure anomaly.

- > Women make up 70 per cent of all health and social services staff globally (Boniol, et al. 2019), and their share of healthcare workers affected has also been high, for example, at 72 per cent and 66 per cent in Spain and Italy, respectively (UN Women 2020b).
- > Furthermore, most of these women are on the frontlines of the pandemic dealing with communities directly and often paid less than men. In India for example, the frontline Health Workers (ASHAs and Anganwadi Workers) who are only paid an honorarium and even denied minimum wages have been the most involved in community outreach, testing and contact tracing.

- > Homemaker caregivers are also more prone to contracting the infection. Even during the 1918 Spanish flu, more women in India – relatively undernourished, cooped up in unhygienic and ill-ventilated dwellings, and nursing the sick – died than men (Joe, et al. 2020).

And finally, the crisis-management anomaly – The key strategy to deal with the crisis was imposition of lockdowns. This has resulted in women suffering more than men, mainly due to the fact that:

- > Domestic, sexual and gender-based violence increased under conditions of quarantine or stay-at-home measures; women and children who live with violent and controlling men are exposed to considerably greater danger. These trends are seen globally and in Asian countries like India (Joe, et al. 2020) and Cambodia (CCHR Cambodia 2020). Young boys and girls in Asia-Pacific regions have been especially affected (Plan International and Save the Children 2020). This was not unforeseen – previous epidemics, such as the Ebola virus disease outbreak in west Africa, as well as cholera and Zika virus disease outbreaks, led to regional environments where domestic violence became more prevalent (Chandan, et al. 2020). However, no measures to address these issues have been considered or deliberated upon.
- > Women have also been left to face an economic crisis. Already existing gender gaps in wages, higher concentration in informal sectors could mean that women could lose their existing income sources. It is also well-documented that women are often disproportionately affected by cuts and lay-offs (ILO 2020).
- > Media reports in May 2020 showed that across the United States of America, the cost to female jobs is already visible. The latest unemployment figures show that women held 55 per cent of the 20.5 million jobs lost last month. Women's share of all unemployment claims filed between March and April 11 ranged from 53 per cent in Wyoming to as high as 67 per cent in Alabama, according to

non-profit journalism organization The Fuller Project. In Canada, too, women have made up the bulk of the layoffs (Martinuzzi 2020).

- > The lockdown also increased the workload of women and girls at home, as in most societies, women are traditionally responsible for domestic responsibilities, spending three times more than men. The lockdown in many countries meant shutting down of all domestic services which are linked to market like restaurants and food supply, washing and ironing clothes, even children's online education support. The burden of all these activities has fallen on women, thereby increasing their care role (ILO 2020).
- > The provision of sexual and reproductive health services, including maternal health care and

gender-based violence-related services, are central to health, rights and well-being of women and girls. The diversion of attention and critical resources away from these provisions may result in exacerbated maternal mortality and morbidity, increased rates of adolescent pregnancies, HIV and sexually transmitted diseases (UN Women 2020a).

As a result: The pandemic is deepening pre-existing inequalities, exposing vulnerabilities in social, political and economic systems which are in turn amplifying the impacts of the pandemic. It would also put the achievements of 2030 Agenda at stake, especially for women and girls (UN Women 2020b).

GENDER-BASED VULNERABILITIES

Climate change is not only projected to increase treats to human health (IPCC-AR5 2014a) through direct effects of extreme events, such as heat waves, floods and storms, but also through more complex pathways of altered infectious disease patterns and negative effects on food and nutrition security and water scarcity, among others.

Unfortunately, although there is some evidence that health impacts of climate change vary by gender, even the World Health Organization has acknowledged that there is limited research available to capture the gendered dimensions of health and CCDRR (WHO, 2014b). The key health impacts on women projected based on available studies in select regions show that:

- > Climate change is increasing the risk of health impacts associated with storms and flood events with evidence that mortality rates for women and girls during these events is higher than that of men and boys (UN Women 2016). Much of these can be attributed to gendered cultural practices related to purdah, restrictions on mobility, unsuitable dressing, lack of swimming skills, limited access to early warning systems and others.
 - > Furthermore, while studies in the United States of America and Australia indicate no significant gender differences, available studies from Asian countries suggest otherwise (GGCA 2016). For example, the rate of deaths among females (likely associated with heat) in Ahmedabad (India), during a 2010 heat wave was significantly higher than for males (Azhar, et al. 2014). Similarly, research from Korea suggest that women were at a significantly greater risk (16 per cent) of mortality during heat waves between 2000 and 2007,
- while men's increased risk of mortality was statistically indistinguishable from zero (Son, et al. 2012). While physiological differences between males and females in their capacity to regulate high temperatures are at least partially responsible for gender differences in heat-related mortality (Lundgren, et al. 2013), most trends suggest that gendered living and livelihood patterns, access to medical treatment, and local climatic factors likely matter more than biological differences.
- > Climate change is increasing the spread of water- and vector-borne diseases around the world (IPCC -AR5 2014c), such as cholera, dengue fever, malaria and schistosomiasis, which tend to disproportionately burden the poor more especially in developing countries. It is estimated that in 2000 alone, climate change was responsible for 2.4 per cent of cases of diarrhoea worldwide and 6 per cent of cases of malaria (Prüss-Üstün, et al. 2008). Sex-disaggregated analysis of the disease burden shows that men may be more susceptible to dengue than women while women, especially pregnant women, are more susceptible to malaria (Dhangadamajhi, Kar and Ranjit 2009; WHO 2015). Cholera may roughly affect men and women equally in many settings, while some studies show slightly higher burdens of the disease among men, and others among women (Agtini, et al. 2005; Lopez, et al. 2015)
 - > Bacterial and viral infections related to exposure to contaminated flood waters, however, seem to affect women more. Evidence from Bangladesh suggest that females may be disproportionately exposed to skin problems related to floodwater exposure (Alston 2015). While formal studies are not available, saline

- contamination expected to increase with climate change and sea-level rise is indicated as affecting a large number of pregnant women in Bangladesh with preeclampsia, eclampsia and hypertension (Khan, Scheelbeek, et al. 2014). Local healthcare workers have reported that there are increasing trends of gynaecological problems due to unhygienic water use and water logging (Neelormi, Adri and Ahmed 2009).
- > Climate change also has gendered impacts on mental health, with additional stress especially after disaster, often leading to depression and in extreme cases suicide. However, while both men and women tend to experience higher rates of mental health challenges after disasters, women are generally more susceptible to developing stress-related disorders and depression (Olf, et al. 2007).
 - A large study after flooding in Hunan (China) found that females had a 1.1 times greater risk of developing post-traumatic stress disorder (PTSD) than males (Liu, et al. 2006). Another study (Li, et al. 2010) found that the odds of girls developing PTSD were also slightly greater than those of boys. After Cyclone Nargis in Myanmar, the odds of women developing PTSD were 2.6 times greater than those of men, while women's odds of developing acute stress disorder were 3.2 times greater than men's odds (Kim, et al. 2010). In Nepal, Women's Rehabilitation Centre (WOREC) reported that women who were displaced during the flood in Dang district in 2014 experienced trauma, and this resulted in them suffering from irregular menstrual cycles and abdominal pain (Singh 2015).
 - While studies on suicide risks are not so clear, there is evidence to show that men are disproportionately more likely to commit suicide. In India for example, climate change is increasing risks to farmers on small plots on marginal lands (largely men), who are more vulnerable to crop failures due to the limited ability to diversity crop holdings, which in turn is associated with elevated suicide rates (Keneddy and King 2014).
 - > Climate change also threatens the ability of women to access family planning services, making it harder for women to choose if and/or when to have children. While data from Asia is not available, studies elsewhere have shown that climate-linked natural disasters are likely to hamper access to reproductive healthcare, as occurred after Typhoon Haiyan and Hurricane Katrina. Additionally, the impacts of disasters may exacerbate the effects of pre-existing barriers that women have to seeking reproductive health services, such as race and class, as documented after Hurricane Ike (GGCA 2016).
 - > Climate change is also likely to impact pregnancy outcomes and care. Pregnant women are more susceptible to dengue (Machado, et al 2013) and malaria (Khan, Galagan, et al. 2014). Other research has linked heat wave (He, et al. 2016) and flood/storm events (Currie and Rossin-Slater 2013) to an increased risk of preterm delivery and related pregnancy complications. Saltwater intrusion into groundwater, which is more likely with higher sea levels and associated flooding, may also increase rates of preeclampsia and hypertension during pregnancy

The lack of accessible and affordable healthcare services, especially sexual and reproductive health (SRH) care, further aggravates the problem. Accessibility barriers may include lack of time due to long working hours, long waiting hours at public health care facilities, transportation costs and lack of decision-making power due to gender inequality. The privatization of healthcare services, made these services unaffordable. Furthermore, SRH is often not prioritized in the New Urban Agenda and unabated climate change will make the situation worse for the urban poor women and girls (Mian 2017; 2018).

A study by ARROW and the Khan Foundation in Bangladesh (2015) showed:

- > Almost 90 per cent of the respondents stated that medical care and services/treatment facilities are not available to women.

- > Around two-fifths cited absence of emergency doctors as the key problem, while another two-fifths stated lack of necessary medicines, sanitary and hygiene products, and one-fifth stated lack of emergency and delivery kits as major problems.

All the above have negative consequences on the sexual and reproductive health and rights of women and girls especially during disasters. As expressed by Mahmuda Begum, a 35-year-old housewife and mother of seven children, from Fakirghona village of Moheshkhali sub-district:

"During times of disasters, the biggest problem faced by the women in our community is the lack of access to medical care, including health services and facilities." (N. Khan 2015)

- (A.E. Khan, et al. 2011; Khan, Scheelbeek, et al. 2014). As these point to the added dimension of vulnerability for pregnant women in relation to climate change, it is thus important to integrate family planning and other reproductive and sexual health services within all adaptation and disaster management programmes.
- > The increase in the disease burden due to climate change will also affect the caregiving role of women and girls, as they take care of the sick in their homes (Brody, Demetriades and Esplen 2008). This increases their workload and they often end up neglecting their own health and well-being. This also limits the time they have available for income generation and education, which, when coupled with the rising medical costs associated with family illness, heightens levels of poverty, which is, in turn, a powerful determinant of health. It also means that they have less time to contribute to community-level decision-making processes, including on climate change, health and disaster risk reduction.
 - > Climate change is also expected to increase water scarcity, forcing many families to use unsafe sources, including streams and ponds that are likely to be contaminated. This will not only lead to an increase in water-related diseases such as diarrhoea and cholera, but also affect women more than men by increasing their workloads. In a study of drought management in Ninh Thuan (Vietnam) for example, 74 per cent of the respondents believed that women were more affected from the drought due to water scarcity which forced them to walk long distances. There are also studies which show that during the dry season in rural India, 30 per cent or more of a woman's daily energy intake is spent fetching water. Carrying heavy loads over long periods of time causes cumulative damage to the spine, the neck muscles and the lower back, leading to early ageing of the vertebral column (WHO 2014b).
 - > Damages to sanitation facilities and scarcity of water, especially toilets and bathrooms not having running water, also restrict menstrual hygiene practices among women and girls. The typical way for them to cope is to refrain from drinking water to avoid having to go to the toilet during the day, thereby exacerbating urinary tract infections and reproductive tract infections. Also, the lack of water and toilet facilities in school contributes to absenteeism among girls and this impacts their education (Mian 2018).
 - > Climate change also threatens crop production in terms of the decline in quality and quantity of food crops, resulting in food insecurity and undernutrition. Crop failure would cause a hike in food prices, indirectly increasing the cost of living. This would ultimately affect women's food consumption, not only due to poverty but also due to household food hierarchies still practiced in some cultures in Asia where women and girls are allowed to eat only after the men and boys have eaten, resulting in high undernutrition and its related health problems.
 - > Their undernutrition will be further exacerbated during climate extreme events (Aguilar, Granat and Owren 2015). After natural disasters in India, young girls were more likely to be stunted and underweight than boys (Datar, et al. 2013). In another study in Andhra Pradesh (India) twice as many women as men reported eating less in response to drought (FAO 2018). A Bangladesh study (Alston 2015) showed that women and girls are typically the first to skip meals if there is a shortage of food, as often occurs during droughts, floods or storms. In the Philippines, infant mortality increased after typhoons among girls but not among boys, which researchers attribute to competition for scarce resources within families (Anttila-Hughes and Hsiang 2013). In Vietnam, women are more likely to skip meals than men during periods of food scarcity due to cultural norms regarding the importance of men's physical labour (Oxfam 2009).
 - > Studies on the impact of climate change on undernutrition have also shown that it would result in increased disability-adjusted life year (DALY) lost in developing countries. Women are more susceptible to nutritional deficiencies compared to men because of their distinct nutritional requirements, particularly when pregnant or breastfeeding. For example, in South Asia and South-East Asia, 45 per cent to 60 per cent of women of reproductive age are underweight and 80 per cent of pregnant women have iron deficiencies. Thus, they need more iron intake compared to men as they are more prone to anaemia. They also need more protein when they are pregnant or breastfeeding. Undernourished pregnant women are at high risk of having pregnancy and delivery problems such as intrauterine growth retardation, premature labour, stillbirth, low birth weight babies and perinatal mortality. Undernourished women may suffer from amenorrhoea and infertility, and undernourished prepuberty girls may experience delayed menarche (WHO 2014b).

Gender-Based Violence: A Critical Dimension in Climate Change and Health Considerations

Although specific evidence of impact of climate-related disasters and Gender-Based Violence (GBV) is not available, studies from other disasters point to an increase in gender-based violence in after disaster settings. Displaced women and girls are often forced to sleep in insecure homes and shelters, making them feel unsafe and exposing them to sexual harassment. For example, after the 2010 Pakistan floods, majority of women reported feeling insecure sleeping in the open (UNIFEM 2010). Shelters that do not offer separate sleeping arrangements for men and women, unlit and insecure bathing and washing facilities can all increase the risk of GBV for women and girls (Hussain 2015). Women and girls also face elevated levels of violence if they must travel long distances to fetch water, firewood or food after a disaster (Nellemann, Verma and Hislop 2011).

“Overcrowding, chaotic conditions, lack of privacy and the collapse of regular routines can contribute to anger, frustration and violence,” with children (especially girls) and women being the most vulnerable individuals (Bartlett 2008). Increased stress and feelings of powerlessness, due to bereavement, loss of property and loss of livelihood, mental health problems such as post-traumatic stress disorder, the scarcity of basic provisions, and other factors leading to hegemonic masculinity crises also contribute to pre-existing levels of violence among men. This is often compounded by loss of protection from family members who have died or migrated, as well as a breakdown in the rule of law. A study in Bangladesh, found extremely high incidences of violence against women after 2007 flooding, particularly among disadvantaged groups such as sex workers and the disabled (Dankelman, et al. 2008). Increases in violence against women after climate change-related disasters have also been documented in Vietnam (Oxfam 2009). Although trends in Asia are not known, studies (Sanz-Barbero, et al. 2018) have reported an increase in risk of intimate partner violence after three days of a heat wave threshold on 34 degrees Celsius in Madrid (Spain).

Women and girls also face an even more serious risk with the onslaught of climate-induced disasters: child marriage and organized trafficking. Child marriage is an epidemic in Bangladesh, and has recently been linked with climate change and the increased numbers of natural disasters.

Women and children are also at greatest risk of being trafficked in times of disasters, and they face the greatest risk of becoming targets for exploitation, resulting in slavery and sex labour (Nellemann, Verma and Hislop 2011). Again, while no statistical data are available, employment in sex work and begging are risk factors in times of environmental and climate crises (IFRC 2015). In West Bengal (India), there is an observed pattern between human trafficking of women and girls, and annual flooding. There is a yearly increase in human traffickers who follow annual inundation, when targeted families become destitute and desperate for livelihoods. Some evidence following typhoon Haiyan in the Philippines in November 2013 also supports the claim that trafficking is a major concern.

GENDER-RESPONSIVE ADAPTATION CHOICES AND STRATEGIES

The adaptation actions in the health arena mainly overlap with adaptation strategies for disasters, such as enhancing early warning systems, ensuring access to fresh water for drinking and hygiene, ensuring agriculture and food security for nutrition, reducing poverty and ensuring education to expand opportunities, and addressing psychosocial and mental health issues related to stress from disaster recovery, relocation, and forced migration. However, there is also the need to look at improvement in general public healthcare services, especially sexual and reproductive health care, water and sanitation accessibility, which fall within the development purview as important adaptation strategies. The World Health Organization (2014b) has brought together the gender dimensions of climate change, along with adaptation strategies and possible interventions. Key highlights from this are reproduced in Table 4-5.

TRAINER'S TIP



At this point, it would be good to take a break and show a short film on Voices of women from Sarawak highlighting their challenges in living in a changing landscape. This story is part of a regional research on “Building New Constituencies for Women’s Sexual and Reproductive Health and Rights (SRHR) and Climate Change,” available at https://www.youtube.com/watch?v=2PrRN5YLa_U&t=29s.

TABLE 4-5: GENDER-RESPONSIVE ADAPTATION STRATEGIES AND PRACTICES IN CLIMATE CHANGE ADAPTATION FOR HEALTH SECTOR

GENDER-RESPONSIVE ADAPTIVE STRATEGIES	GENDER-RESPONSIVE ADAPTATION PRACTICES
<ul style="list-style-type: none"> > Provide safe shelters and homes for both women and men. > Training on gender-sensitive disaster risk reduction and early warning systems. > Promote programmes that facilitate men to seek help for psychosocial problems. > Empowerment of women to strengthen their capacity to question and change harmful behavioural norms that put them at risk in the case of extreme events. 	<ul style="list-style-type: none"> > Gender-sensitive disaster preparedness. > Gender-sensitive early warning systems. > Ensure women's participation on equal basis in all policy and programme cycles. > Target women and men differently in communication campaigns and health promotion strategies, taking into account their gender norms and roles. > Adopt strategies at all levels of programming to change norms and practices that prevent women or men from appropriate responses and coping mechanisms in situations of natural disasters.
<ul style="list-style-type: none"> > A gender perspective must be incorporated into infectious disease analysis and research to target policies and programmes. > Collected data must be disaggregated by sex, age, socioeconomic status, education, ethnicity and geographical location, where appropriate. > An understanding of gender and its implications for health and health-seeking behaviour should be incorporated into training of health professionals and development of health-sector responses. 	<ul style="list-style-type: none"> > Ensure better availability and access to, and support by, health systems for both women and men, but especially for women, given their caregiving roles. > Support outreach activities, using gender-sensitive information, education, and communication strategies and materials for advocacy and training. > Promote childcare facilities and other approaches to support women's caregiving role, while trying to transform related gendered roles and norms.
<ul style="list-style-type: none"> > Promote programmes that facilitate men to seek help for psychosocial problems. > Empower women to enhance their capacities to look after themselves and their families and specifically to use available social and other networks to cope with increased burdens and tensions. 	<ul style="list-style-type: none"> > Target women and men differently in post-disaster relief, taking into account gender norms, roles and relations.
<ul style="list-style-type: none"> > Promote water-saving practices that take into account the different uses and roles related to water for women, girls and men. > Address salination and arsenic contamination of water, proposing specific actions that consider the different patterns of exposure and impacts on women and men. > Counter social stigma attached to the effects of arsenic poisoning on women and men. 	<ul style="list-style-type: none"> > Ensure affordable drinking water, taking into account the different roles and needs of women and men. > Empower women and facilitate their equal participation in management of water resources at national, regional and grassroots levels. > Appropriate technologies for assuring potable water closer to where families live. > Strengthen forestation and water harvesting mechanisms, considering the different roles, needs and impacts on women and men. > Promote women's rights to own land and ownership of land use certificates. > Effective implementation of water policies that consider women's and men's different needs and roles for water use, provision and consumption. > Ensure equitable access to resources also in relation to payments for environmental services.
<ul style="list-style-type: none"> > Involve women and men in conservation of biodiversity. 	<ul style="list-style-type: none"> > Training on agricultural extension for both women and men. > Better nutrition supplements for needy families. > Marketing facilities. > Land rights for women.

TABLE 4-5: GENDER-RESPONSIVE ADAPTATION STRATEGIES AND PRACTICES IN CLIMATE CHANGE ADAPTATION FOR HEALTH SECTOR

GENDER-RESPONSIVE ADAPTIVE STRATEGIES	GENDER-RESPONSIVE ADAPTATION PRACTICES
<ul style="list-style-type: none"> > Build strong and supportive networks for both women and men. > Promote gender-sensitive training to eliminate violence against women, girls and boys. > Capacity-building within the health system to ensure early detection of domestic or sexual violence. > Involve women in management of shelters and distribution activities. 	<ul style="list-style-type: none"> > Policy initiatives in the health, education, finance and labour sectors to be conceived as a part of a cohesive national/ international violence prevention effort that includes women, girls, men and boys. > Implement appropriate health services that respond to the specific needs of women and men based on their respective needs, roles and capacities. > Design effective referral systems for cases of domestic violence. Design referral system for cases of sexual harassment.

Source: Adapted from WHO (2014b).

Sector 3: Climate Change and Coastal Zones

DISCUSSION POINT



Ask the participants which livelihood activities are predominant among coastal communities in their regions and what the role is that men and women play in said communities. Ask them what they think will be the impact of climate change on these coastal livelihoods.

Facilitator Clues

Activities:

- > Fishing (subsistence, household level)
- > Fishing (commercial/local or external markets)
- > Capture fisheries (caught fish, prawns, crabs, or shellfish)
- > Gleaning/hand collection from wetland areas (e.g., snails, frogs, crabs)
- > Aquaculture
- > Fish processing and post-harvest production
- > Preparing fishing gear
- > Rice and vegetable farming
- > Marketing and selling (fish, vegetables, rice, forest products, others)
- > Tourism (e.g., tour guide, boat operator, cooking, homestay, working in a guesthouse)
- > Informal employment (unpaid work, e.g., shopkeeper, food preparation, handicraft production, casual work)
- > Business (small and medium enterprise, shop, trading)

Impact of Climate Change on Coastal Livelihoods:

- > *Rice Farmers* – Seawater inundation has become a major problem for traditional agriculture in countries like Bangladesh, Cambodia, Vietnam and other low-lying island nations (Lata and Nunn, 2012; Rahman

and Rahman 2015). The combination of rice yield reduction induced by climate change and inundation of lands by seawater causes an important reduction in production (Chen, et al. 2012).

- > *Fishers* – Rising temperatures could also lead to changes in fish migration patterns and localized extinction of fish species, severely affecting the livelihoods of fisher communities (Cochrane, et al. 2009). According to the FAO, about 58 million people worldwide are directly engaged in fishing and aquaculture, including substantial numbers of men and women in Asia. In Cambodia for example, the fishing sector alone contributed up to 10 per cent of the country’s GDP and employed six million people nationwide in 2013 (NCCP Cambodia 2013), indicating that any changes in fish productivity would endanger the economic development and livelihoods of millions.
- > *Tourism* – Changes in marine ecosystems and frequent disasters will also affect tourism in the areas, further resulting in loss of supplementary incomes for most coastal families.
- > *Local Business* – With falling local incomes and decline in tourism, local business will also suffer.

GENDER-BASED VULNERABILITIES

Coastal zones contain unique ecosystems with significant economic assets and activities; and they typically have higher population densities than inland areas. At least 1 in 10 people worldwide live near the coast in a low-lying area; most of them in the United States of America and Asian countries like China, India, Bangladesh, Vietnam and Indonesia (Neumann, et al. 2015). The IPCC-AR5 (2014a) has predicted with a high confidence that coastal and marine systems are under increasing stress from both climatic and non-climatic drivers in Asia. These would involve damage to the coastal ecosystems and increase in disasters due to storm surges and tropical cyclones causing loss of livelihoods and social impacts, including food and water insecurity, to millions of people, especially the poor and women.

The key impacts of climate change on coastal zones and coastal communities especially women were elaborated here:

- > Degradation of marine ecosystems, especially coral reefs, will significantly affect coral reefs and mangroves. These provide natural barriers and resources for managing climate change risk, such as storm surge from disasters. If these coastal landscapes are degraded, it can cause even more severe impacts on surrounding communities and ecosystem resilience. A significant decline in biodiversity is also predicted and likely to include local loss of pollinators, which, with other threats, will put at risk food availability for coastal communities. Women's livelihoods are also impacted by risk in coastal resource use and fisheries. Women are involved in the fisheries sector, particularly in processing fish, preparing for market, and small-scale harvesting – activities that are close to the shore. In the Pacific region alone, it is estimated that women catch about a quarter of the total seafood harvested. In Cambodia, Laos, Thailand, Vietnam and the Philippines, there are communities where women have a greater role in aquaculture production and harvesting of littoral organisms than that of men (Aguilar, Granat and Owren 2015). Shifts in pelagic fish may increase fishing labour and price of fish, and the income from post-harvest production can decline, impacting incomes of women fishers. Ocean acidification is harming many shellfish species, with profound economic costs for producers who are often female (Narita, Rehdanz and Tol 2012). The loss of near-shore resources' sustenance also impacts women more especially, as household food security and nutrition are threatened.
- > Sea level rise, in combination with cyclone intensification, could increase coastal flooding; losses of coral reefs and mangrove forests would exacerbate wave damage. Asia already has more than 90 per cent of the global population exposed to tropical cyclones. Fifteen of the global top 20 cities for projected population exposure and 13 of the top 20 cities for asset exposure are based in Asia (IPCC-AR5 2014c). There is an observed gendered disparity in mortality during major storms in the developing world. Evidence examining 26 years of cyclones from Bangladesh show that women were 58 per cent more likely than comparably-aged men to die during these events (Lindeboom, et al. 2012). Preliminary evidence from Tacloban City (Philippines) after Typhoon Haiyan struck its shores show that among adults, roughly 50 per cent more females died than males (Ballera, et al. 2015). Much of this is due to socio-cultural practices like purdah, restrictions in mobility of women, limited access to information and early warning systems, traditional attire and lack of swimming skills, among others (Alston 2015).
- > Storms (including tropical storms such as hurricanes and cyclones, as well as thunderstorms) and floods are often also associated with mortality and can pose a significant risk to the coastal communities. The 2013 Typhoon Haiyan in the Philippines, for example, displaced more than 4 million people, destroying entire communities and ruining millions of livelihoods. It was the fiercest storm to make landfall at the time, with winds reaching 196 miles per hour (Singer 2014).
- > The damage to assets and infrastructure will have long-term economic and social impacts. In Cambodia, the typhoon Ketsana of 2009 caused US\$24 million in damages to the education sector, affected 12 per cent of the schools in the country and many others had to be closed due to inaccessibility following destroyed infrastructure (UNDRR 2019b).
- > The aftermath of a disaster also places acute pressure on women with their everyday workloads, besides creating the loss of household dwellings, security, safety nets and ruptures in social controls that regulate behaviour and norms within and between households (Bartlett 2008). There is evidence from Bangladesh suggesting that females may be disproportionately exposed to skin problems related to floodwater exposure (Alston 2015).
- > Women are also often subject to be disproportionately impacted by loss of livelihoods in the aftermath of a disaster. In the Philippines, post-typhoon vulnerability assessments found that female-headed households were more likely to be vulnerable to flooding and other storm-related impacts (Barth 2010).

After Typhoon Ondoy struck Metro Manila (Philippines), female-headed households experienced greater damage costs, while male-headed households experienced greater temporary loss of income, likely due to a reliance on manufacturing employment among men, which took longer to resume after the floods (Porio 2014).

- > Climate change-related disasters are also associated with increases in gender-based violence. Recent work from Bangladesh notes that violence against women increased in response to the effects of climate change (Alston 2015). Extremely high incidences of violence against women occurred after the 2007 flooding, particularly among disadvantaged groups such as sex workers and the disabled (Azad, Hossain and Nasreen 2014). Research also notes that adolescent girls are particularly at risk of sexual harassment and violence in shelters (Swarup, et al. 2011). Increases in violence against women after climate change-related disasters have also been documented in Vietnam (Oxfam 2009). Organized trafficking of women and girls is emerging as a potentially serious risk associated with climate-related disasters. Reports of advocacy groups from the Philippines also suggest that after Typhoon Haiyan, there was an increase in risk of sex trafficking. In another study by IFRC (2018b) on Sexual and Gender-Based Violence during disaster situations in Indonesia, Lao PDR and the Philippines, household survey respondents expressed that child marriage and domestic violence are “harmful incidents for women and girls” that occur in the immediate aftermath of the disasters
 - In the Philippines, 30 per cent of respondents reported that women and girls felt distressed by the rise in child marriage after the disaster.
 - In Indonesia, 18 per cent of respondents reported that women and girls felt distressed by the rise in child marriage after the disaster.
 - In Lao PDR, 47 per cent of respondents reported that women and girls felt distressed by the rise in child marriage after the disaster.
 - > Evidence also suggests that extreme weather events – such as heavy rainfall, flooding, and cyclone – tend to cause disruption to water system. As a result, safe and clean water have become scarcer. Women have to consume and use polluted water, causing them to be more susceptible to SRH problems, especially for pregnant women.
 - > Coastal freshwater wetlands will also be vulnerable to saltwater intrusion with rising sea levels, affecting the availability of drinking water (Rasmussen, et al. 2013).
- Water sources in coastal Bangladesh, such as rivers and groundwater, have already become contaminated by varying degrees of salinity due to saltwater intrusion from rising sea levels. Besides increasing their workload for finding water, this will also impact women’s health, especially hypertension among elderly and pregnant women (Shammi, et al. 2019).
- > Other possible health consequences of hazards associated with flooding and typhoons include stress-related illness and risk of malnutrition related to loss of income and subsistence, which are known to have a strong gender dimension. Studies from Vietnam found that stress factors were apparent at the household level. People interviewed in cities in the Mekong Delta referred to increased anxiety, fears or intra-household tension as a result of the dangers and damage associated with flooding and its livelihood impacts. Interviewees in the central provinces referred to food shortages and hunger potentially resulting from crop and income losses following destructive floods and typhoons (Few and Tran 2010). Studies in China and Myanmar have also shown that females, both women and girls, have a greater odd of developing post-traumatic stress disorder (PTSD) than males (Liu, et al. 2006; Kim, et al. 2010; Li, et al. 2010).
 - > Climate change also threatens the ability of women to access family planning services, making it harder for women to choose if and/or when to have children. GGCA (2016), in a review of existing literature on gender and climate change, concluded that climate-linked natural disasters are likely to hamper access to reproductive healthcare. The review quotes studies which report that this occurred after Typhoon Haiyan and Hurricane Katrina. Additionally, it says, the impacts of disasters may exacerbate the effects of pre-existing barriers that women have to seeking reproductive health services, such as race and class, as documented after Hurricane Ike. Similar results are seen in various scoping studies conducted by the Asian-Pacific Resource and Research Centre for Women (ARROW) in Bangladesh (N. Khan 2015); Philippines (Castro and Hernandez 2015); Lao PDR (Thikeo and Sychareun 2015); among others.

TRAINER'S TIP



At this point, it would be good to take a break and show a short film on women in coastal areas in the Philippines by Path Foundation, available at <https://www.youtube.com/watch?v=YZ-IHRcTe2Y>.

GENDER-RESPONSIVE ADAPTATION CHOICES AND STRATEGIES

Not considering these gender-differentiated effects of climate change on coastal communities can result in adaptation choices which are less efficient – not only due to their limited outreach to women and girls but also due to the negative impacts that the choices may have.

For the protection of the coastline, one of the key identified adaptation options includes the construction of physical barriers (e.g., seawalls, breakwaters, gabion, groins and sluices). Unless a gender lens is incorporated in these projects, these may end up creating job sources that favour hiring a male work force, with no opportunities for women to work on jobs they would like to do and can do. Due to ignorance of the impact on women's productive activities (hand digging for molluscs, among others), there is often also no attention paid to the consequences of such projects on women.

The same is also true for disaster risk management. For example, women often experience increased vulnerability due to the fact that disaster planning and policymaking does not routinely take into account the needs and concerns of women.

- > Women are often not involved in designing the spaces around them – construction is often seen as men's work – and this may lead to the use of designs (such as the use of ladders that are less accessible for pregnant women), which can make women disproportionately vulnerable to harm during storms, fire and floods (Jabeen 2014).
- > Additionally, information regarding hazards may not be provided in a way that is easily accessible for women. There is evidence which indicates that women and men have different preferences regarding how to hear warnings, as women often have less access than men to radios, televisions and mobile phones. After Cyclone Sidr for instance, women reported that warnings about the storm were provided only in local markets, and that efforts were not made to notify people door-to-door.
- > Women are also more impacted by inaccessible shelters due to distance. For example, a study of predominately male respondents in Bangladesh found that individuals who lived more than one kilometer from a shelter were significantly less likely to evacuate to a shelter during Cyclone Sidr than those who lived within one kilometer (Paul 2012). Since evacuation decisions in Bangladesh for entire families are typically made by men, these results imply that women distant from shelters are less likely to evacuate during storm as well, even if they independently prefer to leave.

- > Women also face additional barriers if shelters are not designed to provide them sufficient space or privacy. Studies of shelter in Bangladesh (Alam and Rahman 2014) show the lack of separate or hygienic washing facilities for women, as well as private spaces for breastfeeding or changing menstrual pads, often resulting in women being harassed or threatened in these settings. A recent study also found that among individuals who did not evacuate to a shelter during Cyclone Alia, 36 per cent cited the lack of separate spaces for women in shelters as an important reason for not evacuating (Ahsan, et al. 2016).

The second is less construction-oriented and involves improved environmental management, with approaches such as protection of existing ecosystems and reforestation of areas adjacent to coastlines. However, restoring damaged ecosystems may worsen gender inequality by encouraging the voluntary (unpaid) work done by many women in rehabilitation and conservation activities. This may reinforce traditional environmental work roles, for example, making women responsible for cooking, community meetings, and children's and adolescents' environment education, without promoting non-traditional roles. It is important to promote joint responsibility and redistribution of reproductive work in families, to give women free time for other activities, and also to pay women for their work on environment restoration. Similarly, introduction of native and salt-tolerant plants and animals to protect/re-vegetate the coast without consulting women and taking into account their knowledge can have a negative effect on women's interests and needs in coastal zones, if varieties introduced affect resources specifically used by them (Aguilar, Granat and Owren 2015).

There is also the need to acknowledge the linkages between climate change and reproductive health so that voluntary, rights-based family planning programs are adopted as a strategy for reducing vulnerability to climate disruptions. In particular, integrating family planning with other forms of development designed to promote resilience, such as through population, health and environment initiatives, is an increasingly popular approach for jointly improving human health and environmental outcomes (D'Agnes, et al. 2010; De'Souza 2014). Providing women with greater control of their fertility empowers them to make choices that can improve their resilience to the effects of climate change (Mian 2018).

Another critical aspect is to look at reproductive health concerns during disasters. For example, after Typhoon Haiyan struck the Philippines in 2013, it was estimated that there were more than 250,000 pregnant and

169,000 breastfeeding women in the typhoon-hit areas. Some 1,000 childbirths were taking place every day, with 150 expected to experience potentially life-threatening complications (UNFPA 2014). Extreme events like typhoons often end up damaging health service infrastructure. While restoring health services should be a priority in disaster recovery interventions, it is also important that relief measures include focus on child birth and needs of pregnant women.

Fisheries is another important sector that has not only neglected gender-responsive planning and adaptation choices but also has had limited involvement of women as important stakeholders in the decision-making processes. Due to their focus on activities that are often on the sideline of harvesting, women's tasks in relation to fisheries have not been prioritized in economic analyses or resource investment. Few sustainable development programs in coastal areas have reached out to women as strategic partners due to the misconception that women are not actively involved in the fishing industry. The result is that:

- > Women do not usually participate in the meetings held by the fishermen's organizations;
- > Most of the fishing projects are oriented toward men, and the participation of women is limited with respect to planning, programming and management;
- > There are very few policies or programmes within the fishing sector where gender aspects are considered, as also indicated by recent results from the Environment and Gender Index (EGI).

Tourism activities in coastal zones also do not take into account the relationship between tourist and the local population and its impact on gender relations. Jobs in the tourism sector reproduce the traditional forms around the sexual division of work (i.e., hiring women as chambermaids and cooks).

GGCA and IUCN have suggested various strategies for gender-responsive coastal adaptation (Aguilar, Granat and Owren 2015). These include the following:

- > Ensure access to wage-earning productive activities to improve living conditions for families.
- > Include gender criteria in Environment Impact Assessments (EIAs).
- > Undertake focused gender assessments of all projects.
- > Develop a network of women and local bodies and sectoral departments for efficient infrastructural management, in order to ensure protection of infrastructure from damage during calamities.

- > Involve women in monitoring the effects of climate change, for example in coral ecosystems and in aquaculture.
- > Women should be trained in administration to ensure official resource and fishing permits.
- > Include women in strategies to adapt to the reduction of marine species, or managing new marine species.
- > Grant concessions and permits of marine coastal resources to groups of women.
- > Develop initiatives to recover and reforest mangroves.
- > Implement integrated coastal management policies that consider gender-sensitive risk management.
- > Involve women in coastal research through training on monitoring and data gathering methods.
- > Train women and men on non-traditional activities related to rehabilitating ecosystems.
- > Encourage leadership and women's effective participation in organizations and decision-making.
- > Analyze gender relations associated with the use of, access to, management and control of coastal environmental resources.
- > Promote equitable inclusion of women and men when introducing varieties.
- > Create jobs with equitable participation of women and men.
- > Relocate critical infrastructure and facilities with consideration of gender-specific socio-economic impact.
- > Establish protection of marine and coastal systems and infrastructure managed by women.
- > Ensure equal access to resources.
- > Establish gender equality and diversity in planning, design, decision-making and leadership roles of marine and coastal systems, and in designation of marine protected areas.
- > Ensure equal access to education and employment in technical and scientific fields, and strive for, or guarantee, equality in food distribution.
- > Analyze gender relations associated with the use of, access to, management and control of resources to conduct gender-disaggregated vulnerability studies in coastal zones. Develop a process for capacity-building for women so that they can run local meteorological stations to report on coastal weather conditions, and mobilize these women to act as information focal points for weather information that has to be transmitted to communities regarding major metrological events along the coasts.