



INTERLINK OF CLIMATE CHANGE, GENDER WITH TRAINING MODELS

Authors: Maureen Kabasa, Dr. Joel Onyango, Dr. Asenath Maobe and
Prof. Shem Wandiga

CapCET WP 001/2022

AFRICAN CENTER FOR TECHNOLOGY STUDIES
ICIPE DUDUVILE CAMPUS, KASARANI
P.O. BOX 45917 - 00100
NAIROBI, KENYA.

TEL: +254710607210 || +254737916566
EMAIL: info@acts-net.org

Abstract

Over the years' climate, change has continued to evolve with its dimensions on causes, effects and response differing in space and time. Despite climate change being a physical phenomenon social, cultural, economic, and political systems influence how different social groups are affected by environmental pressures from climate change and their contribution to reducing emissions. Minority groups are affected disproportionately; women, children and persons with disabilities are more vulnerable to the effects of climate change due to the differential gender roles, physical challenges and insufficient access to resources. Despite women and girls being more vulnerable, men and boys also have unique vulnerabilities that need to be addressed through policies and practices. Gender mainstreaming is an effective way of handling gendered concerns through researches, policies and practices that ensure no further or limited gendered inequalities are experienced.

This paper uses discourse analysis and systematic literature review to access the context of climate change in different dimensions including gender and the link of both to climate training models. In addition, primary data collection using KII and focus group discussions to assess the climate trainings individuals have already undertaken the training gaps and preferred delivery modes. The status of climate change training in the continent and the individual institutions: Ethiopian Environment and Forest Research Institute (EEFRI) and Environment Climate and Sustainable Development Institute (ECSDI) were highlighted to give an overview of the current situation through the Capacity building of technical institutions involved in climate change education, research and training (CapCET) project in the COMESA region.

Institutional capacity building being one of the main challenges of climate action this paper highlights the different formal (education and research/training) and informal (internships, art, social media and informal training) training models. Despite these models being different to the target audience (whether global or local and their gender exclusivity or inclusivity) incorporating the different methods to pass a message is more impactful than using each independently. Therefore, researchers need to be open up to both old and new training models to reach a wider audience locally and globally.

TABLE OF CONTENTS

Abstract	2
List of figures	4
List of tables.....	4
List of examples	4
Abbreviations	4
1.0 Introduction.....	5
2.0 Methodology	6
3.0 Multidimensionality of climate change	6
3.1 Global climate action	6
3.2 Regional and local climate action	7
3.3 Minority group considerations in climate change	8
3.4 Capacity building	10
3.4.1 Training models	10
4.0 Interlink of climate change, gender, and training models.....	17
5.0 Conclusion and recommendation.....	19
References.....	20

List of figures

Figure 2: Impact of the training models.....	17
Figure 3: Outcome of the interlink of climate change, gender and training models	18

List of tables

Table 1: Differences between the formal and informal methods.....	15
Table 2: Key messages.....	16

List of examples

Example 1: Educational institutes.....	12
Example 2: Estwatini Environment Authority (EEA)	12
Example 3: Community groups	14
Example 4: Ocean sole Africa	14

Abbreviations

CapCET	Capacity building of technical institutions involved in climate education, research and training
COMESA	Common Market for East and Southern
CSA	Climate Smart Agriculture
ECSDI	Environment Climate and Sustainable Development Institute
EEFRI	Ethiopian Environment and Forest Research Institute and
SADC	Southern African Development Community

1.0 Introduction

Climate change impacts continue to affect countries with developing countries affected more compared to developed countries. Efforts to mitigate and adapt to the changes are dissimilar for developed and developing countries due to technological, power and socio economic capabilities differences making it difficult to achieve the climate goal. Climate change is multifaceted including causes, effects, mitigation, adaptation, financing among others. Since the 18th C¹ the Greenhouse gases accumulation have been anthropogenically inflicted leading to greenhouse impacts (raising the atmospheric temperatures beyond the Paris agreement 1.5°C²) posing challenges in different sectors including agriculture posing a threat to food security. Further, these effects have created havoc on people's livelihoods and communities, necessitating immediate action to curb the changes³. Mitigation measures and the adaptation strategies have been financed by the developed countries to developing countries and economies in transit as per the Paris agreement to contribute to the reduction of emissions and ultimately climate action⁴.

Social, cultural, economic, and political systems influence how different social groups are affected by environmental pressures from climate change and their contribution to reducing emissions. These systems have directly or indirectly caused inequality in the access of resources and capacity to respond to challenges adequately. A key concept of inequality is gender with social, economic, and political implications for individuals responding to climate change⁵. Gender beyond a monogamous grouping is encompassed in the roles and responsibilities of women, girls, and men, boys created in the family unit, societies, and cultures. It further entails the expectations, characteristics, and behaviors tied to males or females as defined by UNESCO⁶. Examining gender is essential as females and males have different experiences concerning CC. Gender serves as an important dimension in vulnerability, adaptation, and mitigation. That is how they are affected by and respond to CC⁷. Women and girls are not vulnerable because they are "naturally weak," but due to the specific roles, lack of/limited access to education, health, water, sanitation, and food resulting in different adaptive capabilities⁶.

Despite women and girls being more vulnerable, men and boys also have unique vulnerabilities that need to be addressed through policies and practices⁸. Gender mainstreaming is an efficient way of addressing gendered concerns through policies and practices that ensure no further existing gendered inequalities⁹,⁸. Education being one of the inequalities in gender has affected how capacity is built within societies and how climate change education reaches both men and women equally. The delivery tools of climate change training, research, and education need to be contextual and gender specific. To create, develop and strengthen institutional, systemic and human resource capacity building a gender-sensitive action that recognizes and ensures gender balance in decision making on delivery tools of implementation for mitigation and adaptation action is important¹⁰. The overall objective of this paper is to bridge the gender gap in capacity building about delivery tools of climate education, research, and training. Specifically, this paper seeks: -

- To explore the different dimensions of climate change, the gendered nature of it, and how both concepts link to the climate training models;
- To strengthen institutional and human resource capacity by ensuring gender inclusiveness in the delivery tools for climate education, research, and training
- Inform a demand driven climate change training in the continent

This study is focused on the training models for capacity building and how the different contexts of climate change and gender inequalities can inform the creation of gender-sensitive training models. The link between climate change, gender, and training models is detail protocolled in this paper through the methods highlighted below.

2.0 Methodology

The paper employed both secondary and primary data mining. Systematic literature review and discourse analysis¹¹ in the framing of multidimensionality of climate change was done to give perspective on the context of climate change, gender and how these link to training models. Key Informant Interviews through targeted online questionnaires was conducted at the continental (Africa) and the in-country (Ethiopia and Zimbabwe) level to give insight on the status of climate change training in the continent and case countries as well as highlighting the continental demands and the in country climate training needs. The questions targeted climate professionals in different sectors to give insight on the three concepts. The focus was on the climate change training (trainings undertaken, needs and preferred mode of delivery). The interviews were validated through in-country focus group discussions and stakeholder discussions in a webinar organized by the CapCET project team.

3.0 Multidimensionality of climate change

3.1 Global climate action

The climate change is complex and evolving since the physical, social and economic aspects are affected¹². In as much as climate change is a global physical phenomenon, the effects are being felt at different rates between the developed and developing countries and across gender. The developed countries are less susceptible to these effects as they have the capacity and means to deal with the eventualities associated with climate change. Countries with poor infrastructure and economies need assistance to tackle the frequent and evolving change¹³. For this reason, the global negotiations that aim to improve climate actions in the developed countries play a huge role in supporting the mitigation and adaptation activities on climate change. Climate adaptation and mitigation plans go hand in hand to ensure climate resilience through disaster risk management, improved health, and social protection. Through different global agreements and development plans, collective action against climate change has been realized. Adaptation and mitigation measures have been informed and motivated by these noble action plans discussed below¹³, with the strategies adopted in the region and supported by the national, regional, and global entities¹⁴.

The Paris agreement implementation emphasizes climate-related capacity building for developing countries and encourages the developed countries to support actions support that. Strong institutional arrangement and good governance are key factors to the Paris agreement's success and agenda 2030 of sustainable development. However, with the continued support from developed countries, there are limited opportunities to identify the best possibilities for climate-related development policies¹⁵. Global agendas, including the Paris agreement, IPPC, Kyoto protocol have increasingly created awareness on integrating gender considerations in climate decisions and actions¹⁶. In addition, building capacity in the developing countries through financing has been a core objective of the Paris agreement backed by support of conventions including the UNFCCC despite there being challenges associated with climate financing^{17,18}.

With the support that the African countries get from developed countries they still need to find means of mobilizing resources locally and using what is already available to meet climate needs.

Sources identified for financing climate change actions include: National or domestic investment; multilateral funding; grant, loan and concessional; bilateral investment and donor funding; insurance and other risk management instruments; private sector instruments; and market-based instruments, e.g., carbon finance¹⁹. According to the African Union the continent to maximize on resource mobilization from these sources, there is need for negotiations to focus on: Improving access to financing through rationalizing the ever-growing number of funds; harmonizing the governance of the funds; reducing conditions for disbursement; streamlining bureaucratic procedures; and reducing transaction costs¹⁹.

3.2 Regional and local climate action

Climate change has affected the globe, region, and locals in different ways and at transparent rates. Assessing vulnerability is an important component of the human dimension of climate change. Vulnerability assessments characterize who and what is sensitive to the climate risks and why define the adaptive capacities and identify opportunities for adaptation. Different dimensions provide insights into the vulnerability of climate change in space and time. The past and present experiences clearly show the climate changes, the extreme effects of the same and inform the adaptive measures to take²⁰. In the case of space, the developing countries are seen to be more vulnerable to climate change effects as compared to the developed countries. This is so as they do not have enough capacity to address the evolving effects of climate variability. Their dependence on fossil fuels for cooking and lighting purposes has led to massive degradation of natural resources, reducing nature's capability to sequester greenhouse gases, increasing the atmospheric temperatures exponentially over the years²¹.

Climate adaptation and mitigation plans and strategies have been implemented over the years to create climate resilience through disaster risk management, reduction of vulnerability to climate change, improved health, and social protection. These strategies have been adopted in the region voluntarily with the support of the national, regional, and global communities. Strategies have been implemented at the global level, and each country has its plan relating to climate change mitigation and adaptation¹. The Sub-Saharan countries depend mostly on rain-fed agriculture for their livelihoods especially in the rural areas²². The agriculture sector contributes largely to the economic development of African countries contributing about 32% of the Gross Domestic Product (GDP). Additionally, agriculture contributes about 10% -12% of the total greenhouse emissions in Africa²¹. Climate-smart agriculture is one of the activities that are important for proper mitigation and adaptation to climate change and ensures food security¹⁴.

According to FAO Climate-Smart Agriculture (CSA) is an integrative approach that aims to address challenges of climate change through a set of three core principles including sustainably increasing agricultural production and incomes, adapting and building resilience to climate change, and reducing GHGs from agriculture as much as possible¹⁴. Initiatives and plans have been established to encourage and achieve more green agriculture. Practices that promote conservation agriculture, soil and water conservation, and irrigation and drainage are prioritized within key communities in the region as mitigation and adaptation strategies. Efforts from COMESA, ESA, and SADC have been realized with people within the region adopting the practices. However, there have been challenges for some to adopt due to lack of information on CSA²³.

Some of the important development organizations that have been at the forefront of CC impact recognition in the continent include COMESA. COMESA's initiative on CC aims at “*achieving economic prosperity and climate protection*” by addressing CC impacts to build social and

economic resilience for present and future generations. The focus of COMESA in the continent is to support Africa in adapting to CC and safeguarding natural ecosystems that play an important role in carbon sequestration while considering that gender mainstreaming is the ultimate goal towards achieving climate prosperity and improved capacity building.

Regardless, global decisions being made to curb climate change, every region and country has a way of implementing them according to the needs of its people. However, there are gaps in the implementation of these strategies in finance, institutional arrangements, capacity building, and knowledge involvement, and integrated planning. A report on climate change mitigation in COMESA/ESA/SADC region emphasizes that "to mitigate climate change, there is need to implement capacity building on CC mitigation to develop and broaden the regional capacity of key agencies working with the CC mitigation agenda in the region and strengthen existing regional research institutions"²³.

Individual countries have their priority areas in terms of climate change mitigation and adaptation as well as capacity building embedded in the National Adaptation Plans of Actions (NAPAs) and Nationally Appropriate Mitigation Actions (NAMAs). The areas of focus include but are not limited to concepts within sectors of agriculture, energy, water, industry, and forestry. Policies and plans of implementation of initiatives that promote the development of the specific sectors have been formulated with some countries having a framework of implementation²⁴. Further, capacity building is a priority of the NDCs²⁵ as the African countries have had challenges with either communal or institutional capacity building. The global and regional institutions have inspired these plans but each country makes its guidelines to fit their climate needs. Capacity building being one of the limitations to climate prosperity by COMESA is one of the key areas to address. Therefore, with the right transnational, regional, national, and institutional capacities training, research, and education on climate change will motivate better climate actions and capacity-building initiatives²³.

3.3 Minority group considerations in climate change

Minority groups including women, youth, and persons with disabilities are affected disproportionately by climate change and always need special attention and representation. According to UNICEF as the impacts of climate change, continue to intensify it is children and young people that experience the worst impacts due to their vulnerability. Far from being passive victims young people all over the world are beginning to voice and advocate for proper climate action for the present and the future generations to benefit from the ecosystem services. In 2018, Take Greta Thunberg, the 15-year-old from Sweden sparked a global movement of school-age students demanding greater and better action from governments to fight climate change. Now millions are marching to demonstrate their support with younger climate activists challenging the reluctant approaches to climate change and getting involved directly or indirectly in climate mitigation and adaptation. Through climate research, education, and training more information is reaching the youth and they realize that they have more to benefit from climate-friendly activities than ever before²⁶.

Persons with disabilities are impaired diversely and they make up approximately 1 million persons of the global population. Discrimination, marginalization, and other social and economic factors have resulted in the different and more intense experiences of CC impacts by the disabled. They are most affected in emergencies that require higher rates of mobility and mortality and are among the least able to access emergency support. With climate change posing different and adverse

challenges the food and nutrition, access to safe drinking water and sanitation, access to health care services and medication, access to education and training as well as access to adequate housing and decent work are limited²⁷. According to the United Nations High Commissioner for Human Rights recommends the inclusion of persons with disabilities in decision-making and implementation of climate adaptation and mitigation strategies is necessary for optimal and sustainable results.

Socially, women and men are affected differently by the changes in climate due to the differential roles that society has gendered. Women especially in the rural developing world are more vulnerable to the effects of CC as they are involved in activities that meet the households' basic needs like agriculture, animal husbandry, smallholder farming, workers and enterprises, and collection of firewood for cooking and lighting purposes. Their lack of or having insufficient access to proper education, health, water, sanitation, and food has resulted in different adaptive capabilities^{6, 28}. Additionally, with climate change posing extreme weather conditions their task of providing for their families is more difficult. Though women in developing countries are more vulnerable to climate change effects, they play a crucial role in climate change mitigation and adaptation. The link between the roles of males and females and their interaction with the environment needs to be assessed and opportunities that can reduce their vulnerability explored to enhance their adaptive capacities and consequently gender sensitivity^{29, 21}. Engaging all these minority groups in climate change mitigation and adaptation is the right step to ensuring inclusivity contributing to sustainability.

Although climate change is a scientific, technical, and practical phenomenon it is also a social issue. The implication of climate change on society is evident through the social justice and gender equality matters. Climate change poses the most complex challenge of our time. Dealing with the challenges requires proactive, collective, and holistic approaches to dealing with the impacts. Gender, youth, and persons with disabilities roles have been a sensitive topic across disciplines that remain a point of consideration and involvement if most of the developmental agendas are to be met³⁰. It is clear through many researches that climate change poses different effects on both men and women. This is mainly due to the “rules” on traditions, resource access, and patterns, and importantly gender-specific roles and responsibilities. Studies have recognized women’s role as key agents of change and reaching the country-specific Paris agreement emission goals³¹.

The fifth assessment report of the IPCC appreciates that the societal poor are most vulnerable to climate change. It highlights that poverty determines vulnerability through several mechanisms: a) access to resources that allows coping with extreme weather events; and b) marginalization from decision-making and societal security. The report also states that an increase in gender inequalities as a result of weather events/calamities and continued differential vulnerabilities proportionally increase³². However, recognizing the role women play as decision-makers, stakeholders, educators, and experts across sectors can lead to successful and long-term solutions to climate change. Women have proven to lead the way towards better climate action through inspiring and pushing for equality and sustainable development in different levels and sectors. Their innovations and expertise have transformed livelihoods, increased resilience, and improved overall well-being³⁰.

The global entities in the spirit of gender mainstreaming have been pushing for participation^{28 30} and adoption of gender policies in the global and the regional³³ contexts. This has contributed to increase in women voices in climate change with most taking part in negotiation, decision making

and climate change training³⁴. At the national level The NDCs of specific countries have aligned their gender contribution in the NAPAs and NAMAs informed by the global and regional action plans regarding gender²⁵.

However there is still more that needs to be done as from the primary data Out of the 88 respondents from the continent the number of male respondents was conspicuously higher than that of the females. Nationally the gender gap in Ethiopia is pronounced in the number of respondents in the demand assessment. Out of the 47 respondents from Ethiopia 95.7% (45) were male while only 4.3% (2) were female while in Zimbabwe 83% of the respondents were male with a lesser 17% of them being female. Out of the 88 respondents, a majority of 42 respondents were extremely confident in addressing climate change issues with only two respondents being not at all confident and not so confident respectively.

Additionally, around 63.6% of the respondents affirmed they had very professional climate change capacity and lesser 5.6% did not have or had very limited capacity in climate change. This goes to show that the knowledge on climate change is widespread in the continent with initiatives being undertaken by different individuals to address the climate change crisis and both genders have been able to get some form of climate change training irrespective of the numbers. The stakeholder engagements affirmed the increase in women participation in climate issues despite the numbers of women being lower than men.

3.4 Capacity building

Not all developing countries have enough capacities to deal with the challenges brought about by climate change and often need financial assistance to realize adaptation and mitigation goals. The importance of building the capacities of these countries has been long recognized by the UNFCCC (1992), the Kyoto protocol (1997), and most recently, the Paris agreement (2015). UNFCCC recognizes the need to build capacities in their processes to establish climate-friendly patterns of sustainable development through an array of approaches: “identifying, planning and implementing adaptation strategies; facilitating technology development, dissemination and deployment; enabling access to climate finance; developing relevant aspects of education and public awareness; and communication of relevant climate information”^{35,36}.

According to the UNFCCC, the levels of capacity building encompass the individual, institutional, and systemic. Incorporating all three levels addresses the climate change challenges effectively to achieve the goals sustainably. Of importance is ensuring capacity support is given to the priority areas and assessing gap analysis needs³⁵. Emphasis on gender-sensitive delivery and dissemination of climate information is encouraged to achieve gender equality by allowing both males and females to make an informed decision on the different climate spaces and ideas³⁷. One aspect that makes a difference regarding climate capacity building is the training models.

3.4.1 Training models

To encourage climate change mitigation and adaptation training on climate research, education and research are necessary. Effective engagement of the target audience is necessary to ensure efficient and sustainable climate action implementation. There is a need to identify appropriate training models that will pass the message of climate change, impacts, and strategies for the response³⁸ as supported by the needs assessment in the continent, Ethiopia and Zimbabwe. There have been different methods that have been employed and with the recent COVID 19, pandemic

trainers have had to be innovative and flexible to the changes that have presented themselves for continuity of capacity building. EEFRI and ESDI have been employing both the online and physical tools to deliver the climate change message and 100% of the respondents prefer a blended system for delivery.

Learning is an ongoing process that keeps evolving regardless of gender, age, power, or area of expertise. The modules and manuals of capacity building keep metamorphosing with the current events. Climate modules generally aim to equip learners with tools, skills, knowledge, and attitudes that help manage and adapt to climate change and related risks. The pieces of training educate on a wide range of topics that are relevant to the understanding of the concept of climate change, its impacts, and the strategies that are best to tackle the adverse effects. The courses are normally made from authoritative scientific disciplines recognised by the subject matter expert while putting the market need of the specific context in mind³⁹. Generally, the most common training models are formal or informal; however, other methods have come up with improved technology and changes with time.

Distinctively, even with the availability of different training modes there is need to have demand driven training to solve problems by context rather than a one size fits all model. For instance, the climate training needs in Ethiopia differed from the priority areas of Zimbabwe. In Ethiopia Climate modelling, Climate finance and climate leadership were prioritized as need areas and in Zimbabwe climate mitigation, adaptation, and climate finance were training need areas. After consultation the two countries expressed need to get training in all the topics however, the case studies and the practical part of the module will be contextual to the specific countries for proper innovative climate solutions.

3.4.1.1 Formal training models

The delivery of climate courses is usually done in different ways that fit the target audience. Some of the methods include Online, self-guided tutorials, training webinars, online scheduled lecture series, and onsite, trainer-led lectures^{40, 38}. Before the COVID pandemic, the most common form was the onsite trainer-led lectures/trainers however, the online methods have gained momentum in these times that physical contact is discouraged as much as possible. Webinars, online classes, workshops, world cafes, and online tutorials have become the new normal when it comes to climate education, training, and research. At the end of each training test, exercises and examinations are the common forms of evaluation of the trained topics by the trainers^{9, 38}.

3.4.1.1.1 Formal education system

The most common formal method is embedded in the education systems. There is a set formal curriculum that is followed as part of the system. In the Kenyan Education system, the topic of climate change is within the social studies subject at the primary level, in the secondary level in geography and the university level as an independent course in some universities or indirectly in the climate change-related courses e.g. Environmental science, natural resource management, renewable energy. However, formal education if not free is valued as a private consumer good, a form of cultural capital that allows some to go ahead and stay on top rather than a public good that benefits the overall society⁴⁰. Contrary to the informal approaches, the formal models are partly financed by the public revenues. The Institute for Climate Change and Adaptation (ICCA) at the University of Nairobi is a good example of a climate change institution that employs the formal models.

Example 1: Educational institutes

[The institute for climate change and Adaptation \(ICCA\)](#) at the University of Nairobi was established in 2011 with the sole mission of building the human capacity necessary to address the distinct climate change and adaptation needs of vulnerable communities through teaching, action-oriented research, development of innovative technologies and community participation. With the execution of climate experts and researches formal training on CC and adaptation is offered through postgraduate level education, professional short courses to CC and adaptation professionals in the public and private sectors including NGOs. Other modes of climate training include climate change and adaptation research exchange; action-oriented outreach programmes; and policy advice on climate change and adaptation issues. The training has mainly been done on-site through lectures but with the current COVID19 situation the online methods have been adopted widely.

ECSDI being an academic institution that recently became an institute dealing with climate change issues is still trying to establish strong climate change curriculum to contribute to knowledge and innovative solutions to climate change. Just like the ICCA, the training delivery modes have included both online and physical with the COVID 19 pandemic presenting new ways of doing things. However due to internet challenges and they admitted that trying to deliver courses online is a challenge especially to their students in the rural areas.

3.4.1.1.2 Research Institutions

Research is a scientific tool that enhances knowledge in different disciplines. Researches on climate change impacts, adaptation and mitigation strategies have been done at the global, regional and local scale. The findings have not only increased knowledge but informed certain policy aspects for sustainability and contributed to meeting the climate ambitions. Research bodies such as the IPCC have improved access researches and policy formulation and implementation informed by different scientific outputs on climate change ⁴¹.

Example 2: Ethiopian Environmental and Forest Research institute

Research institutions including EEFRI have been instrumental in offering experiential learning opportunities to studies in the environmental sector or climate change-related courses. The Ethiopian Environment and Forest Research Institute (EEFRI) is an autonomous federal research institute established with the following four main objectives: Identify, import, adapt, utilize and generate technologies that significantly contribute to forest development and environmental protection focusing on the priorities of the country and demand of users; coordinate the environment and forest research activities carried out by environment and forest research centers or higher learning institutes and other related facilities conducting research on the basis of contract; Build capacity and establish a system that enables the environment and forest research activities to be efficient, effective and development-oriented; and disseminate the environment and forest research outputs to users. EEFRI has a climate change directorate with well trained climate change professionals. The staff under this directorate have received training on climate change in different parts of the world.

3.4.1.2 Informal training models

The climate sector has in the years appreciated the lengths the informal methods of education go to realising capacity goals that formal education has failed to reach. Formal education is limited to people who have financial benefits whereas there are many in the African continent specifically the COMESA region who can barely afford a formal education especially the higher learning education.

3.4.1.2.1 Internships

Different disciplines realise the importance of experiential learning at the higher level of education. During/after the class course period internship placement to different organisations has been the norm in many higher learning institutions. In the climate sector, students can be placed in environmental, water, forestry, scientific research, and natural resource management organisations to put the subjects learned in class to practice and get first-hand training from experts and professionals. Often, students tend to learn more in these settings, as they are practical and engaging. For instance, it is through these experiences that some students gain ideas for their thesis and/or get grounds on their area of focus and ultimately defined career path. Assessments on the process are usually documented by the lecturer in charge from both the supervisor of the student in the respective organisation and the student. Access to both human and scientific resources is a proper blend to solving problems and innovation in the climate change world.

3.4.1.2.2 Community engagement

Engaging communities especially those in the informal settings is a key attribute to meeting climate needs and enhancing the inclusivity of the different stakeholders. The informal training models remain widespread and significant in reaching communities and educating them to deal with the climate shocks posed by climate change as well as employing the relevant strategies of mitigation and adaptation⁴⁰. Though this engagement indigenous dialogues that are all inclusive and give every participant time to give their inputs can be involves for better and impactful research⁴². The community members with the facilitation of the leaders contribute to their understanding on climate change, their view on inclusivity and how to curb climate change and conserve the environment.

Example 3: Community groups

Barazas have been a way of passing information especially in the rural settings. Having discussions surrounding climate change lifts the weight of the climate educators as individuals are able to relate at a personal and relatable level. The forest sector has shown great progress in promoting climate education through rehabilitation activities, afforestation, and reforestation activities and taking part in engaging activities like the Participatory Geographical Information System (PGIS) and participatory forest management in Kenya, Ethiopia, Uganda, and Tanzania⁴⁶. In the agricultural sectors demonstration plots and including farmer's groups with farmers that have been trained by experts to train fellow farmers has been beneficial in improving organic agriculture and climate smart agriculture in Sub-Saharan Africa⁴⁷. The informal methods are mainly engaging to integrate the traditional knowledge with the modern methods of management.

3.4.1.2.3 Informal training

In as much as formal education is encouraged by different people in the society not everyone can afford it especially in the developing worlds. Due to the lack of financial or human resources some end up in the informal training sectors to gain skills for income generation and bettering their livelihoods in general. With the skills gained in these sectors most people become artisans with skills including but not limited to leather design, carpentry, tailoring, hairdressing, painting. In Kenya this sector is mostly referred to as the “Jua Kali” sector translating to “hot sun) as it mostly involves hours outdoor under the sun. With more awareness on environmental management recycling is gaining popularity as a way of reducing waste which is common in this sector. The process of extracting and manufacturing plastic is a source of GHGs and recycling is a progressive way of reducing GHGs indirectly. An example is the plastic pollution that takes place along and in the beaches. Of great interest is the “flip flop” pollution in the white sandy beaches of the Kenyan coast. The pollution not only affects the biodiversity of the ocean but also the biodiversity.

Example 4: Ocean sole Africa

[Ocean sole](#) is a Kenyan company that collects discarded flip-flops and transforms them into animal sculptures. The company's mission is to up-cycle the Earth's flip-flop pollution into inspiring art while promoting conservation and creating employment. They work closely with the community to collect the pollutants, training them to have fine arts skills and transforming the flip-flops. Some artisans through in the coast through ocean sole have become innovative in contribution to saving the planet by transforming the plastic waste to useful and beautiful art⁴⁵.

3.4.1.2.4 Social media and art

With changing times and technological advancement social media is almost becoming a “basic need”, especially among the young generation. Having merits and demerits it can be used to share positive information globally. It is argued that social media can bridge both formal and informal

learning through participatory digital cultures. Most young people support this argument although many play the role of consumers rather than full participants. Scholars have suggested the potential of social media to integrate both formal and informal models of delivery although this has been scarcely theorized⁴³. Christine Greenhow and Cathy Lewin⁴³ propose models for theorizing social media as a platform of learning, integrating the different attributes of the formal and informal learning methods. Within two contrasting case studies, they apply the model together with social constructivism and connectedness as theoretical lenses to provoke the complexities of learning in various settings. They conclude that the model could reveal new understandings of social media in education, and outline future research directions.

[Youtube](#) , [facebook](#), [blogs](#), [podcasts](#), [instagram](#), whatapp and TV programs (National Geographic and Our Planet on Netflix) have availed platforms that relay relevant climate information in form of videos, pictures, songs, poems, story telling, plays, paintings and other engaging ways to reach a wide range of people regardless of age, race, gender and social status. However, this method is limited by internet availability and network connectivity. It is important to understand the link between climate change, gender and training models to make better and informed choices.

Error! Reference source not found. and Table 2 below breaks down the difference between the formal and informal training models and the key messages synthesized in this paper respectively.

Table 1: Differences between the formal and informal methods

Formal	Non-formal
Guided by economic principles	Guided by social and cultural principles
Financed by public revenues	Financed by individual, communities, and/or donor-funded organisations
Have clear institutional arrangements, rules, and regulations	No clear or minimal institutional arrangements, rules, and regulations
Set curriculum	No set curriculum
Limited to the financial capacity	Limited to the human capacity

Table 2: Key messages

Climate context	Key message
Climate change	<ul style="list-style-type: none"> • Context specific • Responses are context specific (Developing worlds have less capacity to address CC) • Global, regional and local efforts have been made. • Country specific efforts to curb climate change through NDCs • NDCs and institutions take into account gender considerations.
Vulnerability	<ul style="list-style-type: none"> • Context specific (location, social groups) • Developing countries are more vulnerable. • women, youth and Phd are more vulnerable
Mitigation strategies	<ul style="list-style-type: none"> • Reducing emission of GHG in to ensure Long term • Implementation take into account gender consideration but more action is needed
Adaptation strategies	<ul style="list-style-type: none"> • Actions taken at all special scales to manage impacts of climate change • Exploiting potential benefits • Reducing vulnerability and exposure to harmful effects • Implementation take into account gender consideration but more action is needed
Participation in the climate agenda	<ul style="list-style-type: none"> • Gender responsive especially in the global negotiations (Paris agreement, IPCC, Kyoto protocol, UNFCCC among others) • Inclusivity through adoption of gender policies. • More need to be done in both the local and global spheres
Resilience building	<ul style="list-style-type: none"> • Capacity to anticipate, absorb, accommodate and recover from negative climate impacts • Effective adaptation and mitigation • Improved institutional and technical capacity building • Inclusivity in decision-making.

4.0 Interlink of climate change, gender, and training models

Formal and informal training models have different impacts on the local and global space and are different regarding their gender responsiveness. The **Error! Reference source not found.** shows the different models and how they link to the contextual and gendered nature of climate change

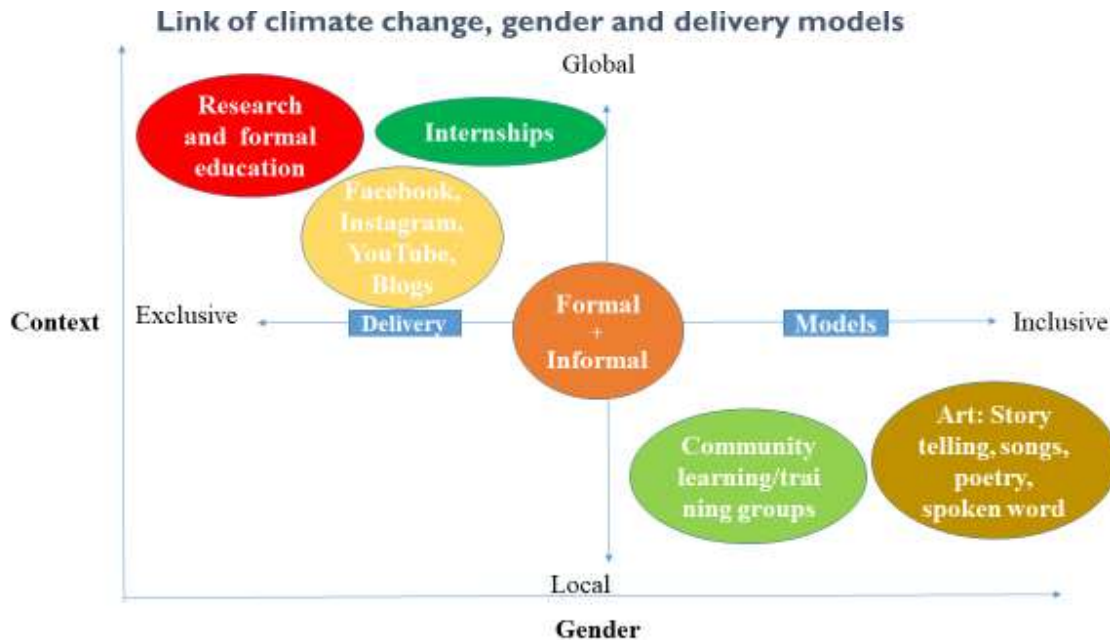


Figure 1: Impact of the training models

Formal methods are global as the subjects learned cut across the global, regional, and local sectors. However, this is limited to the financial capabilities of individuals. They are gender-inclusive as most of the institutions nowadays aim at gender equality and equity. There is still more to be done but progressive steps have been made to include as many people and subjects in climate education. Social media if used appropriately can be a good learning platform, especially for the youth. All genders and ages can access it but it is dependent access the internet.

The informal models contrary to the formal reach the local communities at the grassroots. The effectiveness of this method allows those who are challenged financially and infrastructure-wise (internet) and technologically to have access to climate education despite the setbacks. Organisations that initiate and implement informal education ensure men, women, and the youth are fully represented as part of their strategic considerations.

Interactive and inclusive methods that cut across the training models such as the power walks have proven to be more learner-centered and are encouraged. Combining the different models gives a wholesome representation of the local and global communities with the social considerations like gender, youth, PWDs and children fully involved. Field visits and excursions, participatory discussions around different topics, narratives, and photovoice are key to better understanding and the chances of implementation of mitigation and adaptation strategies are high⁴⁴. With the availability of many methods of delivery, every country has its contexts on concepts and strategies hence the climate delivery methods need be country-specific from the market needs and priority

issues⁹. Figure 2 below shows what happens when there is harmonization of climate change, gender and the training models.

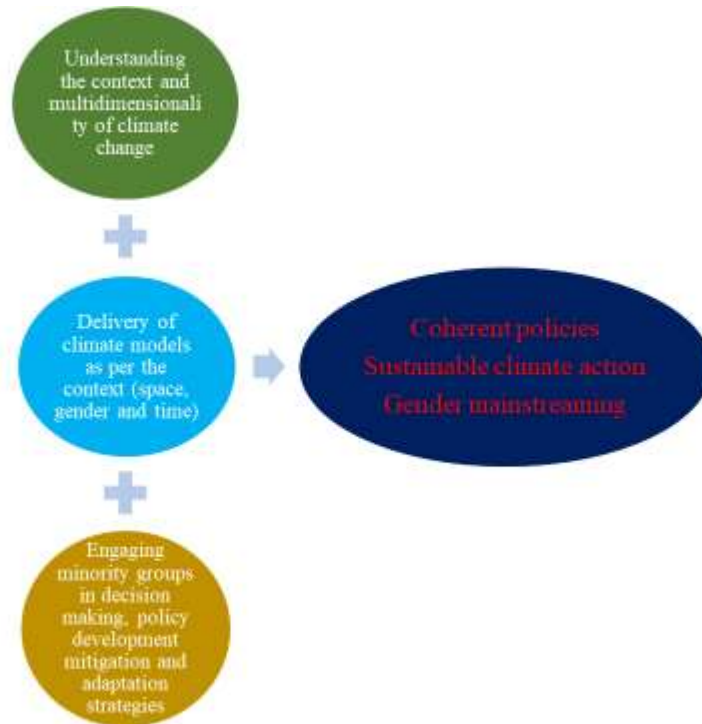


Figure 2: Outcome of the interlink of climate change, gender and training models

5.0 Conclusion and recommendation

Climate change has posed different challenges at different levels in the globe and the region. Capacity building, one of the encouraging practices towards climate education, training, and research is a sure way to contribute to climate action. The understanding of the multidimensionality of climate change, the gendered nature of the same is crucial in making informed decisions that inform the decision on climate change and appreciating that aspects like gender are not neutral but crucial in the delivery of results. Whilst understanding the different concepts in climate change the data has proven that climate change is contextual and giving demand driven training could be the solution to unsolved climate related problems.

It is important to keep in mind that gender equality means equality for men and women as they are disproportionately affected. However, the differences in gender roles, responsibilities, and respective social and economic limitations more often disadvantage women by the data. To create a level playing field, women have to be supported and empowered to counter these socioeconomic barriers. Hence, gender is not a women's issue; rather, the creation of equality often requires the empowerment of women specifically to compensate for discrimination.

Achieving gender mainstreaming is informed by initiatives at the global and national levels. Involving women in research, training, and education regarding climate change is a progressive way to ensuring that men and women work towards a common goal maintaining their different roles in society. It is a fact that men's and women's approaches to capacity building are usually implemented in different ways. Delivering and disseminating the climate change message to women and men is different as their roles are disproportional. Information is the power they say and incorporating the different styles for women and men is a positive step in the right direction of inclusivity. Therefore, acceptance of the different roles is the first step to implementing the best delivery methods that will make a greater impact and achieving gender balance by all means. For optimal results, the delivery methods need to be learner-centered and engaging at all times. The trainers and climate professionals have to be flexible to the changing times and open-minded to new training models as evidenced by the recent challenges posed by climate change regarding climate education, research, and training.

In general, formal, informal, and social media delivery model have their merits and demerits. A combination of all the methods in climate education, training, and scientific research will ensure effectiveness, equitability, responsiveness, and robustness in climate action.

References

1. The Impact of Climate Change on Regional Systems: A Comprehensive Analysis ... - Google Books. https://books.google.co.ke/books?hl=en&lr=&id=JwNpcXNuArYC&oi=fnd&pg=PR7&ots=fuFrVBI_15&sig=0xgK3ELp_dKmDUjSXVtKuXk-0IU&redir_esc=y#v=onepage&q&f=false.
2. Unfccc. *ADOPTION OF THE PARIS AGREEMENT - Paris Agreement text English*.
3. Wheeler, T. & Von Braun, J. Climate change impacts on global food security. *Science* vol. 341 508–513 (2013).
4. Kissinger, G., Gupta, A., Mulder, I. & Unterstell, N. Climate financing needs in the land sector under the Paris Agreement: An a[1] G. Kissinger, A. Gupta, I. Mulder, and N. Unterstell, “Climate financing needs in the land sector under the Paris Agreement: An assessment of developing country perspectives,” *L. Land use policy* **83**, (2019).
5. Sellers, S. Gender and Climate Change : A Closer Look at Existing Evidence. *Glob. Gen. Clim. Alliance* 27 (2016).
6. Context | United Nations Educational, Scientific and Cultural Organization. <http://www.unesco.org/new/en/natural-sciences/priority-areas/gender-and-science/cross-cutting-issues/climate-change-and-gender-equality/context/>.
7. Alston, M. Introducing gender and climate change: Research, policy and action. in *Research, Action and Policy: Addressing the Gendered Impacts of Climate Change* 3–14 (Springer Netherlands, 2013). doi:10.1007/978-94-007-5518-5_1.
8. Alston, M. Gender mainstreaming and climate change. *Womens. Stud. Int. Forum* **47**, 287–294 (2014).
9. Bank, A. D. *Training manual to support country-driven gender and climate change. Klinicheskaia meditsina* (2015).
10. Gender and Climate Change Capacity-building | UNFCCC. <https://unfccc.int/topics/gender/gender-and-unfccc-topics/gender-and-climate-change-capacity-building>.
11. Discourse Analysis - an overview | ScienceDirect Topics. <https://www.sciencedirect.com/topics/social-sciences/discourse-analysis>.
12. Calzadilla, A. *et al.* Climate change impacts on global agriculture. *Clim. Change* **120**, 357–374 (2013).
13. Gomez-Echeverri, L. Climate and development: Enhancing impact through stronger linkages in the implementation of the Paris Agreement and the Sustainable Development Goals (SDGs). *Philos. Trans. R. Soc. A Math. Phys. Eng. Sci.* **376**, (2018).
14. Climate-Smart Agriculture | Food and Agriculture Organization of the United Nations. <http://www.fao.org/climate-smart-agriculture/en/>.
15. Alves, F. *et al.* Climate change policies and agendas: Facing implementation challenges and

- guiding responses. *Environ. Sci. Policy* **104**, 190–198 (2020).
16. Introduction to Gender and Climate Change | UNFCCC. <https://unfccc.int/gender>.
 17. Atteridge, A., Siebert, C. K., Klein, R. J. T., Butler, C. & Tella, P. *Bilateral finance institutions and climate change: A mapping of climate portfolios*. *SEI Working Paper* (2009).
 18. Jakob, M., Steckel, J. C., Flachsland, C. & Baumstark, L. Climate finance for developing country mitigation: blessing or curse? *Clim. Dev.* **7**, (2015).
 19. *AFRICAN STRATEGY ON CLIMATE CHANGE*. (2014).
 20. Ford, J. D. *et al.* Case study and analogue methodologies in climate change vulnerability research. *Wiley Interdiscip. Rev. Clim. Chang.* **1**, 374–392 (2010).
 21. Tongwane, M. I. & Moeletsi, M. E. A review of greenhouse gas emissions from the agriculture sector in Africa. *Agricultural Systems* vol. 166 124–134 (2018).
 22. Diao, X., Hazell, P. & Thurlow, J. The Role of Agriculture in African Development. *World Dev.* **38**, 1375–1383 (2010).
 23. Isabirye, B. E. & Diversity, G. Climate Change Mitigation and Adaptation in ECA / SADC / COMESA region : Opportunities and Challenges Climate Change Mitigation and Adaptation in ECA / SADC / COMESA region : Opportunities and Challenges Didas N . Kimaro , Alfred N . Gichu , Hezron Mogaka. (2020).
 24. Ross, K. *et al.* *STRENGTHENING NATIONALLY DETERMINED CONTRIBUTIONS TO CATALYZE ACTIONS THAT REDUCE SHORT-LIVED CLIMATE POLLUTANTS*. www.wri.org/publications/reducing-SLCPs. (2018).
 25. Nationally Determined Contributions (NDCs) | UNFCCC. <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs#eq-5>.
 26. Youth for climate action | UNICEF. <https://www.unicef.org/environment-and-climate-change/youth-action>.
 27. A/HRC/44/30 - E - A/HRC/44/30 -Desktop. <https://undocs.org/A/HRC/44/30>.
 28. *Action on GEnDER*.
 29. Edvardsson Björnberg, K. & Hansson, S. O. Gendering local climate adaptation. *Local Environ.* **18**, 217–232 (2013).
 30. Gender and climate change | IUCN. <https://www.iucn.org/resources/issues-briefs/gender-and-climate-change>.
 31. Market, T. C. & Africa, S. Comesa submission on gender and climate change. 1–5 (2014).
 32. Fifth Assessment Report — IPCC. <https://www.ipcc.ch/assessment-report/ar5/>.
 33. *CONSTITUTIVE ACT OF THE AFRICAN UNION*.

34. Gender — IPCC. <https://www.ipcc.ch/about/gender/>.
35. Building capacity in the UNFCCC process | UNFCCC. <https://unfccc.int/topics/capacity-building/the-big-picture/capacity-in-the-unfccc-process>.
36. Capacity-building to Boost Climate Action | UNFCCC. <https://unfccc.int/news/capacity-building-to-boost-climate-action>.
37. *MAINSTREAMING GENDER INTO NDCs PRESENTED BY: SYEDA HADIKA JAMSHAID*.
38. Usefulness of delivery methods for climate change programming: perspectives of Extension and research faculty. <https://www.cabdirect.org/cabdirect/abstract/20173364628>.
39. Training Courses | U.S. Climate Resilience Toolkit. <https://toolkit.climate.gov/training-courses>.
40. Minnis, J. R. Nonformal education and informal economies in sub-saharan Africa: Finding the right match. *Adult Educ. Q.* **56**, 119–133 (2006).
41. Beck, S. & Mahony, M. The IPCC and the new map of science and politics. *Wiley Interdisciplinary Reviews: Climate Change* vol. 9 (2018).
42. Nabobo-Baba, D. U. Decolonising Framings in Pacific Research: Indigenous Fijian Vanua Research Framework as an Organic Response: <https://doi.org/10.1177/117718010800400210> **4**, 140–154 (2008).
43. Greenhow, C. & Lewin, C. Social media and education: reconceptualizing the boundaries of formal and informal learning. *Learn. Media Technol.* **41**, 6–30 (2016).
44. Barone, T. A return to the gold standard? Questioning the future of narrative construction as educational research. *Qual. Inq.* **13**, 454–470 (2007).
45. Fine Art Made Out Of Upcycled Flip-Flops. <https://educateinspirechange.org/fine-art-made-out-of-upcycled-flip-flops/>.
46. Ayana, A. N., Vandenabeele, N. & Arts, B. Performance of participatory forest management in Ethiopia: institutional arrangement versus local practices. *Crit. Policy Stud.* **11**, 19–38 (2017).
47. Mwongera, C. *et al.* Climate smart agriculture rapid appraisal (CSA-RA): A tool for prioritizing context-specific climate smart agriculture technologies. *Agric. Syst.* **151**, 192–203 (2017).