

Coastal Women and Net-Zero Energy Transitions

Policy Brief

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INTRODUCTION

Empowering coastal women and supporting their participation in sustainable energy solutions can accelerate the transition to net-zero emissions, particularly in areas vulnerable to climate change. Coastal areas are among the most vulnerable to climate change due to rising water levels, leading to the submergence of land, permanent loss of previously livable areas, and the relocation of communities. The National Ocean Service reports that global sea levels are rising at an eighth of an

inch every year, and attributes the rise to the expansion of water as its temperature increases due to global warming and the melting of glaciers (NOAA, 2021). The rising water levels in oceans and seas put the people living along or close to coastlines at an increased risk of nuisance flooding, which leads to the submergence of land, permanent loss of previously livable areas, and the relocation of communities from their homes (Hauer et al., 2021).

The flooding along the coast is exacerbated by an increased incidence of

Figure 1: Impact of Climate Change on Women. Adapted from the Food and Agriculture Organization of the United Nations.

Climate change impacts	Impacts exacerbate gender inequalities
Crop	Household food provision; increasing work load
Fuel shortage	Household fuel provision; more time for fuelwood collection
Water scarcity	Household water provision; contaminated water; more time for water collection
Natural Disasters	Women's greater incidence of mortality
Disease	Lack of access to health care; contaminated water; more time for water collection
Displacement	Forced migration increases women's vulnerability
Conflict	Loss of lives; violence against women

natural disasters around the coast (Ebi et al., 2021). The dense population along the coast increases the number of people affected by climate change in these areas. The coast of Southeast Asia, for instance, is one of the world's largest and most dynamic coastal stretches, covering an estimated 20% of the planet's surface area. In the five years between 2015 and 2020, the region experienced multiple natural disasters. Their effects were exacerbated by significant ecosystem degradation due to human activity, such as improper development to meet the needs of a booming tourism industry and extensive fishing and agricultural practices to feed the burgeoning coastal population (Noor et al., 2022).

Whilst coastal communities experience the effects of climate change universally, women are exceedingly vulnerable to changes in weather patterns. A study on the Ilaje coastal region of Nigeria found that women are the community's first contact with environmental resources due to political, educational, economic, and sociocultural factors, increasing their vulnerability to climate change (Akinsemolu & Olukoya, 2019). Therefore, women are the first and most affected community members when the environment is destroyed, as shown in Figure 1.

The United Nations Development Programme (UNDP) found that the stress from the adverse effects of climate change led to increased frustration and aggression within coastal communities in the Caribbean, which raised incidences of physical and sexual assault on women (Bolaji, 2020). The increased incidence of the physical and sexual abuse of women in coastal areas following climate-related disasters is replicated in coastal communities beyond the

Caribbean. Coastal women in Bangladesh reported sexual harassment while collecting relief supplies after their homes were hit by a cyclone (Hasan & Shovon, 2012). Despite facing higher risks and shouldering a greater burden of the impact of climate change than men, women are often sidelined in making decisions or taking leadership of climate change initiatives. By empowering coastal women and supporting their participation in sustainable energy solutions, their communities can achieve net-zero energy transitions more efficiently and equitably, accelerating the transition to a more sustainable future.

THE ROLE OF COASTAL WOMEN IN SUSTAINABLE ENERGY SOLUTIONS

Women in coastal communities can play critical roles in achieving SDG 13 (Climate Action) through reducing emissions from energy production and aiding net-zero energy transitions. As the makers of energy-related decisions in the home, women can reduce emissions by adopting environmentally friendly energy sources. Coastal areas have naturally high solar radiation levels. The solar radiation levels in the coastal region of the Gulf of Mexico, for instance, reach 6.7 kWh/m² making the region highly suitable for producing solar photovoltaic power (Villicana et al., 2015). Coastal communities in other parts of the world have capitalized on their high solar radiation by producing and using solar power. Coastal communities in Kenya, along the East African coast, are harnessing the high solar radiation by adopting solar power, a renewable form of energy with zero emissions, for their energy needs (Takase et al., 2021). A study evaluating the viability of a similar solar

energy drive among coastal communities in Chile found that the production of solar energy using mono-Si technologies would yield constant solar energy all year round (Ferrada et al., 2015). The adoption of the technology by the communities would reduce their emissions from non-renewable energy sources whose production and combustion emit carbon dioxide and other greenhouse gases. The transition to solar energy is impossible to achieve without the cooperation of women, who are the primary decision-makers on the form of energy used in households for lighting, cooking, and other purposes. For instance, solar energy provides a safe means of food storage, reducing emissions from food waste and providing women and other vulnerable groups with a food cushion to feed their families (Mbow et al., 2019). The positive reception of solar energy among women in different coastal communities makes them more receptive to other energy-efficient solutions.

Women's role as the makers of energy decisions in their homes extends to decisions about food production, preparation, and storage. The knowledge they gather in their efforts to feed their families can be harnessed and used to reduce emissions from the production and consumption of energy. For instance, one universal source of income among coastal women from different parts of the world is mangrove farming. Mangrove trees are crucial to coastal ecosystems. Coastal communities in Africa, Asia, and South America use mangroves as a source of wood, to produce charcoal and firewood for cooking, to feed livestock, and as a source of traditional medicine. Mangrove roots are home to over 2,000 species of fish and are

important to the retention of soils in coastal areas amidst inundating shorelines and regular flooding (Cormier-Salem, 2017). Mangrove forests also store large amounts of carbon, reducing the emission of greenhouse gases (Adame et al., 2021). Coastal women can use their knowledge of local ecosystems to reduce emissions by using specific parts of mangrove trees as a source of energy for cooking or smoking food for preservation, while saving the trees and forests to benefit from their carbon storage. They can also use their indigenous knowledge to harvest roots for medicine and leaves for baskets and medicine, leaving the trees standing to preserve the home of the marine life that thrives in mangrove forests and maintain the forests' carbon storage ability.

THE BENEFITS OF INVOLVING COASTAL WOMEN IN NET-ZERO ENERGY TRANSITIONS

Involving coastal women in their communities' transition to a low-carbon status quo can lead to more effective and efficient

»Off-grid renewable energy can help rural communities achieve energy access and decarbonize their economies while promoting gender equality and social inclusion.«

solutions by ensuring that renewable energy sources that are mainly maintained and used by women are fronted as potential alternatives to fossil fuels and receive the necessary attention and financial consideration in budgetary allocations. Figure 2 below shows some outcomes that were achieved when women were involved in environmental conservation efforts, which included the adoption of sustainable energy. For instance, traditionally, investment in fossil fuels, hydro, and geothermal energy dominates energy research and budgetary allocations. Such discussions often ignore biomass, a renewable energy source that is primarily produced and used by women (Lieu et al., 2020). Involving coastal women in discussions of low-carbon energy would prompt all stakeholders to consider the use of algae biomass to produce energy for cooking. Since cooking accounts for 70% of all energy demand along coastal areas, its

universal adoption as the primary source of energy for food preparation would be a significant step towards the communities' net-zero efforts.

One of the potential economic benefits of involving coastal women in net-zero energy transitions is the collective savings that will result from reduced reliance on expensive and non-renewable energy when women drive the adoption of cheaper and more environmentally friendly energy sources. As key decision-makers in the energy source used to power their homes, women are more likely to endorse and adopt energy solutions if they are involved in the decision and are well informed on their benefits. Their involvement is also instrumental in ensuring that the laid-out strategies to drive net-zero energy transitions will not face social, cultural, or economic barriers to their implementation (Osman-Elasha, 2012). For instance,

wind energy is one of the cheapest sources of renewable energy, which is also easy to adopt in coastal areas alongside solar energy. Europe anticipates the ability to produce enough wind power to power 1 million homes along the continent's East coast by 2030 (Wang, et al., 2023). Despite having potential, such projects often fail to achieve their intended outcomes due to the exclusion of women. In coastal communities in India, for instance, women take the lead in harvesting clean water, guarding natural resources, and educating their communities, yet they lack access to basic information regarding climate change (Sorensen et al., 2018). Including them in decisions to overhaul expensive and carbon-based sources of energy in favor of net-zero energy sources will reduce the cost of energy consumption while driving net-zero energy transitions. Finally, involving women in the transition to a zero-carbon future will reduce gender-based violence and help address gender inequality through inclusion, access to information on reducing the risk of injury in the wake of adverse weather patterns, and better protection for women from the violence that results from the effects of climate change.

them in all stages of the formulation of policies to this end. The women will be particularly valuable in the information gathering, decision-making, and implementation stages of policies that will drive net-zero energy transitions such as the adoption of renewable energy. We must support the inclusion of women in sustainable energy solutions and other efforts and initiatives that are driving net-zero energy transitions.

RECOMMENDATIONS

We can harness the potential of coastal women and accelerate the transition of their communities to net-zero emissions in the following ways.

1. Involve women in leadership and decision-making process

Coastal women have a vast knowledge of their communities' food and energy needs. Their insight in discussions on renewable energy, organic food sources whose production does not use chemicals that release greenhouse gases,

Figure 2: The Outcome of the Empowerment of Coastal Women as Climate Action Ambassadors. Adapted from the United Nations Environment Programme (UNEP).



CONCLUSION

Coastal women are crucial stakeholders in environmental conservation efforts and should be involved in net-zero transitions owing to their role as the main users of energy in their households. However, they are often overlooked in decision-making and their access to information regarding net-zero energy transitions is equally limited. Policy makers can reverse the traditional exclusion of coastal women in sustainable energy solutions by involving

»Women's participation in decision-making can enhance the effectiveness of policies and programs, leading to more sustainable and equitable outcomes.«

and resource conservation is invaluable. Their inclusion in decision-making and leadership for sustainability initiatives will yield practical solutions to environmental challenges that coastal households will adopt to realize intended benefits such as the adoption of renewable energy, reliance on energy-efficient food preparation and storage methods, and the conservation of critical resources such as mangrove forests.

2. Invest in clean energy solutions

Most coastal communities rely on traditional sources of energy such as wood and charcoal, which are associated with respiratory health problems (Jestin-Guyon et al., 2023). Their combustion emits carbon. Furthermore, the continued use of charcoal and wood contributes to deforestation, which worsens flooding and soil erosion and increases carbon emissions from the loss of mangrove forests (Adame et al., 2021). Since women have demonstrated willingness to adopt clean energy solutions, investment in alternatives to wood and charcoal will drive coastal communities towards the achievement of net-zero emissions.

3. Support women's entrepreneurship and innovation in sustainable energy

Traditionally, women face barriers to accessing capital and other resources needed to support innovation. Female entrepreneurs and innovators lack support for their innovations, including sustainable energy solutions that would reduce the communities' reliance on unsustainable energy sources that emit carbon and destroy the forest cover. With adequate support, women would create sustainable energy

solutions and use their extensive networks of fellow women to drive the adoption of the solutions in all households within and beyond the community.

4. Promote women's safety for sustainable energy interventions

Extreme weather events, such as storms and floods, which are common in coastal areas, increase incidents of gender-based violence (GBV) in the community (van Daalen MPhil et al., 2022). The high prevalence of GBV in coastal communities threatens the safety of women, preventing them from participating fully in energy interventions that drive the community towards net-zero emissions. Vulnerable women and girls in coastal communities can be protected through GBV awareness-raising campaigns.

These four steps will unlock, secure, and advance the full potential of coastal women as agents of change toward achieving net-zero emissions in the future.

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