

The Role of Public Awareness in Climate Change Mitigation and Adaptation in Zimbabwe

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Abstract: *The international community's response to the global climate change challenge has been immense and in different ways ranging from the Intergovernmental Panel on Climate Change (IPCC) and many treaties and protocols. Zimbabwe signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and the country acceded to the Kyoto Protocol in 2009. Debates, conferences and workshops on climate change issues are being organised at different levels. The growing risk of vulnerability to climate change is widely discussed in the scientific and political sphere. While international and national conferences are necessary this paper contends that public awareness is critical to climate change mitigation and adaptation in developing countries. But to what extent has climate change information been disseminated to the public? The study was undertaken in Marondera urban and sought to assess people's knowledge on climate change. There has been an increased dependence on natural resources for energy and food in Zimbabwe's urban areas hence the selection of an urban area for the study. The once considered rural problems in Zimbabwe have started to haunt urban areas as well. The research design adopted was the descriptive survey. A sample of 80 participants was selected for the study through a combination of simple random and purposive sampling and data was collected using key informant interviews, questionnaires and documentary review. Despite much talk on the political and scientific arena about climate change, the study revealed that though the residents of Marondera are aware of climate change; its causes, effects and mitigatory measures the knowledge they have is rather general. While the researcher acknowledges that public awareness on its own may not be enough, this study recommends that climate change information be disseminated to the grassroots levels through various means and strategies so as to allow full participation in climate change mitigation and adaptation.*

Keywords: climate change, adaptation, mitigation, vulnerability

1. Introduction

Climate change is generally recognised as the major environmental problem facing the globe. Evidence is building that impacts are being felt in the form of melting icecaps in the polar areas and increased variability of temperature, rainfall and storms in virtually all regions. Though climate change is a global problem; its impacts and consequences are not evenly distributed. Developing countries are the most vulnerable to climate change impacts because they have fewer resources to adapt: socially, technologically and financially that is, they have a low adaptive capacity. It is predicted that billions of people, particularly those in developing countries, face shortages of water and food and greater risks to health and life because of climate change. Climate change is anticipated to have far reaching effects on the sustainable development of developing countries including their ability to attain the United Nations' Millennium Development Goals by 2015 (UN 2007).

Africa is already a continent under pressure from climate stresses and is highly vulnerable to the impacts of climate change. Many areas in Africa are recognized as having climates that are among the most variable in the world on seasonal and decadal time scales. Extreme events such as floods and droughts can occur in the same area within months of each other. These events can lead to famine and widespread disruption of socio-economic well-being. Other factors that make Africa more vulnerable to climate change impacts include poverty, limited infrastructure, lack of technology and information, poor access to health care, poor access to resources, low management capabilities and armed conflicts among other issues. The overexploitation of land resources including forests, increases in population,

desertification and land degradation pose additional threats (UNDP 2006). Climate change will thus have wide-ranging effects on the environment, and on socio-economic and related sectors, including water resources, agriculture and food security, human health, terrestrial ecosystems and biodiversity and coastal zones.

Africa will face increasing water scarcity and stress with a subsequent potential increase of water conflicts. Agricultural production relies mainly on rainfall for irrigation and will be severely compromised in many African countries, particularly for subsistence farmers in Sub-Saharan Africa. Under climate change much agricultural land will be lost, with shorter growing seasons and lower yields. (Hirji and Johnson, 2002)

Adaptation is a process through which societies make themselves better able to cope with an uncertain future. Adapting to climate change involves taking the measures to reduce the negative effects of climate change by making the appropriate adjustments and changes. Options and opportunities to adapt range from technological options to behaviour change at the individual level, such as reducing water use in times of drought and using insecticide-sprayed mosquito nets. Other strategies include early warning systems for extreme events, better water management, improved risk management, various insurance options and biodiversity conservation.

According to the UN (2007), the poor, most of which are indigenous people are more exposed to the risks and impacts of climate change yet they are rarely involved in public discourse of climate change. Improving education, training and public awareness on climate change is an important measure for persuading the whole of society to jointly

participate in activities for the mitigation of and adaptation to climate change. Chapter 36 of Agenda 21 States that "Both formal and non-formal education is indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making."

2. Key Concepts and Definitions

2.1 Climate change

Climate change is a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. (UN, 1992)

2.2 Climate variability

Climate variability can be defined as the way climate fluctuates yearly above or below a long-term average value.

2.3 Vulnerability

Vulnerability is the degree to which a system is susceptible to and unable to cope with adverse effects of climate change including climate variability and extremes (IPCC, 2007). According to Shaw *et al* (2010) vulnerability is a function of character, magnitude and rate of climate change and variation to which a system is exposed, its sensitivity and its adaptive capacity.

2.4 Adaptation

Adaptation to climate change refers to the measures or actions aimed at managing the impacts of climate change

2.5 Adaptive Capacity

Adaptive capacity is the potential or ability of a system, region, or community to adapt to the effects or impacts of climate change. Enhancing a community's adaptive capacity reduces its vulnerability and promotes sustainable development.

2.6 Mitigation

The term mitigation when used in issues relating to climate change refers to measures to reduce greenhouse gas emissions.

2.7 The Kyoto Protocol

The Kyoto Protocol is an international treaty adopted in 1997 that sets concrete targets for developed countries to reduce the greenhouse gas emissions that contribute to global warming and climate change. The Kyoto Protocol was adopted in Kyoto, Japan, in 1997 and entered into force in 2005. The Kyoto Protocol, like the UNFCCC, is also designed to assist countries in adapting to the adverse effects

of climate change. It facilitates the development and deployment of techniques that can help increase resilience to the impacts of climate change.

2.8 The UNFCCC

The United Nations Framework Convention on Climate Change (UNFCCC) was signed by more than 150 countries at the Rio Earth Summit in 1992 and the convention took effect in 1994. The convention sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The ultimate objective of the convention is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

2.9 The Role of Climate Change Education and Awareness

Though Southern Africa has contributed very little to the occurrence of global climate change it will still and has started to bear the brunt cost of climate change. Southern Africa and the rest of developing nations lack the capacity to adapt to climate change due to the fact that they are already faced with many socio economic challenges which include poverty, unemployment and inequality (Masters and Duff, 2011). Due to the high poverty levels in developing countries, the poor are heavily depended on natural resources for their daily survival. This makes the climate change-poverty nexus a strong one thus making public education and awareness on climate change a necessity.

One of the commitments of the parties under the UNFCCC in Article 4 requires all parties to 'Promote and cooperate in education, training and public awareness related to climate change and encourage the widest participation in this process, including that of non-governmental organisations;....'

To fulfil the commitments presented in Article 4, Article 6 of the same convention requires parties to develop and implement educational and public awareness programmes on climate change and its effects; promote and facilitate public access to information on climate change and its effects; as well as public participation in addressing climate change and its effects and developing adequate responses; and training of scientific, technical and managerial personnel;

Climate change education, awareness and training are not only helpful in capacity building but are also necessary if developing countries are to fulfil their commitments under the UNFCCC. While climate change is a global challenge, vulnerability to climate change will differ from country and so will the adaptation strategies. Public education, training and awareness on climate change issues are therefore country specific as the programmes will be designed to meet the needs of a particular country and community. Climate change education, awareness and training will therefore depend on the political will of the concerned countries.

Zimbabwe's Environmental Management Act (EMA) stresses that every person shall have the right to access environmental information and protect the environment for the benefit of present and future generations and to participate in the implementation of the promulgation of reasonable legislative, policy and other measures that protect that environment. Among other principles the EMA acknowledges the principle of participation by all affected parties in environmental governance as well as environmental education and awareness and the sharing of knowledge and experience so that communities are able to address environmental issues and sustainable environmental management. Improving education, training and public awareness on climate change is an important measure for influencing the whole of society to jointly participate in activities for the mitigation of and adaptation to climate change. Public education is necessary if negative and wrong perceptions about climate change are to be cleared to allow for the implementation of climate change mitigation and adaptation strategies.

Communities in developing countries across the world have been exposed to extreme events such as floods and droughts and over the years they have developed coping mechanisms and strategies. Climate change education therefore does not only empower communities but also enables indigenous knowledge to be incorporated in adaptation and mitigation measures at different levels.

Rainfall patterns will change due to climate change leading to droughts and floods which ultimately affect agriculture and food production and the livelihoods of communities. Climate change education and awareness can be a useful tool in disaster management as it allows community based approaches and the use of indigenous knowledge to be integrated in disaster management. This is echoed by Shaw *et al* (2010:5), who put forward that

“Communities worldwide have coexisted with disasters from the earliest of times. Their mechanisms for coping with natural disasters have protected and nurtured the very existence of their civilisations. Therefore their indigenous knowledge and methodologies should be considered and, where appropriate, adopted and imparted to reduce disaster risks at global level”.

While it is a fact that climate change is not the only environmental problem facing the world in general and Zimbabwe in particular, climate change issues can be integrated in disaster management and risk reduction as well as in dealing with other challenges that are not triggered by climate change.

3. Statement of the Problem

Zimbabwe is already experiencing the impacts of climate variability and climate change as evidenced by changes in rainfall patterns, droughts and floods. The UNFCCC is clear on the fact that the poor people a greater percentage of which are found in developing countries will be the most affected by climate change. Public awareness is critical Zimbabwe's environmental legislation acknowledges the importance of public awareness and participation for the

achievement of sustainable environmental management. Article 6 of the UNFCCC stresses the need for education, training and awareness on climate change and its effects. More than ten years after Zimbabwe has signed and ratified the UNFCCC, is the public aware of climate change; its causes and effects?

3.1 Objectives

The objectives of this study were;

1. Determine sources of climate change information for the respondents
2. Examine the role of climate change information dissemination in climate change mitigation and adaptation.
3. Assess people's knowledge on climate change.

3.2 Research questions

The research questions that guided this study are;

1. Which methods are being used to disseminate climate change information in Zimbabwe?
2. To what extent is the public aware of climate change issues?
3. How significant is the dissemination of climate change information in climate change mitigation and adaptation?

4. Methodology

4.1 Study Area

Zimbabwe is generally a semi-arid country with low annual rainfall reliability. The average annual rainfall is 650 mm but geographically it ranges from around 350 to 450 mm per year in the Southern Lowveld to 1,000 mm per year in the Eastern Highlands. The rainfall pattern of Zimbabwe is variable with years below and above normal rainfall.

Marondera is a small town that is situated about 75km North-East of Harare the capital city of Zimbabwe and has a population of about 62 120 (CSO, 2012). Marondera urban is divided into 12 administrative wards and the average household size is 3.7 and the total number of households is 16700. The town is agro-based and thrives on commercial farming. Marondera is situated in Zimbabwe's agro ecological region 2 which is characterised by moderately high rainfall and the rainy season stretches from October to March.

The study employed a mixed paradigm approach and the descriptive survey design was employed for the study. An urban area was chosen for the study due to the fact that in Zimbabwe urban areas tend to have more access to information than rural areas due to the perceived advantages which include better education facilities as well as access to the internet and other forms of media. So in the case of climate change issues, urban areas were most likely able to give a clear picture of whether climate change information has reached the general public. Moreover, due to the rural-urban migration, both the educated and the uneducated tend to flock to urban areas in search of greener pastures.

An urban area was also selected for this study due to the fact that there has been increased poverty in Zimbabwe's urban areas due to a number of reasons including poor economic performance as a result; urban dwellers have been forced to depend heavily on the natural resource base for survival. Environmental degradation has also become a serious urban problem due to activities such as deforestation, overexploitation of wetland resources as well as unplanned urban agriculture. More to that, urban councils and Marondera Town Council in particular is already struggling to provide adequate and safe water for its residents owing to a number of reasons making environmental education in general to be imperative for behavioural change in the use and management of natural resources in Zimbabwe.

The sharp contrast that once existed between the rural and the urban population in the country is being wiped away in the face of increasing urban poverty in Zimbabwe. The need to communicate climate change issues in Zimbabwe is imperative not only for rural areas but for urban areas as well.

4.2 Sampling and research instruments

A combination of convenience and purposive sampling was employed in this study. Thus participants of different educational qualifications and professions were selected regardless of gender. The questionnaire was the main data collection tool and in cases where the questionnaire could not be administered, interviews were used. Relevant environmental laws and policies were reviewed to find out the level to which climate change is addressed. The data

collection instruments sought to ascertain the level of climate change awareness in the study area.

4.3 Data Analysis

Data was analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics analysis was the main analytical technique.

5. Results and Discussions

5.1 Characteristics of Respondents

The respondents' age groups ranged from Below 20 years to above 50 years. The distribution of the age groups among the 80 respondents that filled in the questionnaires is shown in Table 1 below.

Table 1: Distribution of Respondents by Age

Age Group	Number of respondents	Percentage (%)
Below 20	5	6.25
20-30	27	33.75
31-40	30	37.5
41-50	8	10
50 and above	10	12.5
Total	80	100

44 respondents (55%) were males while 36 (45%) were females. 67.5% (54 respondents) of the respondents were married; while 26 respondents (32.5%) were not married. Respondents were required to indicate their highest level of education and the results are presented in Figure 1 below.

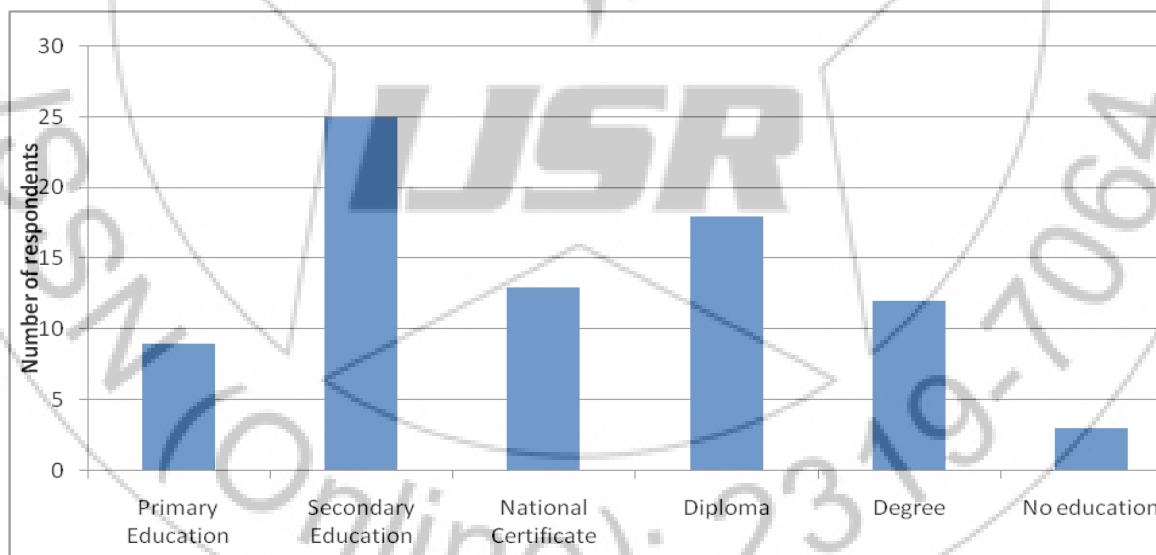


Figure 1: Level of education for the respondents

From the graph in Figure 1 above, the respondents with the highest qualification were degree holders who constituted 15% of the respondents (12 respondents). 18 respondents indicated that they had National Diplomas, 13 had National Certificates in education, while 25 and 9 respondents had secondary school education and primary school education respectively. 3 respondents indicated that they had no form of formal education.

The results therefore show that 96.25% of the respondents had obtained some form of formal education only 3.75% had

no such education. The results also show that more than half of the total respondents (53.75%) have tertiary education qualifications (National certificate, diploma and degree).

5.2 Knowledge about Climate Change

To investigate people's awareness level regarding climate change, respondents were asked to respond to a close ended question as to whether they were aware of climate change. All the respondents (100%) indicated that they were aware

of climate change though their knowledge of climate was rather general and limited. While respondents were aware of climate change, their interpretation was more inclined to changes in weather patterns as the discussion shall reveal in the succeeding paragraphs of this paper. The results of this study therefore concur with a report on South African awareness of climate change which revealed that while most Africans were aware that weather patterns are changing, their understanding of global climate change is limited. (Taderera, 2010 in Acquah 2011). Muzari and Mutambara (2014) reiterate that though communities are aware that weather patterns have changed, they are not always aware of exactly which factors have changed. Global climate change is poorly understood such that it is interpreted to mean changes in weather pattern.

5.3 Source of Climate Change information

To find out about the main sources of awareness of climate change, respondents were questioned on how they got to know about climate change. 41.25% of the respondents (33) indicated that they had known about climate change from the school. The Zimbabwe School Examination Council's (ZIMSEC) Geography Syllabus for Zimbabwe Ordinary and Advanced Level, do cover climate change issues. The fact that 41.25% indicated that they became aware of climate at school indicates that there is need to upgrade the information they obtained when they were still at school. This is of importance because more than half of the total number respondents are well above 20 years, meaning that it has been long since they left school.

Despite the fact that Zimbabwe has a literacy rate of 92% (GoZ, 2013), only 5% of the total respondents indicated that they had obtained climate change knowledge from books and journals. While this could be a result of the fact that most people do not have a reading culture as cited by Acquah (2011) relating to a study done in Ghana on public awareness and the quality of climate change knowledge, this can also be an indication that literature on climate change in Zimbabwe is not available and or readily accessible to most Zimbabweans. 10% of the respondents indicated that they had obtained climate change information from climate change conferences and workshops. The respondents who obtained climate change from workshop and conferences were also holders of tertiary education qualifications. This is an indication that workshops and conferences on climate change have been restricted to certain fields and professions and not to the general citizens of the country. There are certain sectors that are directly influenced by changes in climate such that climate change discussions in the form of workshops and conferences are imperative. Such fields include water management, agriculture, disaster management and environmental management to mention but a few.

21.25% of the respondents (17 respondents) indicated that they had learnt about climate change through the national television and radio stations. This relatively low proportion of the respondents may be due to the fact that the national television station in Zimbabwe has lost its credibility. 7.5% of the respondents indicated that they had obtained climate change information from the newspapers. From the obtained

information therefore, 28.75% of the respondents obtained climate change information and knowledge from the media (radio, newspapers and national television). 6.25% (5) of the respondents indicated that they had made their own observations of weather patterns and had ultimately concluded that the climate was changing. 8.75% of the respondents showed that they had known about climate change through EMA awareness campaigns.

5.4 Causes of Climate Change

Respondents were asked to express their opinion on the causes of climate change. 93.75% of the respondents indicated that climate change is caused by deforestation and veldt fires, while 5 were not aware; 69 respondents representing 86.25% thought burning of fossil fuels lead to changes in the climate, 72 respondents representing 92.3% cited emission of gases from industries and cars as a cause of climate change. These views expressed by the respondents on the causes of climate change the respondents show that respondents were certain that climate change is human induced. While there are many factors leading to climate change scientists concur that the warming of the earth after 1950 can be attributed to human factors or influence. According to the IPCC (2007), the current temperature changes associated with global warming suggest a noticeable influence of human beings on global climate. The IPCC Fourth Assessment Report mentions that global greenhouse gas emissions are mainly attributed to energy supply sector, industry; forestry; agriculture; and transportation (IPCC, 2007).

5.5 Climate change impacts observed by respondents

Respondents were asked to give their opinion on whether Zimbabwe is experiencing the impacts of climate change. 74 respondents (92.5%) indicated that Zimbabwe is experiencing the effects of climate change. The remainder of the respondents (6) indicated that they were not aware of the fact that Zimbabwe is experiencing the effects of climate change. On being asked whether they had made any observations relating to climate change impacts in Zimbabwe 92.5% of the respondents indicated that they had made some observations relating to climate change effects and they cited changes in rainfall patterns (92.5%) which they said had impacted on the agricultural production and cropping seasons. 23.75% (19 respondents) mentioned temperature increases. The results show that respondents were aware of changes in climate in Zimbabwe. Petengell (2010) in Mutambara and Muzari (2014) argues that communities easily notice changes in rainfall patterns and such changes are usually attributed to factors such as deforestation, an act of God or a locally caused problem.

5.6 Respondents' knowledge on the prevention of climate change

Respondents were required to identify methods of preventing climate change. 91.25% of the respondents identified afforestation and reforestation as possible climate change prevention strategies, while 87.5% identified curbing deforestation. 27.5% thought that government restrictions on the importation of used cars from Japan and other developed

countries would help to prevent climate change. Making electricity available and accessible for domestic and other uses was mentioned by 92.5% of the respondents. 43.75% of the respondents indicated that education and awareness on climate change issues was a necessary climate change prevention tool. Education increases climate change awareness; its causes, effects and mitigatory measures. The results indicate that the respondents are aware of possible climate change prevention strategies. The results also point out to the need for Zimbabwe to address the issues of making alternative energy sources available if deforestation is to be curbed.

6. Conclusion and Recommendations

The results obtained from this study indicate that residents of Marondera are aware of climate change, its causes, impacts and preventive measures, though their understanding of climate change on a global scale is rather general. Though various strategies are being used to educate the public about climate change, the study discovered that the school curriculum plays a significant role in educating and disseminating climate change information in Marondera. The study therefore recommends that various strategies be used to make climate change science and information accessible to the average Zimbabwean citizen. Climate change adaptation and mitigation strategies should also be mainstreamed into national development initiatives. Political will and investment is necessary if education and public awareness of climate change issues are to be achieved.

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