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Master of Social Services
Community Development and Conflict Resolution
Thesis, 2020

CLIMATE CHANGE AND WOMEN RIGHTS IN SUB-SAHARAN AFRICA

A literature review

ABSTRACT

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Pages 48 and 2 attachments

December 2020

Diaconia University of Applied Sciences

Master of Social Services

Community Development and Conflict Resolution

The aim of this research was to find topics that should be discussed in order to strengthen women's right to a healthy environment. This aim was achieved by evaluating what the impact of climate change has been on Sub-Saharan African women in recent years, getting an insight to women's daily struggle with their environment which is vulnerable and is easily affected by climate change.

The literature review study consists of 9 articles published between 2014 and 2020 in Sub-Saharan Africa. The data was analysed using an inductive thematic analysis method. The analysis on the impact of climate change on women resulted in three main categories: loss of livelihood, diminishing health and poor finances. Sub-Saharan African women experience climate change differently from men because they depend on the environment and natural resources for everyday needs such as food, firewood and water. They depend on the land for food which can also be used as a means of generating income. The data also shows that the process of getting firewood for energy and water in an environment that is vulnerable and affected by climate change impacts women's general health negatively.

The main findings were that to strengthen women's right to a healthy environment, women need to have equal land rights to men to improve their lives in the area of livelihood and finance. Gender equality in decision-making and women's participation in legislature will mean implementation of climate change adaptation programs that will be beneficial to women by women. While the state can support women by enforcing some laws against the influence of culture and traditions, NGOs can also support and/or hold the government accountable to do their job if failing and fight for the rights of women against climate change.

In conclusion, land rights, socio-economic inequality, sustainable development, education, efficient climate change policies and adequate support are topics that should be discussed in order to strengthen Sub-Saharan African women's right to a healthy environment and the result of this research can be used as a pointer for NGOs in protecting women's right against the effect of climate change.

Keywords: climate change, environment, women, human rights, women's rights, Sub-Saharan Africa

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LIST OF ABBREVIATIONS

IPCC - Intergovernmental Panel on Climate Change

NGO - Non-governmental Organisation

CEDAW - Convention on the Elimination of all Forms of Discrimination Against Women

UNDP - United Nations Development Programme

AU – African Union

UNFCCC - United Nations Framework Convention on Climate Change

1 INTRODUCTION

Africa, according to the Intergovernmental Panel on Climate Change (IPCC) is the most vulnerable to climatic changes (Serdeczny, Adams, Baarsch, Coumou, Robinson, Hare, Schaeffer, Perrette & Reinhardt, 2015) with Sub-Saharan Africa as the most vulnerable region due to its reliance on agricultural activities as a means of food and income generation. These agricultural activities are easily affected by atmospheric condition such as temperature, precipitation, wind direction and speed, humidity and atmospheric pressure (Ibe & Amikuzuno, 2019).

The effect of climate change on a man is different from that of women and girls. In Sub-Saharan Africa, women and girls are responsible for bringing water into the household. Certain activities such as cleaning, childcare, cooking, pregnancy, sanitization, and so on reveal the inequalities regarding the effect of climate change on both genders. A large number of women are found in the Agricultural sector in Sub-Saharan Africa, therefore the effect of climate change on agriculture directly affects them (Zoloth, 2017, p. 139-140). The effect of climate change on atmospheric pressure provides a conducive atmosphere for germs and disease to prosper and spread faster as seen in the Zika virus which affects pregnant women and their unborn child. The neurological effect of this virus also means that women are burdened with the lifelong care of the child that was infected. (Zoloth, 2017, p. 142)

A rapid increase has been seen in the effect of climate change on our environment either on television, radio, newspaper, social media, and first-hand experience. Having lived in Finland for the past 10 years, my knowledge about climate change has significantly grown but even at that, I have not thought of climate change and women's rights in the same context. It is not only important to combat climate change but also understand how it affects us as humans, especially African women.

The aim of this literature review is to find what topics that should be discussed in order to strengthen women's right to a healthy environment, an environment where they can live and prosper. The role of Non-governmental Organisations (NGOs) in the fight for human and women's rights cannot be overemphasized as seen in the area of policies. The

combination of the Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW) agreement and NGOs whose agenda is in women's right has had a positive impact on the outcomes of women's right (Bell & Banks, 2018). NGOs are constantly promoting gender equality and the empowerment of women in Africa, but women's rights are still being violated (Amnesty International, 2019) through culture and traditions in some Sub-Saharan African countries (Enchanove, 2017). Climate change is another phenomenon that is being discussed in connection to women's rights. NGOs, therefore, will benefit from developing themes that can be used as a guide in understanding Sub-Saharan African women's struggle with climate change with the hope that it can be used to protect women's right from the effect of climate change.

2 SIGNIFICANCES FOR WORKING LIFE

As part of the requirements for master's thesis, research should be done with a working life partner. Unfortunately, effort to contact the chosen human right NGO was unsuccessful due to the global pandemic. Therefore, the utilization of the result of this thesis is directed to human right NGOs in Sub-Saharan Africa with the hope that it can be useful in strengthening women's right to a healthy environment.

Human rights NGOs are organizations whose aim is to promote common goals at both national and international level, they support the mission of the United Nations which is to fight for the common good of everyone (Kaloudis, 2017). NGOs promote and bring to the United Nations new and developing ideas that is both important on policy and operational level (Appiagyei-Atua, 2002, p. 265).

Discrimination, marginalization and violence against women occurs regularly in some African countries and this is because of cultural traditions that are institutionalized by unjust laws. While some level of progress has been made in some countries, women are still exposed to assault and different types of sexual and gender-based brutality in some countries (Amnesty International, 2019 p.11). Integrating African women in economic development through reforms in education, technology and income generation has been slow. Women are seen as home makers, are deprived of their right to be involved in policies and decision making and are still struggling to accord the same rights as men (Dibie & Dibie, 2012, p. 96).

More than half of Africa's population are women and they are underrepresented by the government, NGOs in Sub-Saharan Africa are therefore responsible for addressing issues that women are faced with. The inequality women are subjected to damages sustainable development efforts in all African countries, these unequal treatments are further supported by traditions and culture which obstructs human rights. NGOs are therefore responsible for collaborating with the government by openly discussing violations in order to protect women's right by eliminating cultures and traditions that violates women's right (Dibie & Dibie, 2012, p.107-109).

A lot has been achieved for African women through NGOs and these includes elimination of abuses against women, improving their health status by speaking against early marriage, female circumcision, education and training for women and men, equality in accessing jobs, property, and leadership positions (Dibie & Dibie, 2012, p.116). This therefore makes them the right organisation to collaborate with in order to protect women's right against the effect of climate change. According to NGO explorer (2020), there are over 8,000 NGOs in Sub-Saharan Africa, some of these NGOs include:

- Amnesty International: promotes of human rights (including Human Rights education, research and related activities).
- Client Earth: promotes and protects the environment for the public benefit, using the law to provide legal assistance to those who otherwise do not have access thereto, to promote education on environmental rights and responsibilities and to conduct research thereon.
- Womankind Worldwide: UK-based women's rights organisation working to transform women's lives in Africa, Asia and Latin America, and to create lasting change for the future. They support women to transform their lives and their communities by working in partnership with women's rights organisations in Africa, Asia and Latin America.
- Amref Health: works with some of the most remote and marginalised communities on the African continent, ensuring they can access their right to health. They believe women and girls have the power to effect lasting change in their communities.
- War on Want: fights poverty in developing countries in partnership and solidarity with people affected by globalisation. We campaign for human rights and against the root causes of global poverty, inequality and injustice.

The significance of NGOs is identified with their policy advocacy ability and are therefore quickly turning into a more significant component in the advancement cycle turning into the core of African civil society (Lutabingwa, J., Gray, K., & Skinner, E., 1997). Hopefully, the result of this thesis will be useful in the advancement of women's right.

3 THEORETICAL CONCEPTS

Concepts are the building blocks of the theories or topics being researched, studied, compared and how they identify with each other. It is an abstract description of the phenomenon been described. (Shoemaker, Tankard Jr & Lasorsa, 2004). Concepts for this thesis was developed with key words chosen through the main topics, climate change, environment, women, human rights, women's rights, Sub-Saharan Africa.

3.1 Climate change and the environment

Werndl (2016) explains that to be able to accurately define climate change, it should satisfy five criteria which are: the definition is to be empirically applicable; classify different climates correctly; it should not depend on our knowledge; should apply to the past, present and future; and should be mathematically well-defined, no definition has been able to satisfy all criteria. However, climate has been defined as the weather over long periods (Herman, 2018) and climate change is a long-term shift in global or regional climate patterns. (National geographic, 2019)

There is a limit to the amount of waste the earth can sustainably support and exceeding these limits is what leads to climate change (McKinney & Fulkerson, 2015 p. 3). For example, woods isolate carbon dioxide discharges and bring clean back oxygen. Be that as it may, when a populace discharges more carbon dioxide than the woods can ingest, the overabundance gas collects in the environment and intensifies worldwide warming and general environmental change patterns. In this manner, the overshoot of carbon absorption limits causes a type of climatic injustice that compromises livelihood of people the world over (McKinney & Fulkerson, 2015, p. 3-4).

The environment has been defined as air, water, and land in or on which people, animals, and plants reside (Cambridge Dictionary, 2020). Humans have suffered diseases and even death due to the effects of climate change. This is expected to continue in the future because of climate-induced changes in the physical conditions, emission, and atmospheric

interaction. The quality of the air we breathe is dependent on weather conditions and therefore is sensitive to climate change. (Trájer, Nagy, & Domokos, 2019, p. 276)

High near-surface ozone concentrations which are mainly produced from organic compounds, carbon monoxide, and nitrogenous oxides and are emitted by industry, traffic, heating, and biogenic sources in urban and rural environments may lead to higher levels of hospital admission due to the increased respiratory morbidity and other adverse effects. Increased ozone concentration will result in cardiovascular mortality, hospital admissions for asthma and chronic obstructive pulmonary disease, allergic rhinitis, and an increase in respiratory problems. (Trájer, Nagy, & Domokos, 2019, p. 277)

3.2 Women rights are Human rights

Human rights have always assured equality between men and women, one of the purposes of the United Nations is to advance regard for human rights and fundamental freedoms “without distinction as to race, sex, language or religion” based Articles 13 of the mandate of the General Assembly and 55 of promotion of universal human rights (United Nations Human Right, 2014, p. 3). When the Universal Declaration of Human Rights was adopted in 1948, it also indicated that men and women have equal rights, while writing a version of the declaration, using the term “all men” rather than men and women was discussed. In the end, the terms “all human beings” and “everyone” was used to eliminate the uncertainty that the Universal Declaration was for everyone, both men and women. (UNHR, 2014, p. 3-4)

Women's rights are basic human rights such as the right to live free from violence, slavery, and discrimination; to be educated; to own property; to vote, and to earn fair and equal pay. These are rights that women are entitled to but are denied almost everywhere around the world because of their gender (Global fund for women, 2020). Women make up half of the population of the world and as such deserve the same rights as men. (UNHR, 2014, p. 43)

The constant disregard for women’s right led to the up rise in feminist and women’s movements, one of which at the international level is the Convention on the Elimination

of All Forms of Discrimination Against Women (CEDAW) in 1979 by the UN General Assembly, basically giving women their human rights treaty (Friedman, 2006). This is the most important legally binding international contract regarding women's human rights (WHO). According to the convention, discrimination against women is described as "...any distinction, exclusion or restriction made based on sex which has the effect or purpose of impairing or nullifying the recognition, enjoyment or exercise by women, irrespective of their marital status, on a basis of equality of men and women, of human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field." (UNWOMEN, 2000-2009)

The violation of the right to a healthy environment affects every part of basic human right because human right is indivisible and interrelated. The right to life, health, food, water and sanitation is affected when poisonous substances is dumped on the land and river on which people rely on for food, poisoning and possibly killing them, the right to make a living is also affected because some people depend on the land and river for income generation, as seen in the Niger delta conflict in Nigeria (Herbert & Husaini, 2018). A healthy environment allows for the enjoyment of these rights which are all basic human right that everyone should enjoy.

Culture and traditions have constantly been used to violate women's right in Africa and Makina & Moyo (2016) gave two examples of this, i) a rural setting in Cameroon where traditional rules hinder women's ability to farm and, ii) in an urban setting where the tradition states that the firstborn child inherits the father's estate when he passes on, the inheritance was opposed and revoked in the magistrate court because the firstborn child is a woman. The court allowed this discrimination stating that "it is the nature of African society", this is a clear example of how culture and traditions can be used to influence property rights and power relations that oppose institutional policies and legal framework against women. (Makina & Moyo, 2016, p. 1194)

3.3 Climate change and human right

African Union (AU) undertook a limited but meaningful recognition of the relationship between global warming and human rights, basically invoking the inclusion of

fundamental rights in climate change negotiations (Quirico, 2017). Lanyi (2012) linked the effect of climate change to human rights stating that the effect of climate change can be direct (bushes and fire) and indirect (effect on human lives e.g. illnesses, access to safe water, hunger, poverty, and so on). The author also discusses the effect on economic, social, and cultural rights. The effect of climate change can affect people's right to food as a rise in temperature, erosion, livestock reduction, and so on will affect how crops are been harvested and eventually a reduction in how food is generally been grown. The right to water is affected by heatwave and water shortages which will in turn affect drinking water and sanitation. The right to health is affected because human health is determined by a healthy environment. In the absence of a healthy environment, the result is a high rate of diseases, malnutrition and even mental health suffers (Lanyi, 2012).

The framework principles of human rights and the environment states that humans are part of nature, and our rights as humans is linked together with the environment in which we live. Harming the environment interferes with the enjoyment of human rights, and the exercise of human rights helps to protect the environment while also promoting sustainable development. The reason for the mandate is to study human rights obligations relating to the enjoyment of a safe, clean, healthy, and sustainable environment promote best practices of the use of human rights in environmental policymaking, identify challenges and obstacles to the full realization of human rights relating to the enjoyment of a healthy environment and conduct country visits and responds human rights violations (Knox, 2018). The goal is to be able to achieve clean air and the right to a healthy and sustainable environment, a safe climate, and good practices on the right to a safe, clean, healthy, and sustainable environment. (United Nations, 2020)

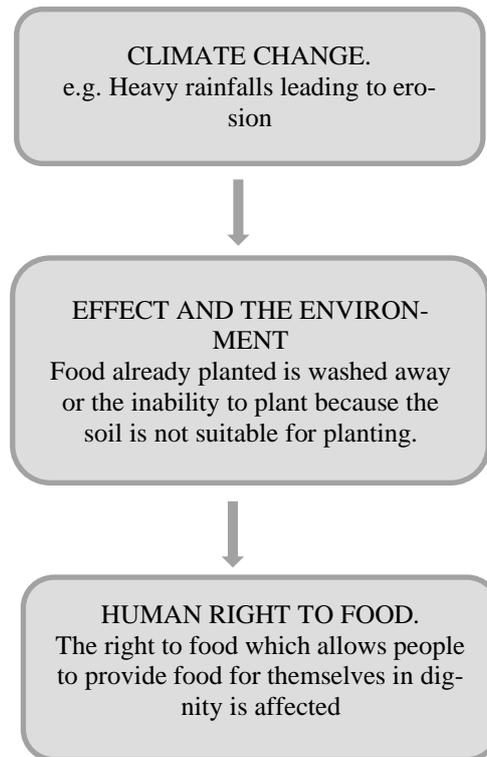


FIGURE 1. An example of the effect of climate change on the right to food

3.4 Climate change in Sub-Saharan Africa

Climate change is one of the biggest problems currently challenging humanity in the 21st century. The effect of climate change in Africa has created a socio-environmental challenge, the result of which will affect the economy and socio-ecological system (Makina & Moyo, 2016 p. 1185). The effect such as extreme weather, flood, and drought causes food insecurity, scarcity of water, and loss of an animal which is most visible within the poor and vulnerable population who depend on natural resources for one thing or another. IPCC predicts that the effect of climate change by 2030 is going to be catastrophic if no change is made (Louis & Matthew, 2020). Countries like Kenya has been listed as one of the nations dealing with water scarcity which might continue because of the deterioration of the climate (Grillos, 2018)

Sub-Saharan Africa's developing economy and population is being negatively affected by poverty and undernutrition due to the effects of climate change such as temperature changes and extreme heat on agricultural systems. Climate change projections for Sub-Saharan Africa highlight a warming pattern, especially in the inland subtropics (successive events of outrageous heat functions, expanding lack of moisture and changes in precipitation). Sub-Saharan Africa is experiencing high rates of undernutrition and infection which can be attributed to the effects of climate change. The most vulnerable to these climatic changes is the agricultural system on which a large portion of the population depends for livelihood (Serdeczny et al., 2015)

IPCC acknowledges that countries in Africa are more at risk to the effects of climate change because the governmental institutions lack ability which could be in the form of resources, knowledge, or interest that may sometimes be readily available within institutions or individuals. Another reason is the culture and traditions in some Sub-Saharan African countries which could hinder the State's ability to respond to its people such as the male-to-son inheritance in Zimbabwe where the court ruled in 1999, that a Sub-Saharan African woman had no right to inherit property from her late father (Echanove, 2017, p.28). Gender roles and responsibilities could also affect policymaking negatively. (Makina & Moyo, 2016, p. 1191)

3.5 Climate change, the environment, and the African woman

Gender and Climate Change Human Development Report from the United Nations Development Programme (UNDP) linked gender equality, poverty, and climate change together. Women are mostly affected by climate change because they are constituting the larger part of the world's poorest. The roles women perform socially have made them more vulnerable to climatic changes due to their dependence on natural resources. Sub-Saharan African women residing in rural areas depend on wood, charcoal, and agricultural waste for energy and therefore, face difficulties regarding how energy is provided and used. Girls have had to give up education to collect firewood for the family which can lead to generational poverty (Chikulo, 2014). Climate change also affects infrastructures which in turn causes ineffective mobility for women, they are then left with no choice but to move from one location to another or face the effects which are sometimes

disastrous. Women are exposed to trading their bodies for monetary purposes or resources in order to support themselves and their families (Jegede, 2017).

The social division also plays a role in women's vulnerability to climate change, responsibilities such as the provision of food and energy means that as climatic conditions change, they need to work harder to provide food and energy for the family which could mean doing extra hard work or means of money earning to ensure food security. The physical and emotional toll of working long hours to provide for their families affects their health which is not the case for the man, men usually have time to relax while women do not, this could also lead to the man having extramarital affairs which increases the chances of unwelcome health problems for women (Chikulo, 2014).

The physical labor of carrying and transporting firewood on their head over a long period causes a certain degree of damage to some parts of the body such as the spine, neck, and lower back and even complication to childbearing. Women risk their lives daily to collect firewood as they are exposed to falling, snake bites or attacks from wild animals, assault, and rape. Long-term inhalation of carbon monoxide from firewood burning also contributes negatively to their health especially to those in the poorer family. (Makina & Moyo, 2016, p. 1188)

Women also have the responsibility of water provision and domestic activities like washing, and so are exposed to water-borne diseases caused by climate change. Some have had to result to sharing water from the same source with their animals due to water shortages. (Louis & Matthew, 2020)

The roles of men and women have also been affected, women have been left with little choice other than to put up with the effect of climate change. It has been noted that most women with low sustainable economic activities in South Africa, Eastern Cape, and Limpopo regions have had to step in the role of men because men have the freedom to move when faced with the effect of climate change. Women do not have the same freedom because culture dictates that a woman is the caregiver and manages the home. (Louis & Matthew, 2020)

4 METHODOLOGY

Research methodology is the process of systematically describing how a researcher designs a study to ensure the research is well grounded and the results are reliable as it address the aims and objectives of the research. Methodology shows how the researcher decides on what data to collect, who are the participants, how data is collected and how the data is analysed (Jansen & Warren, 2020).

4.1 Aim and research question

This study aims to describe the effect of climate change on Sub-Saharan women and their rights in order to develop topics that should be discussed to strengthen women's right to a healthy environment. The research question is:

What is the impact of climate change on Sub-Saharan African women's lives during 2014 - 2020?

4.2 Literature review as the research method

Literature review was chosen as the research method. Literature review as a research method can serve as a means of assessing collective evidence in a specific research area, it creates a firm basis for propelling information and encouraging development thereby finding areas where there is further need for research (Snyder, 2019, p. 333) and this is it was chosen as the research method for this study.

Leavy (2017) also describes a literature review to be an effective evaluation of a chosen document on a research topic, it is used to get background and to check previous findings and helps to discover important and relevant variables related to the topic. It is a published explanation of a subject by certified personnel. It should be organized such that it is immediately associated with the research question of the thesis (Leavy, 2017). Literature review allows to search for appropriate literature, evaluate sources, identify the idea of

the literature, define the structure, and eventually write the review (Shona, 2019). Data was collected from different online databases. The articles about climate change are quite broad, especially in connection with human rights.

Sub-Saharan African women as the focus of the thesis also enable the author to find a broad approach in order to generate enough articles for study. A literature review was performed systematically to research articles about the effect of climate change on women and their environment in Sub-Saharan Africa, and how women's rights can be strengthened when they are faced with the challenges of climate change. The search from the different databases generated thousands of articles about climate change in connection with the environment, people, places, and so on. Keywords and synonyms were used according to different databases. Databases chosen for data collection are EBSCO academic search premier which is an academic institutions database that contains scholarly researched data that are accurate and reliable and ProQuest which is the largest multidisciplinary single research resource in the World. Some of the search terms were tailored according to each database to avoid a large number of results.

TABLE 1. Search terms according to database

Database	Search terms
Academic Search Premier	climate change OR global warming AND women OR female OR woman OR females AND Sub-Saharan Africa
ProQuest	climate change AND women OR females AND Sub-Saharan Africa

Literature in the English language from 2014 to 2020 was decided on. Keywords and functions of the databases were also decided on using the PCC (Population, Concept, Context) identification tool.

TABLE 2. PCC identification tool. (The Joanna Briggs Institute, 2017)

Topic: Climate change and women rights in Sub-Saharan Africa What is the impact of climate change on Sub-Saharan Africa women 's lives during 2014 - 2020?			
	Population	Concept	Context
PCC	Sub-Saharan Africa	Climate change	Women

4.3 Inclusion and exclusion criteria

According to Arksey and O'Malley (2005), inclusion and exclusion can be set later during the study process and not at the beginning. However, for this study, some criteria such as type of article and time frame were set at the beginning to avoid an unreasonable amount of results. Exclusion criteria such as population not in Sub-Saharan Africa, men, and articles earlier than 2010 were then set after the initial data search. The focus of the study was on women or females in Sub-Saharan Africa.

TABLE 3. Inclusion and Exclusion Criteria of the study

Inclusion criteria's	Exclusion criteria's
Written articles in the English language	Non-English language articles
Articles are written with full text	Non-full-text articles
Sources from 2014 – 2020	Sources older than 2014
Climate change and women or females	Not related to climate change and women
Peer reviewed	Not peer-reviewed
Articles from Sub-Saharan Africa	Articles not from Sub-Saharan Africa
Studies	Literature reviews

After the initial database search, most of the articles were based on other participants other than women, and in some cases duplicate of an article was found in another database

search engine. Reading through the titles narrowed down the search thereby reducing the number of the study found considerable and finally reading through the abstract of each article enabled the author to decide which article to read in full text to determine if the study is beneficial to the scoping study. See Figure 2 for the search process.

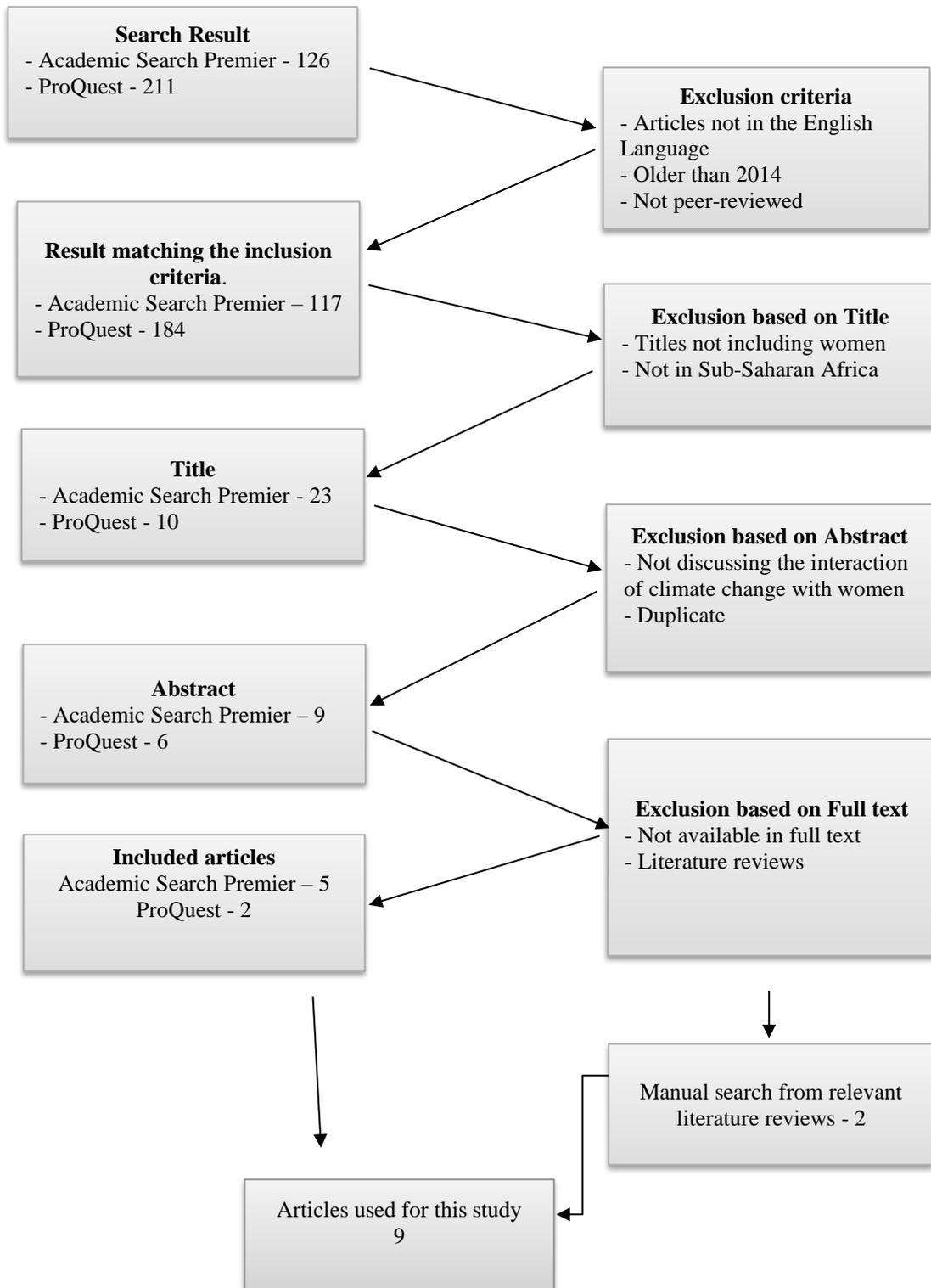


FIGURE 2. Search Process

The database search from both databases yielded 336 results, exclusion criteria of articles not in the English language, older than 2014, and not peer-reviewed was set giving a total of 301. The titles of each article were read and articles whose title was not related to women in Africa reduced the results to 33 articles. The next step was reading the abstract of each article to get an understanding of the article was useful for the research, some articles were presented twice and so one was excluded and then article not discussing the interaction of climate change with women is also excluded from the search giving a total of 15 search result.

Articles that were not available in full text were excluded leaving a total of 9 articles. 2 out of the 9 articles found were literature reviews which meant that they could not be used for the study and was excluded leaving 7 articles. Therefore, a manual search was done by searching the references of the literature reviews which yielded 2 articles which were within the study criteria and was therefore included in the articles that was useful for this thesis, bringing the total number of included articles to 9. The table of included articles is presented in appendix 1.

4.4 Data analysis

Thematic data analysis was chosen to analyse the data. "Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data. It minimally organizes and describes your data set in rich detail". Thematic analysis makes it possible for a researcher to identify similarities in data and form a meaningful pattern from the collected data. The steps of thematic analysis are to get familiar with the data collected, generate codes, searching for themes, reviewing themes, defining and naming themes, and finally producing the report. Data were analysed using an inductive approach, this means that the themes identified are based on the data collected specifically for this research, and researchers' interest in the area of study. An inductive approach ensures that data is coded without presumption and thematic analysis is solely based on data collected. (Braun & Clarke, 2006)

Articles were thoroughly read to get an idea of what possible themes are available and look for potential interest. Articles were reread while extracting interesting ideas for

analysis. Data in the articles were systematically read with attention to all information, available quotes from the different studies were grouped under themes. Once themes were found, each theme was examined to find which themes will come together to form an overarching theme which is the main theme. For example, “Increased poverty” and “Lack of adequate education” were found to go under the main theme “Poorer finances”. Themes were moved back and forth to ensure that they are in the appropriate category. Three main categories were found for what is the impact of climate change on women’s lives during 2014 – 2020: loss of livelihood, diminishing health, and poor finances and under these three categories, subcategories were found. An example of the analysis process is shown in table 4 below.

TABLE 4. Analysis example.

Main category	Subcategory	Condensed meaning of quotes	Quotes
Poorer finances (1,3,6,8,9)	Increased poverty (3,6,8,9)	Inability to afford basic healthcare	“Compounded to these dire effects of climate change, most participants lamented lack of access to basic health care facilities to for treatment or prevention of ailments dovetailed by climate change.” (3 p.15775)
		Women farmers are poor due to climate change	“Climate change impacts on smallholder farmers most of them who are women is aggravated by poverty and perennial inequalities. Inequality serves as a barrier for sustainable adaptation and effective mitigation” (3 p.15770)
		Rural women are not able to afford medical cost	“According to WEDO (2016), notably, most rural women in Africa are crippled with webs of poverty trapping them in very dimension and they are unable to meet the medical costs during times of family illnesses and health hazards emanating from climate change are worsening their circumstances.” (3 p.15775)
		Inability to embark on other income generating activities	“The cutting down of trees for firewood and for medicinal purposes is having a backlash on the environment which they should protect. In the same line of argument, the scarcity of firewood means high labour for women and this decreases the opportunity for them to embark on other income generating activities where men enjoy much freedoms” (3 p.15776)
		No time to make money	“the depletion of the forest resources means women must shoulder extra burdens to secure the scarce resources which suffocate their participation in other income generating initiatives” (3 p.15776)
		Land inequality causes poverty	“Women’s poverty is partly due to unequal access productive resources such as land” (8 p.15459)
		Inability to afford healthcare	“most rural women in Africa are crippled with webs of poverty trapping them in very dimension and they are unable to meet the medical costs during times of family illnesses” (3 p.15770)
		Income generation through recycling	“I know how to sort and price paper and plastic.” (6 p.151) “We collect the waste and we can now also buy waste from the community; our buy-back centre is good for this.” (6 p.151)

5 RESULTS

This thesis included nine studies that at some level discussed climate change effect on women and some gave suggestions for interventions in order to protect Sub-Saharan Africa women's right against the effect of climate change. All studies were carried out in Sub-Saharan Africa with women as participants.

Out of the 9 studies selected for the research, 1 (Ampaire et al. 2020) was an appraisal approach study that shows the role of commission in gender focused climate change education in Uganda and Tanzania. 3 of the studies was a desk study (Kabaseke 2020; Echanove 2017; Jegede 2017) examining women's land rights and climate change adaptation in Uganda and Kenya; understanding policy gaps and climate change resilience towards women and small-scale farmers in Zimbabwe; examines the role of commission gender focused climate change education in South Africa, 1 (Grillos 2018) was a quasi-experimental study to evaluate an intervention that aimed to increase drought preparedness and women empowerment in northern Kenya.

1 (Louis & Mathew 2020) was a qualitative study to determine the effects of climate change on rural women in South Africa, 1 (James 2014) participatory action study to understand student narratives on community partnerships which were developed for climate change mitigation in South Africa, 1 (Nhamo 2014) was a study conducted to assess whether climate change policies include gender and women from East and South Africa and the last one (Munien 2014) was a mixed methodological study shows that there was a negligible difference in the awareness and perceptions of factors contributing to climate change amongst men and women South Africa.

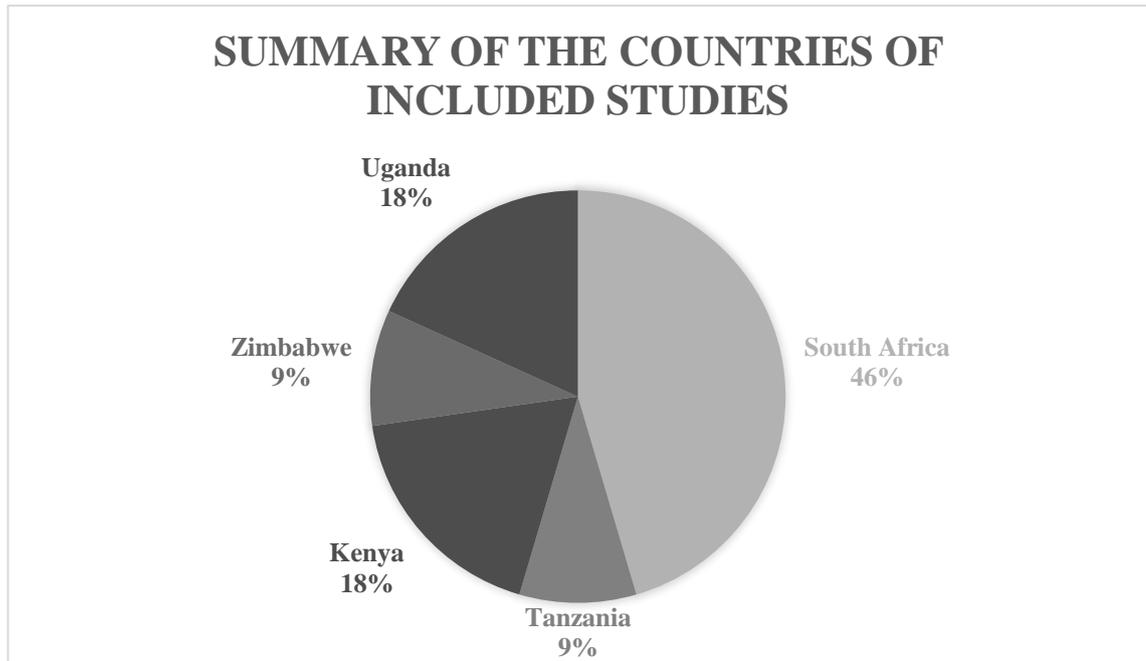


FIGURE 3. Summary of included studies

5.1 Impact of climate change on women's lives during 2014 – 2020

Based on the included articles, three main categories emerged: loss of livelihood, diminishing health, and poor finances. Below is the presentation of the main categories and subcategories, for the full coding sheet see appendix 2.

TABLE 5. Impact of climate change on Sub-Saharan Africa women lives during 2014 – 2020

Main categories	Subcategories
Loss of livelihood	Malnutrition
	Increased environmental disorder
Diminishing Health	Weak physical health
	Unsteady mental health
	Reproductive health suffers
	Rise in incidence of diseases
Poor finances	Increased poverty
	Lack of adequate education

5.1.1 Loss of livelihood

The impact of climate change affects the daily lives of Sub-Saharan African women in the area of livelihood is as a result of the dependence on the land which is sensitive to climate change and the responsibility they hold as the supplier of food, water, and energy for the household (Kabaseke, 2020 p.15467). The Agricultural sector which mainly includes women is also affected by climate change in various manners. Changes in temperature and precipitation affect harvest yields and animals, climate conditions additionally influence the accessibility of water required for the water system and animals (Louis & Mathew, 2020 p. 15774 – 15775).

Women mostly in rural areas depend on the land and environment for their livelihood which can be easily disrupted by climate change. Unfortunately, when this is combined with factors such as poverty, they are not able to just leave because of their social responsibilities as homemakers and they have children who depend on them (Jaggernath, 2014 p.97). This is not the case for men who can move more freely to search for greener pastures (Grillo, 2018 p. 2).

Women in most Sub-Saharan African countries are then taking on extra work to maintain food security in the household, this includes walking long distances to fetch water (Ampaire et al.,2020 p. 50). The combination of drought and climate change sabotages food production and can result in famine when combined with other factors such as food importation (Echanove, 2017 p 18). Women's exclusion in energy and climate change adaptation or planning makes their vulnerability worse therefore making sustainable livelihood worse (Munien, 2014 p.117).

Inadequate access to water and sanitation also affects maternal and the mortality rate is higher especially in rural areas where natural resources are in abundance and vulnerable to the effects of climate change. Water plays an essential role in improving maternal well-being during pregnancy and after delivery. Some women have had no other option than to buy water which is not an option for everyone as it is expensive as stated by one of the women (Louis & Mathew, 2020)

"...It's difficult to do other things now because we spend much of our time looking for water and we are getting it very far, sometimes, to save time we resort to buying water when we have money, they sell a 25 liter of water for R5 and a drum for R100..." (3)

Many women farmers are not able to plant their crops due to high temperatures which destroy them, animals die because of hunger and thirst as a result of low rainfall. The combination of these also results in poverty within women households. Natural disasters as a result of too much rainfall are also a concern and with the women unable to prepare themselves appropriately has resulted in the loss of property and leaving some of them traumatized, one of the women said

"...I have been staying here since 1987 and there was no problem. All my furniture, blankets and groceries were damaged, and I do not have money to replace or repair them, I did not sustain any major injuries, but I am extremely shocked....." (3)

5.1.2 Diminishing health

Natural resources that women rely on for energy, heat, and water have been affected by climate change and resulted in women walking long distances to get firewood and water. The physical consequences of firewood collection over a long period while risking falls, animal attacks, or assault by criminals can result in physical exhaustion and damage to the body. These physical damages are not limited to the body, but reproductive organs are affected also (Munien, 2014 p.122). Women in communities lament of high rise in water-borne diseases such as malaria which is as a result of low rainfall and rivers that do not flow, water is stagnant and mosquitos are able to breed there by multiplying and the result is high rate malaria. High temperatures in the region is also resulting to skin diseases and this are cases they were not experiencing before. Some have resulted to sharing water with their animals or sharing from the same source which promotes diseases as stated by a participant

"...Lack of rainfall is causing most of the diseases; we are drinking water from the same sources as animals causing a lot of diseases..." (3)

A study by Louis and Mathew establishes that too much or too little in rainfalls are resulting in diseases which were not common in the area (Louis & Mathew, 2020 p.15774). The psychological effect of experiencing a near-death during a flood is also what women have to experience. This is because they are physical, not able to escape these dangers and so are traumatized by the experience, one participant of the study carried out by Louis and Mathew expressed her experience as

"...All along I thought God is not going to destroy us with floods like during Noah's era but what I have seen so far Mmmmm, I think anytime we can die with these thunderstorms and harsh rains. Some of us are helpless when things go bad because I have a lot of consideration in the middle of the disaster..." (3)

".... From my experience in this community, I learnt that women are highly affected by disasters because by nature, women are physiologically and physically weak to escape danger. Even those who survive danger end up traumatised more than men..." (3)

5.1.3 Poor finances

The effect of climate change on women's finances has resulted in the inability to afford basic health care for themselves or their families and the prevention of diseases caused by climate change. Women farmers are affected by poverty which does not give room for sustainable adaptation necessary for protection against climate change (Louis & Mathew, 2020 p. 15770). The difficulty and time used in searching for firewood and water for their families mean they are not able to invest their time in other income-generating activities which can better their financial situation or invest their time in getting an education that shields them from poverty. To make matters worse in some communities, girls spend all their time looking water and do not go to school, this easily leads to generational poverty when every girl in the family is subjected to the same faith (Louis & Mathew, 2020 p.15776)

Women are most affected by climate change because of their low levels of education, limited social mobility, exclusion in decision-making processes, unequal access to resources, assets and opportunities (Louis & Mathew, 2020 p.15770) as seen in the study by Munien (2014) when the respondents of the surveys for sampling framework were mainly female because the surveys were administered during working hours thus

revealing that most men were working while the women were at home. The study also revealed that women had low level of education and skills which is typical of a low-income household (Munien, 2014 p.119-120). However, women stand a better chance against poverty if gender-budgeted activities were directed towards awareness creation such as educating women about income-generating activities and gender-based violence and training youth in leadership (Ampaire et al. 2020 p.54).

Gender contrasts is connected to women's financial and social rights. Poverty is pronounced among women farmers who face discrimination and are afraid of making financial investments on land for the fear of losing them because landowners which are men (Kabaseke, 2020 p.15460). Socially, men are the heads of families so regardless of whether the women develop food on their husband's property, whatever profit that was made must be given over to their husbands. Men will buy more land yet will not state women as benefactors or co-proprietors of the land. Some women still give their husbands their money (as a sign of respect) and when they abuse this practice, they are seen as disobedient or may even be accused of adultery (Kabaseke, 2020).

6 DISCUSSION

Several studies have shown that women are the most affected by the effect of a changing climate in Sub-Saharan Africa because of their dependency on the environment and natural resources for daily life. The literature review has shown that women are major players in agriculture, natural resource managers, and agents of change. However, women are small scale farmers due to the limited access to assets such as land, water, and technologies to be able to protect themselves against climate change (Jaggernath, 2014 p.95).

Africa is a patriarchal society this means that there is a socially-built framework where men have the primary power which influences numerous parts life, from political authority, business, establishments, monetary frameworks, and property possession, directly down to the family home where men are viewed as the top of the family unit. Women are therefore subjected to gender inequality which promotes discrimination against women regarding resources such as land, this is so engraved in the society so much so that it affects legal framework implementation because it is influenced by culture (Kabaseke, 2020 p. 15460).

Decades of discussion about women having equal rights and access to land and natural resources which they depend upon is been affected by climate change because of men who own and control the land (Louis & Mathew, 2020 p. 15771). It is customary in most Sub-Saharan African countries that married women lose access and control of land and property after the death of a husband or separation because properties are usually purchased in the name of the husband. Women are therefore sent back to their fathers' house should there be a divorce, where male relations are also in charge because properties are relinquished to them (Kabaseke, 2020 p.15466).

Article 17 of the 1948 Universal Declaration of Human Rights (UNDR) states that “everyone has the right to own property alone as well as in association with others. No one shall be arbitrarily deprived of his property” especially based on their gender and CEDAW Committee in 2016 issued its general recommendation No. 34 certifying “rural women’s rights to land, natural resources, including water, seeds, forestry, as well as fisheries, as fundamental human rights.”. This right for Sub-Saharan African women is also

fundamental to their ability to survive the effect of climate change because the violation of the right to own land threatens the right to food and the progress on gender equality and sustainable development. (OHCHR, 2017)

Some legislation in the law in some Sub-Saharan African countries allows women and children to inherit land the same cannot be said for widows and divorcees and neither does the policy provide a means of improving such legislation which is of a disadvantage for women (Ampaire et al. 2020 p.54). Women are therefore dependent on men regarding land ownership, making it hard for them to make decisions regarding climate change adaptation strategies that will improve their lives. In some cases, the loss of husband and cattle among women-headed households who have no other means of generating income and poor customary rights to land and other property have resulted in increasing poverty. (Jaggernath, 2014 p.95-97)

The right to food is affected due to climate change effect on food security, this could be prevented if women had land rights thus allowing them to make their own decisions about the land that they depend on. According to Kabaseke (2020), women's land rights should include ownership, control, access, and decision making concerning the land (Kabaseke, 2020 p.15467). Therefore, rights over land assets for women in Sub-Saharan Africa is important to improve income opportunities, improve access to services, and eliminate poverty (Jaggernath, 2014 p. 98). Furthermore, the discrimination women face directly affects all aspect of their lives including education and finance (UN, 2012 p.4).

Studies have also shown that community based environmental education and awareness is an important intervention method of enlarging women's understanding of climate change while also getting them involved in the decision-making process in policy development (Nhamo, 2014 p.159). Educating small scale farmers such as women about climate change will not only equip them with knowledge and skills to prepare themselves and recover easily from environmental hazards but will also have a positive effect on their life expectancy and socio-economic chances (Echanove, 2017 p. 41).

According to the World Bank (2011), educating young women in the developing world will be important in enhancing countries future resilience against climate change. The high illiteracy level has been also established with women because social norms and

behaviours associated with women such as the long-distance search for energy and food limit their access to education which in turn endangers them. After all, they are ill-prepared for climate change (James, 2014 p.159).

An example of the benefits of female education is a study carried out in 2014 in connection with a non-profit student organization called ENACTUS enrolled female students for climate change initiatives. At the end of the study, students commented that they gained knowledge about what climate change is and how it is different from global warming, others said they now understand the dual power in the ability of trees as a source of food and cleaning up excess carbon in the air we breathe thereby purifying it (James, 2014). Another study carried out to empower women in decision making revealed that women explicitly requested that a training program be provided to their men, to help them see the need for livelihood diversification and women's role in drought preparedness (Grillos, 2018 p.4). This will also serve as a means of support for women in stepping up and taking control of their lives both in the household and hopefully in their community too.

Gender in some Sub-Saharan African countries is viewed as a “women’s issue” (Ampaire, 2020 p.56) and as such men who are mostly represented in politics do not consider gender inequality a problem because it does not affect them. Women's interest is mostly discussed by female members of the parliament in Uganda showing that an increase in women’s participation in the legislature will increase political participation by citizens who are women (Grillos, 2018, p.13). Women are also found to be knowledgeable about ecology, social, and political topic because of their daily interaction with the environment, this knowledge can contribute positively to climate change adaptation (Nhamo, 2014 p.159) but, unfortunately, women are often excluded in the decision-making process which should not be so considering they are the most vulnerable to the effect of climate change (Louis & Mathew, 2020 p. 15771).

Recognizing the significant commitments of women as decision-makers, partners, instructors, careers, and specialists across areas and at all levels can prompt fruitful, long haul answers for climate change. They have demonstrated to be driving the route towards more even-handed and maintainable answers for climate change. Across divisions, women's developments and mastery have changed lives and occupations and expanded climate strength and general prosperity. Equal rights to access and full participation in assistance

programs that empower women and increase their ability to recuperate from and manage with environmental tension and extreme weather disasters are important (Jaggernath, 2014 p. 95-97).

It is estimated in South Africa that over half of poor people are women. Out of the population of 11.9 million people, more than half of female-headed households are poor as oppose to male-headed households.” (Chikulo, 2014 p.5962). When women are not able to acquire lands used for income generation due to inequality directed towards them from laws and customs, this easily translates to men getting rich and women been poor which is no surprise why they are stated as the poorest in South Africa. Some of these inequalities are lost of access and control of land due to the death of the spouse, divorce, or separation. Lands which women depend on for money are mostly given to male children; women in a polygamous marriage cannot have access to land considering is a lot of wives; women who do not have children are not considered at all and when a woman loses her husband and they have no children, the husband’s land and the property is inherited by the closet relatives leaving the woman with nothing (Kabaseke, 2020 p. 15465 – 15466).

Electricity and water are sustainable ways to protect women against climate change, clean energy is vital for women’s well-being in terms of reducing the time spent on collecting firewood, cooking, and heating as well as supporting other livelihoods activities (Chikulo, 2014 p.5963). When electricity is available, women can easily pump water from boreholes, this eliminates the need to walk a long distance to fetch water and collect firewood. This means women can invest in free time for leisure, education, or whatever they chose to do in their free time and this is supported by studies that suggest that electricity for women meant better education, opportunities, television, health, and safety as well as more leisure time for both men and women (Chikulo, 2014 p.5964).

Recycling and tree planting are also a sustainable method of cleaning the environment while easily making money. Plastics and bags that are waste products are reprocessed and reused, this has been used and by a non-profit student organization where female students were taught about climate change initiative, one of which was tree planting. When interviewed, some of the students stated that they gained knowledge on how recycling can be a means of generating income by using waste such as plastics and tyres to make bags,

mats and shoes. The process of tree planting was also beneficial to them as they can now understand how it reverses the effect of climate change (James, 2014).

Women should be able to enjoy the right to a healthy environment where they can live and prosper, therefore the state has a responsibility to protect the ones who are most affected by climatic changes so they can easily adapt (Kabaseke, 2020 p.15462). This means that the state has a responsibility to protect, educate and support women against the effect of climate change while also protecting the rights and fulfilling the mandate of the United Nations Framework Convention on Climate Change (UNFCCC) that states that "parties are required under article 6a(i) to develop and implement educational and public awareness programs on climate change and its effects" (Echanove, 2017 p. 17)

An NGO can also support women by supporting and/or holding the state responsible when women's right to a clean and healthy environment is been violated. NGO's can influence the government in developing a participatory planning system that involves having a community conversation (Grillos, 2018 p.3). NGO's also promote gender equality and human right which is necessary for women against the effect of climate change, they can support women in terms of coping and adaptive capacities to environmental change while also holding the state accountable to do their part. The environment in which women rely on to grow food, provide energy, feed their livestock feed their families, and make a living is been destroyed by climatic changes. This indirectly affects their human right and these impacts have been studied in Sub-Saharan Africa. (Ampaire et al. 2020 p.50)

NGOs can help rural officials in preparation, application, and execution of projects on environmental protection, socio-economic parameters, land security, technology, education, access to information, infrastructure, and services are also ways women can be supported. An example of a coping and adaptive capacities to environmental change in Sub-Saharan Africa is the Naam Movement in Burkina Faso which is a women's organization that uses the knowledge and skills of rural women to promote environmental sustainability (including the development and dissemination of locally-based energy-efficient technologies) and to educate local communities about environmental degradation. (Jaggenath, 2014 p.96)

Climate change affects all humanity as seen all over the world and with my background and my origin, I can understand how women are affected by climate change and the importance of protecting them against these effects. This thesis process has not only developed my professional knowledge and skill, it has also broadened my knowledge in the field of research-based approach by being able to acquire and analyse large amount of information critically in order to produce new understanding. Data search, collection and analysis has broaden my knowledge about climate change and the environment and its effect on women in Sub-Saharan Africa and I have been able to achieve the aim of the research which is topics to be discussed to strengthen women's right to a healthy environment. My understanding of the chosen topic, research and development process is also deeper because I am able to apply existing knowledge in my field while following the rules of ethical research practices according to the Finnish Advisory Board on Research Integrity.

6.1 Further Research

According to the articles used for this research, almost half of the data was generated in South Africa and since there are many countries in Sub-Saharan Africa with probably different cultures and traditions, it would be important to research the impacts of climate change on women in each country which will also allow NGOs interventions to be tailored to each country's need.

The result of this study reveals the impact of climate change on women's lives are loss of livelihood, diminishing health and poor finances. Therefore, it would be logical to research finding ways or how to tackle the impacts of climate change effect on women's lives.

7 CONCLUSION AND RECOMMENDATION

This literature review has shown that women are more vulnerable to the effects of climate change. More than half of all black African farmers in South Africa are women, and they outnumber men by 65% in the category of farming as an extra source of food. Damage to the environment interferes with human right and so the effect of climatic changes on women affect their human right.

Some laws protect women's rights in connection with the environment, however, the patriarchal society in Sub-Saharan Africa undermines these laws. Women have the right to own lands, but traditions hinder their rights and the patriarchal nature of Africa does not help as landowners are mostly men. Property rights are been manipulated by traditions and this is used to violate women's right to own properties such as land which indirectly exposes them further to the effect of climate change including poverty. Laws regarding land and property ownership should be strengthened such that discrimination based on tradition against women will be put to halt, this will protect women against the effect if climate change and reinforce them as decision makers.

Other factors such as socio-economic inequality also limit women and so are not able to afford to buy land, however, education, sustainable development, and support can be used to uplift women and equip them to be decision-makers in deciding issues that concern them. Even with the establishment that climate change experience is different from a woman's point of view and that they are major players in adopting environmentally friendly behaviours, adaptation and mitigation policies do not encourage women as decision makers. Studies show that some policies include women while some do not even acknowledge gender, therefore women are at a disadvantage.

All agricultural and climate change policies should not only include women but women should also hold legislative positions so they can monitor and ensure that women are effectively represented in the decision-making process. Also, there is a need for education regarding the promotion of gender equality in climate change policies on regional to national level and adherence to standard on the international level.

Education for women about climate change is very important, Munien (2014) reveals that almost half of participants did not know the meaning of climate change although they understood the impacts due to changing weather, storms and constant rainfall. This also suggest that they are unable to connect scientific terms and local knowledge even though they have some degree of awareness about what climate change is, this could be reversed if education was incorporated into policies to educate the public, especially women. Educating women also helps them in making environmentally friendly decisions.

Educating the community in understanding the role of women also increases the likelihood of women been supported as decision makers as seen in the (Grillos, 2018) study. Women whose husbands were educated about women's ability to make implement change supported their wives at some level in making decisions in the household, but no changes were recorded at the community level. Therefore, there is a need for political awareness and access to decision making spaces so that women can make important changes in the community level.

Sustainable development such as electricity and light are seen to have a positive effect on women's wellbeing and their human right. However, some of the impacts of climate change on women is due to poverty. The government can support women by making electricity and light available and affordable by implementing projects in low-income communities and rural areas so women can enjoy electricity, the impacts of climate change on their health will also be greatly reduced. Studies have also shown that some women are unable to afford health care to treat themselves and/or family members who fall sick from the effect of climate change, healthcare can also be made affordable or even free to women thereby changing the diminishing health experience they are facing. Access to basic amenities such as these is one of the basic human right women deserve to enjoy.

The result of this research can be used by NGOs with agenda on women rights to formulate interventions for the protection and the empowerment of women such as

- Calling for the eradication of culture and traditions that are used to violate women rights when it come to land ownership while also ensuring equality between men and women in the enjoyment of same rights in property ownership.

- Often, these women do not even know that they have these rights and so do not know the difference when their rights are been violated. NGOs can create public awareness to educate rural women on what their rights are so violations are appropriately reported and addressed, this will also serve as a means of collaboration between women and NGOs to not only support women but also to effectively bring change.
- NGOs can also speak out against the inequality in legislative positions, women's perspective need to be taken into consideration to come up with effective policies that protect women against the effect of climate change. This will also mean that women are appropriately represented and are included in the matters that affect them. Women, especially in rural areas should be involved in household, political and economic decision-making.
- NGOs can collaborate with the government and private sector in coming up with a means of financially supporting women, for example a micro finance initiative that gives women the possibility to invest in land acquisitions, sustainable development, climate change adaptation strategies that will improve agricultural proceeds or start up food produce businesses. This gives women financial freedom and control over their own finances thereby creating economy security for women and reducing poverty.

8 ETHICAL AND AUTHENTICITY ISSUES

Literature review as a research method strength lies in its possibility to objectively and critically evaluate a question thereby allowing the researcher to understand the knowledge in the area of interest (Dawidowicz, 2010). According to Kumar (2011 p. 244), the research result should be relevant to working life. Therefore the research topic was selected accordingly as it is recent and relevant to working life, which is to examine the impact of climate change on Sub-Saharan women in recent years with the aim of finding topics that should be discussed to protect women's right against these effects.

I am from west Africa with a bachelor's degree in nursing and I have been working as a registered nurse in elderly care for four years. I have no other research experience apart from my bachelor's degree thesis, which was done with another student four years ago, I am not a professional or experienced researcher. Data collection was done by the author with the help of an experienced librarian in searching for appropriate keywords in searching for researches from reliable online databases in English language and also received support from supervisors in narrowing down the research topic. This raises the possibility that result could have been different if other languages were included from other sources apart from online database and the possibility of more result from other databases, if research was performed by multiple authors which could place a limitation on the result of this Literature review. The limitations of this study provide the possibility of further research on this subject.

Analysis and results are solely based on collected data, with care taken to include all relevant information gathered from past researches about the topic. All information gathered from other researchers' articles and included in this research has been cited accordingly to avoid any misconduct. Data collection, limitations and results of this literature review has been described as clearly as possible, analysis process, researchers background and experience has been described to show transparency. (Kumar, 2011 p. 245-246)

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APPENDIX 1 – Chart of included articles.

Author and year of publication	Methodology	Objectives	Participants, country of origin	Impact of climate change
Ampaire et al. 2020	Gender-aware policy appraisal approach, content analysis	To articulates how the Commission can inform a gender focused climate change education in South Africa	Uganda Tanzania	Livelihood Finances
Grillos 2018	Quasi-experimental approach	Evaluate an intervention that aimed to increase drought preparedness in northern Kenya pastoralist communities through the empowerment of women at the household and community levels	Women, northern Kenya.	Livelihood
Louis & Mathew 2020	qualitative methodology guided by multi-case study design	to determine the effects of climate change on rural women	Women and traditional leaders in South Africa	Finances Health Livelihood
Jegede 2017	Study	Articulates how the Commission can inform a gender focused climate change education in South Africa	South Africa	Livelihood Health
Echanove 2017	Desk study	To become a baseline to better understand the policy gaps and implementation challenges in Food and Nutrition Security and Climate Change Resilience towards women and small-scale farmers in Zimbabwe.	Women and small scale farmers in Zimbabwe.	Livelihood
James 2014	participatory action research approach	To understand student narratives on perceptions of the three projects and community partnerships were developed for climate change mitigation	six female students from the University of KwaZulu-Natal Westville, Edge-wood and Pietermaritzburg campuses in South Africa	Health Finances

Nhamo 2014	Thematic analysis	To assess whether climate change policies include gender and women	East and southern African countries	Livelihood
Kabaseke 2020	A desk study where descriptive and analytical method are used	Analyses the connection between land rights of women and climate change adaptation in Uganda and Kenya and how existing law and policy respond to the normative gaps and practices in respect to land rights of women	Women in Uganda and Kenya	Livelihood Finances
Munien, S. (2014)	Mixed methodological approach	shows that there was a negligible difference in the awareness and perceptions of factors contributing to climate change amongst men and women	Women and men from KwaZulu-Natal, South Africa	Livelihood Health Finances

APPENDIX 2. Code sheet for impact of climate change on Sub-Saharan African women during 2014 – 2020.

Main category	Subcategory	Condensed meaning of quotes	Quotes
Loss of livelihood (1,2,3,4,5,7,8,9)	Malnutrition (1,3,4,5,8,9)	No safe water	lack of adequate access to safe water and sanitation is a key factor in maternal and child mortality, and is dramatically more pronounced in rural settings susceptible to the effects of climate change” (4 p.9894)
		Difficulty in getting water	”Acknowledges a higher vulnerability of women and children to climate change (e.g., increased time burden due to longer distances needed to fetch water)” (1 p.50)
		No access to food	” Household access to food is constrained by poverty, declining remittances, low productivity, inadequate employment opportunities, high food prices and recurrent weather shocks, and by economic instability, low growth, deflation and lack of liquidity” (5 p 41)
		Low food production	”In relation to food production, Wolfenson (2013), Maxwell and Fitzpatrick (2012) show that both drought and desertification associated with climate change can undermine food production, serve as a trigger for famine or when combined with other factors including dependence on importation of food sources, they can cause significant changes in the price of food” (4 p 9891-9892)
		Importance of water in daily life	“Women in rural areas that depend on collecting natural resources, including firewood and fetching water to maintain their family’s livelihood” (4 p. 9896)
		Women are deprived of livelihood activities	”the execution of development projects in developing countries does not only dispossess women of their livelihood activities, it brings about major decimation of the environment.” (4 p. 9894)
		Food insecurity as weather changes	“The number of food insecure households begins to dramatically increase from June-September, October-December with the highest peak of food insecure households being recorded during the January-March quarter. Women are the most affected with this development because they lack essential farming resources which are climate responsive’. ‘We used to produce more than enough even for selling but this is no longer the case. Our soils are wasted hence it is affecting our crop production efforts. The is no food coming out of those dry fields you saw” (3 p.15772)
		Difficulty getting food and water	“when land is affected, women are the most affected. It means that women will walk longer distances in search for food, water and firewood” (8 p. 15467)
		Food is expensive	“Many households in the rural areas are net food buyers: they do not produce enough food to meet their needs through to the next harvest season, purchasing up to 65% of their maize from markets. Food purchases make up 56% of household expenses” (5 p.19)
		Food insecurity caused by erratic rainfall	“Erratic rainfall, driven by climate change causes peaks in food insecurity every four to five years” (5 p. 18)
		Climate change affects the right to food	“In the face of climate change, the food security of households is threatened, which affects the right to food” (8 p. 15467)
		Low water availability	“We are now leaving like scavengers, always looking for water. Water availability is now a nightmare. We don’t know where we are heading. How are we going to survive without water like this” (3 p.15773)
		Water scarcity	“It’s difficult to do other things now because we spend much of our time looking for water and we are getting it very far, sometimes, to save time we resort to buying water when we have money, they sell a 25 litre of water for R5 and a drum for R100...” (3 p.15773)
Difficulty accessing water	“...Water is a serious problem, since I was born, I have never seen problems of this nature, we now find it very far and I can’t walk for long distances because of my health, so I wait for my grandchildren to come back from school to fetch water for me” (3 p.15773)		
Thinking of relocating because of water scarcity	“...I grew up in this village and I fell in love with it but the way we are struggling with water, if there was a chance I would relocate to somewhere where the situation is better, I don’t know what to do...” (3 p. 15774)		

		Women's livelihood suffers	Failure to recognise the role of women in energy and climate change planning exacerbates their vulnerability and further jeopardises livelihood sustainability(9 p.117)
		food is expensive	"Increasing climate pressures will inevitably lead to rising food prices weighing heavily on household and national budgets. Disadvantaged social groups will therefore be condemned deeper into hunger and malnutrition" (5 p.20)
	Increased environmental disorder and natural disaster (2,3,7,9)	High temperature and drought	"In planting, we have stopped doing that because of the high temperatures and the drought, it discourages you from continuing to plant. When you try like I tried this year ...but the crops wilt and dry up and fall to the ground it is discouraging" (3 p.15772)
		Low rainfall	"...It's a chain of calamities my brother, climate change affect agriculture since crops wouldn't grow well and animals die due to starvation and hunger as a result of shortages of water due to low rainfall. Due to high temperatures crops wilt and animals die. Death of livestock due to lack of water and pasture result in inadequate access to protein in diet..." (3 p. 15774 – 15775)
		Floods and thunderstorms	"All along I thought God is not going to destroy us with floods like during Noah's era but what I have seen so far mmmmmm, I think anytime we can die with these thunderstorms and harsh rains. Some of us are helpless when things go bad because I have a lot of consider in the middle of the disaster..." (3 p.15775)
		Environmental degradation due to bad weather	"From a climate change perspective, they are therefore more exposed to impacts since research shows that extreme weather conditions (especially floods and droughts) are likely to contribute to environmental degradation" (9 p.121)
		Destruction of property due to flood	"...I have been staying here since 1987 and there was no problem. All my furniture, blankets and groceries were damaged, and I do not have money to replace or repair them, I did not sustain any major injuries, but I am extremely shocked....." (3 p.15775)
		Women are more affected by natural disaster	"It has been well documented that women are more vulnerable during times of climate change-induced natural disasters" (7 p. 157)
Diminishing health (3,4,6,9)	Weak physical health (3,6,9)	Water scarcity influences diseases	"...Climate change is causing scarcity in water resources thereby influencing diarrhoea diseases. I think climate change is the major cause of most health problems we are experiencing in the community. We used not to experience this before..." (3 p.15774)
		Skin infections caused by high temperature	"A significant proportion of households attested that excessive temperatures are the order of the day and exposure to heat waves is causing some skin infections though they failed to state ways through which their skins were affected." (3 p.15774)
		High blood pressure caused by high humidity	"The hours of exposure to continuously increasing humidity levels poses a threat to the well-being and health of the elderly woman (their blood pressure), but because they need the money they generate from collecting waste material, they put their lives at risk and collect regardless of the humidity levels. Having pointed out the impact climate change has on the beneficiaries' profits and health, I feel that the very environment they try and protect by recycling and alleviating pollution is the very environment that may hinder their growth and sustainability" (6 p. 154)
		Indoor pollution	"shifting reliance from traditional sources such as fuelwood and kerosene (locally referred to as paraffin) which have been associated with indoor pollution to more sustainable energy options, will have positive outcomes on the household" (9 p.117)
		Walking long distance to collect firewood will affect the body	"In fact, it is possible that women will be expected to walk longer distances to collect natural resources, including fuelwood, as environmental quality is undermined and resources become scarce due to increased population pressures and climate change" (9 p. 121)
	Unsteady mental health (3)	Trauma from home destruction caused by floods	"Women were victims to the floods as compared to men. A number of 156 families were displaced. Elderly women living in mud huts had their homes destroyed. These participants gave an account of the trauma they reeled with during the floods" (3 p.15775)
		Women experience trauma after disasters	"... From my experience in this community, I learnt that women are highly affected by disasters because by nature, women are physiologically and physically weak to escape danger. Even those who survive danger end up traumatised more than men..." (3 p.15775)
		Women are traumatized due to property destruction	"It emerged that women who saw their assets and properties being destroyed and their beloved ones being injured were psychologically traumatized." (3 p. 15775)

	Reproductive health suffers (3,4,9)	<p>Reproductive health suffers because of climate change</p> <p>Maternal and child mortality due to water scarcity</p> <p>Miscarriages cause by indoor pollution</p>	<p>“This study further established that climate change is leading to the depletion of local herbs that are essential for human beings and livestock. Most women reported to be using the herbs for maternal and reproductive health” (3 p.15776)</p> <p>”lack of adequate access to safe water and sanitation is a key factor in maternal and child mortality, and is dramatically more pronounced in rural settings susceptible to the effects of climate change. Resurgence of diseases in areas where such was previously unheard could increase mortality of pregnant women and girls.” (4 p.9894)</p> <p>”Burning of fuelwood within the household produces harmful gases such as carbon mono-oxide, which is linked to health problems (such as infant mortality, headaches and miscarriages) and respiratory illnesses” (9 p. 122)</p>
	Rise in diseases (3)	<p>Diseases due to lack of rainfall</p> <p>Water borne diseases caused by floods</p> <p>Malaria caused by excessive rainfall</p>	<p>“...Lack of rainfall is causing most of the diseases; we are drinking water from the same sources as animals causing a lot of diseases...” (3 p. 15774)</p> <p>“rising water levels and increased frequency of floods due to climate change will balloon water borne diseases and women will be impacted adversely by diseases like malaria.” (3p.15774)</p> <p>“It was further established in this study that changes in rainfall or excessive rainfalls are leading to the emergence of diseases which were not common in the area. The outbreak of diseases such as malaria is as result of rampant breeding of mosquitoes” (3 p.15774)</p>
Poor finances (1,3,6,8,9)	Increased poverty (3,6,8,9)	<p>Inability to afford basic healthcare</p> <p>Women farmers are poor due to climate change</p> <p>Rural women are not able to afford medical cost</p> <p>Inability to embark on other income generating activities</p> <p>No time to make money</p> <p>Land inequality causes poverty</p> <p>Inability to afford healthcare</p> <p>Income generation through recycling</p> <p>Inequality induce poverty</p> <p>Women are at home during working hours</p> <p>Poverty caused by lack of education</p>	<p>“Compounded to these dire effects of climate change, most participants lamented lack of access to basic health care facilities to for treatment or prevention of ailments dovetailed by climate change.” (3 p.15775)</p> <p>“Climate change impacts on smallholder farmers most of them who are women is aggravated by poverty and perennial inequalities. Inequality serves as a barrier for sustainable adaptation and effective mitigation” (3 p.15770)</p> <p>“According to WEDO (2016), notably, most rural women in Africa are crippled with webs of poverty trapping them in very dimension and they are unable to meet the medical costs during times of family illnesses and health hazards emanating from climate change are worsening their circumstances.” (3 p.15775)</p> <p>“The cutting down of trees for firewood and for medicinal purposes is having a backlash on the environment which they should protect. In the same line of argument, the scarcity of firewood means high labour for women and this decreases the opportunity for them to embark on other income generating activities where men enjoy much freedoms” (3 p.15776)</p> <p>“the depletion of the forest resources means women must shoulder extra burdens to secure the scarce resources which suffocate their participation in other income generating initiatives” (3 p.15776)</p> <p>“Women’s poverty is partly due to unequal access productive resources such as land” (8 p.15459)</p> <p>“most rural women in Africa are crippled with webs of poverty trapping them in very dimension and they are unable to meet the medical costs during times of family illnesses” (3 p.15770)</p> <p>“I know how to sort and price paper and plastic.” (6 p.151)</p> <p>“We collect the waste and we can now also buy waste from the community, our buy-back centre is good for this.”(6 p.151)</p> <p>“The patriarchal society in Africa has created women’s dependence on men. Women have to seek men’s approval with every decision they have to take concerning land, including the earnings that they make from accessing land. This makes it difficult for women to access credit to invest in lasting solutions to climate change” (8 p. 15466)</p> <p>”The dominance of female respondents could have been attributed to the sampling framework, as all surveys were administered during work hours, and may also suggest that gender divisions of labour are still prevalent within households in Bergville with more women being at home” (9 p.119)</p> <p>”Additionally, poor levels of employment among women may be perpetuated by the limited levels of education and skills which are characteristic of low income households within South Africa” (9 p.120)</p>

	Lack of adequate education (1,3)	<p>Women are vulnerable due to lack of education</p> <p>Educating women on how to make money</p>	<p>“Feminist writers like Macgregor (2010) denotes that the vulnerability of women to climate change impacts is caused by low levels of education, limited social mobility, exclusion in decision making processes, unequal access to resources, assets and opportunities” (3 p.15770)</p> <p>”Gender-budgeted activities were aggregated into (i) awareness creation (educating women about income-generating activities and gender-based violence, and training youth in leadership)” (1 p.54)</p>
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1) Ampaire et al. 2020, 2) Grillos 2018, 3) Louis & Mathew 2020, 4) Jegede 2017 5) Echanove 2017, 6) James 2014, 7) Nhamo 2014, 8) Kabaseke 2020, 9) Munien 2014