



Targeting Vulnerable Groups in Climate Change Extension

Nwobodo Cynthia E[✉], Odii JN, Ezeuzo OP, Iloegbu AC

Department of Agricultural Extension, University of Nigeria, Nsukka, Nigeria

✉Corresponding author:

Lecturer, Department of Agricultural Extension,

University of Nigeria,

Nsukka, Enugu State,

Nigeria,

Email: cynthia.nwobodo@unn.edu.ng; cynthynice@yahoo.com

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General Note



Article is recommended to print as color version in recycled paper. *Save Trees, Save Climate.*

ABSTRACT

Climate change vulnerability is the degree to which change in climate may damage or harm a system and the ability of that system to adapt to new climatic conditions. This paper sought to explore the vulnerable groups in climate change. Inductive and deductive reasoning through review of relevant literature was used in the paper. Countries, regions, economic sectors, social groups and households differ in their degree of vulnerability to climate change, as a result of uneven change in temperature and precipitation, uneven distribution of climate change impacts around the globe and the fact that resources and wealth are unevenly distributed.

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The paper concluded those children, the aged, women, the disabled, the marginalized, and the minorities are the worst victims of natural disasters due to their lower status in society. It is advocated that these groups should be prioritized in any development agenda geared towards ameliorating the impacts of climate change on populations.

Keywords: Climate change, Vulnerable groups, social risks, environmental risks

1. INTRODUCTION

Climate change will directly exacerbate the risk of disease and poor-health, inadequate drinking water and food scarcity, loss of livelihoods, migration, violence, and conflict (United Nations Development Program, 2007). The poorest population in low and middle income countries represents the vulnerable and marginalized groups which faces unbalanced impacts of climate changes. This will challenge the effectiveness and success of development and poverty eradication efforts (The World Bank, 2006). Climate change is an issue faced by the entire world but their perceptions to this differs. Some perceives it as mere changes in weather pattern characterized by a bit hotter or cooler and a bit more uncertain conditions. For others, climate change manifestation is already a matter of survival: too little or much water, food scarcity, security and safety risks. The real injustice of climate change is that those who have contributed least to its causes are suffering most from its effects. At the international level, discussions tend to focus on identification of the most vulnerable countries. Experiences have shown however that vulnerability to climate change varies among countries and even within communities and households. One of the reasons for the vulnerability of this groups to climate change is as a result of their noninvolvement in planning and major decision-making on policies and allocation of resources in their locality and country at large (PECCN, 2011).

The linkages between agriculture and climate are pronounced and often complex. Agricultural systems are mostly affected by extreme climate conditions such as drought, flood and hailstorms including seasonal variation and change in rainfall patterns. Addressing vulnerability, agricultural extension will increasingly face challenges in the context of climate change. Factors such as identifications of vulnerable regions and groups, farmer with multiple stressors, areas which will be multiply disposed for assessing and strengthening the coping strategies among vulnerable groups/regions and enhance the adaptive measures will be helpful in influencing the effectiveness of agricultural extension in addressing the vulnerability to climate change. The future impacts of extension will be greatly influenced by timely and effective provision of information (Shaik, Balaji, Muthuraman, Sailaja and Dixit, 2011; Bitu Javidfakhr, 2017a; Bitu Javidfakhr, 2017b).

2. MATERIALS METHODS

The purpose of this paper was to explore the vulnerable groups in climate change for effective extension and communication for development. This paper is based on desk review of literature. Both inductive and deductive reasoning were used in reviewing relevant literatures that were used for the study.

3. DISCUSSION

3.1. The Concept of Climate Change Vulnerability

The ordinary use of the word 'vulnerability' refers to the capacity to be wounded, i.e., the degree to which a system is likely to experience harm due to exposure to a hazard (Turner et., al., 2003). Vulnerability, according to (DFID, 2013) is an indication of people's exposure to external risks, shocks and stresses and their ability to cope with, and recover from, the resulting impacts. Blaikie, Cannon, Davis and Wisner (1994), defined vulnerability from the natural hazard perspective as the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard. Vulnerability is a measure of a person or group's exposure to the effects of a natural hazard, including the degree to which they can respond to impact of that event. Vulnerability according to IPCC (2000) is the degree of susceptibility of a natural or social system to sustaining damages caused by climate change which is a function of the extent of the climate change, sensitivity of the system to climate change and the adaptability of the system to change in climate. Hence, a highly vulnerable system is one that is highly sensitive to modest changes in climate and not easily adapted to the change. Watson, Zinyoera and Moss (1998), were of the opinion that the vulnerability of a region is dependent on its wealth, as poverty limits the adaptive capacities. Vulnerability is also dependent on economic development and institutions.

According to PECCN (2011), varieties of approaches have been developed for assessing vulnerability at different levels, with different emphasis on following elements of vulnerability:

1. **Exposure to climate variability and change:** This is the degree of variability and changes that the entire country, community, individual or ecosystem experiences.
2. **Sensitivity to climate shocks and stresses:** This is the assessment of the extent of the impact exerted by climatic factors on the entity.
3. **Adaptive capacity:** This describes the capacity of a system to manage the adverse effects and make use of any advantage arising from it.

A common theme in the climate change impacts and vulnerability findings is the idea that countries, regions, economic sectors and social groups differ in their degree of vulnerability to climate change (Bohle, Downing and Watts, 1994). This is as a result of uneven change in temperature and precipitation, uneven distribution of climate change impact around the globe and the fact that resources and wealth are unevenly distributed. Though vulnerability differs substantially across regions, it is also observed that even within region impacts, adaptive capacity and vulnerability will vary (IPCC 2001).

3.2. Climate Change and the Poor

Blaikie, Cannon, Davis and Wisner (1994), argue that less vulnerable household are the ones which have access to resources and social network. Even when they experience greater loss than their counterparts, they are more resilient in that they recover more quickly. However, for the poor households, climate change will exacerbate the existing poverty. Because of the geographical and climatic condition, high dependence on natural resources and agricultural produce and limited capacity to adapt to climate change, the developing nation will mostly be left to suffer the adverse impacts of climate change. The poorest within these countries are most vulnerable because they have least resources and capacity to respond (IPCC 2001). Expected variation in the incidence, frequency, intensity and duration of climate extremes (for example, heat waves, heavy precipitation, and drought) as well as more gradual changes in the average climate, will further threaten their livelihoods thereby increasing the gap between the developing and developed worlds. The tropical and sub-tropical areas of the least developed country are highly vulnerable. Hence the poorer the country, the greater the burden they are likely to bear of climate change in terms of death and relative effect on investment and economy (IPCC 2001). DFID (2013) opined that the increased frequency of climate extremes is of particular concern since it reduces the time for poor households to recover from one climatic shock to another. There is also the risk of unprecedented shocks, such as the flooding experienced in East Africa following extended drought. Traditional coping strategies may not be sufficient in this context and will lead the poor to rely on ad-hoc and unsustainable responses. This not only reduces resilience to the next climatic shock but also to the full range of shocks and stresses that the poor are exposed to.

3.3. Gender issues in Vulnerability to Climate Change

The role played by men and women in household livelihoods differs, so they experience the impact of climate change differently. Most importantly men and women cope differently to adverse effects of climate change on their lives and livelihoods and women are often more disadvantaged in terms of adaption (Dazé, 2011 and Bhutan, 2016). Throughout their lifecycle women suffer more than men from poverty, hunger, malnutrition, economic crises, environmental degradation and disaster related problems.

Statistically mortality and morbidity rates of environmental disaster point to a staggering unsuitable and inconsistency in terms of their impacts on the gender/sexes. The vulnerability of women and children to the disaster and post disaster casualties is 14 times greater comparing to men (Araujo and Quesada-Aguilar, 2007). Furthermore, majority of women lack the ability to swim, also restriction of their mobility due to the pattern of their dressing reduces chances of escaping quickly during emergency situation (Mehta, 2007, Dasgupta, Samir, Ismail and Sarathi, 2010).

The following are part of the gendered impacts of climate change together with its consequences on women's health, agricultural livelihoods, water access and use, wage labour, migration and conflicts related with the deterioration of the environmental conditions (Broady, Alyson, Demetriades, and Justina, et. al., 2008). Aspects of gender specific vulnerabilities are:

(a) Women's health, food intake and mortality:

Women's health is a factor to sustain in climate induced changes. The prevalence of chronic energy deficiency among women is the highest in the world and they are more calorie-deficiency compare to men (Del Ninno, Dorosh, Smith and Roy, 2001). During climate endeared catastrophes, poor health and calorie-deficiency make women vulnerable. These conditions have reduced women's ability

to adapt and capacity to manage or respond to disasters and other adverse climate change. For example, the 1991 cyclone in Bangladesh killed 138,000 people, many of whom were women and older than 40 years (Cannon, 2002).

Observations have shown that after disasters, pregnant, breastfeeding and menstruating women are at risk of compromising their health. These can be attributed to scarcity of suitable places for babies breastfeeding, inadequate sanitary materials such as women's underwear's and inefficient doctors or even health attendants pose great hazard and complicates the overall health situation beyond control for women (Dasgupta, Samir, Ismail and Sarathi, 2010). Other factors contributing to higher mortality rates among women during disasters are:

1. Majority of women are left aside from most information lines with limited access to early warning information.
2. The poor- infrastructures which happened to be the residence and working place of poor women account for a substantial portion of their mortality rate.
3. Some gender based and culturally assigned roles like poor decision making and weak bargaining power of women coupled with rigid patriarchal social norms, mores and value systems do not allow women to save themselves in disaster situations (Aguilar, 2006 and Dasgupta, Samir, Ismail and Sarathi, 2010).

(b) Women's family work load and their burden:

Climate induced environmental and socio-economic changes have increased women's burden and hardship. Evidence shows that women's domestic burden is increased due to flood, because of loss of utensils and other household essentials. Also because of over-dependence on economic activities that are connected to home, women's well-being is undermined by flood (Khondoker, 1996). On the other hand, loss of economic activities in the primary sector like agriculture, cultivation of cereal and livestock farming due to extreme weather events causes women to experience a significant increase in their workload after disasters. Regardless, home chores like preparation of food, fetching water, collecting firewood and waste disposal have to be performed by women and girls. Increase in workload could force a girl child to leave school to help with domestic works during and after disasters. Due to their roles in supplying and caring for the extended family, women always experience restrictions in their mobility as workforce. The unequal impact on women is not only pronounced in major disaster events but it also affects everyday life and opportunities. Women already work more hours each day than men in many low-income countries. FAO (1999) estimated that 60-80 per cent of foods grown in developing world are being produced by women who often engage in small scale production for their family sustenance. In cases of drought, women and girls are responsibility for collecting and carrying water- a task that can be time consuming and physically demanding. Fetching water becomes much more difficult for these women since it takes hours each day to do and most times the water they fetch might be contaminated. As communities adapts to effect of climate change, demands on women's time and workloads are likely to increase.

(c) Access to economic security:

Women have limited access to resources in social networks, transportation, information, skills (including literacy), control over land and other economic resources, personal mobility, securing house and employment and decision making power. These are essential in disaster preparedness, mitigation and rehabilitation (Dasgupta, Samir, Ismail and Sarathi, 2010). Enarson (2000) identified four types of economic impacts of disaster on women's participation in economic life. First, after disasters women become economically insecure. Second, increase in responsibilities and workload of women. Third, deterioration of women's working conditions. Fourth, women take considerably more time to compensate for the economic losses caused by the disaster compare to that of men (Enarson, 2000, Dasgupta, Samir, Ismail and Sarathi, 2010). Women have less access to developing entrepreneurial skills, less ability to access financial resources like credit, savings or pensions, less ability to buy and own land and their income is less secure which makes them poorer than men. The Asian Development Bank (2001) reports that over 95 % of female headed household are below poverty line.

(d) Access to help:

At different levels women face some difficulties to get adequate aid and access to compensation from aid agencies. Cultural barriers can discourage women to present compensation claims for damages resulting from weather-related disasters (Dasgupta, Samir, Ismail and Sarathi, 2010).

(e) Violence:

Violence against women is common all over the world and increases during crisis such as war or natural disaster (Nasreen and Mahbuba, 2010). Dasgupta, Samir, Ismail and Sarathi (2010) posit that there is an increase in robbery during disasters because of

isolation of communities. Incidents such as rape or abduction of young girls and women (by the robbers) also occur during disasters. Violence against women during disasters is common phenomenon. Both within households and in flood and cyclone shelter or refugee camps, women and girls face physical and emotional violence. Women and girls may witness sexual violence due to infrastructure conditions in refugee camps, for example long ways to toilets or showers and deficient closing mechanisms of tents are the predicaments to women's safety and security (Dasgupta, Samir, Ismail and Sarathi, 2010).

(f) Lack of education:

Impact of disasters itself can also be a limiting factor to gaining more education particularly for girls and women. Many girls are forced to drop out of school during or after disaster to help with domestic chores and to save money (Davis, et. al., 2005). The ability of women and girls to access information, including early warning mechanisms and resources, or to make their voices heard are reduced due to lack of education. This poses an extra challenge when women want to look for their livelihood strategies. Education does not necessarily mean formal education, but it may be knowledge about technology, information, access to information and other means of knowledge. For example, in river basin and coastal areas, and many remote rural areas, people barely get access to information or education opportunities and women are even more vulnerable and deprived due to their economic and social restrictions.

3.4. Climate Change and Children Vulnerability

Evidence has shown that climate change is contributing to the increase in disease outbreak. The World Health organization WHO (2000) estimates that climate change account for approximately 2.4% of the worldwide diarrhea and 6% of malaria- diseases which affect mostly young children disproportionately in developing worlds. Decrease in rainfall causes crop to wither and death of livestock, thereby exposing children to starvation and diminishing water supplies for drinking and hygiene. Children are being deprived of school and good health care when their families are faced with natural disasters. Children are considered more vulnerable because of their small size and relative inability to care for themselves. During natural disaster, children are more likely to perish compare to adults; they can easily succumb to malnutrition, injuries and diseases in the aftermath. Natural disasters may force children out of their homes or even their countries. They may become orphaned or separated from their families, and may be preyed upon by opportunistic adults (Danish Mission Council Development Department, 2017).

According to UNICEF (2015), children will suffer disproportionately from climate change and growing environmental risks in the following sense:

1. The youngest will have to contend with the immediate and life-threatening dangers of climate-related disasters, food insecurity, rising air pollution, increased risk of vector-borne diseases, acute respiratory infections, diarrhoeal diseases and malnutrition. Evidence is increasingly showing that these risks can have a markedly detrimental impact on a child's early development. Children, especially young children, live their lives at a faster pace than adults. Consequently, anything harmful in the environment is bound to have a relatively greater impact on them. For example, young children breathe at twice the rate of adults. In polluted environments, their risk of respiratory infections, such as pneumonia, or conditions such as asthma, is likely to be far higher than for adults.
2. Children's vulnerability to vector-borne diseases such as dengue, malaria, and diseases associated with poor water quality, inadequate sanitation and poor hygiene practices, such as diarrhoeal diseases, is also far higher than adults. In 2015, malaria is estimated to lead to 438,000 deaths, of which more than two-thirds are children under 5 years of age (UNICEF, 2015). Children are also more susceptible to under nutrition. Diarrhoeal diseases are a major cause of under-five mortality, and are estimated to result in 530,000 deaths in 2015 alone.
3. Weather-related disasters (floods, droughts, cyclones, hurricanes), which have increased in frequency and intensity as a result of climate change, have directly affected an estimated 66.5 million children worldwide, 600,000 of whom died every year from 1990 to 2000 (Perera, 2016). The number of children affected is predicted to more than double, rising to 175 million a year in the next decade. Children are highly vulnerable both to physical trauma, stress, drowning and displacement due to floods and to famines associated with drought. In 2005 Hurricane Katrina forced one million people in New Orleans from their homes and left 372,000 children without schools. Higher rates of anxiety and depression have been found among children affected by this disaster (Perera, 2016).
4. Children, particularly young children are reliant on adults for their survival and development: whatever happens to adults often has a devastating impact on children too (U.S. Environmental Protection Agency (EPA), (2014). Besides the direct risks of climate change, children are also affected when climate change hits their parents and other caregivers, such as loss of

livelihoods and crop productivity. Moreover, when climate change sparks conflict over dwindling resources, children again pay the price for adults' actions (UNICEF, 2015).

3.5. Climate Change and Older Adults

Undeniably older adults are vulnerable to health related impact of climate change due to number of reasons.

(a) Extreme Heat:

Climate change will aggravate extreme heat events which will lead to increase in temperature all year round. These can increase the risk of illness and death among older adults, especially people with congestive heart failure, diabetes, and other chronic health conditions that increase sensitivity to heat (United state environmental protection agency, (USEPA), 2016). Increased hospital admissions for older people with heart and lung conditions have been linked to increase temperature. According to WHO (2017), Climate change is expected to cause approximately 250 000 additional deaths per year between 2030 and 2050; 38 000 due to heat exposure in elderly people.

(b) Extreme events:

Storm and flood related disaster are likely to affect older adult more, for example, almost half of deaths recorded from Hurricane in Katrina were people over age 75, also in Superstorm Sandy event, almost half were over the age of 65 (USEPA, 2016, Filiberto, Wethington, Pillemer, Wells, Wysocki, and Parise, 2011). In cases of disasters that require evacuation, older adults are at higher risk of both physical and mental impacts. People with disabilities, chronic medical conditions and those living in nursing homes or assisted-living facilities are most vulnerable. Climate change can worsen their health impacts due to interruption in medical care and challenges associated with transportation of patients together with necessary medication, medical records and equipment like oxygen. Power outages can affect functions of electrically powered equipment and elevators leaving older adult without treatment and capacity to evacuate.

(c) Poor air quality:

Warming temperatures due to climate change worsen air quality making it easier for the formation of ground-level ozone which can lengthen the season of aeroallergens like ragweed pollen. Change in weather patterns and more intense and regular wildfire also increase the amount of pollution, dust and smoke in the air. Respiratory conditions commonly found in older adults such as asthma and chronic obstructive pulmonary disorder (COPD) are worsen by poor air quality. Also there is increased risk of heart attack in older adult due to air pollution especially those who are diabetic and obese.

(d) Illnesses spread by ticks or mosquitoes:

Climate change and higher temperatures will lead to ticks and mosquitoes expanding their ranges and being present for longer seasons. This means an increased risk of being bitten by disease-carrying ticks and mosquitoes. Lyme disease, which is transmitted by ticks, is often reported in older adults. The West Nile and St. Louis encephalitis viruses, which are transmitted by mosquitoes, pose a greater health risk among older adults with already weakened immune systems.

(e) Illnesses caused by contaminated water: There is increase in contamination risk for sources of drinking water and recreational water because of change in climate. Older adults are more prone to contracting gastrointestinal illnesses from contaminated water. Those already in poor health are more likely to suffer severe health consequences including death.

(f) The impact of location:

Some older adults can be more vulnerable to climate change related health conditions compared to others depending on where they live (Filiberto, Wethington, Pillemer, Wells, Wysocki, and Parise, 2011). For instance, about 20% of older adults live in an area in which a hurricane or tropical storm made landfall within the last 10 years (USEPA, 2016). The increasing intensity of tropical storms may pose risks for older adults living in coastal areas. For older adults living in cities, factors such as the urban heat island effect, urban sprawl, and neighborhood safety may also cause risks. For older adults and people with limited mobility who reside in multi-story buildings with elevators, the loss of electricity during a storm can make it difficult to get food, medicine and other needed services (USEPA, 2016).

3.6. Disable and Climate Change

While different populations may face similar risks of exposure to the effects of climate change, their actual vulnerability is socially constructed i.e. it is dependent on their socio-economic conditions and the available resources and infrastructure (Morrow, 1999). Disabled people account for a significant proportion of the poorest of poor in the world (Hoogevan, 2005, McClain-Nhlapo, 2006, U.S. Census Bureau, 2008) and face inequalities in access to education (UN Educational, Scientific and Cultural Organization [UNESCO], 2009), health care, employment, asset accumulation and opportunities for social and community participation (Handicap International and Christian Blind Mission, 2006). Low and middle income countries contain more than 80 % of the disabled people (WHO, 2009). During natural disasters people with disabilities are disproportionately affected because of their inability to evacuate, response and recovery efforts (Center for International Rehabilitation [CIR] 2005, Fox, White, Rooney and Rowland 2007, National Council on Disability 2006 and Priestley and Hemingway, 2007). Social and economic inequalities have a substantial effect on vulnerability of disabled people with regards to adverse impacts of climate change. In order to mitigate and reduce harmful effects of climate change, promote sustainable access to basic necessities, secure livelihoods, health care, social and civic participation, people with disabilities and their families need adaptation, coping strategies, robust systems and mechanisms.

3.7. Climate Change and Youth

The impacts of suicide and disability are usually devastating and significant among the youths and are chiefly caused by depression. Over the years, researchers have attributed causative factors of depression to genetic loading, low socioeconomic status, and unfavorable life events, with the impact of climate change receiving little or no attention. Climate change and its effects on the physical environment can worsen poverty, hunger, malnutrition, and spread of diseases which can in turn bring about development of depression especially among youths within the locality (Norris, Friedman and Watson 2001).

Frumkin, Hess, Luber, Malilay and McGeehin (2008), stated that climate change may bring about a variable increase in the symptom of depression and anxiety among the young people. A surveyed study finding of Nicaraguan youths after Hurricane Mitch in 1998 showed that there are both post-traumatic stress and depressive reactions. These results supported the discovery of Norris, Friedman and Watson (2001) which revealed that: compared to adults, youths are effected more by environmental related trauma and are more likely to experience depression if their family members were victims.

(a) Trafficked adolescents and youth:

Among the many climate-related displacement trends are emergency movements from frequent and intense acute natural hazards and conflict related to competition for scarce resources. Particularly when these events take away economic opportunities and trigger law and order breakdown vulnerability to trafficking for adolescents and youth are increased. Although all affected persons are prone to trafficking because of loss of means of livelihood and community protection, those already displaced by conflict or natural disasters are at higher risk. Displacement deprives economic opportunities, terminates dependable employment and educational opportunities, induces extreme forms of isolation and poverty and destroys social structures. Many displaced persons struggle to survive with inadequate shelter, little or no access to food, basic healthcare, hygiene or protection. These conditions leave young people disoriented and less able to resist exploitation as they desperately search for a means of survival (Martin and Herzberg, 2014)

(b) Irregular youth migration: Climate change aggravates the conditions that already cause many children and youth to migrate without official authorization. These problems will no doubt increase in scope and difficulty, given the lack of policies addressing the complex links between environmental change and migration (Martin and Herzberg, 2014). According to Perezniето, Gbedemah, Monjane, Roesen, Harper and Jones (2011), in rural areas where the impact of these phenomena (flooding, drought, growing sea levels and typhoons) were studied, the most salient impact on young people's lives was loss of livelihood options and reduced incomes and these have caused many illegally migration in search of greener pasture which make them vulnerable to dangers and even death. Extreme weather event causes youth to fall into slavery when they try to migrate to other countries.

(c) Adolescents, youth and protracted displacement:

Young people displaced by climate change for extended periods face further challenges. Experiences in refugee and displaced persons camps where stays for many years are evidence. Many refugees are born in and experience their entire childhood or adolescence as displaced persons, with limited access to education, training or employment opportunities. Those displaced across international borders will lack work authorization, if they find work it is often in the informal economy or under exploitative conditions, with no legal recourse or protections. Lack of primary and secondary education may bridge youths prospect for

economic advancements especially if the lack legal status. In camp settings, their physical mobility is often restricted as well. International aid organisations are seen as the principal providers of food, shelter, clothing and other items rather than parents. Not surprisingly, young people may resort to alcohol, drugs and violence (Martin and Herzberg, 2014).

4. CONCLUSION

Vulnerability is an evidence of people's exposure to external risks, shocks and stresses and their capacity to cope with, and recover from, the resulting impacts. Vulnerability may differ seasonally or at different times within people's lives. It also varies across groups within communities or individuals within a household, owing to their livelihood activities or social standing. Vulnerability of the poor is increasing due to a number of trends, such as increasing HIV/AIDS, conflict and pressures associated with globalization. It is undeniable that children, the old and women, the marginalized, and the minorities are the worst victims of natural disasters due to their lower status in society. Women are more vulnerable to climate related disasters than men through their socially constructed roles and responsibilities, and their relatively poorer and more economically vulnerable position, especially in the developing world. Having studied these different groups and their degree of vulnerability, it is therefore imperative to map out well-structured adaptation and mitigation strategies and strictly implement them in order to ensure survival of the endangered groups and to secure the lives of the future generation.

SUMMARY OF REVIEW

1. Climate change impacts group of individuals differently as a result of their socially ascribed roles and due to some inherent factors that put them into a disadvantaged position in climate change adaptation.
2. It is the women, children, elderly, disabled and younger adults that feel the greatest impacts of climate change.
3. Adaptation interventions should prioritize these most vulnerable segments of the society.

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