CHAPTER ONE: GENERAL ORIENTATION OF THE STUDY

1.1 INTRODUCTION

The environment consists of the biophysical (which is the natural), the social, political, economical and the technological. All these environmental aspects are interdependent. Therefore, a change in one of these aspects affects all the others. In other words, the environment is a system, which consists of units that function together to keep the whole system functioning. According to Kwiatkowska (1999), the environment is a setting under which life takes place for people, animals and plants. It is not a physical place but a perceptual one. It has values, hidden assumptions and myths attached to it. Environment is a fusion of our consciousness, of meaning, of climatic and geological conditions, geographical location and of physical inhabitance. Environment is culturally constructed to a significant degree, yet is determined to some extent by constrains that are neither deliberate nor unintentional products of human activities.

It is the relationship between man and his environment that has an influence on the quality and the health of such an environment. Both the environment and man have an influence on each other. The way man interacts with the environment depends on his environmental knowledge, skills, attitudes, values, ethics and commitment. In other words, the way man perceives an environment determines his interaction therein. Problems such as global warming, greenhouse effect, deforestation, desertification, air pollution and water pollution, soil erosion, etc., are associated with man-environmental interaction (Baum, Bell, Fisher, & Greener, 1990, Irwin, 1991). This is when the concept of environmental literacy comes in, which is the basis towards sustaining the quality and health of the environment, starting from the community leaders to the community as a whole.

Environmental literacy can be achieved through the introduction of Environmental Education programmes, which may serve as the basis for imparting necessary knowledge,
skills, awareness, values, attitudes and ethics for the improvement of the quality of the environment. According to the United Nations Conference of Environment and Development, “education is critical for achieving environmental and ethical awareness, values, attitudes, skills and behaviour consistent with sustainable development and for effective public decision making” (Carson, 1978).

The quality of our environment depends on insight, awareness, knowledge, skills and positive attitudes imparted to individuals. The development of all these aspects provides a full understanding of actions that can result in the reduction of environmental damage. Improved environmental skills and knowledge may lead to the improvement of the health and quality of the environment as well as the quality of life.

1.2 DESCRIPTION OF THE STUDY AREA

Malamulele Location is situated in the far northern part of the Northern Province in the Thohoyandou-Malamulele municipality. It is divided into four sections, that is, section A, B, C and D. In the northwestern part of this area, there are two informal settlements occupied by the refugees from Mozambique, who also depend on this location for services such as medical and educational. Adjacent to these settlements is the shopping complex, which caters for this location and also villages around it. Due to poor environmental conditions such as lack of proper sanitation facilities, fresh water supply and lack of toilets, the health of people staying in these areas is at risk.

There is one hospital and a community health centre, which offer medical services to this location and areas around it. This has led to inadequate provision of medical services to the community. As a result of the Malaria-outbreak in the Northern Province, these hospitals tend to be overcrowded and sometimes left without accommodation for patients.

There are also five governmental educational institutions, namely, three high schools and two primary schools. There is also a private primary school and a private technical
college, which also offers high school subjects. Despite the number of educational institutions in this area, there are many far more learners than the number these institutions can accommodate.

The environmental status of this area is unsatisfactory. There are a number of environmental problems such as water pollution, poor sewage systems and land pollution due to a high rate of littering in this area. The poor sewerage systems have led to a lot of leakage of sewage water in so many main sewage pipes, and this has produced an unpleasant smell in this area (Anon, 2001). This sewage leakage problem has also led to the development of perennial streams and ponds with dirty water good enough for breeding a lot of mosquitoes, hence the risk of an outbreak of malaria in this area (Anon, 2001).

Land pollution is another problem faced in this location. This is the result of a high rate of littering and the dumping of waste materials at the street corners and other open areas. It is also the result of waste not being removed frequently to the dumping sites. Environmental degradation and soil erosion are also a problem in this area. This is the result of vegetation clearance for agricultural activities by people to meet their basic daily needs (Anon, 2001).

1.3 ENVIRONMENTAL LITERACY AND ENVIRONMENTAL QUALITY.

According to Moseley (2000: 23), environmental literacy is a result of a basic functional education for all people, which provides them with the elementary knowledge, skills and motives to cope with environmental needs, and contributes to sustainable development. Allers (1997: 5) sees it as “essentially the capacity to perceive and interpret the relative health of environmental systems and to take appropriate decisions and actions to restore, maintain and improve the health of those systems.”
There is a close relationship between environmental literacy and the quality and health of the environmental systems. It is people who are environmentally literate who can help sustain the quality and health of an environment, because they are environmentally aware and are sensitive to the total environment. They are also able to identify and solve environmental problems affecting their local environments and actively participate in environmental improvement and protection (Allers, 1997: 5). Therefore, being environmentally literate is a great benefit to the environment. This is because an environmentally literate person tends to know and understand what is good or bad for the environment, so he/she is able to interact with it properly (Allers, 1997: 5).

Due to the relationship that exists between the quality of the environment and environmental literacy, the following question may be asked: “is it necessary for community leaders to be environmentally literate in order to sustain the quality and health of the environment?”

Once the answers to this question are obtained, it is the intention of this study that environmental literacy among community leaders is developed through the Environmental Education programmes. The use of these programmes is aimed at showing and increasing the importance of environmental literacy amongst community leaders.

It is assumed that the level of environmental literacy determines the overall quality of the environment. Therefore, the implementation of the Environmental Education programmes as a support programme of education for community leaders, can improve the level of environmental literacy amongst community leaders, and thus improve the quality of the environment as a whole.

By improving the level of environmental literacy amongst community leaders, it is the assumption of the researcher that this will benefit the community as a whole, thus the improvement of the quality and health of the environment. Therefore, through the risen level of environmental literacy of the community leaders and the fruits thereof, the whole community will then imitate their leaders and act responsibly towards the environment. It
is hoped the environmental responsibility and ethics will then improve, and thus uplift the quality and health of the environment as a whole.

1.4 RATIONALE AND BACKGROUND OF THE STUDY

1.4.1 Motivation of the Study

The researcher, after completing a B Ed (Environmental Education) degree, became more acquainted with more knowledge about the environment and how it functions, and the importance of environmental literacy towards the improvement of the quality and health of the environment. This postgraduate study helped the researcher to understand the need for environmental literacy, which is the main determinant of the quality and health of the environment and the quality of life as well.

Interaction with community members of the study areas made the researcher realize that it is necessary for community leaders to be environmentally literate in order to contribute to the improvement of environmental quality. It is the assumption of the researcher that if community leaders must be environmentally literate, then this would benefit the whole community. Through environmental knowledge, awareness, skills, values, and ethics they shall have acquired through environmental education, they should be able to implement strategies that will improve the environmental quality of the local community of life.

The researcher also realized that there is a need for regular implementation of environmental programmes so as to improve the level of environmental literacy among the community leaders. This can be achieved through environmental education seminars and workshops.

The quality of the environment of the study area is so poor due to, among other factors, the high rate of littering and poor sewage systems. As a result of this situation, the researcher found it necessary to investigate whether it is essential to be environmentally
literate in order to improve environmental quality. The role of environmental education will also be part of this study since it is the basis for the achievement of environmental literacy.

1.4.2 Statement of the Problem

There is a continuous environmental threat caused by the activities of man. Humans tend to exploit natural resources in order to meet their daily needs. Environmental degradation is also the result of activities of man on the environment in order to improve their lifestyles. Dumping of waste materials along the streets and at the street corners is a habit in most Northern Province communities including the study areas. This has led the researcher to perceive that insufficient environmental literacy by community leaders may also contribute towards the reduction of the quality of the environment. Therefore, the main problem addressed in this study is the necessity of environmental literacy towards the improvement of the quality and health of the environment by community leaders. The main problem can be rephrased in a research question: Is it necessary for community leaders to be environmental literate to contribute in the improvement of the health and quality of the environment and quality of human life as well?

1.4.3 Aims and Objectives of the Study

The main aim of this study is to assess the necessity of environmental literacy towards the improvement of the quality and health of the local environment.

The objectives of this study are:

- To assess the state of environmental affairs and the overall environment of Malamulele Location.
- To assess the level of environmental literacy of the Malamulele Location community leaders.
To make community leaders understand the improvement of environmental literacy so as to sustain the quality and health of the local environment.

To evaluate the importance of the Environmental Education Programmes in the development and improvement of environmental literacy amongst the community leaders.

To suggest the implementation of the Environmental Education Programmes through seminars and workshops in order to improve the level of environmental literacy of the Malamulele Location community leaders.

Once the above aims and objectives are achieved, which is the purpose of this whole study, then conclusions will be drawn about whether it is necessary for community leaders to be environmental literacy or not, in order to improve the quality and health of the environment as well as the quality of human life.

1.4.4 The Assumption of the Study

It is the assumption of this study that it is necessary for the community leaders to be environmentally literate, since this helps in:

- Promoting environmental awareness among community leaders.
- The improvement of the quality and health of the environment and quality of human life through the implementation of the acquired environmental knowledge, skills, attitudes, values and ethics on the environment.
- Acquiring skills necessary for empowering the community towards making decisions that affect the environment.
- Identification and resolutions to environmental problems by community leaders.
- Improving environmental decision-making by community leaders.
1.4.5 Sampling

The sampling method use in this study was random sampling (Kerlinger, 1986). A random sample was taken to determine the level of environmental literacy and environmental quality among community leaders at Malamulele Location. All respondents to the questionnaire were randomly selected, where community leaders available at that time were given a questionnaire each and were requested to complete it. No prior warning was given to any respondent about the survey. The sample size for this study included 100 community leaders at Malamulele Location.

1.4.6 Pilot Study

Interviews were conducted within the local departments, that is, the Department of Education, Arts and Culture, Department of Public Works, Department of Water Affairs and Forestry, and the Department of Agriculture, Conservation and Environment. These interviews were conducted with the supervisors of each department mentioned above.

Structured questions were used in the interview for each departmental interviewee, in order to determine the level of environmental literacy among community leaders as well as the state of environmental quality in the study area.

1.5 RESEARCH DESIGN AND METHODOLOGY

1.5.1 Research Design and Methodology

The research design for this study will be a plan, structure and strategy of investigation, which the researcher will adopt to answer research questions or solve the problem in this study (Kumar, 1999: 74). Initially, a situation-type analysis (Marsh, 1992) was conducted to determine the level of environmental literacy and environmental quality of the
participants in the study area. This resulted in a qualitative study, which included interviews and questionnaires from which data was collected. Data was then categorized to allow for a quantitative data analysis approach.

Research methods commonly used in this study are qualitative research methods such as interviews, and quantitative research methods such as questionnaires. When these methods are used to determine the initial situation of a study it is termed situation analysis (Marsh, 1992). Techniques used in this study’s situation analysis, are surveys in the form of questionnaires, interviews and checklists, and meetings as in discussions and brainstorming (Marsh, 1992).

The information gained was then used to draw conclusions and to make recommendations with regard to the necessity and development of environmental literacy among community leaders.

1.5.2 Empirical Study

Data will be collected qualitatively through interviews that will be carried out to gather general data on the environmental status of Malamulele Location. These interviews will also be used to gather data on the knowledge, skills, values, attitudes and ethics the community leaders have towards the environment. This will involve government departments: the Department of Education, Arts and Culture, Public Works, Water Affairs and Forestry, and the Department of Agriculture, Conservation and Environment. Structured and unstructured interviews will be used depending on the situation demands (Sax, 1979:244).

Questionnaires will be presented to the private sector business leaders, church leaders, civics, media, principals and staff of the schools in Malamulele, doctors, and local council members of Malamulele Location, and the above-mentioned government departments. Questionnaires can be an advantage to the respondents as they permit them to answer more completely (McBurney, 1994:15). This will then lead to the drawing of
conclusions, that is, after the gathered data has been processed into meaningful information that will be useful and readily available to the user.

1.5.3 Limitation of the Study

- Due to the reluctance of the interviewees, the researcher could not record the interview on an audiocassette; interviewees wanted to remain anonymous.
- The study only concentrated on Malamulele Location; therefore, the results found cannot be generalized for the Northern Province as a whole.
- There were also some difficulties in obtaining information through interviews from some of the local departments such as the Department of Public Works and the Department of Water Affairs. These difficulties included:

1.6 THEORETICAL CONCEPTS

1.6.1 Environment is a setting, under which life takes place for people, animals, and plants (Fuggle & Rabie, 1992: 83).

1.6.2 Environmental Literacy is essentially the capacity to perceive and interpret the health of environmental systems and to take appropriate decisions and actions to restore, maintain and improve the health of those systems (Allers, 1997:5).

1.6.3 Environmental Education is a process that seeks to develop the necessary awareness, ethics, values, knowledge, skills and commitment to allow the people to become environmentally literate in order to be pro-active in securing a properly functioning and healthy environment that is sustainable (Allers, 1997:5).

1.6.4 Environmental Awareness is the ability to perceive, love and care for the environment and to take part in the process of environmental improvement and protection (Miller, 1993).

1.6.5 Environmental Ethics present and defend a systematic and comprehensive account of the moral relations between humans and their natural environment.
Environmental ethics assume that human behaviour towards the natural world can be and are governed by moral norms (Des Jardins, 1993).

1.6.6 **Sustainable Development** is the development that seeks to meet the needs of the present generation without compromising the ability of the future generations to meet their own needs (Hugo *et al*, 1997).

1.6.7 **Deforestation** refers to the removal of forests and vegetation to provide land for agricultural activities, to obtain firewood, and for financial benefits such as the sale of wood for furniture and other wood products (Hugo *et al*, 1997).

1.6.8 **Environmental Pollution** refers to the accumulation of materials in the air, water and soil in sufficient concentration to have a direct or indirect negative effect on people and their environment (Hugo *et al*, 1997).

1.6.9 **Water Pollution** refers to hazardous and toxic waste materials disposed into water resources such as dams, lakes, rivers and seas, which then lead to a negative effect on living things found in water, and which can also affect human health (Hugo *et al*, 1997).

1.6.10 **Soil Erosion** refers to the removal of soil particles from one area to another by either wind or water (Hugo *et al*, 1997).
CHAPTER ONE: SCIENTIFIC FOUNDATION OF THE STUDY

This chapter gives an overview of what this study consists of. This includes:
- General Orientation
- The description of the Study Area
- Environmental Literacy versus Environmental Quality
- Motivation of the Study
- Statement of the Problem
- Aims and objectives of the Study
- The assumption of the Study
- Sampling
- Pilot Study

CHAPTER TWO: LITERATURE REVIEW

Theoretical concepts concerned with environmental Literacy are discussed in details in this chapter. These concepts include:
- The Environment
- Environmental Awareness
- Environmental Ethics
- Environmental Literacy
- Environmental Education

CHAPTER THREE: DATA COLLECTION AND ANALYSIS

This chapter addresses how data was collected and then the analysis thereof. This will include:
- Data collection
- Data Analysis
- Discussion of the Results

CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS

This chapter discusses conclusions drawn from the analyzed data and recommendations made to improve or solve the problem concerned in the study.
CHAPTER TWO: ENVIRONMENTAL EDUCATION AND AWARENESS

2.1 THE ENVIRONMENT

2.1.1 Introduction

The term “environment” is widely used, but it means various things to different people. In everyday usage, it has thus become common to speak of a natural environment, a built environment, a social or cultural environment, and even an economic environment. When applied to human beings, the term refers to the totality of objects and their interrelationships that surround and routinely influence the lives of human beings (Fuggle & Rabie, 1992: 83).

2.1.2 The Meaning of the Term ‘Environment’

There is no general agreement on exactly what the concept ‘environment encompasses. Traditionally, individual components of the environment were identified and treated separately. However, as the need for a comprehensive environmental problems approach manifested, the environment then had to be considered holistically (Fuggle & Rabie, 1992: 83).

The term ‘environment’ is used in a variety of ways in different contexts. The term originally denoted ‘surroundings’, but it has increasingly been applied not to surroundings, which just happen to be passively there, but to objects, individuals or processes which interact in some way with whatever is being surrounded. The object being surrounded can be defined in a host of different ways, from a single individual to all living things. At those extremes, the environment is easily defined (Silvertown & Sarre, 1990: 3).
An individual’s environment is its life support system – the objects, individuals and processes that provide water, food, air, and shelter. Clearly a human being’s environment is much more extensive than that of an insect or plants, in that the human depends on other people for companionship and in that human food and shelter depend on a world system of agriculture, industry and trade and on structures built in the past.

The environment of all living things is composed of the physical objects and processes of the earth, seas and atmosphere, including the incoming solar radiation, which is vital to life.

Between these two extremes, most usage of the term ‘environment’ explicitly or implicitly defines it in human terms. Because human beings now exist in societies, most of which use technology and complex economic and political arrangements to produce and distribute food and water and shelter, it usually makes more sense to define society’s environment rather than that of human species (Silvertown & Sarre, 1990: 3).

Society’s environment is made up of natural processes and physical and biological processes themselves altered by society through agricultural practices.

Because the concept of environment now stresses vital connections between object and environment, it is to some extent arbitrary where the boundary is drawn between society and environment (Silvertown & Sarre, 1990: 3).

The environment can be referred to as a setting under which life takes place for people, animal, and plants (Kwiatkowska, 1999). The environment is culturally constructed to a significant degree; yet is determined to some extent by constrains that are neither deliberate nor unintentional products of human activities. Hugo, Viljoen & Meeuwis (1997) defines the environment as consisting of both natural and physical components, which are interdependent. It also consists of the cultural as well as the natural landscape (Hugo et al., 1997).
Environment can also be defined as the sum of total of the conditions within which organisms live. It is the result of interaction between non-living (abiotic) physical and chemical and present living (biotic) parameters (Barrow, 1995). It is a place where the interrelationship between organisms and the natural environment exists.

The extensive approach to the concept environment sees the environment as a concept that embraces a multitude of ingredients such as (Fuggle & Rabie, 1992: 84):

- **Natural environment**, i.e. in a strict sense the natural world in its pure state, but more generally regarded as referring to renewable and non-renewable natural resources such as air, water, soil, plants, animals etc.
- **Spatial environment**, i.e. man-made and natural areas such as suburb, town, city region, province, country, as well as certain specific landscapes, for instance mountains, wetlands, rivers, sea-shore, forests etc.
- **Social environment**, i.e. other people such as family, group, society etc.

Other components of the environment are (Fuggle & Rabie, 1992: 84):

- Economic environment
- Cultural-historic environment
- Built environment
- Political environment
- Labour or work environment

### 2.2 ENVIRONMENTAL AWARENESS

#### 2.2.1 Introduction

Environmental awareness can be described by first explaining the key concept involved. These key concepts include:

- **Comprehend** – what the environment consists of or the structure of the environment.
- **Understand** – an understanding of how the environment works or functions.
- **Perceive** – that there is a relationship between the biophysical and socio-cultural concepts of the environment, and these parts of the environment interlink.
- **Appreciate** – that the interaction between biophysical and socio-cultural components of the environment can cause environmental problems.
- **Realize** – that one will have to solve these environmental problems by effective management of the environment. This means that environmental problems must be solved in such a way that solutions do not lead to the development of new problems (Miller, 1993).

A person who has developed environmental awareness, must know what the environment consists of and how it functions. Such a person must be able to perceive that there is an interrelationship between the biophysical and the socio-cultural components of the environment. This person must also be able to appreciate and know that the interaction between these environmental components may lead to the development of environmental problems and realize that one will have to come with an action plan that will solve these problems by effective environmental management.

### 2.2.2 Four Levels of Environmental Awareness

- **Pollution and Environmental Degradation**
  Environmental problems are seen as essentially pollution problems that threaten human health and welfare. Individual problems are solved one by one by waiting until each problem reaches a crisis level. Then it is dealt with by using legal, technological and economic methods to try to control or clean-up pollution instead of preventing it (Miller, 1993).

  There are four major drawbacks to remaining at this awareness level. Firstly, it is a human-centred view, not a life-centred view. Secondly, individuals see their own impacts as too tiny to matter, not realizing that many individual impacts acting
together threaten life-support systems. Thirdly, this approach encourages people to think that environmental and resource problems have quick technological resolutions. Fourthly, it attempts to treat the symptoms of environmental abuse instead of trying to determine and deal with the causes leading to our environmental and resource problems (Miller, 1993).

- **Consumption Overpopulation**
  The causes of pollution, environmental degradation and resource depletion are seen as a combination of people overpopulation in poor countries and consumption overpopulation in affluent countries, with the most environmentally demanding populations living in industrialized societies. This second level of awareness still view humans as above or outside nature, with an obligation to dominate and conquer it (Miller, 1993).

- **Spaceship Earth**
  The goal at this level is to use technology and existing economic and political systems to control population growth, pollution and resource depletion to prevent environmental overload. The earth is viewed as a spaceship, a machine that can be controlled using advanced technology. If the earth becomes too crowded, the solution is to build space stations for the excess population, and if the earth becomes depleted of mineral resources, then the other planets will be mined (Miller, 1993).

This view of the earth as a spaceship is a sophisticated expression of the idea that technology and human ingenuity can control nature and creates artificial environments and life forms to avoid environmental load. However, this approach can also cause environmental load and resource depletion in the long run, because it is based on the false understanding of how nature works, and that there are no limits to the earth’s resources. This then calls for sustainable economic development and sustainable societies for humans (Miller, 1993).

- **Sustainable Earth**
  The first three levels of environmental awareness are human-centred views in which the world is shaped by humans to meet their own needs. It is not realized
that the solutions to environmental problems lie in the development of Earth-centred or life-centred worldviews. At this level, it is realized that there cannot be sustainable or any form of economic development or sustainable human societies, unless people sustain the whole earth by working with the Earth that sustains them and other species (Miller, 1993).

Environmental awareness has then led to what is referred to as a sustainable worldview, which is when people believe that the earth does not have infinite resources and that ever-increasing production and consumption will put severe stress on the natural processes that renew and maintain the life-support systems and the variety of potentially renewable plant and animal life. According to Miller (1993: 28), people with a sustainable-Earth worldview believe that nature exists for all Earth’s living species, not just for people. Humans are then regarded as part of nature, not apart from nature, and also not conquerors of nature. People with this worldview emphasize (Miller, 1993: 28-29):

- Seeing the world as an integrated, interconnected, interdependent whole rather than as a fragmented collection of parts.
- Seeing people’s most fundamental value as maintaining the integrity, good functioning, and sustainability of Earth’s life-support systems for people and other species now and in the future.
- Building societies and personal relationships that emphasize co-operation over competition and domination.
- Protecting Earth’s biodiversity by interfering with non-human species only to meet important needs.
- Concentrating on pollution prevention and waste reduction and converting to more environmentally benign technologies.
- Not wasting non-renewable minerals, fossil fuels and water.
- Greatly increasing people’s dependence on perpetual solar energy and decreasing their use of fossil fuels and nuclear power.
- Achieving sustainable use of potentially renewable cropland, forests, and grasslands by using these resources more slowly than they can be renewed and by placing primary emphasis on sustaining the fertility of Earth’s topsoil.
Protecting the world’s remaining wild areas from development and pollution and restoring many of the areas people damaged.

Converting the world’s existing economic systems, all based on ever-increasing economic growth, with little concern for possible long-term consequences, to systems that reward Earth-sustaining forms of growth.

Halting human population growth to prevent a massive dieback, then encouraging a slow population shrinkage toward an optimum level that can allow every person an opportunity for a decent life without impairing the ability of Earth to sustain human and non-human life in the future.

This worldview is based on the following general beliefs and guidelines (Miller, 1993: 29-30):

- People can never completely do their own thing, because everything they do has mostly unpredictable present and future people and other species.
- People are part of nature, and thus all living species are interconnected and interdependent.
- Nature is not only more complex than people think but also more complex than people can ever think. It is a myth that with enough science and technology people can understand and manage the planet earth.
- The earth does not belong to people, people belong to the earth, and they are just one particular strand in the web of life.
- A person’s role is to understand and work with the rest of nature, not to conquer it.
- Every living species has a right to live, or at least to struggle to live, simply because it exists, and this right is not dependent on its actual or potential use to people.
- Something is right when it tends to maintain the ecological integrity, sustainability, and diversity of Earth’s life-support systems for people and other species, and wrong when it tends otherwise.
- The best things in life are not things.
- It is wrong for human beings to cause the premature extinction of any wild species and the elimination of and degradation of their habitats.
When people alter nature to meet their basic needs or non-basic wants, they should choose a method that does the least possible harm to other living things, because it is in general worse to harm a species than an individual organism and still worse to harm a community of living organisms. When damage cannot be avoided, it should be minimized and repaired.

When people alter nature, they should make such changes at nature’s rates and in nature’s ways.

Resources are limited and must not be wasted.

No individual, corporation or nation has a right to an ever-increasing share of earth’s finite resources.

It is wrong to treat people and other living things primarily as factors of production, whose value is expressed only in economic terms.

Everything people have or will have comes from the sun and the earth. The earth can get along without people, but people cannot get along without the earth. An exhausted planet is an exhausted economy, and short-term greed leads to long-term economic and environmental grief.

People should leave the earth in as good a shape as they found it, if not better.

All people should be held responsible for their own pollution and environmental degradation. Dumping of waste in another area or country is the equivalent of using chemical warfare on the people or other species receiving the waste.

People must protect the earth’s remaining wild systems from their activities, rehabilitate or restore natural systems they have degraded, use natural systems only on sustainable basis, and allow many of the systems they have occupied and abused to return to a wild state.

In protecting and sustaining nature, go farther than the law requires.

To prevent excessive deaths of people and other species, people must prevent excessive births.

Put the poor and their environment first, not last. Help the poor sustain themselves and their local environment, and do this with love, not condescension. There can never be peace, environmental justice, or a sense of pride about people’s accomplishment as a species as long as anyone still lives in poverty.
To love, cherish, celebrate and understand the earth and themselves (people), take time to experience and sense the air, water, soil, trees, animals, bacteria and other parts and rhythms of the earth directly.

Learn about, love, and care for the local environment, live gently within that place, and walk lightly on the earth.

To achieve a sustainable earth worldview involves people working their way through the four levels of environmental awareness mentioned in 2.2.2. Sustaining the earth requires not only a new way of thinking but also a new way of feeling based on listening to and experiencing the earth and themselves (people) with their senses and their hearts (Miller, 1993).

Being environmentally aware will lead people to know and understand the principles for sustainable societies. These principles are also referred to as the principles for sustainable development. These have been clearly defined in the initiative called “Caring for the Earth, A Strategy for Sustainable Living” (Yeld, 1997). What this initiative entails is being discussed below.

2.3 CARING FOR THE EARTH

2.3.1 Introduction

A significant contribution to fostering human responsibility for the earth or the environment has been the worldwide initiative called “Caring for the Earth, A Strategy for Sustainable Living.” There are two fundamental requirements stresses by Caring for the Earth, and these requirements include to secure a widespread and deeply held commitment to an ethic for sustainable living, and to integrate conservation and development (Fuggle & Rabie, 1992:2). According to Caring for the Earth in (Yeld, 1997) argues “… living sustainably depends on accepting a duty to seek harmony with other people and with nature. The guiding rules are that people must share with each
other and care for the earth. Humanity must take no more from nature than nature can replenish. This in turn means adopting life-styles and development paths that respect and work within nature’s limits. It can be done without rejecting the many benefits that modern technology has brought, provided that technology also works within those limits. This….is a new approach to the future, not a return to the past.” Therefore, nine principles for sustainable living were then outlined in the initiative *Caring for the Earth.*

### 2.3.2 Nine Principles for Sustainable Living

- **Respect and care for community of life.** This ethical principle requires that human actions should not be at the expense of other human groups or later generations nor threaten the survival of other species. It recognizes that our survival depends on the use of other species, but that we need not and should not use them cruelly or wastefully.

- **Improve the quality of human life.** The underlying aim of all development is to improve the quality of human life. It is a process that enables people to lead lives of dignity and fulfilment and to realize their potential. People everywhere want to lead long and healthy lives, to have access to education and resources needed for a decent standard of living and to attain political freedom and freedom from violence. Development must address all these factors and not only economic growth.

- **Conserve the earth’s vitality and diversity.** The human species is utterly dependent on the earth’s natural life-support systems. There must be a deliberate action to protect the structure, functions and diversity of the world’s ecosystems. The ecological processes that govern climate, recycle essential elements, form soil, disperse waste and keep the planet fit for life, must be conserved. The variety of plants and animals and other organisms as well as the different ways these are assembled in communities must be preserved, and human use of living resources must be within the resource’s capacity for renewal.

- **Minimize the depletion of non-renewable resources.** Minerals and fossil fuels are non-renewable resources, so they cannot be used sustainably. Nevertheless,
avoiding over-use or wasteful use through their recycling and by using renewable substitutes where possible, can extend their usefulness to human beings.

- **Keep within the earth’s carrying capacity.** Policies that bring human numbers and life-styles into balance with nature’s capacity must be developed together with technologies and management practices that enhance that capacity.

- **Change personal attitudes and practices.** Through educational programmes and the dissemination of information, individuals must be encouraged to re-examine their values and to alter their behaviour to accord with the ethic of sustainable living.

- **Enable communities to care for their own environments.** Authorities and governments are too far from everyday activities of communities for them to constantly intervene to protect the environment from human actions. Communities must themselves be empowered to contribute to and enforce decisions that affect their environment. Care for the environment is the responsibility of all communities. It must not be made to appear the predominant responsibility of government or conservation agencies.

- **Provide a national framework for integrating development and conservation.** To ensure action to harmonize conservation and development, all countries need an acceptable framework of law, and institutions consistent with their social and economic norms. Such programmes must be adaptive and responsive to changing national circumstances. What will work in one country will be different to what will work in another; each country must therefore assume responsibility for a framework that will ensure a movement toward sustainability within its own domain.

- **Create a global alliance.** All nations of the world are interdependent. No nation is economically self-sufficient and the life-supporting systems of the planet do not respect political boundaries. For sustainable living, all nations of the world must act in accord. It is fallacious to think the either the developed or developing countries will be able to proceed towards sustainability without the co-operation of the other (Fuggle & Rabie, 1992: 2-3).
Being able to consider all the nine principle of sustainable development or sustainable society mentioned above, one could be said to have developed environmental ethics. These are the ethics, which govern all the moral relations between humans and the natural environment. They are the ones that determine human behaviour towards the environment. They also help people to understand what actions are good and wrong for the environment. Therefore, there is a need for understanding what environmental ethics are, what they are comprised of, and their necessity towards the improvement and protection of the quality and health of the environment.

2.4 ENVIRONMENTAL ETHICS

2.4.1 Definition of Environmental Ethics

In general, environmental ethics present and defend a systematic and comprehensive account of the moral relations between humans and their natural environment (Des Jardins, 1993). Environmental ethics assume that human behaviour towards the natural world can be and are governed by moral norms. Therefore, environmental ethics explains what these norms are, to whom or to what humans have responsibilities, and show how these responsibilities are justified. According to Kwiatkowska (1999), environmental ethics address the most important contemporary environmental problems and exhibit considerable concern over the extinction of species, degradation of ecosystems, water and air pollution, soil erosion etc.

2.4.2 The Necessity of Environmental Ethics

Firstly, human activity has caused extensive modifications to the natural environment and it still continues to do so (Elliot, 1995). Many of these modifications threaten the well being of both presently existing and future humans. Therefore, there is a need for people to know what is right and wrong for their environment.
Secondly, environmental ethics is the enhancement for the respect for nature. According to Taylor in Dower (1989), “human beings are not inherently superior to other living things.” He went on to argue that “human goods are not in themselves to be preferred to the good of other living things: the natural environment has its own intrinsic value, independent of that value that human beings may attribute to it” (Dower, 1989: 49-50).

It is only human beings who are capable of having an ethic at all, let alone an environmental ethic. To have an ethic is to have views, necessary arrived at by reflection, about what is desirable on the environment. Humans must have environmental ethics due to the fact that it helps them to make choices that are good and wise for the environment and with respect to the rest of the nature (Dower, 1989: 49-50).

2.4.3 Environmental Ethics and Human Ethics

There are three components of human ethics (Taylor, 1986). All these components are connected to each other in some way. The first component is the acceptance of a belief-system within which each moral agent conceives of others in certain way. The second component is the attitude of respect for persons, which is both a moral and an ultimate one. It is of moral attitude because it is universalizable and disinterested, and it is an ultimate one because its justifiability does not consist in being derivable from any more general or fundamental attitude. The third component is a system of rules and standards, which are considered valid in the domain of human ethics (Taylor, 1986).

The connection between these three components is that the belief system supports and makes intelligible the attitude of respect for persons. If one has as an ultimate moral attitude, one will be committed to fulfilling whatever rules of conduct and standards of character embody the principles of respect for persons. That will then help in conducting activities that show moral attitudes and respect for the natural environment (Taylor, 1986).
2.4.4 The Ethics for Respect for Nature

- Human-Centred and Life-Centred Systems of Environmental Literacy

A set of moral values governing human treatment of the natural world is a rationally grounded set if, first, commitment to those set of norms is a practical entailment of adopting the attitude of respect for nature as an ultimate moral attitude, and second, the adopting of that attitude on the part of all rational agents can be itself justifiable. When the basic characteristics of the attitude of respect for nature are made clear, it will be seen that a life-centred system of environmental ethics need not to be holistic or organicist in its conception of the kinds of entities that are deemed the appropriate objects of moral concern and consideration (Van DeVeer & Pierce, 1998: 160).

Human actions affecting the natural environment are right or wrong by either two criteria: they have consequences, which are favourable or unfavourable to human well-being, or they are consistent or inconsistent with the system of norms that protect and implement human rights. Form this human-centred standpoint; it is to humans and only humans that all duties are ultimately owed. Humans may have responsibilities with regard to the natural ecosystems and biotic communities of their planet, but these responsibilities are in every case based on the contingent fact that their treatment of those ecosystems and communities of life can further the realization of human values and/or rights (Van DeVeer & Pierce, 1998: 160).

- The Good of a Being and the Concept of Inherent Worth

Firstly, every organism, species population, and community of life has a good of its own, which moral agents can intentionally further, or damage by their actions. One can act in its overall interest, and environmental conditions can be good or bad for it. What is good for an entity is what does it good in the sense of enhancing or preserving its life and well-being, and what is bad for the entity is something that is detrimental to its life and well-being (Van DeVeer & Pierce, 1998: 161).

Secondly, essential to the moral attitude of respect for nature is the idea of inherent worth. Attitude towards wild living things (individuals, species
populations, or whole biotic communities) are regarded as entities possessing inherent worth. According to the principle of moral consideration, wild living things are deserving of the concern and consideration of all moral agents simply in virtue of their being members of the Earth’s community of life. Therefore, from the moral point of view, their good must be taken into account whenever the rational agents affect it for better or for worse. The principle of intrinsic value states that, regardless of what kind of entity it is in other respect, if it is a member of the earth’s community of life, the realization of its good is something intrinsically valuable (Van DeVeer & Pierce, 1998: 162).

Combining these two principles, one can now define what it means for living things to possess inherent worth. To say that it possesses the inherent worth is to say that its good is deserving of the concern and consideration of all moral agents, and that realization of its good has intrinsic values (Van DeVeer & Pierce, 1998: 162).

- **The Attitude for Respect of Nature**

  Adopting the attitude of respect for nature as an ultimate moral attitude is to make a commitment to live by certain normative principles. These principles constitute the rules of conduct and standards of character that are to govern people’s treatment of the natural world. First, this is an ultimate commitment because it is not derived from any higher norm. The attitude for respect for nature sets the total framework for people’s responsibilities towards the natural world. Second, the commitment is a moral one because it is understood to be a disinterested matter of principle (Van DeVeer & Pierce, 1998).

  Once environmental ethics are developed then one can be referred to as to have developed environmental awareness, has become sensitive to the total environment, and can come up with an action plan to solve and mitigate some environmental problems. The development of environmental awareness, knowledge, skills, attitudes, values and ethics
needed for the improvement and protection of environmental quality can only be achieved through environmental literacy, which is then discussed in details in 2.5.

2.5 ENVIRONMENTAL LITERACY

2.5.1 What is Environmental Literacy?

Environmental Literacy is a basic functional education for all people, which provides them with the elementary knowledge, skills and motives to cope with environmental needs and contribute to sustainable development (Moseley, 2000). Sustainable Development is development that meets the needs of the present generation without compromising the ability of the future generations to meet their own needs (World Bank, 1997). According to Allers (1997:5), “environmental literacy is essentially the capacity to perceive and interpret the health of environmental systems and to take appropriate decisions and actions to restore, maintain and improve the health of those systems.”

The term "environmental literacy" has been used hitherto in the environmental education literature, but while it has been given working definitions, these have not been derived directly from a systematic engagement with literacy debates within language and literature studies. As part of the American work on "standards", Roth (1992) provides a framework for environmental literacy with relation to knowledge, affect, skills and behaviour at three levels of competence (nominal, functional and operational).

For UNESCO, Marcinkowski (1991) provides a set of nine statements which amount to what environmental literacy might be taken to be, relating to knowledge, understanding, attitudes and active involvement. In Scotland, curriculum planners have included environmental literacy as one of the four goals of "environmental citizenship" (Scottish Office, 1993), defining it in terms of "knowledge and understanding of the components of the system" (p4). While each of these definitions of environmental literacy might have its
practical uses, none is overtly grounded in the primary academic debate about the nature of literacy.

For one to be said to be environmental literate, one should have developed

- An awareness of and sensitivity to the total environment.
- The capacity to move from environmental awareness to knowledge and action.
- A set of values and feelings of concern for the environment, the motivation for actively participating in environmental improvement and protection.
- Skills for identifying and solving environmental problems (Allers, 1997: 5).

Additional requirements of an environmentally literate person are:

- Awareness of the natural resources upon which people are directly or indirectly dependent and some knowledge of renewable and non-renewable resources.
- Conviction of individual responsibility for the validity of the land and for caring for the local environment.
- Concern about maintaining the quality of life in harmony with the carrying capacity of the environment (Anon, 1999).

2.5.2 The Kinds of Environmental Literacy

2.5.2.1 Functional Environmental Literacy

Functional print literacy can be measured by objective tests, which can be purely summative, or may be diagnostic if subjected to miscue analysis, which analyses reader's errors (Williams & Snipper, 1990). Functional literacy is not just a matter of knowing what words mean, but of being able to find out what they mean in the context of whole sentences by the use of phonic and contextual cues. Functional literacy also involves being able to read words referring to commonplace abstractions (beauty, goodness, fear etc.). It involves literal comprehension (Williams & Snipper, 1990).
Functional environmental literacy must, therefore, refer not only to the ability to remember what an oak tree is, but to recognize one; not only to recognize several trees within a given area, but to know whether they form part of a wood or an area of parkland (Anon, 1999). Functional environmental literacy must also involve the ability to ascertain, from contextual cues, what something half known is likely to be: for instance, to make an informed guess, using observation, at the types of woodland flower within a beech copse overlying chalk rather than an oak wood on more acid soil. Functional literacy is not, therefore, a mere prerequisite to more advanced forms of literacy, but involves a series of complex skills and an accumulation of knowledge which has unlimited capacity for growth (Anon, 1999). Arguably, much science education in schools focuses chiefly on what is defined here as functional literacy, whether or not this entirely reflects intentions. Certainly, its role in environmental education should not be underestimated (Anon, 1999).

Both cultural and critical literacy are impossible without functional literacy. Just as the ability to decode print is a prerequisite to the development of deeper levels of comprehension of the passage to be read, so is knowledge of the natural world a condition of the development of awareness of environmental issues and of the ability to take effective action. However, functional environmental literacy is not enough because it does not, of itself, engage the learner (though many learners may already be highly motivated), and it does not engage either with the crucial notion of what the environment means, either to others or to the learner (Anon, 1999).

Environmental education, therefore, must never abandon its scientific knowledge base, but must always move beyond it, so that scientific knowledge is used to inform what are essentially human value judgments. In terms of environmental literacy, we must acknowledge the importance of the functional but place it alongside the cultural, and see both as conditions of the critical, as only critical environmental literacy can facilitate effective environmental action.
2.5.2.2 Cultural Environmental Literacy

Cultural literacy refers to the ability to understand the significance that society attaches to cultural icons. Such icons include, of course, living natural objects in terms of cultural history with respect to the ways in which these landscapes have been viewed, used and reshaped over a millennium (Anon, 1999). On one level, a degree of cultural environmental literacy merely enables one to recognize the significance of natural images in human culture, along with some recognition of why and to whom they are significant. However, it also allows for an understanding of why the landscape itself is as it is, shaped not merely by climate, glaciation and topography, but by arguments about enclosure, the need for timber and patterns of land ownership dating back many centuries (Anon, 1999). While functional environmental literacy develops knowledge of what natural things are, cultural environmental literacy enables us to explain why they are there when the causes are clearly not simply geological or climatic with no apparent human intervention (Anon, 1999).

Cultural literacy depends on a degree of acceptance of cultural hegemony: it links the learner with a dominant value system. Cultural literacy refers more to cultural heritage than to cultural analysis. Insofar as cultural literacy is empowering, it empowers by giving the learner access to socially powerful perspectives; cultural literacy alone does not enable the learner to act upon that knowledge, once acquired. Effective action requires critical literacy (Anon, 1999).

2.5.2.3 Critical Environmental Literacy

Critical literacy is the ability to understand the text on a deeper and more creative level: the ability to discuss the use of genre in context, to question the motives and ideology of the text, and to explore and develop personal (and broader social) response to it (Anon, 1999). Critical environmental literacy must then imply the power to develop an understanding of the factors that contribute to environmental change and to have a view on how further to oppose that change in a way that can be translated into action. Critical
environmental literacy involves the ability to explore questions such as "What does a place or an issue mean to me?" "What does it mean to us, or to others?"; "What are the consequences of carrying on in this way [in relation to this place or this issue]?"; "Should we act differently, and if so how?"; "How do we translate our values into effective action - and are our values themselves ready for change as a result of what we now know or feel?" (Anon, 1999).

As has been stressed above, critical literacy cannot be effectively developed without good levels of both functional and cultural literacy, though the latter are arguably pointless without the former (Habermas, 1987). Critical environmental literacy relies on functional environmental literacy because both environmental debate and environmental action rely on information. Critical environmental literacy relies on cultural literacy not simply because environmental debate and action need to be grounded in an awareness of the norms and values of, say, national cultures, but because influence on environmental change demands an understanding of the norms and values of the dominant culture (Anon, 1999).

2.5.3 Development of Environmental Literacy

The accomplishment of developing environment literacy is based on the following stages. These stages are the stages along which individuals progress towards acquisition of environmental literacy. These major clusters are (Roth; 1991):

- **Nominal Environmental Literacy.** This refers to the ability to recognize many of the basic terms used in communicating about the environment and to provide a rough working definition of their meanings. Developmentally, the nominally environmentally literate person, although aware of the terms or vocabulary, has little or no depth understanding of them, has only rudimentary process skills, and has no more than casual commitment to environmental concerns and actions.

- **Functional Environmental Literacy.** This refers to the capacity to use fundamental environmental knowledge, concepts, and thinking skills to formulate action positions on particular environmental issues and in daily
behaviour. The functionally literate person can communicate the substance of an account to a third party, either orally or in writing.

- *Operational Environmental Literacy.* This refers to the capacity to regularly perceive environmental issues, gather and evaluate pertinent information, examine and choose among alternatives, take positions and actions that work to sustain and develop a foundation of environmental knowledge, and use analytical and deductive reasoning, logical thought processes and objective analysis.

People tend to progress along the continuum of proficiency in environmental literacy in stages that include awareness, concern, understanding and action (Moseley, 2000). Environmental literacy has to do with understanding how decisions affect the environment, the economy and the community.

### 2.5.4 Building Blocks for the Creation of Environmental Literacy

The following are the building blocks of environmental literacy that will create environmental literacy among people in the present days (Irani, 1991). People must:

- Address the public’s environmental concern more effectively than they have in the past.
- Continue to be straightforward with facts about their chemistry and operations.
- Listen to ideas put forward by everyone concerned, in order to find solutions that are best for the environment, the economy and the community.
- Play an even greater role in environmental management and redouble their efforts and resources in an effort to find permanent environmental solutions.

### 2.5.5 How Do People Become Environmentally Literate

Traditionally, governments have relied on command control regulations to protect the environment. However, the diverse and diffuse nature of human activities, which are causing environmental transformation and degradation, clearly require the use of every
possible tool to change the behaviour of individuals and institutions. Therefore, there is a need for research and development, the provision of information to government, industry, and the public, and education and training (Cortese, 1991). This is an indication that there is a need for community leaders and the community as a whole to be environmentally literate in order to improve and protect the health and quality of the environment.

To enhance environmental literacy, there is a need for (Cortese, 1991):

- **Environmental Professionals.** A major shift in the relationship of humans with the environment will require a long-term societal effort in environmental education. Because virtually every human activity affects the environment, there is a need for well-trained interdisciplinary professionals. Unfortunately, there is a shortage of such highly trained personnel. Furthermore, the education and training of the current workforce is incomplete, most professionals are trained to deal with the subset of environmental problems, and they are not trained holistically to deal with issues in an integrated and comprehensive manner.

There is also a need for a concerted national and international strategy to ensure that there is an adequate and continuing supply of environmental professionals. These professionals must be trained to understand environmental issues in a holistic and integrated manner involving population, natural resources and pollution, and both to anticipate and to prevent as well as to control and remediate environmental problems (Cortese, 1991).

### 2.5.6 Environmental Literacy and Responsibility

All members of society consume resources and produce pollution and waste (Cortese, 1991). It is essential therefore, that they all understand the importance of the environment to their quality of life and that they have the knowledge, tools and the ethic to carry out their daily lives in ways that minimize the impact of their actions to the environment. That is, the ability to have a sustainable future is entirely dependent on having the next generation of human beings being “environmentally literate and responsible” (Cortese, 1991).
Environmental literacy and responsibility require a new education strategy at all educational levels. The environment should not be solely a special topic or a subject for professionals who will work on environmental problems. Because the environment provides the basis for life and is a major determinant of the quality of life, it must be a fully integrated and prominent part of all education. This is especially important for the education of professionals in business, engineering, science, medicine, architecture, economics, government, demography and law (Cortese, 1991).

With such knowledge and understanding, professionals will help make our productive sectors and governments more efficient in the use of natural resources and energy and reduce adverse impacts of their activities on the environment and the society (Cortese, 1991). Business and industry will be more competitive and successful and will improve community and government relations. This will also improve the participation of community leaders in solving environmental problems, and encourage them to actively participate in the improvement and protection of the quality and health of the environment.

The primary goal for environmental education should be to produce people who are environmentally literate, because it is mainly the process that seeks to develop the necessary awareness, ethics, values, knowledge, skills and commitment to allow people to become environmentally literate in order to be pro-active in securing a properly functioning and healthy environment that is sustainable. While Environmental Education is concerned with the biophysical environment and its associated problems, it ultimately is concerned with man, so as to educate people and not environments (Swan & Stapp, 1974: 25).
2.6 ENVIRONMENTAL EDUCATION

2.6.1 What is Environmental Education?

Environmental Education is education about, for, in and through the environment (Allers, 1997). It is basically a process that seeks to develop the necessary awareness, ethics, values, knowledge, skills and commitment to allow people to become environmentally literate in order to be pro-active in securing a properly functioning and healthy environment that is sustainable. According to Carson (1978), environmental education is “the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings.” It also entails the practice in decision-making and self-formulating of a code of behaviour about issues concerning environmental quality.

Environmental Education teaches people to understand and appreciate the natural world around them, and to think critically and creatively in order to identify and solve environmental problems. As a field, Environmental Education is centred on two relationships: (1) the interdependence of living organisms in an ecological framework (i.e., the web of life, food chain etc.), and (2) the interactions between human society and the natural world (i.e., water pollution, deforestation etc.) (Miller, 1993).

Environmental Education programmes often emphasize ways in which human activities can preserve or restore environmental quality. Environmental Education participants are provided with the knowledge and skills to look at environmental issues critically, helping them make informed, balanced decisions and take responsible actions. Environmental Education requires an interdisciplinary approach that draws connections between environmental issues and the associated social, economic, political, scientific and technological concerns (Northwest Environmental Education Council, 2001).
Although Environmental Education has a long history, until fairly recently formal curricula in the South African education system largely ignored environmental principles and the philosophy of sustainable living. There have also been powerful forces effectively nullifying much of the positive benefit of environmental education: advertising and mass entertainment, which – both in this country and internationally – have promoted excessive consumption, ignored the need to conserve scarce resources, and glorified wasteful living practices (Yeld, 1997: 58-59).

Many people do not understand the links between individual life-styles, the alleviation of poverty, the use of resources, environmental degradation, and, ultimately, the survival of humanity. They have not been taught how changing their behaviour can help others and have a positive influence on the natural environment. They have to be shown why an acceptable quality of life for all is dependent on the wise, sustainable use of the country’s natural resources (Yeld, 1997: 59).

A new approach to environmental education in which an understanding of the intricate and often delicately poised balance between humanity and the natural world is essential. According to Yeld (1997: 59), environmental education should be conducted in a participatory way, enabling the learners, the public, community groups or whoever to be active participants in the learning experience. Non-formal education through the efforts of non-government organizations will have a vital role to play, by helping to create public awareness about issues such as soil erosion, desertification, global warming, the loss of biodiversity, pollution and the need for water conservation.

### 2.6.2 The Principles of Environmental Education

The principles of environmental education as formulated by the “Belgrade Charter” (1975) in (Allers, 1997: 5-7) are as follows:

- Environmental education should consider the environment in its totality – man-made, political, economic, social, ecological, technological, legislative, cultural and aesthetic.
- Environmental education should be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective.
- Environmental education should be a continuous lifelong process, both in school and out of school.
- Environmental education should emphasize active participation in preventing and solving environmental problems.
- Environmental education should examine major environmental issues from a world point of view, while paying due regard to regional differences.
- Environmental education should focus on current and future situations.
- Environmental education should promote the value and necessity of local, national and international co-operation in the solution of environmental problems (Schreuder, 1991: 26).

Other guidelines outlined by Joubert & Steenkamp (1995: 28-29) can be added:
- Focus on current and potential environmental situations while taking into consideration the historical perspective, utilizing indigenous history and local cultures, as well as promoting linguistic, cultural and ecological diversity.
- Stimulate dialogue and co-operation among institutions and individuals in order to create new lifestyles, which are based on meeting everyone’s basic needs.
- Facilitate equal partnership in the process of decision-making at all levels and stages.
- Enable learners to become empowered by having a role in planning their learning experiences, and provide an opportunity for decision-making and accepting consequences.
- Emphasize the complexity of environmental problems and thus the need to develop critical thinking, decision-making and problem-solving skills to manage conflicts in humane and just ways.
- Utilize diverse learning environments and a broad array of educational approaches, strategies and resources for teaching and learning with due emphasis
on practical activities including field study, action research, simulations, information technology and residential experiences.

2.6.3 Goals and sub-goals of Environmental Education

The primary goal of environmental education is to help people develop or become environmentally aware, skilled, knowledged, dedicated citizens, who are committed to work, defend, improve and sustain the quality of the environment on behalf of present and future generations of all living organisms (Allers, 1997).

The sub-goals of environmental education are to (Allers, 1997: 6-7):

- Develop perceptual awareness of the environment.
- Develop knowledge, skills, values and attitudes needed for sustaining the quality and health of the environment.
- Develop environmental ethics.
- Develop citizen action skills.
- Develop citizen action experience.

According to Carson (1978: 63), the following aims should be included in the programmes of environmental education in order to look at the environmental problems and issues:

- To appreciate the varying relationships between man and the environment on a dimension from minimal to maximal human impact as varying with different sorts of exploitive technology, and systems of organizing production and distributing products.
- To recognize the checks and breakdown points of pre-industrial technologies, both as a topic in its own right and as a point of comparison with environmental problems in the industrialized world.
- To consider the environmental and social effects of gearing third world economies into a global economic and political system.
To consider how environmental issues are formulated as issues for decision-making (or why they are not), how remedial programmes are constructed, and who will benefit from particular problem formulations and the suggested solutions.

To consider the values of other cultures with regard to the environment as an antidote to our own culturally and historically limited thinking.

2.6.4 Environmental Education and the Environment

Environmental problems and issues can normally be linked with poor education or miseducation, or the combination of the two (Schreuder, 1995). In addition, education programmes tend to bypass the intellectual issues and moral dictates needed for taking responsibility for the earth (Plant, 1995). Education is initially directed at people whose well-being is the ultimate goal (Fien & Trainer, 1993).

Environmental education is actually an innate complex field of study. It draws on conflicting political, sociological, pedagogical and environmental strands in order to give meaning to the ecological crisis in holistic terms and interdisciplinary (Plant, 1995). Environmental Education is increasingly perceived as an instrument for social change, which will assure a sustainable future. However, Environment Education being seen as leading to a more environmentally sustainable society “is at best an act of faith” (Sterling, 1993). Human societies need to live in harmony with the natural world, and the long-term goal of Environmental Education should be to foster attitudes and behaviour compatible with the ethic of creating harmony (Sterling, 1993)
CHAPTER THREE: DATA MANAGEMENT

3.1 Data Collection

Data collection was executed through questionnaires (Appendix A) and interviews (Appendix B and C). These were conducted to get data on the necessity of environmental literacy towards the improvement of the health and quality of the environment among community leaders.

A hundred copies of questionnaires were distributed among community leaders, who were randomly chosen. No prior notification about the contents of the questionnaire was made. Community leaders were asked to complete them, with honesty as a requirement.

Data collected through the questionnaires was then processed qualitatively. This involved the frequency distribution of data, which is the presentation of the number of observations for each value (Fruin, 1980: 8). All frequencies have one common shortcoming, that is, they are all specific to a given total number of observations and cannot be generalized to a larger or smaller group (Thorndike, 1982).

A frequency distribution for each statement in the questionnaire was made, wherein all the four categories of the questionnaire were considered. This means that a frequency distribution for each category per question was drawn. This then led to the development of a frequency table followed by graphing of the collected data. Frequency distribution techniques such as bar charts and pie charts were used to represent the collected data and to aid the analysis and interpretation thereof, which is purposed to produce meaningful information.

A bar chart/graph was used as a data compression technique to provide graphical presentation. This is the type in which the length of a bar is used to indicate the frequency of occurrence of a particular value of a variable (Fruin, 1980: 12).
A pie chart was used to present average percentages of the collected data (Games & Klare, 1961). Data presented in the pie charts was aided in the drawing of conclusions and making of recommendations about or/and for the study.

Interviews were used to gather information on the overall environmental quality and the environmental problems that prevail in the study area. They also aided in the assessment of the level of environmental literacy among the community leaders in the study area. Information gathered through interviews aided in determining the quality and health of the local environment of the study area, and how such environmental quality would affect human health. This also aided in making recommendations to improve and protect the health and quality of the local environment of the study area concerned.

Gathering of information through interviews was not an easy task since some interviewees were reluctant to participate positively, while some of those who agreed were reluctant to be identified as well as to be audio recorded. Then the researcher had to make some notes regarding the interviews conducted in the respective departments.

**3.2 Data Analysis and Discussion of Results.**

Data collected through questionnaires was processed to develop frequency distribution graphs such as bar charts and pie charts. This also included tabulation of data (refer to Table 1). Statements in the questionnaires were divided into six categories, which represent the main aspects covered in this study. These categories are as follows (Appendix D):

- Statement 1 – 5: Environmental Awareness (Table 2 in Appendix D).
- Statement 6 – 15: Level of Environmental Awareness (Table 3 in Appendix D).
- Statement 17 – 20: Environmental Ethics (Table 4 in Appendix D).
- Statement 21 – 25: Environmental Literacy (Table 5 in Appendix D).
- Statement 26 – 30: Environmental Education (Table 6 in Appendix D).
- Statement 16 & 31: Community Leaders’ Perspective on Environmental Literacy (Table 7 in Appendix D).
Table 1. Frequency Distribution for Data on Overall Environmental Literacy and Environmental Quality

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<th>Statement Number</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Overall Total</th>
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<td>02</td>
<td>00</td>
<td>100</td>
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<td>26</td>
<td>02</td>
<td>00</td>
<td>100</td>
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<td>10.23</td>
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The above table (Table 1) represents frequency distribution for data collected through questionnaires. For full statements of the questionnaire, refer to Appendix A.
Categorization of the statement in the questionnaire into main aspects of the study was done to simplify data analysis. Each individual aspect of the study would then be dealt with separately, and the analysis thereof would be logical.

**Figure 1** represents the average percentage of data collected on overall environmental literacy and environmental quality (refer also to **Figure 14 and Table 1**). An average percent of 51.23 % presents category *Strongly Agree*; 37.87 % presents category *Agree*; 10.23 % presents category *Disagree*; and 0.67 presents category *Strongly Disagree*. This is an indication that community leaders in the study area understand that it is necessary for them to be environmentally literate in order to help in the improvement and protection of the quality and health of the local environment. However, the level of their understanding of the necessity of environmental literacy is not satisfactory. There is a need for the development thereof.

![Average Percentage Chart](image)

**Figure 1.** Average Percentage for Data on Environmental Literacy and Environmental Quality
Figure 2 represents frequency distribution for Environmental Awareness (statement 1 – 5 in Appendix A). The level of understanding of the environment and how it functions is satisfactory among community leaders in the study area. Community leaders also understand that man-environment interaction may lead to the development of environmental problems, and it is necessary for them to be able to identify and solve those problems in an effective environmental management way. About 69% of the community leaders understand the necessity of being environmentally aware; 28.4% fairly understand the importance of environmental awareness; while 2.6% do not what environmental awareness is, and how important it is towards maintaining the quality of the environment (refer to Figure 3).

Figure 2. Frequency Distribution for Environmental Awareness (Statement 1 – 5)
Figure 3. Average Percentage for Data related to Environmental Awareness (Statement 1 – 5)

Figure 4 represents frequency distribution for data collected in the level of environmental awareness (statement 6-15 in Appendix A) among community leaders. Being environmentally aware determines how man interacts with his environment. It was discovered in this study that although community leaders in the study area fairly understand the environment and how it functions, as well as their role towards its improvement and protection, their level of environmental awareness is unsatisfactory, therefore, it needs to be developed. Only 40.9 % of the community leaders level of environmental awareness has developed, 42.6 % of them have a satisfactory level; 15.1 % of them have not yet developed a level of environmental awareness; and 1.4 % of them, have a level that is most unsatisfactory (refer to Figure 5).
Figure 4. Frequency Distribution for the level of Environmental Awareness (Statement 6 – 15)

Figure 5. Average Percentage for Data related to the Level of Environmental Awareness (Statement 6 – 15)
Figure 6 represents the frequency distribution data related to environmental ethics (statement 17-20 in Appendix A). Environmental ethics assume and defend what is wrong and right for the environment. It helps humans to develop positive norms, values and morals towards the environment. About 52 % of the community leaders in the study area strongly agree that there is a need for environmental ethics to aid the improvement and protection of the health and quality of the environment; 36 % agree; 12 % disagree; and no one strongly disagrees with environmental ethics being one of the requirements for improving and protecting environmental quality and health (Figure 7).

**Figure 6.** Frequency Distribution for Environmental Ethics (Statement 17 – 20)
Figure 7. Average Percentage for Data related to Environmental Ethics (Statement 17 – 20)

Figure 8. Frequency Distribution for Environmental Literacy (Statement 21 – 25)

Figure 8 is the representation of data collected on environmental literacy (statement 21-25 in Appendix A) among community leaders in the study area. Most of the community leaders fairly understand what environmental is, but have not acquired adequate...
knowledge, skills, attitudes, values and ethics necessary for the protection and improvement of environmental quality, as well as identifying and solving environmental problems that may develop in their local environment.

Data collected indicates that 47.8% of the community leaders in the study area fairly understand what environmental literacy is, and are able implement the knowledge, skills, attitudes, values and ethics they have acquired through environmental literacy. It also indicates that 32% understand the concept “environmental literacy” but implementation of the knowledge, skills, attitudes, values and ethics acquired through environmental literacy needs some development. It also indicates that 19% understand some aspects of environmental literacy, but their level of understanding is unsatisfactory, therefore development of environmental literacy among them is necessary. 1.2% of the community leaders in the study area do not understand what environmental literacy is, and how is it necessary towards the improvement and protection of environmental quality (refer to Figure 9).

![Average Percentage for Statement 21-25](image)

**Figure 9.** Average Percentage for Data related to Environmental Literacy (Statement 21 – 25)
Figure 10 represents frequency distribution for data related to environmental education (statement 21-26 in Appendix A). Community leaders in the study area understand the necessity of environmental education as a tool to be used to develop environmental literacy, which is vital to the improvement and protection of environmental health and quality. The data collected indicates that 47% of them strongly agree that environmental education can develop environmental literacy among community leaders, while 51.2% of them agree. They also agree that the implementation of environmental education programmes may develop their level of environmental literacy, and 1.6% of them disagree that environmental education programmes may develop environmental literacy among community leaders, while 0.2% of them strongly disagree (refer to Figure 11). This means that the community leaders’ knowledge of environmental education towards the development and improvement of environmental literacy needs to be developed.

Figure 10. Frequency Distribution for Environmental Education (Statement 26 – 31)
Figure 11. Average Percentage for Data related to Environmental Education (Statement 26 – 30)

Figure 12 represents perspectives community leaders in the study area have on the development of environmental literacy through environmental education programmes and community empowerment, which contributes towards effective decision-making that affects the environment (statement 16 and 31 in Appendix A). It is 75.5% of the community leaders who strongly agree that there is a need for conducting regular workshops and seminars aiming at the development of the level of environmental literacy among them. They also strongly agree that there is a need for the community to be empowered to contribute and enforce decisions that affect their environment. However, 23% of them fairly agree that there is a need for regular development of environmental literacy among community leaders to help in the improvement and protection of the health and quality of the environment, while 1.5% of them disagree (refer to Figure 13).
**Figure 12.** Frequency Distribution for Community Leaders Perspectives on Environmental Literacy (Statement 16 and 31)

**Figure 13.** Average Percentage for Community leaders Perspective on Environmental Literacy (Statement 16 and 31)
Information gathered through interviews has indicated that although the quality and health of the environment of the study area is improving, it is still unsatisfactory (Appendix B and C). It was also indicated that some people still continue to dump waste materials along the street or/ and on the street corners. One interviewee stressed that it is everyone’s responsibility to improve, protect and maintain the quality and health of the environment, although community leaders are expected to play a much better role.

Community leaders, from the data collected through interviews (Appendix B and C), have indicated that to show love, appreciation and care for the environment, they should not dump waste materials along the street and/or on the street corners. They also should not litter, and should plant at least one tree a year. They also believe that this will set a good example to the community as a whole, and will get the community involved in the decision-making that will benefit the local environment. Furthermore, they understand that it is necessary for them to be environmentally literate in order to assist in the improvement, protection and maintenance of the quality and health of the local environment.

### 3.3 Summary

Data collected on the overall environmental quality and environmental literacy has shown that the status of the environment in the study area is still unsatisfactory. However, there are some improvements. It is the assumption of this study that once the level of environmental literacy among community leaders develops, the quality and health of the environment will also improve.

The level of environmental literacy among community leaders is satisfactory, but needs regular development and improvement through environmental education. Data collected on the overall environmental literacy and environmental quality and the analysis thereof has shown that community leaders understand that it is necessary for them to be environmentally literate in order to aid in sustaining, maintaining, improving and protecting the quality and health of the environment. They also understand that their
levels of environmental literacy need to be developed regularly through environmental education workshops and seminars. This can be accomplished through the implementation of environmental education programmes during the workshops and seminars, which should be aimed at the development of environmental literacy among community leaders.
CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The quality and the health of the environment in the study area are still unsatisfactory, although there are some improvements. These improvements include the installation of new sewage systems throughout the location by the Department of Water Affairs and Forestry (Anon, 2001, Personal observation). Because this is still in process, the quality of the environment in terms of water quality is still unsatisfactory because in some sections of the location, they still experience sewage leakage. However, this is hoped to improve as soon as the process of installation is complete.

Furthermore, environmental pollution, mainly from littering and dumping of waste materials along the street and/or in the street corners, is gradually decreasing (Personal observation). This is the result of the clean-up campaigns being conducted by the Department of Agriculture, Conservation and Environment together with the Department of Public Works. However, some people still dump waste on the street corners and/or along the street, hence the unsatisfactory quality of the environment.

This study has concluded that there is a close relationship between environmental literacy and environmental quality. The quality of the environment is the main determinant of the quality of human life. It has also been discovered that the increased level of environmental literacy among community leaders improves the quality and health of the environment of the local community. If community leaders are environmentally literate, they are likely to work together with the community towards the improvement, protection and maintenance of the local environmental quality.

The level of environmental literacy among the community leaders at this stage is satisfactory. However, there is a need for development thereof. This may be achieved through the introduction of environmental education both formally and informally, in order to cater for both the educated and uneducated community leaders.
It is the conclusion of this study that community leaders should be environmentally aware in order to know the environment, its constituents and how it functions. They should also be able to identify and solve environmental problems that may arise from human activities on the environment, in an effective environmental management.

Furthermore, it is necessary for community leaders to have environmental ethics that will assist them in the differentiation of what is right and wrong for the environment. They will be able to identify activities that may negatively affect the environment. This will also assist in improving their love, appreciation and care for the local environment.

It has also been discovered that the development of environmental literacy among community leaders may be achieved through environmental education. Environmental education may be offered formally or informally. Environmental education programmes (Appendix E) should be introduced to aid the development of environmental literacy among community leaders.

This study also concludes that regular environmental education workshops and seminars for community leaders need to be conducted. It is believed that these will aid in the development of environmental literacy among community leaders, and thus contribute to the improvement, protection and maintenance of the quality and health of the environment.

Therefore, it is necessary for community leaders to be environmentally literate in order to contribute towards the improvement, protection and maintenance of the quality and health of the environment, especially the local environment.
4.2 Recommendations

To improve the quality and health of the local environment, it is recommended that community leaders introduce a law whereby everyone who pollutes the environment is liable to pay a fine. The amount to be paid for environmental pollution will then be determined by the amount of pollution an individual has contributed to the environment.

It is recommended that environmental education programmes (Appendix E) be introduced and implemented to assist in the development of environmental literacy among community leaders. This will involve regular workshops and seminars, wherein community leaders will learn more about the environment and how they should interact with it to contribute to its improvement, protection and maintenance.

Furthermore, it is recommended that environmental education models such as “Education for Environmental Sustainability” (Van Rooyen, 2000) be used to assist in the development of environmental literacy among community leaders (see Appendix E). This model is recommended because it is assumed that it will make the community leaders go out there and be involved in the identification of environmental problems in their community. They will also be engaged in finding solutions to such environmental problems.

Thereafter, they will be able to develop a plan of action to implement the solutions to the identified environmental problems. They will also be able to discuss amongst each other what they should do to continuously improve, protect and maintain the quality and health of the local environment. As they meet regularly (during workshops and seminars), they will then be able to reflect on the decisions they shall have made during the previous meetings with regard to the local environment, and make some adjustments wherever necessary.
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APPENDICES

Appendix A: QUESTIONNAIRE

QUESTIONNAIRE ON THE OVERALL ENVIRONMENTAL QUALITY AND ENVIRONMENTAL LITERACY

For the Research Study

By

TINYIKO PETUNIA MALULEKE

At

MALAMULELE LOCATION

With

RAND AFRIKAANS UNIVERSITY

SUPERVISED BY PROF H G VAN ROOYEN

Signature:...........................................

Date:..............................................
Dear Respondent.

Please follow the instructions very carefully before attempting to complete the questionnaire. Remember the following:

1. Do NOT write your name anywhere on the reply sheet.
2. Read the inserted paragraphs before answering any questions.
3. Respond to the questions as honestly as possible
4. Questionnaires will be collected within three days from the day received.
5. Thank you for helping in the completion of this information survey.

READ THE FOLLOWING.

The environment is being disturbed continuously by the activities by man. The interaction between man and the environment depends on his knowledge, skills, attitudes and values towards the environment. Although people wish to live in a healthy environment, for their wish to come true, they need to be careful of their actions towards their local environment. They also need to be responsible for whatever actions or developments they carry out on the environment. This has led to what is referred to as Environmental Literacy, which is the ability to perceive and interpret the health of environmental systems and to take appropriate decisions and actions to restore, maintain and improve the health of those systems.

An environmentally literate person should develop:

- An awareness of and sensitivity to the total environment.
- The capacity to move from environmental awareness to knowledge and action.
- A set of values and feelings of concern for the environment, the motivation for actively participating in environmental improvement and protection.
- Skills for identifying and solving environmental problems.
YOU MAY NOW COMPLETE THE QUESTIONNAIRE.

STATEMENTS POSED TO THE RESPONDENT

Respond to the following statements by indicating with a cross next to the appropriate answer.

<table>
<thead>
<tr>
<th>STATEMENTS</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. You know what the environment consists of and how it functions.</td>
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<tr>
<td>2. You understand that there is a relationship between the natural and man-made environment.</td>
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<td>3. The relationship between man and the environment determines the quality of the environment.</td>
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<tr>
<td>4. You perceive that the interaction between the natural and man-made components of the environment can cause environmental problems.</td>
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<tr>
<td>5. You realize that one has to be able to identify and solve environmental problems in an effective environmental management.</td>
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<tr>
<td>6. Environmental pollution and degradation negatively affect the environment and threaten the health and welfare of humans.</td>
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<td>7. You meet personal needs by exploiting natural resources and wasteful use of resources.</td>
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<tr>
<td>8. The earth does not have infinite resources to sustain lives of people.</td>
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<tr>
<td>10. You understand that people are part of nature, and that there is a need for love, appreciation and care for it.</td>
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<tr>
<td>11. All people should be held responsible for their own pollution and environmental degradation and also dumping of waste in another illegal area.</td>
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<td>12. You learn about love and care for the local environment and live gently with that place.</td>
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<tr>
<td>13. Sustainable use of resources and not to use them cruelly or wastefully is essential.</td>
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<td>14. Life-support systems such as water, air and soil need to be either preserved or conserved to sustain environmental quality.</td>
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<tr>
<td>15. Improvement of the quality of human life depends on the quality of the environment.</td>
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</tbody>
</table>
16. Communities must be empowered to contribute to and enforce decisions that affect their environment.

17. You respect and care for community of life.

18. The natural environment has its intrinsic value, independent of any value that humans may attribute to it.

19. The attitude for a respect of nature sets a total framework for people’s responsibilities towards the natural environment.

20. You understand the need for a set of values and feelings of concern for the environment, and active participation in environmental protection and improvement.

21. Environmental literacy is the basic functional education for all humans, which provides them with knowledge, skills and motives to perceive and interpret the health of the environment.

22. Environmental literacy enables people to make appropriate decisions and to perform actions that restore, maintain and improve the quality of the environment.

23. You address the public’s environmental concerns effectively more than in the past.

24. You play a greater role in environmental management finding solutions that are best for the environment, and you increase efforts and resources by finding permanent environmental solutions.

25. The development of environmental literacy needs the introduction of environmental education as life-long education.

26. Environmental education programmes should be introduced at all formal and informal educational levels to develop and improve environmental literacy.

27. Environmental education programmes and the dissemination of information may help community leaders encourage people to re-examine their values and to accord with the ethic of sustainable living.

28. The environment forms the basis for the quality of life, therefore it should be integrated and be a prominent part of all education.

29. Environmental education teaches people to understand and appreciate their local environments.

30. Environmental education teaches people to think critically and creatively in order to identify and solve environmental problems.

31. Community leaders should conduct regular workshops for the development and improvement of their environmental literacy.
Appendix B: Interview Questions

1. What do you understand by the term “environment”?
2. Comment on the quality and health of Malamulele Location environment.
3. Who do you think should be responsible for improving, protecting and maintaining the quality and health of the environment?
4. What have you already done to show love, appreciation and care for your local environment?
5. Do you think it is necessary for you as a community leader to have some knowledge, skills, attitudes, values and ethics about the environment you are living in?
6. Do you think such knowledge, skills, attitudes, values and ethics may assist you to improve, protect and maintain the quality and health of the local environment?

Appendix C: Transcript of Interviews

Interview A: Department of Education, Arts and Culture

Interviewer: Thank you for agreeing to participate in this information survey. Firstly, I would like to know what you understand by the term the “environment”.

Interviewee: The term “environment” refers to a place where both living things and non-living things are found. It is a place where all living takes place, where the living and non-living organisms are interdependent on each other for living.

Interviewer: Comment on the quality and health of the environment of Malamulele Location.

Interviewee: The quality of the environment of Malamulele Location is not satisfactory because of a high rate of environmental pollution in this area, in terms of water pollution and littering. We normally experience leaking sewage throughout the location, and this problem has long been there without any
attention given to it. It is only recently that the Department of Water Affairs has been busy installing new sewage systems throughout the location. These leaking sewage systems have led to the development of some streams in the location, which produce a bad odour, and are also a good breeding place for mosquitoes, hence the high risk of a malaria outbreak in this area.

Littering and dumping of waste materials in the street corner and along the street is one other problem we face environmentally in this area. The area is usually covered with plastics and papers, especially during windy days. These are the main environmental problems we face here at Malamulele Location.

**Interviewer:** What do you think is the main cause for people dumping waste along the streets and in the street corners?

**Interviewee:** I think it is the poor services provided by those responsible for waste disposal, and also that people do not know how much negative effect they exert on the environment by doing that.

**Interviewer:** Who do you think should be responsible for the improvement, protection and maintenance of the quality and health of the environment?

**Interviewee:** Everybody living in this area should be responsible.

**Interviewer:** What have you already done to show love, appreciation and care for your local environment?

**Interviewee:** We normally plant at least one tree a year at the department to show our love, appreciation and care for our local environment.

**Interviewer:** Do you think it is necessary for you as the community leader to have some knowledge, skills, attitudes, values and ethics about the environment you are living in?

**Interviewee:** Yes, I think it is necessary because we sometimes do things that end up affecting the environment negatively, without prior knowledge about that. So, I think there is a need for us to know our environment much better than we do presently, so that we may interact with it properly.
Interviewer: Do you think such knowledge, skills, attitudes, values and ethics may help you to improve and protect the health and quality of your local environment?

Interviewee: Definitely, I think what makes a lot of us do bad things to the environment is a lack of knowledge. Therefore, this would help us to improve and protect the quality and health of the environment.

Interviewer: Thank you very much for your time and responses.

Interview B: Department of Agriculture, Conservation and Environmental

Interviewer: Thank you for allowing me to interview you to get information regarding the research I am doing. Firstly, I want to know what you understand by the term “environment”.

Interviewee: Thank you. The term environment means a setting under which all life takes places. This includes the natural environment, the spatial environment, the socio-cultural environment, the economic environment, as well as the man-made environment. All these various types of environments consist of some aspects that are interdependent.

Interviewer: Comment on the quality and health of the environment of Malamulele Location.

Interviewee: The environment in this area, in terms of its quality and its health, is very poor. This is the result of poor management of the environment, that is, the management of the activities of man as they impact on the environment. Littering has become a habit amongst the people living in this area. Dumping of waste materials anywhere is another problem we face in this area. Leaking sewage is one of the main environmental problems faced in this area. Although our department together with the Department of Water
Affairs and Forestry is trying to improve the situation, the quality and health of the environment is still unsatisfactory.

**Interviewer:** Who do you think should be responsible for the improvement, protection and maintenance of the quality and health of the environment?

**Interviewee:** Every person living in this area should be responsible for the improvement, protection and maintenance of the quality and health of the environment.

**Interviewer:** What have you already done to show love, appreciation and care for your local environment?

**Interviewee:** There are a lot of things I have done, like planting a tree once a year, not allowing any person to litter in my presence, initiating clean-up campaigns etc.

**Interviewer:** Do you think it is necessary for you as community leader to have some knowledge, skills, attitudes, values and ethics about the environment you are living in?

**Interviewee:** Yes, because all this is environmental literacy, and it is necessary for me as a community leader to be environmentally literate to know what is best for the environment I am living in.

**Interviewer:** Do you think such knowledge, skills, attitudes, values and ethics may help you to improve, protect and maintain the health and quality of your local environment?

**Interviewee:** Environmental literacy is necessary for all community leaders and the community as a whole, because it definitely assists in the improvement, protection and maintenance of the health and quality of the environment.

**Interviewer:** Thank very much for participating.
Interview C: Department of Water Affairs and Forestry

Interviewer: Thank you very much for participating in this information survey. Firstly, what is your understanding of the term “environment”?

Interviewee: The “environment” means where all life on earth takes place. It consists of biotic and abiotic organisms. It also consists of the biophysical, the social, the economic, the cultural and the man-made environment.

Interviewer: Comment on the quality and health of the environment of Malamulele Location.

Interviewee: The health and quality of the environment in this area is not good enough for living due to the leaking sewage and high rate of littering. Water from the leaking sewage has developed a lot of streams and ponds in this area. As a result, there is a high risk of a malaria outbreak in this area, and also other environmental health problems that may result from the contact with the water from the leaking sewage system by people. Therefore, I can say that the quality and health of the environment in this area is very poor and not conducive enough to living.

Interviewer: What do you think could be the cause of these conditions?

Interviewee: I think it is the result of improperly installed sewage systems, and also the dumping of waste anywhere in the environment. However, the situation with leaking sewage is being rectified, where new sewage systems are being installed.

Interviewer: Who do you think should be responsible for improvement, protection and maintenance of the quality and health of the environment?

Interviewee: Both the community leaders and the community should work together towards the improvement, protection and maintenance of the health and quality of the environment. However, the main duty is for the community leaders to help the community to know and understand activities that may lead to the lowering of environmental quality and health.
**Interviewer:** What have you already done to show love, appreciation and care for your local environment?

**Interviewee:** We always plant at least one tree a year to show our love, appreciation and care for the environment as a department.

**Interviewer:** Do you think it is necessary for you as the community leader to have some knowledge, skills, attitudes, values and ethics about the environment you are living in?

**Interviewee:** Environmental knowledge, skills, attitudes, values and ethics are a necessity for every community leader. This will help us to make wise decisions with regard to the environment. We will also be able to help the community as a whole to understand the necessity of environmental knowledge, skills, attitudes, values and ethics, especially for harmony between their activities and the environment.

**Interviewer:** Do you think such knowledge, skills, attitudes, values and ethics may help you to improve, protect and maintain the health and quality of your local environment?

**Interviewee:** Definitely. It is only environmental knowledge, skills, values, attitudes and ethics that may contribute to the improvement, protection and maintenance of the health and quality of the environment.

**Interviewer:** Thank you so much for participating.
Appendix D: Tables for the Categorized Statements of the Questionnaire

Table 2: Environmental Awareness Category (Statement 1-5)

<table>
<thead>
<tr>
<th>Statement Number</th>
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Table 3: The Level of Environmental Awareness Category (Statement 6-15)

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### Table 6: Environmental Education Category (Statement 26-30)

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### Table 7: Community Leaders’ Perspectives on Environmental Literacy (Statement 16 & 31)

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Appendix E: The Van Rooyen Model

Figure 15. The Van Rooyen Model
Source: Van Rooyen (2000)