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Youth, Gender and Climate Resilience: Voices of Adolescent and Young Women in Southern Africa

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Abstract: In contrast to the dominant 'vulnerability narrative' applied to studies of gender, age, and other intersectional characteristics in determining differentiated impacts of climate change, there is growing attention to the agency and voices of young people in the context of their development futures in a changing climate. This paper draws on Feminist Participatory Action Research undertaken by adolescent girls in Zambia and Zimbabwe. Centred on access to education, the findings prompt a reframing of youth agency and empowerment beyond instrumental concerns to integrate intrinsic factors that include self-fulfilment, recognition from others, status, and self-resilience. The research demonstrates how young people's enquiry can help to surface the underlying structures of inequality shaping both their gendered experience of climate change and the response options available. Tackling structural issues may be beyond the conventional scope of climate change projects and policy, but gender and youth concerns require more than incremental changes. Rather, harnessing opportunities from low-carbon and climate-resilient futures requires understanding and tackling structural drivers of gender inequality that influence development opportunities for young people.

Keywords: climate change; adaptation; resilience; gender; youth; education; action research; feminism; Southern Africa

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1. Introduction

While the gendered impacts of and responses to climate change cut across wide aspects of lives and livelihoods, children and young people are particularly affected in terms of access to education, both directly and indirectly. The detrimental impacts of the COVID-19 pandemic on school attendance and attainment are overlaid on those impacts from environmental threats.

This paper presents findings from and reflections on a Feminist Participatory Action Research (FPAR) project undertaken by adolescent girls and young women researchers (see acknowledgements) from four areas in Zambia and Zimbabwe. The research aimed to build the evidence base and further the understanding through the views and lived experiences of themselves and other young women in their communities of how climate change is reshaping their lives and their futures, including as a barrier to quality education. The approach also aimed to build the researchers' voices, power, agency, and leadership—key ingredients for effecting structural change. The young women participated in and documented the research process, including writing their own research report and advocacy plans [1], while this paper provides an account of the research process and findings by the academic facilitators.

The FPAR methodology gives an opportunity for young women in marginalised communities that are bearing the brunt of climate change to design and carry out research that empowers them to act. The methods are situated within the theoretical approaches

centred on a liberatory African feminism emphasising learning, empowerment, and action [2]. The paper is an opportunity to foreground and share practices of FPAR in contexts of gender, adolescence, and climate change, building on action research work in the context of children and disaster risk reduction [3,4].

The research findings suggest that constraining access to education is a major impact of climate-related hazards, and that the understanding of both the impacts and development of adaptation responses do not consider structural factors such as gender and patriarchy. In the two countries, the research revealed that the communities are all affected by climate change, most commonly through floods, shifting rainfall patterns, and recurring droughts. These changes have resulted in food insecurity for most communities given their reliance on rain-fed agriculture. The research suggested that the most common impacts of climate change on girls and young women are school absence and dropouts, as well as exacerbating the incidence of child, early, and forced marriages. Climate change impacts also exacerbate unequal gender roles between boys and girls such as fetching water from long distances, inaccessibility of schools by adolescent girls due to extreme weather conditions, and increased risk and vulnerability to physical and sexual abuse in times of crisis.

The paper begins by providing the contextual background to the research topics and study locations, followed by a description of the methodology and approach. It then presents and discusses findings in relation to three areas: the links between climate, gender, and education; the development of climate adaptation and advocacy strategies; and the evidence for FPAR approaches in enhancing empowerment and agency. Finally, it concludes with short recommendations for practice and future research.

2. Background

A recent review of the links between climate change, disasters, and disruption to education, highlights how damage to infrastructure, transport links, or displacement can disrupt learners' physical access to education facilities [5], as well as the ways that disaster impacts can affect children's physical and neurological development and ability to concentrate [6]. Extreme weather events can also affect the presence of teachers in schools, as well as teacher wellbeing, ultimately influencing access to education and threatening child well-being. Disruption to education can also stem indirectly through impacts of a changing climate on livelihoods and consequent household coping strategies. In poor contexts, households may no longer be able to afford the costs of schooling, or require additional labour for subsistence and income-generating activities [6,7].

However, education also has a positive role to play in tackling climate change, both in developing low-carbon approaches to future development and in adapting to the projected impacts of climate change. There is growing evidence of the direct and indirect effects of education on reducing vulnerability to climate change and increasing climate resilience, with girls' education having been identified as the most important socioeconomic determinant [3,5]. Links have also been shown between girls' education, their sexual and reproductive health, and their rights in responding to climate change. Completing a quality education and being able to freely control their sexual and reproductive health empowers girls to contribute to more resilient and adaptable societies, as well as to greener economies [8]. This is not to link reproductive rights and population control as a climate change mitigation strategy, as this can distract from the issue of inequality with much higher consumption and emissions generated by regions of the world with lower population growth rates.

Despite these connections, evidence suggests that national climate strategies are not sufficiently picking up either education concerns or gender considerations. A review of 173 national climate strategies and their links to girls' education [8] revealed that:

- While 43% of country climate strategies ("NDCs") referenced women or gender it was largely in the context of women as a vulnerable group rather than contributors to climate change mitigation or adaptation.
- Only three countries' NDCs make explicit reference to girls; both in the context of their needs rather than competencies and there is only one clear reference to girls' education.
- Those countries that do attend to issues of future generations tend to be "young" countries—those with a large under-15 population—and climate-vulnerable countries. However, only seven NDCs reference children/youth as stakeholders who should be included as decision makers or in climate action.
- Sixty-eight percent of NDCs talk about education but normally in vague terms, including awareness raising, not targeted at young people, or part of a national curriculum to combat the climate crisis.
- No NDCs formally recognise the contributions that investment in girls' education could make toward their climate strategy.
- Climate strategies overall concentrate on technological fixes, ignoring social concerns and the contributions that people, particularly girls and young women empowered by education and information, might make.

Framings of the linkages between young people, climate change, and gender have changed significantly in the last decade. Narratives focusing primarily on vulnerability and protection have been dominant for several reasons, including their use as advocacy instruments to call attention to impacts on, direct resources towards, and make space in decision making for, young people. However, presenting young people or women as passive victims may both misinterpret the causes of vulnerability and obscure the role of women and young people as proactive agents in tackling climate change.

From a gender perspective, agency and empowerment are important to reverse what Djoudi and colleagues [9] label the 'feminization of vulnerability' that can reinforce a 'victimization' discourse within climate change studies. The UN climate body highlights women's leadership roles in sustainable natural resource management and managing climate risks, including at the household level, while women's political participation has contributed to responsiveness to citizen's needs and cross-party and cross-ethnic cooperation: "on the contrary, if policies or projects are implemented without women's meaningful participation it can increase existing inequalities and decrease effectiveness" [10]. Such vulnerability narratives are important in understanding differential impacts of climate change, but need to be supplemented in recent years with those stressing the active participation and agency of young people in efforts to prevent, prepare for, cope with, and adapt to climate change and extreme events, as well as campaign for action to cut greenhouse gas emissions [11–13].

However, these instrumental arguments around young women's participation may be insufficient without attention to morality and the structures driving gender inequality. Adger and colleagues [14] find evidence that climate change action is most effective when framed as a moral issue, which suggests the need for examination of whose morals and values are reflected in knowledge production and decision making and why [15].

The research presented in this paper asked the questions:

- What are the impacts of climate change on young women and girls' lives and futures in Zambia and Zimbabwe, especially on education?
- How are such impacts mediated by gender relations and power?
- How can such impacts be tackled through action and advocacy?

The process and findings presented in this paper provide further evidence on the gendered youth agency and empowerment dimensions of climate adaptation and resilience linked to grassroots climate justice.

3. Approach and Methods

3.1. Conceptual Approach: Feminist Participatory Action Research

While understanding of participatory approaches in development contexts is decades old, there is renewed interest in the importance of knowledges, ownership, and power relations within grassroots research and project-based interventions [16,17]. Within the climate change field, this interest has been both sparked by efforts to decolonise and democratise knowledge and a renewed interest in rethinking the framings of climate change around knowledge, power, and politics [15,18,19].

Feminist Participatory Action Research (FPAR) approaches were employed in this research to support young women in designing and carrying out research that empowers them to act for structural change. It did so through a cyclical and iterative process of collectively planning, action, observation, and reflection to develop, implement, and reflect on strategies for social change in the context of a changing climate [20,21]. FPAR principles guided the development and preparation of the materials for the trainings as well as the writing workshops with the young women (see Figure 1). FPAR is focused on generating feminist knowledge based on women's experiences and stories, with the women working collaboratively in the research process.

Figure 1. Principles of FPAR (Source: [22]).

Although feminism has different strands, our methodological approach adopts the African feminism as its theoretical pillar, encompassing liberatory political philosophies, theories, writings, research, and cultural production, as well as the organizing work of the transnational community of feminists from Africa [2,23]. African feminism has been identified as a working approach because it pays close attention to context and how it affects the experiences or compounds the struggles of young women, including in the context of climate change impacts. As such, it is cognizant of the intersections of gender, race, class, rural/urban divisions, and culture on the experiences of African women.

In our study, FPAR is crucial because the combination of the climate change crisis, deepening inequalities and deteriorating and shrinking democratic space have serious ramifications for the poor and marginalized young women in both Zimbabwe and Zambia. This approach ensures that the most affected grassroots communities strengthen their knowledge and skills, are enabled to document their concerns and local experiences on

how they are affected by climate change, and shape recommendations for solutions and stimulate change.

Throughout the process, the research facilitators were conscious of the need to balance the goals of the research with those of FPAR as an empowering process. We remained conscious of the potential for PAR approaches to retain asymmetrical power relationships and that the young women researchers' and community's priorities may be contrary to the framings of the research and action agenda around climate change and education [24]. Critical researchers studying climate resilience in development contexts have highlighted the importance of agency and empowerment as drivers of transformation that can enable wider ranges of choices within these pathways towards high resilience, low risk, and high welfare outcomes [15,25].

3.2. Research Locations

Research reported in this paper was carried out in Southern Africa, in Zambia and Zimbabwe, where the impacts of climate variability compound conditions of environmental degradation, poverty, gender inequality, and the COVID-19 pandemic. Both countries have experienced warming trends above the global average in the past 60 years and climate change impacts are already being felt across the region in terms of drought frequency and increased intensity of rainfall events, while Zimbabwe has seen reductions in annual rainfall totals [26,27]. These impacts will amplify existing stress on animals and crops, water quality and availability, human health, and the natural environment [28].

In the two countries, the research was conducted by groups of young women in different communities across four areas. These areas were selected in collaboration with the Country Offices of NGO Plan International based on two criteria: areas that are marginalised economically and particularly susceptible to climate shocks and stresses; and availability of local staff willing to provide mentorship and support to the young women researchers throughout the research process. The research was therefore carried out in two focus areas in each country: Chiredzi and Tsholotsho districts in Zimbabwe, and Chisamba and Chembe districts in Zambia (see Figure 2).

In Zambia, Chembe District is situated in the north-eastern part of the country in Luapula province, with a tropical climate and high rainfall levels of 1115–1500 mm per year. Chisamba District is situated in Central Province, a region in the country's fertile belt with high and well-distributed rainfall. Tsholotsho District is situated in western Zimbabwe with an average rainfall low of 650 mm per year, mostly restricted to the summer season from November to April. However, rainfall intensity and the collapse of small dams have led to high levels of flooding experienced in the district since 2000 [29]. Chiredzi District, Masvingo Province, lies in the south-eastern dryland regions of Zimbabwe, receiving less than 450 mm of rainfall per year. Droughts have occurred more frequently since 1970, but rainfall is also becoming more extreme rainfall, resulting in flash floods [30].

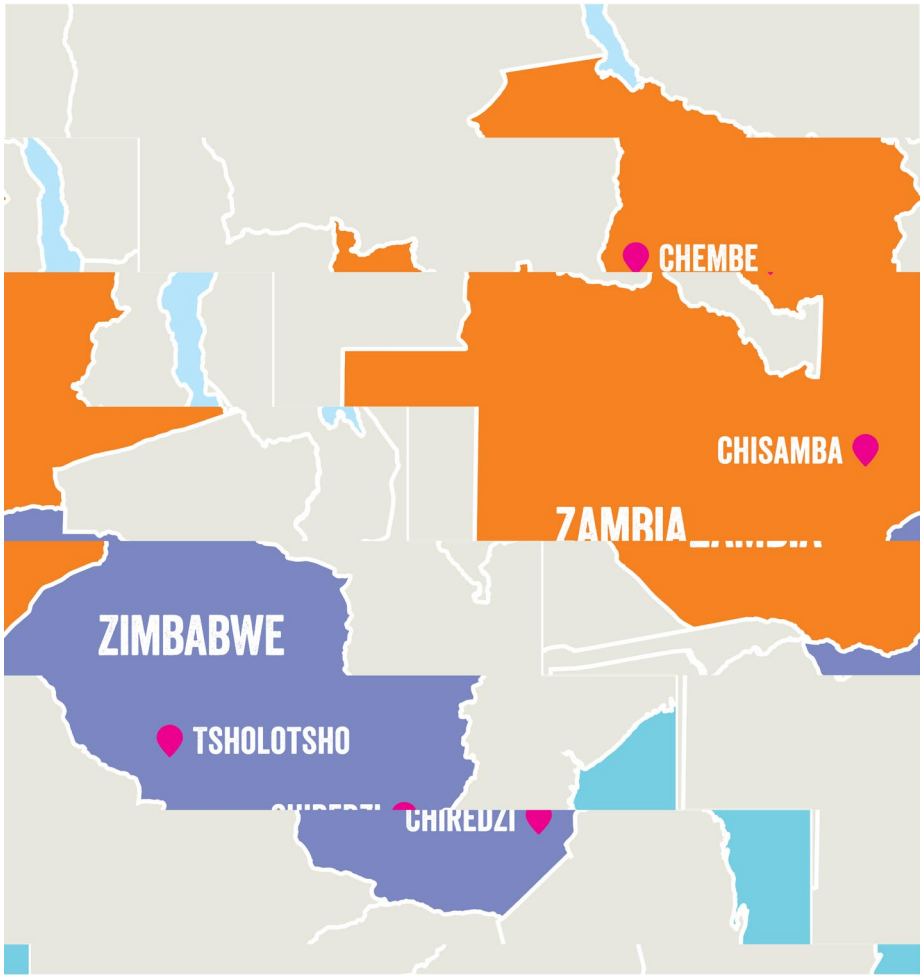

Figure 2. Study locations in Zambia and Zimbabwe.

3.3. Research Methods

The FPAR methodology employed draws on components at the core of feminism, including:

- *Facilitating collective planning of the FPAR process*, focusing particularly on collectively developing a roadmap for the research and planning how the different actions will be coordinated.
- *Active involvement of young women* through a process of sharing their experiences and learning from each other, a continuous process that builds iteratively through the workshops, research, and follow-up. The focus of the research was on the young women as generators of the knowledge—their stories, their experiences, and how they interpret their lived reality.
- *Focus on Feminist Popular Education as a way of building critical consciousness*. The young women researchers' understanding of feminism relates to their own lives and how they can use feminist principles to interpret and analyse the world around them

The FPAR process combined reflection and learning, which allows the young women to better understand their environment as well as empowers them to grow in their analytical capacity as well as individuals. The process allows the young women researchers to take actions that are based on their lived realities and experiences as informed by the knowledge generated through the FPAR process.

The research facilitation process was organised around six iterative stages, illustrated in Figure 3. Plan International local programme offices canvased for volunteers in the case study areas, with 3–5 young women researchers being selected from each of the four areas.

A consultant team comprised of the authors of this paper developed the FPAR methodology and a range of appropriate participatory research tools. The research process was also captured through a questionnaire survey undertaken by the researchers before the training and after the research. This provided a baseline on pre-existing knowledge and confidence to help inform facilitation, as well as helping to assess empowerment processes. Researchers also kept reflective journals throughout the process, and revisited them 6 months into the advocacy process after completion of the research. This journal was designed for self-reflection and sharing of excerpts as shown later in this paper was optional.

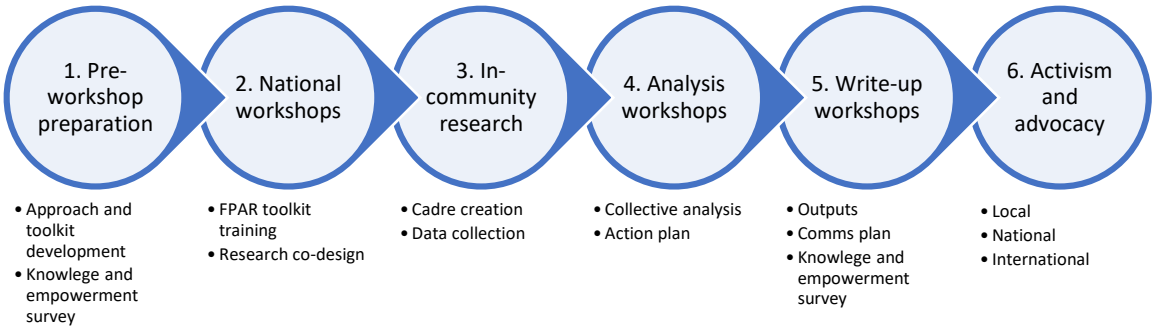

Figure 3. Six stages of the research process.

National workshops with facilitators and mentors then provided the opportunity to co-design and plan out the research process, as well as undertake hands-on training on research skills, feminism, climate change, and FPAR methods. A variety of tools were trialled, from which the groups could select those most appropriate to their contexts when creating their research plans (see Table 1).

Since this research project was taking place during the global COVID-19 pandemic, these workshops were carried out in line with social distancing protocols and were held separately in the respective Zambian districts given travel restrictions. Mentors from the Plan International local offices were also trained in each workshop and provided vital ongoing support to the groups of young women in the FPAR research process, including within their communities. The researchers developed research aims, and plans for data collection and analysis in each location. While the intention was for data collection to be with wider members of the community, COVID-19 risk management meant instead that the young women worked with small groups of young women and girls over a longer period in each location.

In stage 3, the research teams had six weeks of data collection in their communities. The groups then reconvened in each country to share, compare, and jointly analyse results in each country and develop action plans for activism and advocacy activities going forward. These plans were compared to partner NGO advocacy strategies to identify areas of coherence and future collaboration. A final workshop drew the researchers together once again to plan and write a report summarising the findings. They also created videos and refined their advocacy plans for activism and engagement [1]. In the sixth stage, the young women will work with Plan International locally, nationally, and internationally to implement their advocacy plans.

The research drew on a range of participatory and creative data collection methods that encourage diverse participation, access, and inclusion. These include tools designed to help educate and situate climate change in the lived experience, such as visioning exercises, tools that helped establish impacts related to weather hazards and a changing climate, and tools for understanding the gendered drivers of risk and resilience, especially through household decision making. Adaptation pathways exercises helped generate a range of response options, which could be overlaid onto stakeholder and decision-making

maps. Young women researchers gained an active understanding of both feminism and climate change by trialling and developing these tools in stage 2 for deployment with wider groups of 40 girls and young women in each of the four locations for the field research.

Tools drew from common participatory techniques for introducing feminism and FPAR, as well as community and child-centred climate change tools [31–34]. Stakeholder and power mapping mapped out messages and pathways to advocate for just and equitable policies, and influence decision makers. Finally, activism plans were mapped onto Plan International's country office outreach and influence mapping to examine synergies and common entry points

Table 1. Core Research Tools used during the FPAR process.

Tool	Details	Purpose
Online participant survey	Survey carried out online by participants before and after the research process	Capture self-rated language and writing skills to plan facilitation. Capture changes in knowledge and sense of empowerment
Reflexive personal journals	Time set aside daily for personal diaries to reflect on personal development, feelings, and the research process.	Tracking and reflecting on processes of knowledge generation and empowerment
Feminism 101	Group exercises	To examine different understandings of feminism
Masters House	Interactive exercise to construct and deconstruct a building representing patriarchal structures	To explore the influence of patriarchal structures and how they can be challenged/overcome
Visioning exercises	Drawing-based process	To envisage idealised development futures onto which climate impacts can be overlaid
Gender pre-assessment	Cobwebs drawing group exercise	To understand the conditions and status of women and girls in the community from a rights perspective
Climate change 101 exercises	Physical group-based activities	Physically illustrate the greenhouse effect and climate change impacts
Seasonal calendars	Participatory mapping of seasonal activities	Understand local livelihood patterns and seasonality
Hazard mapping	Critical thinking challenge to map out extreme weather and its impacts, overlaid onto a seasonal calendar.	Explore the link between climate, hazards, and impacts with a focus on local context; Determine which hazards most affect the community
Vulnerability matrix	Matrix-based group exercise	Identify the highest-priority livelihood assets and hazards; Analyse the degree of impact of hazards and changes on priority livelihood assets
Impact chains and adaptation pathways	Graphic representations of chains	Analyse direct and indirect impacts of climate change in the community
Identify adaptation options to address identified impacts		

3.4. Ethics and Safeguarding

The project followed the ethics and safeguarding guidance provided by research councils in Zambia, Zimbabwe, and the UK. Formal research approvals were given by the University of Zambia Biomedical Research Ethics Committee in Zambia and the Medical Research Council of Zimbabwe, and from SOAS University of London. This project was undertaken in two specific circumstances: working with young women from marginalised communities and in the extraordinary circumstances of a global pandemic.

The intention of an FPAR approach with young women is to empower their research skills and voices in household, community, and wider geographical contexts where they ordinarily would not have the power to make decisions on the nature of the research, the methods, the analysis, and outputs. We placed control in the hands of the young women facilitators and community researchers to empower voices that might otherwise be lost, harnessing the power of differences and building critical consciousness. This is reinforced by a normative belief that by supporting communities to reflect on and examine their own practice through PAR: 'Those who are currently poor and oppressed will progressively transform their environment by their own praxis. In this process, others may play a catalytic or supportive role, but will not dominate' [35] (p. 68).

At the same time, the project recognised the potential for anxiety induced by learning about climate change, patriarchal structures, or the responsibility of becoming research leaders [36,37]. This was mediated through regular check-ins and the use of daily journals to help the young women researchers to reflect on their learning experiences and to surface and communicate any concerns. Female mentors from Plan International programme units familiar with the study locations supported the groups of young women through the process, attending all workshops, and were available to support young researchers if they had any questions or concerns.

Secondly, the COVID-19 pandemic required managing the FPAR process in line with the health risks that this presented. We minimised travel to comply with country-specific restrictions, held workshops in accordance with risk management plans that minimise the potential for virus transmission and related social distancing requirements, and restricted contact with wider community members in undertaking the research.

4. Results

While climate change was a broad theme for the research, the FPAR process allowed the young women researchers to explore a range of issues pertinent to the different locations. Common to all areas was the importance of climate-related factors in influencing the livelihoods, wellbeing, and development pathways, particularly due to impacts on rainfed agriculture. This paper explores two areas of the research: The findings relating to the gendered nature of access to education in the face of climate change, and reflections on the research process itself as an emancipatory approach.

4.1. Climate, Gender, and Education

The research results emphasise that access to education is a major impact on a changing climate, with significant implications for girls' and young women's life courses. These impacts are discussed below and captured in Figure 4. Some of these impacts were the result of an inability to access education due to physical access restrictions caused by extreme weather events such as flooding. Others relate to the increased exposure to physical and sexual abuse caused when schools provide temporary shelter from extreme weather events.

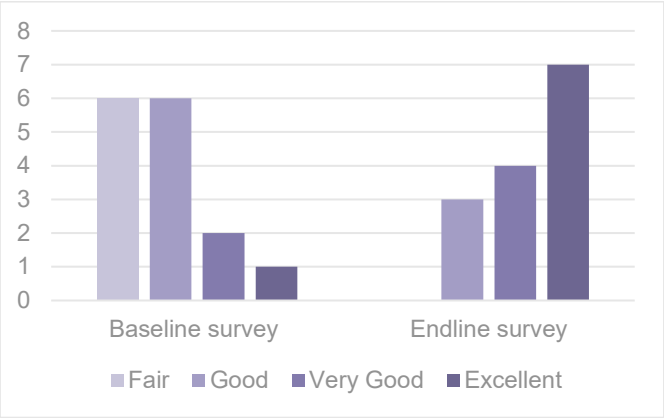

Figure 4. Researcher self-assessed knowledge on climate change.

Physical access problems were illustrated in the research results in Chiredzi district, Zimbabwe, where participants noted that some girls cannot swim across flooded rivers to go to school or go home in contrast to boys. This is compounded by the distances that many students must walk to school (up to 20 km for those who travel from Gulugi to Mupinga secondary school in Chiredzi), which heightens potential disruptions and can tire pupils before they reach school, especially when walking in higher temperatures or rainfall. This reflects findings of similar research in the Solomon Islands in the Pacific region [38]. In Zambia, although there has been an increase in the number of schools in Chembe, floods have often destroyed roads and bridges, rendering schools temporarily inaccessible. This also reduced physical access to other services, including clinics, which compromises access to contraception, with knock-on impacts for sexual and reproductive health and rights of young women. This in turn can have a knock-on effect on educational attainment by increasing school drop-out rates due to early pregnancy.

The consequences of both drought and floods on menstrual health and hygiene illustrate how the experience of climate change impacts is mediated by gender. Respondents in Chembe, Zambia reported lower school attendance for girls who are in their menstrual cycles as they are not able to cross flooded rivers while their male counterparts are able to do so. Respondents in both countries also reported that limited access to water at schools because of climate change has affected girls' menstrual health and hygiene, particularly where they must walk long distances to school and back without adequate sanitary products and limited water for hygiene and laundering. Impacts ranged from lower self-esteem to missing classes altogether until they finish their cycle.

> *"Because of low rainfall received we now share water with animals and that contaminates it making it difficult to maintain a good health and menstrual hygiene"* Focus group discussion, Chisamba district, Zambia

> *"As girls, when the rains destroy our houses, our parents seek shelter on our behalf in the neighbourhood. While there, we are taken advantage of by boys and men living in that house where we will be sheltered"* Young Woman Researcher, Zambia

Results from both countries demonstrated how climate vulnerabilities intersect with socio-economic poverty and gendered household decision making to influence girls' experiences of impacts. All locations in both countries reported that poorer households affected by climate-related impacts were reported as more likely to use early and forced child marriage and unions as a financial coping response, resulting in these girls dropping out of school with limited opportunities to return.

Poorer households were also reported as more likely to pull girls out of school than boys when shocks meant they could not afford fees or needed assistance with domestic and economic tasks. Researchers in Zambia noted that where the rains hinder businesses and livelihoods, parents prefer taking the boy child rather than the girl child to school in the cases that they are forced to choose between the two. In Zimbabwe, girls were more

commonly kept home to help meet household food demands or find water from further afield. Girls from poorer families in Zimbabwe endure cold weather extremes during classes as they cannot afford winter wear such as shoes, socks, and jerseys.

A major finding across locations related to the link between climate impacts and the heightened risk of physical and sexual abuse to girls and young women. This includes both domestic and school-based contexts. Results in Chiredzi, Zimbabwe highlighted that when rivers flood during school hours, girls are forced to stay in classrooms or travel at night, increasing their vulnerability to sexual abuse. Further, Cyclone Idai, which hit Zimbabwe in 2019 forced girls to stay in inappropriate, unhygienic, and indecent accommodation where they shared bedrooms with boys and or older men, exposing them to abuse and unwanted pregnancies, which disrupted or ended their schooling.

In both Chiredzi and Tsholotsho, Zimbabwe, women and girls have been forced to stay in temporary shelters (tents) camps during extreme weather conditions such as floods. Confinement to temporary shelters with limited water, sanitation, and hygiene infrastructure exposes girls and women to diseases in addition to sexual assault and rape. In Zambia, the researchers revealed that girls are often abused while seeking shelter when their homes are flooded, but that this commonly went unreported or ignored.

Limited access to water also increases the time allocated to girls for completing household chores such as fetching water from more distant places, reportedly increasing the risk of abuse and sexual violence from men and cattle herders in Zambia who use the same drinking places. In Zambia, teachers were also reported to be sending girls to fetch water for them, putting them in danger of abuse and reducing the time for girls to concentrate on schoolwork. Similar impacts of climate change on domestic chores were reported in Zimbabwe, both have a risk of abuse and reduced educational time as such work is performed either before or after classes, limiting time for study. In Gujuli Village, a young girl aged 12, was reportedly sent to fetch locusts during school hours in March 2021, never returned home and is still missing. In Chemba, Zambia another indirect effect of climate-induced economic challenges is the increased risk of girls turning to selling and exchanging sex as a livelihood, especially in villages near the DRC border with haulage traffic.

In both countries, researchers highlighted the influence of patriarchal structures, social norms, and entrenched cultural beliefs in contributing to gender-based violence. In Zimbabwe, they noted that rape is not considered sexual violence in the two communities, with one young woman researcher commenting: "*Traditional leaders who are the custodians of culture do not believe women and girls when they report that they have been raped, they always assume that there was consent. This belief makes it difficult for perpetrators to be brought to book and for the girls to get justice in traditional courts*."

Finally, research in Zimbabwe highlighted gender gaps in access to early warning information regarding extreme weather events, including floods, with girls experiencing limited access to radio and television, newspapers, or social media. In both Chiredzi and Tsholotsho girls reported that this increased their vulnerability and any such information was commonly provided by brothers and fathers who have the opportunity and time to go to local shops and drinking places that have TVs and radios, especially during European soccer seasons.

4.2. Climate Adaptation and Advocacy Strategies

Existing adaptation actions being undertaken in the research areas were largely geared towards reducing the climate sensitivity of livelihood activities, particularly in agriculture. In both Chiredzi and Tsholotsho in Zimbabwe, farmers grow drought-resistant crops such as sorghum, rapoko and millet, peanuts and ground nuts, maize, watermelons, pumpkins, sunflower, mashamba, cotton, and bhondasi. In Chiredzi, some farmers engage in contract farming to grow sorghum for Delta Beverages, a beer and soft drink manufacturing company. However, generally, these small grains are only sufficient for subsistence purposes and in most cases do not provide sufficient income to be able to afford

expenses such as school fees. Participants also reported the growing of drought-resistant crops such as cassava and sweet potato in Luapula and preserving foods such as vegetables, cassava, and cow peas. Conservation agriculture was reported as one of the strategies in Mambilima, Chembe District, while planting on higher ground in Luapula is one measure that was noted by the girls as an adaptation measure. Communities in both Chiredzi and Chilonga, Zimbabwe, are moving to livestock production in lieu of crop production. The Lowveld is a hub of livestock that can thrive under harsh climatic conditions (hard Mashona cattle and goats, pigs, sheep, donkeys, guinea fowls, and chickens).

Methods for conservation and storage of water were also popularly reported technical measures. Girls in Chikomeni and Lupani (Chembe District, Zambia) reported tree planting efforts in areas affected by deforestation, including due to the impacts of drilling of boreholes. In Chiredzi, Zimbabwe, the government is planning to convert the area around Chilonga into a green belt through planting lucerne grass. There have been widespread complaints from the Chilonga community that such a project will render over 12,000 families landless, illustrating a trade-off and potentially maladaptive outcome for these already impoverished communities. Building reservoirs and practicing water harvesting were also reported in Chipembi and reducing exposure by building houses away from shores in Chembe, Zambia. In Zimbabwe, various government plans have been drawn up to construct sub-basin dams for surface water supply, with some of these such as the Tokwe Mukosi Dam recently completed. Understanding and managing the impacts on both the natural environment and local communities will be critical to their success as measures to enhance resilience to climate change. Discussions on adaptation practices in Zambia highlighted some efforts at diversifying from agricultural towards less climate-sensitive livelihoods. In Chipembi, learning skills such as tailoring and hairdressing were reported, while respondents in Temfe and Kasoma shared their experiences with chicken rearing as an alternative source of income.

The emphasis on agency and empowerment in using FPAR approaches extends beyond the research planning and implementation and into advocacy and engagement activities to effect changes. In the case of this research, the recommendations made in the analysis exercises were developed into advocacy strategies that map out key issues, key stakeholders and influencers, desired changes, messages, and communication channels.

While the core groups of researchers created policy recommendations and advocacy plans (see Tables 2 and 3), the young women in both countries also recommended community-level action to address the looming challenges of climate change, noting the need for behavioural change, including at a personal level. The young women recommended that more young people need to learn, understand, and act on climate change in their communities. Recommendations included those to the government to address the impacts that are faced by girls and young women, especially in access to and attendance in schools, such as the need to build more/safer schools, change the school calendars, and establish satellite schools. The researchers also highlighted the role of community and families in challenging the structural vulnerability of girls and young women, such as by avoiding the coping strategy of marrying off girls when faced with climate-induced challenges. Comments highlighted the difficulties in tackling such issues, for example:

> "*In our community it was difficult to change behavioral issues, norms and values* i.e., *culture. It was rare to challenge culture especially issues to do with gender balance. Since most interventions in my community were gender blind it wasn't easy to discuss about these issues.*" Patricia, Zimbabwe

Table 2. Recommendations: Zambia.

Issue	Targeted Stakeholders	Recommendation
Low school attendance	Ministry of Education Ministry of Water Development, Sanitation, and Environmental Development	Build more schools so that pupils do not cross rivers. Reschedule school calendar. Build bridges and drainage. Establish satellite schools in flood-prone communities. Provide scholarships to cover school fees for girls.
Limited access to water	Ministry of Water and Sanitation	Drill boreholes and provide safe, clean, gender-sensitive water systems and storage.
Failing to maintain a livelihood	Ministry of Gender Ministry of Forestry	Empower girls with entrepreneurial skills that are not likely to be affected by climate change. Encourage people to stop cutting down trees.
Loss of Crops	Ministry of Agriculture Ministry of Forestry	Provide drought-resistant and water-resistant plants. Enforce policies on cutting down trees. Encourage afforestation and re-afforestation.
Destruction of Infrastructure	Ministry of Infrastructure Development	Provide high quality safe and gender-sensitive climate-resilient infrastructure.
Contamination of water	Ministry of Water and Sanitation Ministry of Health	Provide safe, clean, and gender-sensitive water systems. Provide chlorine.
Vulnerability of girls when seeking shelter	Disaster Management and Mitigation Unit	Provide safe, gender-sensitive temporary shelter for those affected by floods and other disasters, including separate toilets and adequate lighting, and referral systems to easily report or complain where necessary.
Low attendance in school due to increased malaria	Ministry of Health; Ministry of Fisheries; Traditional Leaders	Provision of more mosquito nets and gender-sensitive promotion of its use, including through community channels. Implement Fisheries Act to ensure adequate support.

Table 3. Recommendations: Zimbabwe.

Issue	Targeted Stakeholders	Recommendation
Inaccessibility of schools during extreme weather events such as floods and cyclones:	Ministry of Education; Rural District Council; Member of Parliament; Councillors	Gender budgeting of Community Development Funds (CDF) by Rural District Councils to mirror social needs and concerns of women and girls. Provide fees and transport scholarships for girls.
Unequal gender roles between boys and girls	Parents. NGOs. Ministry of Education	NGOs to support capacity building on gender equality. Ministry of Education to mainstream gender equality and climate education in primary and secondary education curricula
Access to information on gender equality, disaster early warning systems	Ministry of Information. Mobile Service Providers. District Civil Protection Unit Meteorological Department	Installation of boosters to improve mobile network coverage. Ministry of Information to provide radio and television coverage to areas where this is not available
Lack of legal and administrative remedies for survivors of gender-based/sexual violence linked to climate crisis	Zimbabwe Republic Police (ZRP). Ministry of Justice. NGOs. Traditional Leaders. Church	Girls engage with NGOs to support local ZRP offices to establish and operationalise Victim Friendly Units (VFUs). Girls to work with local NGOs working on GBV to establish referral pathways for survivors
Addressing economic vulnerabilities of women and girls	Local NGOs. Local MPs. Local Councillors	Demand local MPs to prioritize climate change responsive economic activities (projects) for women and girls from the Capacity and Delivery Fund (CDF) and other funds. Attend budget consultation meetings for Rural District Councils (RDC) and demand investments in climate change responsive gainful economic activities for women and girls.

4.3. Empowerment and Agency through the FPAR Process

The FPAR approach draws attention beyond instrumental outcomes to ethical concerns around youth and gender empowerment, as well as the processes of change needed to achieve gender equality. Climate change policy has tended to frame both problems and solutions in terms of technical solutions, for which entry points for youth or gender concerns may not be obvious [39,40]. FPAR explicitly aims to empower participants by situating their own experiences within the context of structures and contestations of power. The research served as a platform for renegotiating power relations, including through acts of advocacy and resistance [41].

Results of the before and after questionnaire survey showed a significant increase in participant confidence as researchers, in using participatory tools, and in knowledge about climate change (Figure 4). Crucially, the reported understanding of links between gender and climate change rose through the process, with over 87% of participants reporting their understanding as very good or excellent, compared with less than 19% before the training and research activities (see Figure 5).

Figure 5. Researcher self-assessed understanding of gender and climate change links.

Those strongly agreeing with the statement, 'I feel empowered to act on climate change at household level' rose from 19% to 50%; and at 'school level' rising from 6% to 44% (see Figure 6). Changes in the perception that the community as a whole was empowered to act were less significant, in part this reflected COVID-19 restrictions that had limited the reach of the action research and partly as researchers reported the difficulty in tackling embedded social norms and power relations at the community level.

A number of the journal entries and feedback comments helped demonstrate the sense of personal empowerment as a result of the research process, including:

- "*I feel so happy, I never knew that someone like me can do research and now I understand better issues of climate change*." Annie, Zambia
- "*I am very proud that I helped my community to learn and start discussions on climate change. This process has helped me to gather confidence" Musonda, Zambia*
- *"I now know that everyone can be a feminist*" Penlop, Zambia
- "*I never thought I could be a researcher at some point in my life, getting the opportunity to be a feminist researcher was good for my status*" IIandra, Zimbabwe
- "*Now they call me a feminist in my community*" Grace, Zambia
- "*I felt very empowered by leading this research using the unique tools and methodology that was easy for people to unpack climate change which l thought was very complex*" Faith, Zimbabwe

- "*This research enabled young people to be free and share their views, for me I was happy to meet new people and hear how they live their lives. To know the decision making in homes was interesting and how girls challenge this*" Mwaka, Zambia.

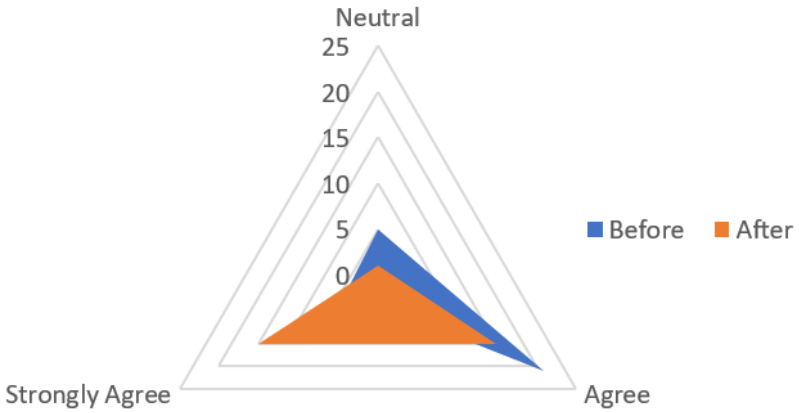

Figure 6. Combined responses: "I feel empowered to act on climate change in my school" "and my household".

5. Discussion

In examining the research process and results, we highlight insights in three areas in turn: widening understanding of the agency of young people; climate-resilient development pathways; and foregrounding the structural drivers of risk and resilience. We conclude with comments on the implications for policy and practice.

Firstly, the research supports the view that gender and other inequalities are reflected in differential vulnerability and exposure to climate change hazards. We extend the metaphor of climate-resilient development pathways [42,43], to classify impacts into three types: disruptive, divertive, and deterministic. Disruptive impacts characterize climate risks that set back or limit progress on development pathways; Divertive impacts constrain options for particular development pathways; Deterministic impacts dictate the course of future development pathways.

Disruptive pathways are exemplified in the research findings by reduced school attendance or reduced time for study due to domestic duties due to floods or droughts. This constrains learning and academic achievement, which in turn limits progress on, but does not necessarily prevent, a particular pathway towards improved human development and climate-resilient outcomes. Divertive pathways represent the potential for climate change to constrain the choice of different options available to young women. This is illustrated by the decline of agriculture as a livelihood option under changing climatic conditions, pushing young people to seek less climate-sensitive options, including waged employment in urban centres. Deterministic impacts provide an extreme scenario of pathways becoming locked-in, with limited choices available for future potential for human development and/or climate resilience. This is exemplified by the case of child marriage as a coping strategy for climate shocks and stresses, which permanently ends schooling for girls and locks them into a determined future centred on domestic activities.

Secondly, research and practice-based coalitions have both acknowledged the tendency to pursue a 'vulnerability narrative' in linking gender, age, and other intersectional characteristics in determining differentiated impacts of climate change [9,44]. This is reinforced by crisis narratives that dominate media accounts of climate change and have been central to protest and public mass action [45]. In contrast, evidence-based counter-narratives have emerged around the agency and voices of young people in the context of their futures in a changing climate [46–48]. This action-oriented imperative is consistent with FPAR as involving 'researchers and participants working together to examine a problematic situation or action to change it for the better', with the objective to change the world,

not only to study it [49,50]. This research provides further evidence to underline the importance of agency-based narratives but suggests this needs to go beyond previous framings.

The FPAR approach employed was underpinned by a belief that by examining their own lived realities in a supportive enabling environment, the groups of young women would be more likely to organise and act. This was borne out in both the research processes and advocacy action plans, which support the identification in other research on youth and disaster risk of multiple participatory modes that include research analysis, sharing knowledge, mobilizing others, and implementing actions [3,11]. However, the FPAR research discussed in this paper critiques these modes as centred in the instrumental realm. Although the ends of this instrumentalism may be those of equality, resilience, and wellbeing, they pay insufficient attention to more intrinsic factors related to the research process itself. The use of reflective journals and surveys to track the processes of empowerment and agency processes reported in the previous section reveals the additional importance of the intrinsic realm in any conceptualization of youth empowerment, including in areas of self-fulfilment, recognition from others, status, and psychosocial resilience (Figure 7).

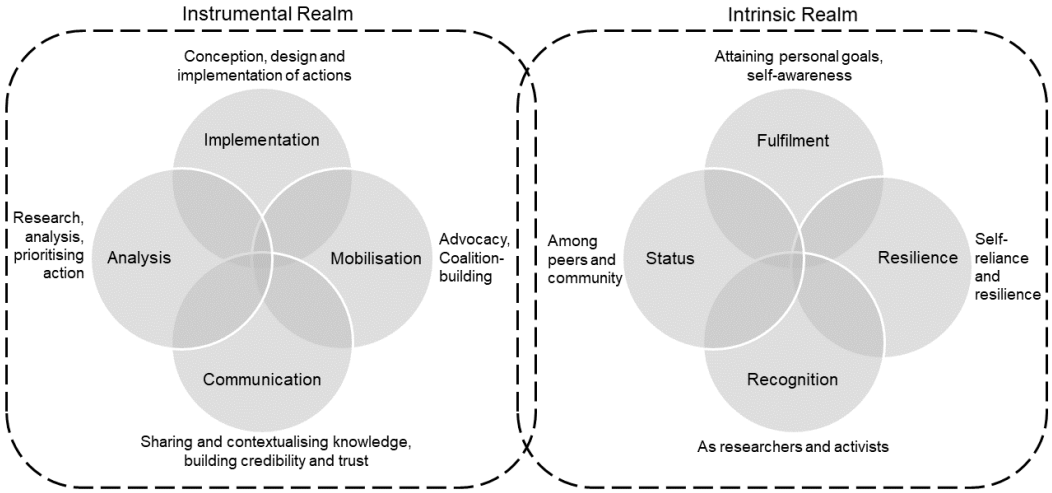

Figure 7. Dual realms of participatory action research for adolescents and young people.

Thirdly, the case studies described in this paper suggest that FPAR approaches have the potential to surface the structural drivers of risk and resilience. Many of the existing adaptation actions identified in the case study areas were directed at adapting agricultural activities. This reflects the technical and managerial biases often associated with climate change adaptation and resilience building, driven by the framing of climate change problems as tackling an external natural hazard rather than as interlinked processes of social-environmental relations [40]. The research findings and advocacy priorities around gender-related impacts on education and wellbeing suggest that climate change risks and adaptation options cannot be treated separately from wider societal structures; impacts related to climate change are mediated as part of a wider range of human and societal dimensions of risk and resilience.

The implication is that interventions that focus on climate-related risks alone are less likely to reflect locally held perceptions or equitable priorities. In turn, this may inadvertently lead to actions that contradict other development priorities or increase potential harm from climate-related risks ("maladaptation"). Some of the responses to climate change illustrated in this research, such as keeping children out of school during crises, are mediated by gendered household decision making. They can be deemed maladaptive responses in the ways they compromise girls' access to education and consequently their

development futures. Addressing such inequalities is therefore key to increasing adaptive capacity to enable climate-resilient development [51].

The research highlights the importance of breaking the social structures of patriarchy as fundamental to the transformations required for climate-resilient development. The research supports a process-centred definition of such transformations emphasising agency and empowerment rather than socio-technological change [52,53]. The FPAR approach helped to surface structural conditions that both mediate the impacts of climate change on adolescent girls and young women, and understand the structural changes to support more transformational approaches to adaptation that address the root causes of risk and resilience. Such transformations require contestation to break down structures of patriarchy that constrain decision options and pathways. Tackling these structural issues is seldom straightforward and evidence from Asia and Africa suggests that environmental stresses can have a negative effect on agency even when women's agency *is* supported by legal entitlement, household structures, and social norms [54].

6. Concluding Recommendations for Practice and Future Research

These findings imply that policy and practice on tackling climate-related risks and building resilience for and with adolescents and young people need a structural approach. This means building agency, empowerment, and equality processes as central goals, with the personal and intrinsic realm as vital in determining outcomes for gender-just climate-resilient development. The research demonstrates how young people's enquiry can help to surface the underlying structures of inequality shaping both their gendered experience of climate change and the response options available. Tackling structural issues may be beyond the conventional scope of climate change projects and policy, but gender and youth concerns require more than incremental changes to climate change programmes and policy. Rather, harnessing opportunities from low-carbon and climate-resilient futures requires understanding and tackling structural drivers of gender inequality that influence development opportunities for young people.

The research provides good examples that illustrate how this approach adds value. Examining coping strategies following flood events, the young researchers challenged conventional responses to climate-induced challenges such as asking governments to rethink learning calendars to allow learning in seasons with favourable conditions to minimise disruption due to climatic hazards. However, they also went deeper, calling for structural changes. Highlighting the need to move beyond a solution that focuses only on ensuring safe physical spaces for women and girls, they called for action to tackle the culture and tolerance of male sexual violence that makes such places unsafe in the first place. Unless underlying gender inequality and norms are tackled, even those policies and projects that explicitly seek to address gender concerns in climate change may not be effective.

The study offers evidence that the FPAR methodological approach allows lived realities to be captured whilst at the same time empowering those involved to become active in community conversations and initiatives to address the challenges they confront. The young women that led the research have demonstrated the desire and ability to make decisions at a personal and community level to address the impacts of climate change. From their interrogation of the issues, they have gone on to define actions that require a higher-level advocacy and collective action, and more importantly, they identify their role and that of their communities to push for both policy and practice reforms. The process has allowed them to transform from a position where they regarded themselves as "powerless" to a position where they see themselves as belonging to the larger sphere of influence.

As an approach, FPAR removes barriers of language and technical understanding of the issue by introducing tools that allow researchers and research participants to note issues from their own perspective in a language that they understand. The study revealed that even without deep technical know-how around a subject, young researchers can be

sensitised about an issue and trained in methods for data collection and facilitation that can allow them to gather data that can influence practice and policy reforms.

The limitations presented by COVID-19 changed the initial design where the young researchers were to cascade training to fellow young women at the community level. Instead, those other young women ended up being the researched individuals. It will be valuable for future research to explore the capacity of young women in leading cascade trainings and develop levels of learning exchange and knowledge between each other. A measure of the levels of empowerment along the chain will be instrumental to see how meaning and approaches are translated between the first-level trainings (by "subject experts") and second-level trainings by the young women who are experts of their lived reality. Future research might also examine the next step of the impact chain in translating empowerment to action in terms of behavioural changes and advocacy outcomes. This might strengthen the evidence that FPAR approaches can deliver higher levels of resilience to climate hazards through gender equality norms and resulting educational access and attainment.

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