

Vulnerability and resilience of female farmers in Oku, Cameroon, to Climate Change

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Abstract

The experience of climate change is filtered through ones existing cultural, social and economic vulnerabilities. The rural poor in natural resource dependent communities in various African countries are likely to be negatively affected by climate change. In many cultures female farmers are considerably worse off than their male counterparts. This study makes use of a life history methodology in order to examine the particular nature of the vulnerability experienced by rural women in Oku in the Bamenda Highlands region of Cameroon. Gender is linked to vulnerability through a number of factors. These include access to and control over land, division of labour, marriage relationships, access to education and responsibility for dependents. Participants' life histories show how vulnerability in the region develops over time and is both complex and non-linear. Nevertheless, the participants expressed how they used their agency, both individual and collective, in coping with vulnerability. They narrate different adaptation strategies employed including livelihood diversification, and changing farming practices. Understanding the role of gender in shaping women's vulnerability is useful in informing the design and implementation of adaptation policies. This article makes an empirical contribution to the discussions on the need to engender climate change research, policy and actions.

Key words: *Vulnerability, Cameroon, Gender, Life history, Climate, Resilience.*

Résumé

L'expérience du changement climatique est filtrée à travers les vulnérabilités culturelles, sociales et économiques existantes. Les ruraux pauvres des communautés dépendantes des ressources naturelles dans divers pays africains sont susceptibles d'être négativement affectés par le changement climatique. Dans de nombreuses cultures, les agricultrices sont nettement moins bien loties que leurs homologues masculins. Cette étude utilise une méthodologie d'histoire de vie afin d'examiner la nature particulière de la vulnérabilité des femmes rurales à Oku dans la région des hautes terres de Bamenda au Cameroun. Le genre est lié à la vulnérabilité à travers un certain nombre de facteurs. Ceux-ci comprennent l'accès et le contrôle de la terre, la division du travail, les relations matrimoniales, l'accès à l'éducation et la responsabilité des personnes à charge. Les histoires de vie des participants montrent comment la vulnérabilité dans la région se développe avec le temps et est à la fois complexe et non linéaire. Néanmoins, les participants ont expliqué comment ils ont utilisé leur agence, individuelle et collective, pour faire face à la vulnérabilité. Ils décrivent différentes stratégies d'adaptation utilisées, y compris la diversification des moyens de subsistance et l'évolution des pratiques agricoles. Comprendre le rôle du genre dans la détermination de la vulnérabilité des femmes est utile pour éclairer la conception et la mise en œuvre des politiques d'adaptation. Cet article apporte une contribution empirique aux discussions sur la nécessité d'engendrer des recherches, des politiques et des actions sur le changement climatique.

Mots clés: Vulnérabilité, Cameroun, Genre, Histoire de vie, Climat, Résilience.

1. Introduction

Climate change and its associated impacts such as floods, droughts, heat waves, increased frequency of extreme weather events, changes in seasonality and associated environmental degradation is felt in many regions around the globe and impacts those who rely directly on agriculture for their food security (IPCC, 2007, 2013, 2014). Rural women and men in low income countries are particularly vulnerable to climate change because their livelihoods regularly depend directly on natural resources which are sensitive to climatic risks (UN Women Watch 2009; Ekblom, 2012; IPCC, 2014). It is generally argued that women are more vulnerable than men to climate change, particularly in subsistence agriculture based economies, as gender inequalities limit women's adaptive capacity (Dankelman 2002; Commission on the Status of Women 2008; UN Women Watch, 2009; Babugura et. al 2010; UNDP, 2011; Elinder and Erixson, 2012; Jost et al. 2016).

This research focusses on the Cameroon where climate change is expected to have an impact on women, who constitute 75% of the farming population and who play a major role in food crop production (Ntsama and Epo, 2009; Raney et al., 2011; GFAR, 2016). It is argued that female farmers, who are already facing numerous challenges such as lack of inputs, insecure access to land, lack of access to adequate labour and farming

technology will be seriously impacted by climate change (Argarwal, 2003; Molua, 2009; Ndoping, 2012; Njoh et al., 2017). Research has highlighted the ways in which climate change affects women involved in agriculture, particularly those in low income countries, indicating the possibility of yield losses and food shortages (Laux et al., 2000; Molua, 2002; Laux et al., 2008; Tingem et al. 2008; Tingem and Rivington, 2009; Babugura et. al, 2010; Ribeiro and Chaúque 2010; Ngondjeb, 2013, Ravnborg et al., 2016; Pearse, 2017). This research focuses specifically on female farmers' vulnerability in Oku Sub-division, North West Region, Cameroon.

2. Gender and Vulnerability

The concept of vulnerability was originally developed in hazard and disaster studies, as a way to explain how various groups in society would be affected differently by a natural hazard or disaster (Adger 2006; Smit and Wandel 2006; Bassett and Fogelman, 2013). Subsequently, the term has been used extensively to examine the potential differential impacts of climate change on different nation states and groups within nation states (IPCC, 2014). Vulnerability is defined as "the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt" (Adger, 2006, 268). Vulnerability includes physical risk to a person or property as well as the social, economic and political context that results in people experiencing worse impacts from a hazard.

In attempting to understand the way in which climate or environmental change might impact on natural resource dependent rural people, it is important to distinguish between adaptation and coping. 'Adaptation' is the term used to define change that takes place over the long term and leaves people better able to adjust to climate change in the future (Smit and Wandel, 2006; Eriksen et al., 2011, Bassett and Fogelman, 2013). The term 'coping' is used to identify ways in which people make small changes in the short term, just to get by. Coping strategies often leave people worse off in the future and can involve a spiral of worsening circumstances (Kleemann et al., 2016; Mehar et al., 2016; Alemayehu and Bewket, 2017). Examples that are often used in this context are the selling off of assets, taking children out of school to save fees or to make use of their labour in the home or fields. These 'adjustments' leave households or individuals in a worse position over the longer term (Devereux, 1993; Alemayehu and Bewket, 2017).

The confluence of gender and climate change remains under-explored in empirical research. This is partly because it is difficult to investigate the hidden and silent incidents which often occur at the intra-household level. It has been stated that "women in the global South are particularly vulnerable to climate-related dangers and resource scarcity" (Pearse, 2016, 1). Factors like race, class, income status, lack of political representation are often seen as exacerbating vulnerability (Huynh and Resurreccion,

2014). The confluence of the effects of these different factors on individuals or groups can be explained in terms of 'intersectionality' (Kaijser and Kronsell, 2014). The research presented here involves an empirical study that looks at whether or not gender, in this particular context, is a factor that exacerbates vulnerability.

This article explores the way in which climate change and human interactions are experienced differently by men and women in the Bamenda Highlands region of the Cameroon. In a recent review article on gender and climate change research in Wiley Reviews of Climate Change, Pearse (2016) highlights questions which would be of concern to research aiming to investigate the confluence of gender and climate change. The questions proposed by Pearse include the following "are women and men impacted by climate change in the same way? Have gender hierarchies been part of the social causes and consequences of climate change? How does gender intersect with class, race, ethnicity and sexuality in a changed climate?" (Pearse, 2016, 1). This article addresses some of these questions in a particular local setting.

Gender needs to be understood as something constructed and fluid, configured and constantly reworked differently in various contexts and societies (Arora-Jonsson, 2011; UNDP, 2011; Hirtenfelder, 2014). The dynamics of gendered positions in society or gender-based social relations can function to re-inforce existing vulnerabilities (Bunce and Ford, 2015). Many cultures have specific gender divisions in roles and responsibilities (Babugura et al., 2010; Kah, 2012). Climate change can therefore exacerbate the difficulties experienced by female farmers in this region. Gender, from a feminist analytical perspective, is not used to define essential differences between men and women, but rather to highlight engendered practices and the differentiated performance of rights and entitlements stemming from unequal power relations (Butler and Gambetti, 2013). Gender differences in the experienced impacts of climate change are filtered through gendered behaviours and lived realities within a particular society (Jost et al., 2016). Gendered vulnerability should thus be understood as a complex, nuanced and layered experience. Policy aiming to address the impacts of climate change should not therefore assume that these impacts are gender neutral or have no long-term gendered consequences (Kleemann et al., 2016; Wong, 2016)

Finally, women's agency in promoting adaptation should also be acknowledged (Djoudi and Brockhaus, 2011; Gabrielsson and Ramasar, 2013; Kleeman et al., 2016). Tschakert and Machado (2012, 276) argue that "lessons from adaptation illustrate that simplistic notions of women as vulnerable victims conceal deep-rooted inequalities, patterns of marginalization and unequal power structures." Therefore, researchers should be cautious not to portray women exclusively as victims, as this fails to acknowledge their potential as agents of change and actors in complex networks of adaptation (Tschakert and Machado, 2012). Women should be understood as both vulnerable and resilient, they constitute adaptive agents both collectively and individually and often act to change their circumstances and those of their dependents (Butler and Gambetti, 2013).

Collectively, women can increase their control over assets, improve on productivity, and enhance their status and wellbeing (Quisumbing and Pandolfelli, 2009, Cornwall, 2016). Social networks are recognized as important assets that women can depend on for personal and family livelihoods (Quisumbing and Pandolfelli 2009).

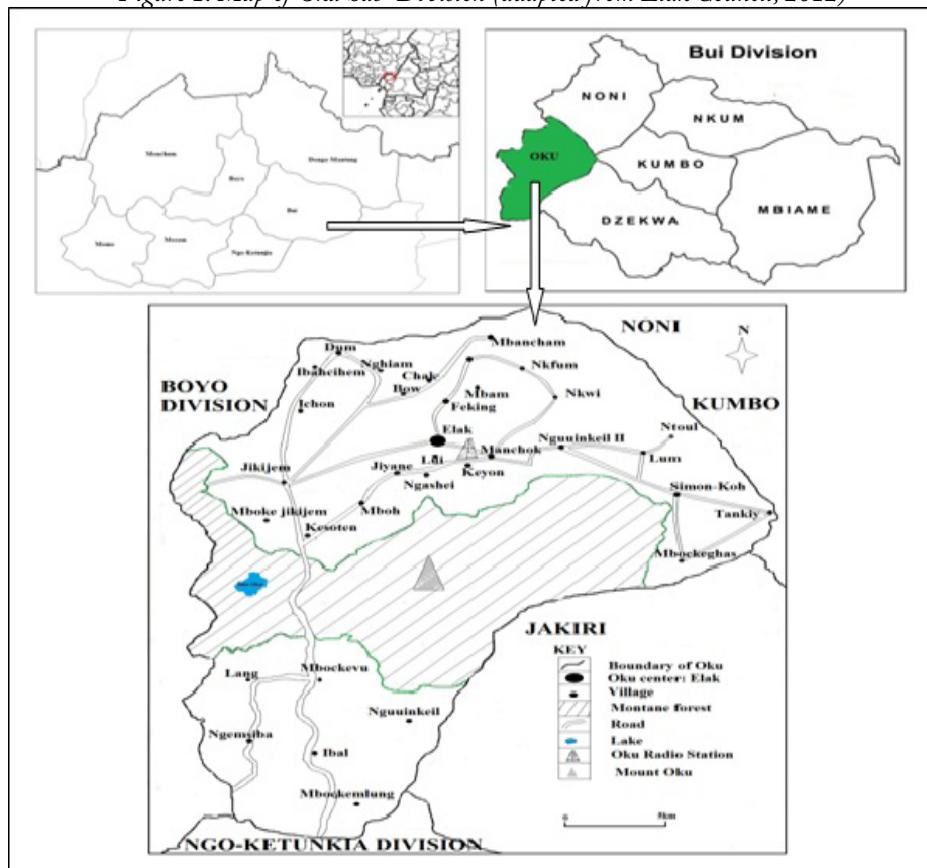
3. Research Site and Methodology

The study was carried out in Oku Sub-division, part of the Bamenda Highlands forest located in the Northwest Region of Cameroon. This area is of importance for research because it is located within a mountainous, ecological zone which has been experiencing increased temperatures, erratic rainfall, flooding and large-scale soil erosion. The study area covers an expanse of 372.50km² and the region has a population of 87,790 (Laux et al., 2010; UCCC, 2014).

3.1. Agro-ecological and Socio-cultural Background of Oku Fandom

The Kingdom of Oku is found in one of the mountainous areas of the Bamenda Highlands, Cameroon. Mount Oku is the highest point of the Oku Kingdom with an altitude of 3,011m, also ranked as the second highest peak in West Africa (Elak Council Baseline Report, 2012). Within the Kingdom, there are three distinct geographical and climatic areas. These include firstly the forested Kilum mountainous area at about 2,400m, which is uninhabited by humans. Secondly, the mountain foothills and highlands at about 2,000 – 2,400m, which constitute the central part of Oku. Of this region Elak is the capital and the villages of Lui, Ngashi and Manchok are the oldest and most populated of all. Finally, the lowland areas of Mbam-Barten in the North and Ibal in the South with an altitude of 1500-1800 meters have a warmer temperature and corresponding vegetation. The climate of all of the regions is classified by two distinct rainfall seasons namely the rainy and the dry season. The rainfall measures about 3050mm per year (Elak Council Baseline Report, 2012). The maximum temperatures range between 16.5 to 19°C and minimum temperatures between 9 to 10.5°C (Elak Council Baseline Report, 2012). Lake Oku is the main water body in the study area with other smaller streams and springs, it is a highland region and as such there are waterfalls in the area. The two largest rivers in the area are the River Mfve and the River Mie both flowing to Nigeria (Elak Council Baseline Report, 2012).

Figure 1: Map of Oku Sub-Division (adapted from Elak Council, 2012)



The livelihoods of most of the members of the Oku communities of the Bamenda Highlands region are directly linked to the natural environment (Asanga, 2002). The communities rely on the environment for farming, hunting, grazing, harvesting of medicinal plants, bee farming, crafts, fuel wood, water supply and building materials (Nurse et al. 1995; Asanga 2002). Agricultural production is the dominant livelihood activity in the highland region. The agricultural population in Oku comprises of mostly crop farmers, livestock farmers, poultry farmers and a small proportion of the population is involved in hunting and craft work (Elak Council, 2012). The farmers in Oku sub-division grow crops such as maize, solanium potatoes, beans, cabbage, tomatoes and huckleberry (Elak Council, 2012).

3.2. Life Histories and Gendered Vulnerability

The life history approach was chosen for this study because it allows insight into the complex nature of women's vulnerability (Ladkin, 1999; Roncoli et al., 2009). Initially a structured questionnaire method was piloted, but it was found that this method fell short of providing an understanding of the nuanced dynamics that shape gender-based vulnerability. The piloted study made use of a detailed questionnaire which would have resulted in a quantified vulnerability index of female headed households. But it was found that this method could only account for a woman's experience at that single point in time and could not account for how both gender and vulnerability are socially constructed, over time, in multiple complex ways.

The life history approach is gaining ground in multi-disciplinary feminist research. It has been applied in ethnographic, anthropological, sociological, health sciences and education. For instance, Roets and Goedgluck (1999) used the life history approach in a study to enable women facing learning challenges to speak out about these challenges and to find their voice. Through their research experience, Roets and Goedgluck (1999) made the following conclusions:

Feminist life history methods serve a political purpose, to "... negotiate openness, expose hegemonic power arrangements and inherent silences, highlight secrets of oppression and resistance, and revalue knowledge that risks being disqualified in current social sciences" (Roets and Goedgluck, 1999, p. 85).

For this research, the life history approach allowed the female participants an opportunity to tell their life story in relation to social, economic, political and environmental experiences. The research was conducted in November and December of 2015. A non-probabilistic, purposive sampling design was chosen for the study. This design enabled the field researcher to select female farmers whose livelihoods depended on farming and who were willing to share their life histories. Although each life history was completely unique, certain similarities emerged, particularly in relation to gendered experiences and this gave insight into intersectionalities and causes of vulnerability (Handwerker and Wonziak 1997; Crona et al., 2013; Kaijser and Kronsell, 2014). Detailed life histories were narrated by 10 female farmers, between the ages of 43 and 66, in the Oku region. The farmers were selected with the assistance of the Oku and Noni Sub-divisional Delegate of Agriculture. The delegate helped identify farmers in the community living within walking distance from the Kilum forests. A snowball method was then used with farmers recommending others for the study.

The women who participated in the study were informed that the information would be kept anonymous and as a result many shared intimate and emotional episodes integral to their life histories. All of the participants gave permission for their interviews to be recorded. A small sample was decided upon because the aim of the research was to engage deeply with participants. The initial interviews were a minimum of 2 hours each and return visits were made where additional information was needed. The life history discussions were then transcribed and analyzed thematically after the interviews had taken place. To create anonymity, while simultaneously not depersonalising the narratives, all of the women were allocated pseudonyms. The pseudonyms and the demographic participant information are summarized in Table 1 below.

Table 1: Pseudonyms and summary of participants in Oku life history research

Pseudonym	Age	Marital status	No of children	Education level
Melvice	63	Widow	10	Completed High school as an adult
Ayatou	64	Married	3	No schooling
Isabel	43	Widow	4	Part primary education
Charity	58	Married	9	Part primary education
Pamela	44	Single	3	Completed primary
Magdelene	44	Married	8	Part primary. 2 years vocational training on craft work as an adult
Emelda	64	Widow	7	No school
Evelyn	55	Married	7	Completed primary
Miriam	67	Divorced	0	Completed primary. Teacher training as an adult
Juliette	55	Married	6	Completed primary.

It is acknowledged that there are limitations to the life history methodology. The experiences narrated are individual and isolated and one cannot generalise too widely from these findings. However, this method was chosen because of the depth and the complexity that emerges from life histories, something which cannot be achieved through quantitative methods. Both gender and vulnerability are deeply complex experiences and so, although the limitations of this method are acknowledged, it was felt that this method was the most likely to provide insightful understanding. The themes relevant to women's vulnerability in the Oku region are discussed below.

4. Results: Responses to Changes in Weather Patterns

The women's narratives provided insight into their experience of vulnerability. Livelihood vulnerability and other aspects of powerlessness interacted with gendered experience making intersectionality a useful lens through which to view the effect of climate change on the women (Kaijser and Kronsell, 2014). Vulnerability emerged as a process that had developed over time, specifically due to lack of direct access to land, lack of access to education and familial responsibilities, the way in which all of these intersect with gender was examined (Butler et al., 2014; Wise et al., 2014; Njoh, 2017). Whilst highlighting their vulnerability, the research also aimed to identify the factors that enhanced women's resilience over the long term. In the section to follow the specific experience of climatic extremes in this region are introduced. Following which, the links between gender and vulnerability are highlighted. Finally, the factors which enhance resilience are discussed.

When asked about changes in weather patterns and how these affected farming, all of the female farmers mentioned that there had been changes in rainfall in the region. The experiences described by the female farmers corresponded with those anticipated by climatic research on the region (Tingem and Rivington, 2009; Laux et al., 2010; Fon, 2011). A number of the women stated that the rains had started coming earlier than in the past. The main rainfall season is generally expected to begin around mid-March and planting is generally done then. Initially their response to the earlier rains was to plant earlier, but in both 2014 and 2015 the early rains were interrupted and the crops failed. The observations made by the women relating to weather changes are included in Box 1 below.

Box 1

Charity

In the past we knew that rain will come during the second week of March then we begin planting; but now rain has started falling in February; so we started planting in February; its been about 4 years or more that rain has been coming in February; when rain started falling in February I was a victim of early cultivation. My crops suffered; some seeds got dried up and died.

Magdelene

In the past we knew that rain will fall on the 15th of March and we will begin planning farm preparation before its arrival; but nowadays rain comes earlier in February or later in March; in 2014 we really experienced early rainfall in February, people planted and the rain ceased and the crops that were just sprouting got dried up; I was also a victim; I lost the money that I had invested in buying seeds and I had to search for money to purchase seeds for replanting;

Juliette

In the past we knew that on the 15th of March the rain will arrive so we start preparing and even plant before the date; nowadays in certain years there is no rain in March, rain sometimes arrive in February and sunshine follows in March and April;

Isabel

Changes have been observed in rainfall pattern; in the past years rain use to fall in March but now it comes in February, we thought that it is dry season rain and we started planting; sometimes sun will appear and we will have three weeks to a month period of sunshine crops will not do well.

Other extreme weather mentioned by participants included “torrential rains,” “hail,” unpredictable rainfall, increase in temperature, extensive wind and water erosion. These climatic changes were associated with other environmental challenges such as soil erosion, destruction of crops, increase in the use of inputs, increase in pest and diseases.

5. Gendered Social Practices and Women’s Vulnerability

Climate change, both changes in temperature and rainfall will affect female farmers directly. Through the life histories it emerged that particular cultural and socio-economic practices worsen women’s vulnerability in Oku. The factors that emerged included: a lack of secure land tenure, leaving school before completion of studies, having an unplanned early pregnancy, being responsible for the care of ill adult dependants, arranged marriages and polygamous relationships in which resource allocation can be problematic. In addition, women narrated how they have coped with these difficulties and how furthering education, purchasing property, prioritising their children’s education and organising into women’s cooperatives are factors which strengthen their resilience over the long term.

5.1. Access to land and inheritance practices

The research revealed that women in Oku mostly access land through their parents or husbands. There is an important difference between access to land on which women labour and ownership of land, which most of the women do not have (Mehtar et al., 2016). Research elsewhere has shown how a lack of land ownership can limit women’s adaptive capacity (Fon, 2011; Jost et al., 2016). Their land rights are user rights not ownership rights (Njoh et al., 2017). Melvice, an elderly woman in the community, explained this cultural bias against women owning land as follows:

Melvice

Women had the rights to work on father or husband’s land but could not claim ownership over the land. A grown up man in the family can take over the land from a woman of the family to build his house or to give to his wife to cultivate. Women do not inherit the property permanently. When you are going to your husband’s family you leave the farm land.

Although all of the female participants actively farm food crops for their families, only three of the participants in this study actually own the land that they farm. Magdelene inherited land from her mother and this land was divided amongst three children. However, in her case she explains how it is not within her rights to dispose of the land. As she states: “the parcels of land are mine to cultivate, but I cannot sell them because they were given to my mother by my father; only my brother can sell the land when he has a problem which needs finance to solve, I cannot sell because I am a woman; even if he wants to sell the farm that I am cultivating, I have nothing to say ...”

Charity also indicates how she provides labour on her husband’s farm for both food crop and coffee production and yet does not have control over the income from the coffee:

“I also contributed labour in the coffee farm but never received any compensation. We know only when coffee is dried, we never know when he weighs and sells coffee. I do not know when he receives payment ...”. Melvice explains how land is becoming more scarce and this is also aggravating gendered practices over access to land. She states that: “at first it was easy to beg for farmland and a farm as long as you wanted but now a woman who has farmed on borrowed land for over 50 years is asked to quit the land [and] then conflict will ensue. I foresee a problem in the new trend of men getting involved in food crop production. Land will be seized from the women. Men take over land and sell. Family head[s] seize the land from women and sell to men who want to practice commercial farming. This is playing negatively on women.”

Women who had been able to obtain income through other means such as employment and were able to purchase their own farm had the most security with regards to continued access to land.

5.2. Access to education

None of the female participants in the study finished high school as children, something which limited their options as adults. Education expands the possibility of varied remunerative opportunities later in life. Six of the participants completed some or all of primary school, two had almost no schooling and two finished high school at a later stage. The two women who completed their high school studies when they were older were both able to find employment, as was another woman who completed

vocational training at a later stage. A number of the women explained that they had wanted to complete their schooling, but were not permitted to do so, or their families were not able to pay the school fees. Poverty and the cultural expectations of women formed obstacles to the educational access of the women who took part in the study. The way that women described their difficulties with regard to access to education are included in Box 2 below.

Box 2

Charity:

[O]ur family was a poor family. [O]nly 5 children completed [grade] seven; women did not go to school; I went to school and dropped out in [grade] 4 because then there was no money; money was hard to get; I had no uniform when I went to school; I used a piece of cloth which I wrapped around my neck in the place of a uniform; When I started primary school there was no school fees until I got to [grade] 4 then school fees were instituted; I had to drop out because of no fees; ...”

Magdalene:

“at the time female children were denied the right to go to school; I was interested in furthering my education but my uncle refused.”

Evelyn

I went to school up to [grade] seven; there was no one to sponsor my education further so I dropped out and joined my mother on the farm;

Miriam

..... my father had 3 wives; he was not interested in sending a girl child to school, his interest was to give us away in marriage. ... there was once a headmaster from Nkambe who was our neighbour; he had 2 girls who were going to school; I used to follow them to school and hide myself when they get into their classes; there was a day that they were asked to recite the things that they had been taught, I forgot that I was in hiding and shouted; they discovered me and reported [me] to the head master; he ordered that they should allow me to attend classes. The headmaster wanted to discuss my education with the my father but I begged him not to because my father will kill me; I suggested that he should speak to my mother; my mother said my dad was the hindrance to my education; she agreed to cover-up for me when I went to school. [S]he said she will pretend that I followed her to the farm and we will always return together after school.

Emelda

I started school and attended just for five days then someone came and convinced my father that women are not supposed to go to school. Then my father made me drop out

of school and told me that I will be working on the farm.

Two points emerge from these findings: firstly, women's education was not a priority in this community when the respondents were young (1950s and 1960s). Secondly, the women expressed strong views that obtaining higher levels of education would have empowered them to find alternative employment and diversify their livelihood opportunities.

5.3. Marriage and child rearing

The life histories revealed how women marrying at a young age, having children at a young age and not being supported to complete school resulted in them having a limited number of livelihood options later in life. Some examples include Melvice whose parents consented to her marrying young because they could not afford school fees. Her husband agreed to sponsor her through school, which he did for three years (until grade 10) but then stopped because he believed that she should start bearing children. Isabel became pregnant in grade seven and married young; she married a man almost her father's age. Juliet's parents chose her husband for her and she was married at the age of 14. She felt that she had no right to object but in telling her story (at age 55 years) she concluded that her marriage was a successful one, because she married a “good man”.

While polygamy does not necessarily worsen poverty or vulnerability, two participants in this study, whose fathers both had multiple wives, explained how this put them in a vulnerable position when it came to access to land and education. Evelyn describes growing up in a polygamous family and explains how her mother was deprived access to land when her father passed away:

“My father left farms but since we were deprived from inheritance; one of the first wife's male children drove my mother out of the family compound and confiscated her farmland given to her by her late husband; he said a woman has no use because we are like commodities for sell; he said we should go and get married that every property belongs to them; my mother moved out to a house that she begged; my father died in misery because of lack of means to go to the hospital My sister took over my sponsorship ...”

Evelyn's sister managed to pay her fees until grade 7. Later she married and was able to access land for farming through her husband. She did not finish school but describes how “now that [my] children are in school my own dream of being educated is lost; I now have to focus on educating my children.”

Miriam describes growing up in a polygamous household as follows: “[I was] born in a polygamous home, my father had 3 wives, he was not interested in sending a girl child to school, his interest was to give us away in marriage...” Miriam's story was particularly

tragic as she became romantically involved with a teacher who, when he learnt that she was pregnant, forced her to drink something to abort the child. She became very ill for about a year after that and was never able to have children. Her husband married 5 more women. As Miriam described: "I continued with the relationship because a woman is regarded as the first article in the house and she was only to answer yes sir and accept whatever she was told by the husband." However, Miriam's story is one of adaptation and survival as she continued to study and qualified as a grade 3 teacher, managing to find employment at the mission primary school. Eventually, she left her abusive husband and was able to buy extra farms, grow enough to supply maize to a grinding mill, open a tourist bar and a snack bar. She made enough money to travel to Nigeria on business trips. She has also adopted two children that she assisted in looking after. Her story shows incredible resilience and exemplifies the value of education training in expanding livelihood opportunities for Oku women, thus enhancing their resilience.

6. Women's Resilience: The Factors

The study identified the factors which aggravated women's vulnerability, but the in-depth life histories also allowed the identification of the factors that enhanced women's resilience. These included improving educational levels, diversifying livelihoods, gaining access to collective organization and funding through loan schemes.

6.1. Education

As mentioned above two of the women who participated in the research had been able to further their education as adults: one in the Women's Empowerment Centre and another with the assistance of her family. Both had managed to find jobs and farmed only on a part-time basis. One described how she returned to study as an adult when the first Women's Empowerment Centre (an NGO working in Oku) opened in her community in 2009. Even though she had 8 children of her own she enrolled at the centre, spent two years training in crafts and was subsequently able to open a craft shop and obtain a teaching position in the institution. She acknowledged that her new status acquired as a result of being educated changed her life and that of her family tremendously. She is now the breadwinner in her home and is able to provide capital for her husband to grow his small business. This contrasted strongly with the women discussed earlier who had to leave school before completing.

What was interesting was that all of the women spoke about how they see their children's education as a priority. They all narrated how they are finding ways to pay school fees to allow their children, both male and female, to complete school. Charity discussed her experience as follows: "I took over the sponsoring of the rest of the children.

I had to empty my account to sponsor my children's education. Now my condition is better because my children send me financial support."

Melvice explains that:

"90% of children in primary and secondary schools are sponsored by women. Some women pay the fees secretly and request that the information should be hidden so that their husbands will pay to the school and they will recover their money and yet nothing happens. The women have realized the importance of education and are paying fees without waiting for the men. When a PTA meeting is scheduled 90% of parents attending are women ... women sell beans during holidays and pay school fees promptly just as school reopens. The ones who owe school fees during the year are children whose mothers are waiting for their father's to pay."

One of the participants described how her mother knew the importance of completing high school, and although her father was not in support of girls finishing school her mother raised money for school fees. She tells the story of how her mother enabled her to attend school:

"My father was deceived not to send girls to school but my mother was not, we were seven girls among 9 children. We owe our education to our mother. She worked so hard to pay our school fees... My mother pushed through the education of the first two. When the first two finished school our mother still had a big influence on the education of her children because she encouraged us to pay the fees of the younger ones when we started earning an income."

It is clear that the women who participated in the research recognize the importance of education in lowering vulnerability for their own children, and that there has been a practice (as evidenced by their mothers interventions) of women encouraging the education of their daughters.

6.2. Diversifying Livelihoods

In response to the changing climatic situation, the women of Oku mentioned employing the following strategies: changes in farming practices, livelihood diversification, multi-cropping, increase in the use of inputs such as insecticides, pesticides, fertilizers, manure, to curb pests and diseases and enhance soil fertility. They also apply erosion control measures such as contour farming, planting of trees, vertiver grass and construction of ridges with blocks and windows to control the flow of water. A few women amongst the participants have diversified their livelihoods and are rearing domestic animals such as goats, pigs and chickens in addition to farming. There has been a growing participation of women in coffee production which was, in the past, done by men.

A number of participants described how participation in women's co-operatives had assisted them in funding and improving their farming. The women in Oku constituted a cooperative made up of 5 groups and registered with the Strategic Humanitarian Services (SHUMAS). SHUMUS is an NGO based in Bamenda North West which provides loans at a very minimal interest rate of 5 FRS per thousand. The aim of this NGO is to empower women economically through a revolving loan scheme and training. A number of the study participants noted that they accessed loans through the thrift and loan association. The organization began as a labour co-operative where the women would assist each other at particular times in the farming process such as at the time of planting, harvesting and transporting. Later this expanded as the women started contributing finances to support each other to buy household necessities. The cooperative members also receive training in income generating activities and animal husbandry. This indicates the way in which collective action can play a role in enhancing women's resilience.

7. Discussion

Women play a major role in farming in most rural communities particularly in Africa. It is argued that women are considerably more vulnerable than men to climate change, given the centrality of their roles in agricultural production and the maintenance of households (Jost, 2016; UNFCCC, 2016). Feminist scholars take the position that women's vulnerability is associated with, and aggravated by, existing gender inequality, the socio-economic status of women, and the existing power dynamics of patriarchal societies (Kaijser and Kronsell, 2014; Bunce and Ford, 2015; Grown et al., 2016; Pearse, 2016). This does not mean that women should be perceived as victims who are incapable of devising strategies to ameliorate their situations. Rather, they are agents active in mediating and confronting the range of difficulties they face by making specific adaptations, both individually and collectively. This research investigated how female farmers in the Oku region are experiencing climate change, their specific gendered experience, and the ways in which they are using their agency to mitigate their vulnerability.

This study found, in line with existing research on intersectionality that poverty, lack of education, socio-economic status and gendered practices inhibit some women's abilities (the poorest, the least educated, the most unsupported) to address vulnerability (Blaikie et al., 1994; Bohle et al., 1994; Dow and Downing 1995; Cutter et al., 2003; Kaijser and Kronsell, 2014). Inheritance practices which lead to the unequal distribution of resources particularly landed property, between men and women work against women's interests. The majority of the women in the study had user access to land through their fathers and husbands, but were not landowners. Lack of secure tenure on land has been

noted in other studies to be a constraint to farm investment (Mehar et al., 2016, Njoh et al. 2017).

Much literature states that insecure tenure means that women lack decision making power over land, but this research showed that within the constraints women exercised a fair amount of agency with regard to farming decisions (UNDP, 2011). Women were able to take actions to improve their productivity on land accessed and stated that farming allowed them the opportunity to feed their families and in some cases to generate income through excess produce. The women perceive lack of funds to buy inputs as one of their major limitations to enhancing productivity (World Bank, 2010). The life history methodology was valuable in illustrating that vulnerability is a process and gender is a practice in a society. The specific nature of vulnerability that the women in Oku experience has been constructed over their lifetimes. This research aimed to identify the subjective experience of vulnerability (Jones and Tanner, 2015). Thus, recent theory which examines pathways of vulnerability becomes useful here indicating how vulnerability, like gender, is not static but complex, dynamic and contested (Butler et al., 2014; Wise, et al., 2014).

Women's agency is evident in this region, women describe how they enhance their resilience through the formation of groups to access loans, labour and resources both at home and in their community. Unlike the formal financial institutions which give loans on the basis of collateral, the thrift and loan organized by women gives loans on the basis of trust. It is possible for them to access a loan at a very low interest rate with no collateral. This enables women to increase their farm investment and diversify their livelihoods to minimize the impacts of climate change. The operation of these women's groups is not without challenges. Most of the thrift and loan associations are informal and as such experience higher risk.

As women gain financial empowerment the level of participation in decision-making also increases (Sikod, 2007). Some of the female participants narrated how they managed to find employment and to purchase property themselves. Education was key over the long term to increase opportunities for income and ownership. Although women's strategies in overcoming climate change may not be direct responses to specific climatic events, those strategies indirectly empower them to cope with fluctuating climate.

8. Conclusion

This research made use of a life history approach to identify the specific characteristics of vulnerability as experienced by women in Oku in the Cameroon. The women explained how the last few years have brought erratic rainfall, particularly changes in seasonality affecting the date on which planting takes place. This experience is in agreement with climatological research in the region. Making use of the life history approach allowed

the research to identify the way in which women's vulnerability is a process that has developed over time and is associated with existing gender roles, rights and entitlements, in Cameroonian society. In particular, lack of ownership of land, appropriation of land in inheritance arrangements, lack of access to (particularly higher) education and multiple dependents at an early age worsened women's vulnerability. On the other hand, it emerged that, while the challenges that women in Oku face are immense, they are actively adapting through both individual and collective agency. Education emerged as key in broadening the livelihood options available to women. In this way, the research affirmed that women are not just victims of climate change but are crucial actors in promoting adaptation. Although they are making strides in improving their economic conditions in the midst of adverse effects of climatic changes, their efforts are limited by challenges such as insufficient funds for agricultural inputs, insecurity of tenure and lack of adequate training. The research has shown that promotion of women's resilience to climate change can be enhanced by supporting existing collective organization. By promoting women's agency and indeed, empowerment, agricultural productivity and opportunities for livelihood diversification will be enhanced better enabling them to adapt sustainably to climate change.

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