



RHODES UNIVERSITY

**RESEARCH PORTFOLIO:**

**AN ENVIRONMENTAL EDUCATION PORTFOLIO:**

**Three small scale studies informing school greening activities and professional development of teachers in two rural Eastern Cape schools in SANBI's Greening the Nation Project**

A research portfolio submitted in partial fulfillment of the requirements of the degree Master of Education (Environmental Education)

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## Declaration of originality

I, Moffat Nkosiphendule Finca declare that this research portfolio is my own work written in my own words. Where I have drawn on the words or ideas of others, these have been acknowledged using complete references according to the Department Guidelines.

.....

Signature

.....

Date

**AN ENVIRONMENTAL EDUCATION PORTFOLIO:**  
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professional development of teachers in two rural Eastern Cape schools  
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## **TABLE OF CONTENTS**

<b>Contents</b>	i
<b>List of appendices</b>	vi
<b>List of tables</b>	vii
<b>List of figures</b>	viii
<b>List of acronyms</b>	ix
<b>Section 1: Introduction to the portfolio</b>	<b>1</b>
<b>1.1 Introduction</b>	<b>1</b>
<b>1.2 The area where the research took place</b>	<b>2</b>
<b>1.3 Greening of the Nation Programme and the South African National Biodiversity Institute's (SANBI) mandate</b>	<b>3</b>
1.3.1 Introducing the SANBI Greening the Nation Programme	3
1.3.2 Programme purpose	4
<b>1.4 My role in the programme</b>	<b>5</b>
<b>1.5 Selection of the schools and research participants</b>	<b>6</b>
<b>1.6 An overview of the studies</b>	<b>7</b>
1.6.1 Research design and links between the studies	7
1.6.2 The contextual profile (Section 2)	10
1.6.3 The stakeholder analysis (Section 3)	10
1.6.4 The action research project (Section 4)	11
1.6.5 Concluding recommendations (Section 5)	12

## **Section 2: The contextual profile**

<b>2.1 Introduction</b>	<b>13</b>
<b>2.2 Research question and methodology</b>	<b>13</b>
2.2.1 Research question	13
2.2.2 Methodology	14
2.2.3 Methods	14
2.2.3.1 Identifying the schools and getting permission to do the research	15
2.2.3.2 Selection of research participants	16
2.2.3.3 Document analysis	16
2.2.3.4 Questionnaires	18
2.2.3.5 Interviews	19
2.2.4 Data analysis	21
<b>2.3 The broader context: Policy, professional development and curriculum change</b>	<b>22</b>
2.3.1 National Policy	22
2.3.2 The National Curriculum Statement	24
2.3.3 Professional development	28
2.3.4 National Environmental Education Project-GET and SANBI'S Greening Project	30
<b>2.4 The specific context: two schools in the Bizana area</b>	<b>35</b>
2.4.1 Introduction to the specific context and some issues	35
2.4.2 Brief background to the two schools	36
2.4.2.1 Ncura Junior Secondary School	36
2.4.2.2 Ntlalontsha Junior Secondary School	38
2.4.3 Issues identified by parents, teachers and principals in the two schools	40
2.4.3.1 Environmental issues	40
2.4.3.2 Curriculum issues	43
2.4.4 Educational responses	44
<b>2.5 Conclusion</b>	<b>45</b>
<b>Section 3: The stakeholder analysis</b>	<b>57</b>

<b>3.1</b>	<b>Introduction</b>	<b>57</b>
<b>3.2</b>	<b>Who are stakeholders?</b>	<b>57</b>
<b>3.3</b>	<b>Context and purpose of conducting the stakeholder analysis</b>	<b>58</b>
<b>3.4</b>	<b>Research question and Methodology</b>	<b>62</b>
3.4.1	Research question and goals	62
3.4.2	Research methodology	63
3.4.3	Methods for data collection	63
3.4.4	Data analysis, ethics and validity	66
<b>3.5</b>	<b>Stakeholders knowledge, roles, interests and contributions</b>	<b>67</b>
3.5.1	Community member’s knowledge, roles, interests and contributions	67
3.5.1.1	Knowledge	67
3.5.1.2	Roles	69
3.5.1.3	Interests and contributions	69
3.5.2	School Governing Body knowledge, roles, interests and contributions	70
3.5.2.1	Knowledge	70
3.5.2.2	Roles	71
3.5.2.3	Interests and contributions	71
3.5.3	Learner’s knowledge, roles, interests and contributions	72
3.5.3.1	Knowledge	72
3.5.3.2	Roles	73
3.5.3.3	Interests and contributions	74
3.5.4	Educator’s knowledge, roles, interests and contributions	75
3.5.4.1	Knowledge	75
3.5.4.2	Roles	76
3.5.4.3	Interest and contributions	77
3.5.5	Ward councillor’s knowledge, roles, interests and contributions	78
3.5.5.1	Knowledge	78
3.5.5.2	Roles	79
3.5.5.3	Interests and contributions	79
3.5.6	SANBI’S knowledge, roles, interests and contributions	80
3.5.6.1	Knowledge	80

3.5.6.2	Roles	80
3.5.6.3	Interests and contributions	81
3.5.7	Department of Agriculture knowledge, roles, interests and Contributions	81
3.5..7.1	Knowledge	81
3.5.7.2	Roles	82
3.5.7.3	Interests and contributions	82
<b>3.6</b>	<b>How stakeholders participation actually worked</b>	<b>83</b>
<b>3.7</b>	<b>Conclusion and recommendations</b>	<b>85</b>
 <b>Section 4: Action Research</b>		<b>97</b>
<b>4.1</b>	<b>Introduction</b>	<b>97</b>
<b>4.2</b>	<b>Literature review</b>	<b>98</b>
4.2.1	Curriculum change in South Africa	98
4.2.2	Changes in pedagogy	99
4.2.3	Integration of Environmental Education in Learning Areas .....	102
4.2.4	Learning Area expectations and Lesson Planning	104
<b>4.3</b>	<b>Research Methodology and process</b>	<b>108</b>
4.3.1	Research question and goals	108
4.3.2	Action research methodology	109
4.3.3	Methods for data gathering	112
4.3.3.1	Using multiple methods	112
4.3.3.2	Observations	113
4.3.3.3	Interviews	114
4.3.3.4	Questionnaires	115
4.3.3.5	Document analysis	115
4.3.4	Ways of working with data	115
4.3.5	Validity and ethical considerations	116
<b>4.4</b>	<b>The action research process</b>	<b>117</b>
4.4.1	Cycle one of the action research	117
4.4.1.1	Planning	117

4.4.1.2	Observing the lesson	118
4.4.1.3	Reflection on the lesson and the research question	125
4.4.2	Cycle two of the action research	129
4.4.2.1	Planning: setting up the workshop	129
4.4.2.2	Action: the workshop	130
4.4.2.3	Reflection	135
4.4.3	Cycle three of the action research: lesson observations	136
4.4.3.1	Planning school visits	136
4.4.3.2	Action: lesson observation and field notes 1	137
4.4.3.3	Action: lesson observations and field notes 2	139
4.4.3.4	Reflection	141
4.5	Reflection on both lessons and implications for future teachers’ Support	142
4.6	Recommendations for supporting lesson planning	147
4.7	Conclusion	149
<b>Section 5: Reflections on the portfolio</b>		<b>181</b>
5.1	Challenges	181
5.1.1	The challenges I came across during the research period	181
5.2	What have I learned that can inform the Greening the Nation Project?	181
5.3	What have I learned about curriculum contextualization and re-contextualization?	182
5.4	What have I learned about the context I work in?	183
5.5	Critical reflection on the research process	184
5.6	Recommendations	185
<b>REFERENCES</b>		<b>187</b>

## **LIST OF APPENDICES**

### ***Section 2 Appendices***

<b>Appendix A:</b> Letter of request to conduct a research in schools	47
<b>Appendix B1 and B2:</b> Acceptance of request to conduct research	48-49
<b>Appendix C1 and C2:</b> Parents and teachers questionnaire	50-53
<b>Appendix D:</b> Interviews	54-55
<b>Appendix E:</b> Map of Bizana	56

### ***Section 3 Appendices***

<b>Appendix 1a:</b> Interview with Ncura J.S.S. Educators	87
<b>Appendix 1b:</b> Interview with Ncura J.S.S. Learners	88
<b>Appendix 2a:</b> Interview with Ntalontsha J.S.S. Educators	89
<b>Appendix 2b:</b> Interview with Ntalontsha J.S.S. Learners	90
<b>Appendix 3:</b> Interview with Ward Councillor	91
<b>Appendix 4:</b> Interview with community member	92
<b>Appendix 5a:</b> Interview with SGB of Ntalontsha J.S.S	93
<b>Appendix 5b:</b> Interview with SGB of Ncura J.S.S.	94
<b>Appendix 6:</b> Interview with Dept. of agriculture	95
<b>Appendix 7:</b> Interview with SANBI	95

### ***Section 4 Appendices***

<b>Appendix 1:</b> Lesson Plan (Ncura J.S.S. Cycle 1)	151
<b>Appendix 2a:</b> School observation visit (Cycle 1)	153
<b>Appendix 2b:</b> School observation visit (Cycle )	157
<b>Appendix 3a:</b> Workshop evaluation form, Ntalontsha J.S.S. (Cycle 2)	160
<b>Appendix 3b:</b> Workshop evaluation form, Ncura J.S.S. (Cycle 2)	164
<b>Appendix 4a:</b> Lesson Plan, Ntalontsha J.S.S. (Cycle 3)	166
<b>Appendix 4b:</b> Assessment task, Ntalontsha J.S.S. (Cycle 3)	168

<b>Appendix 4c:</b> Completed assessment task, Ntlalontsha J.S.S. (Cycle 3)	171
<b>Appendix 5a:</b> Lesson Plan, Ncura J.S.S. (Cycle 3)	173
<b>Appendix 5b:</b> Learners work, Ncura J.S.S. (Cycle 3)	175
<b>Appendix 6a:</b> Evaluation of the research, Ntlalontsha J.S.S. (Cycle 3)	176
<b>Appendix 6b:</b> Evaluation of the research, Ncura J.S.S. (Cycle 3)	178
<b>Appendix 7:</b> Interview schedules	180

## **LIST OF TABLES**

### ***Section 2***

Table 2.1: Questionnaires administered in this research	18
Table 2.2: Interviews conducted at the two schools	21

### ***Section 3***

Table 3.1: Interviews conducted for the stakeholder analysis	64,65
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### ***Section 4***

Table 4.1: Aspects of lesson planning for a healthy environment	107
Table 4.2: Data gathering techniques	112
Table 4.3: Lesson intentions, aims, materials and expected results(see Appendix 1)	118
Table 4.4: Observation schedule questions, with summary of lesson Process and implications for lesson planning	123
Table 4.5: Reflecting on key aspects of Lesson Planning using the NEEP-GET framework	127
Table 4.6: Exemplar of a Senior Phase Natural Science Learning programme	131
Table 4.7: Things to consider when planning a lesson	133
Table 4.8: Summary of reflections on the two lessons, using the NEEP-GET framework for reflection	143

## **LIST OF FIGURES**

### ***Section 2***

Figure 2.1:	Interviewing Mr. Mvunelo and Miss Msuthu at Ncura J.S.S.	20
Figure 2.2:	Interviewing Mr Tshaka, Miss Sontube and Mr. Msana at Ntlalontsha J.S.S.	20
Figure 2.3:	Ncura school showing the way the school grounds are managed	37
Figure 2.4:	Ntlalontsha school showing the well managed school grounds	40

### ***Section 4***

Figure 4.1:	Interviewing Mr Mnisi (on the left) the teacher.	113
Figure 4.2:	Grade 7 learners explaining the parts and functions of a plant	120
Figure 4.3:	Mr Mnisi is asking learners questions about the parts of a Plant	121
Figure 4.4:	The educator is assessing learners by giving them class work	122
Figure 4.5:	Mdlangaso Sinethemba and Clele Sixole are interviewed by Mr Finca, the observer	126
Figure 4.6:	Miss Zithutha and grade 7 learners of Ntlalontsha J.S.S.	138
Figure 4.7:	Grade 7 learners of Ncura J.S.S. are explaining parts of a plant	140

## **LIST OF ACRONYMS**

### *List of Acronyms*

AIDS	Acquired Immune Deficiency Syndrome
DEAT	Department of Environmental Affairs and Tourism
DoE	Department of Education
ESD	Education for Sustainable Development
E.G.	For Example
GET	General education and Training
HIV	Human Immunodeficiency Virus
IUCN	The World Conservation Union
J.S.S	Junior Secondary School
LA	Learning Area
LO	Learning Outcomes
NDE	National Department of Education
NEEP	National Environmental Education Programme
NGO	Non Governmental Organisation
OBE	Outcomes Based Education
RNCS	Revised National Curriculum Statement
RSA	Republic of South Africa
SADC	Southern African Development Community
SANBI	South African National Biodiversity Institute
UNESCO	United Nations Education Science and Cultural Organisation
UNEP	United Nations Environmental Programme

# SECTION 1

## INTRODUCTION TO THE PORTFOLIO

### 1.1 INTRODUCTION

I am a Mathematics and Natural Science Subject Advisor in the Bizana district in the Eastern Cape. In setting up this study, I therefore considered the quality of work of the teachers I am working with, and my formal duties. Amongst other duties I have an important job of supporting the professional development of the teachers I work with. I wanted to focus on a research project which would contribute to the professional development of teachers in Lesson Planning as this is a key issue that needs attention in the implementation of the National Curriculum Statement. As I am also supporting the SANBI Greening the Nation Programme, my interest is to research Lesson Planning that considers the use of school gardens (greening activities) in schools. This research is aligned with my roles and responsibilities as a Subject Advisor, which are:

- To bring about effective curriculum management of the education system in the district.
- To provide professional guidance and support to educators by organizing and facilitating workshops.
- To monitor the implementation of the curriculum according to the policy.
- To support the teachers through training and INSET programmes coordinated with the Institute.
- To promote the integration of social justice, HIV/AIDS, inclusivity, healthy environment, human rights and other social and environmental issues in the curriculum.
- To monitor and support teachers to ensure the successful and sustainable implementation of the NCS.
- To ensure effective and sustainable transformation of the curriculum in disadvantaged and rural schools.

## **1.2 THE AREA WHERE THE RESEARCH TOOK PLACE**

The research took place in the Bizana District. Bizana is one of the 23 districts which form the Eastern Cape Province in South Africa and it is situated in the east of the Eastern Cape in the area formerly known as Transkei. Bizana has been home to some of the strong leaders in South Africa. Oliver Reginald Tambo, former leader of the African National Congress, was born in Nkantolo village in the Bizana district. Mrs. Winnie Madikizela Mandela, former wife of Nelson Mandela, was born in Mbongweni village in Bizana (see appendix E in Section 2).

**1.2.1 Economically:** Bizana is one of the areas declared a poverty stricken area by the State President (Thabo Mbeki) during his visit to the O.R. Tambo Monument in 2006. Bizana is on the border of the Province of Eastern Cape and KwaZulu Natal (KZN), therefore many people move to KZN looking for employment as there are few employment opportunities in the area and unemployment is high (see Section 2). The area is rich in minerals like titanium and others. There are negotiations with an Australian company which want to mine this titanium. This reveals a need for environmental awareness in the area to empower local people to ensure that sustainability issues are attended to in development projects as the area also has unique biodiversity value. There are also outside companies that negotiate for quarries because of the type of the stone that is available in the area.

**1.2.2 From a tourism perspective:** Bizana occupies a large portion of the Wild Coast where many projects are proposed. The proposed Pondoland National Park will consume a large portion of Bizana. There are also plans to route the N2 across an area called virgin land, which the Pondoland people are proud of. There are 8 (eight) estuaries that flow into the sea in the Bizana area. The prominent ones are Umtentu, Mnyameni and Mzamba. Tourists from different places come to visit these estuaries for a number of different reasons. Various activities take place in these estuaries, and there are many things that attract and promote the tourism industry such as waterfalls and natural pools at the beginning of the Umtentu estuary. Swimming and fishing competitions take place in this estuary. There are other tourism adventures such as horse riding and tented camps.

The area is rich in endemic biodiversity, especially in flora species. The Bizana area forms part of the Albany-Maputoland biodiversity hotspot, which means that many plant species are also threatened (C.A.P.E., 2006). For example there is Mkambati Palm, which originated from and is named after Mkambati nature reserve where it was found. Fossils can be found in one of the sandy dunes where one of the horse-riding tourist routes passes through, and there are caves along the coast and inland, which also attract tourists. The area is therefore rich in natural capital, which is also important for economic and cultural purposes.

### **1.3 GREENING OF THE NATION PROGRAMME AND SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE'S (SANBI) MANDATE**

#### **1.3.1 Introducing the SANBI Greening the Nation Programme**

Due to its rich biodiversity, and the poverty status of Bizana, the South African National Biodiversity Institute (SANBI) has been implementing poverty relief projects in the area. According to SANBI's background statement, "environmental degradation comes in many forms ranging from destruction of vegetation through veld fires, overgrazing, over-harvesting of natural resources such as grass for weaving, forest resources for firewood, building materials, wood carving, medicinal use, and others" (2005:1). The destruction of vegetation results in soil erosion, desertification, and land degradation. The local vegetation plays a big role in ensuring a healthy environment in the lives of the people. Rehabilitation of degraded lands and forest patches, planting of trees and indigenous vegetation becomes an important solution to restore and to create a healthy environment for all, in order to replace lost habitats.

The Department of Environmental Affairs and Tourism (DEAT) in partnership with the South African National Biodiversity Institute (SANBI) initiated a three-year outreach Greening Programme whose intention was "The Greening of the Nation". This programme has a strong education component, which is how I became involved as a subject specialist.

### 1.3.2 Programme purpose

According to SANBI (2005:1) the programme has primary and secondary purposes:

The primary purpose of the programme is:

- To support and expand the scope of the current rehabilitation of degraded lands programme implemented by SANBI,
- To provide a healthy environment by developing indigenous gardens in schools, communities and public spaces,
- To assist in combating air pollution by promoting urban greening activities,
- To prevent extinction of plants and trees of medicinal value by promoting the development of medicinal trees and plants nurseries, and
- To contribute in carbon sequestration and global climate issues by embarking on provincial indigenous tree planting.

The secondary purpose will be to:

- Educate people on the importance of planting indigenous trees and plants as well as plants and trees of medicinal value,
- Educate people to take responsibility for their environment in order to avoid degradation and extinction, and
- To raise public awareness on issues around the link between vegetation destruction and climate change (SANBI, 2005:1).

Some trees and plants of medicinal value in the Bizana area are threatened with extinction because of the high rate at which they are harvested for either selling to general community members or used for energy or for healing the sick by traditional healers. For example *Umthathi*, *Umsintsi*, *Impepho*, *Izichwe*, and others were some of the trees and plants mentioned by the community people during interviews as plants that are becoming extinct (see Section 2). The objective of facilitating nurseries for trees and plants of medicinal value is to encourage users of these species to plant them for sustainable use. SANBI states that this will be done in collaboration with law enforcers who will assist the community in reinforcing laws on the harvesting of these species. SANBI sees this greening project as being important in helping to mitigate climate change.

According to scientists climate change has resulted from the increase of the carbon dioxide in the atmosphere. Plants use carbon dioxide for food production and hence assist in clearing the atmosphere of the excess of this gas, which minimizes carbon dioxide in the air. Planting trees and other indigenous plants will therefore be a contribution to the minimization of the greenhouse gases in the atmosphere, and is seen as an important activity in addressing climate change (SANBI, 2005:1). SANBI has therefore developed an innovative programme for addressing climate change and biodiversity issues while addressing poverty and improving education.

The key focus areas of the programme are:

- Garden development in schools and communities,
- Planting indigenous trees,
- Creating job opportunities for the local communities,
- Rehabilitation of degraded land,
- Building capacity of graduates from previously disadvantaged communities through internships that will focus on providing short and long courses by accredited institutions and experiential training along the lines of outreach greening and Environmental Education. (SANBI, 2005:1)

#### **1.4 MY ROLE IN THE PROGRAMME**

Through this research project, I am participating in the capacity building focus area of the SANBI programme in my role as subject advisor in the Bizana District since I am responsible for science education. With the introduction of the National Curriculum Statement, science teachers are now expected to teach about biodiversity and SANBI has helped to provide biodiversity rich school gardens for a number of schools in Bizana District. My role therefore, is to support teachers to make use of this resource (food gardens) in their teaching, which is the focus of this research.

The reason why I chose to study environmental education is related to the process of curriculum transformation in both the General Education and Training Band and Further Education and Training Band of the public schooling system. I want to understand the implementation of the new National Curriculum Statement and the incorporation of environmental education into the different Learning Areas.

The successful implementation of the NCS is a major challenge for the Nation. The research also provided me with an opportunity to reflect on my practice and to improve my contributions to the curriculum transformation process (see Section 5).

To address the challenge of incorporating environmental education into the Learning Areas, there is a need for professional development of subject advisors and educators, for effective implementation of the new curriculum. As a result I have been supported by SANBI to undertake post-graduate studies in environmental education as part of their broader capacity building objective. As indicated above, my broad interest in undertaking this research is to assist teachers to include greening activities in lesson planning. In working towards achievement of this goal, I undertook three small-scale related studies which constitute this portfolio.

### **1.5. SELECTION OF THE SCHOOLS AND RESEARCH PARTICIPANTS**

The two schools selected for this study were Ntlalontsha J.S.S. and Ncura J.S.S. Both of these schools are located in the Bizana area, where I work as a subject advisor. There were only two schools per circuit included in the Greening the Nation Programme, I thus wanted to ensure that I worked with schools in the same circuit. The two schools were selected in part therefore because of their close proximity to our district office, but also because they were selected schools in the SANBI Greening the Nation Programme, and their school grounds were benefitting from the greening provided by this programme. The two schools were selected for this study because:

- They were both selected by the department of education to participate in the greening programme;
- They were in close proximity to the district office where I work, and this facilitated easy access without additional cost implications;
- The teachers of the two schools were interested in the programme and attended workshops related to Greening the Nation Programme; they were also interested in participating in this research;

- The two schools are rural and they are located in the same circuit and fall under a common circuit management framework, and under one Circuit Manager (Mrs. N. Madikizela) who was also supportive of the programme.
- SANBI started greening the schools with those that were fenced and both of the schools were fenced
- The department of education selected the schools to participate in the Greening the Nation Programme because of their good management and ability to sustain the programme as they are section 21 schools, this provided functioning systems with which I could work.

Stakeholders selected for Study 2 were identified by the principals of the schools, and through stakeholder participation in the Greening the Nation Programme activities. A record of these stakeholders was kept at the school, and I followed up with the stakeholders as suggested by the school principal. Teachers selected for Study 3 were the Natural Science teachers in the two schools, since biodiversity is a key knowledge area in the Natural Sciences Learning Area, and I am a Natural Sciences Subject Advisor, responsible for the teachers' professional development. The principals of the schools suggested the particular Natural Science Teachers i.e. the focus on the Senior Phase as they are the leader teachers for Natural Sciences in the schools.

## **1.6 AN OVERVIEW OF THE STUDIES**

### **1.6.1 An overview of the research design and links between the studies**

As indicated above, I undertook three small scale related studies within the SANBI Greening the Nation Programme in the Bizana area. These studies are:

- A contextual profile (see Section 2)
- A stakeholder analysis (see Section 3)
- An action research project to support lesson planning (see Section 4).

This research was designed in a portfolio format, as three small-scale, yet related studies. To provide coherence the same two schools, both involved in the SANBI programme, were used as case study sites in all three of the small scale studies.

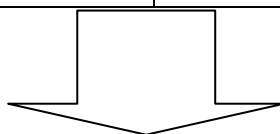
Each of the three small scale studies had a different focus, as discussed below, but were linked to each other, each one building on the other.

#### Links between the three studies

Study 1: Contextual Profile of two schools and the policy environment influencing the two schools.

Main focus: identifying contextual issues affecting the Greening Programme and two schools including the way in which policy is influencing schools.

<i>What the contextual profile achieved</i>	<i>What the contextual profile did not achieve</i>
The contextual profile helped to identify stakeholders for the stakeholder analysis	The contextual profile did not cover stakeholder's interests, and this needed further research, hence the need for Study 2.



#### Study 2: Stakeholder analysis

Main focus: To identify stakeholders' interests in Greening the Nation Programme and what they could contribute to the process of school greening and how the school gardens could be used for learning.

<i>What the stakeholder analysis achieved</i>	<i>What the stakeholder analysis did not achieve</i>
The stakeholder analysis showed how different stakeholders could contribute to school greening, and who could potentially contribute to the programme, identifying their interests and areas of expertise.	While the stakeholder analysis provided useful insight into who could contribute in what way to the school greening programme, it did not give any in-depth insights into the way in which school gardens could be used in the curriculum for teaching and learning processes.

This provided background information on the resources from the stakeholder community that teachers in the two schools could use in the school greening programme.	It also did not provide insight into what was happening with regards to curriculum planning and teacher support, hence the need for Study 3.
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Study 3 : Action research case study in two schools involving Natural Science Teachers.

<i>What the action research case study achieved</i>	<i>What the action research case study did not achieve</i>
The action research case study provided insight into how teachers were planning and implementing lessons using the school gardens. It identified some key issues associated with using school gardens in lesson planning.	The action research project was unable to provide in-depth professional development to teachers on lesson planning, but recommendations for informing teacher professional development programmes were made.

The analysis above shows how the three studies were linked, each building on the other, and each providing further insight into the way in which school greening initiatives can be supported and extended for use as curriculum resources in rural Eastern Cape School contexts, and within the OBE policy environment which emphasizes a healthy environment in schools and integration of this principle into the curriculum.

The methodology used in the three studies differed although similar research techniques were used. The contextual profile used historical and policy document analysis, as well as interviews and observations, while the stakeholder analysis used mainly interviews and questionnaires. Both of these studies were interpretive studies. The third study used action research with interviews, observations and document analysis as the main research methods. The last study was needed to inform SANBI's interest in how the gardens could be used for curriculum purposes. The specific methodological procedures are discussed in each small scale study.

The use of different methods is in keeping with the Rhodes University Portfolio requirements that the portfolio should show, in each component, use of literature, and also use of a diversity of methods.

I now provide a more detailed overview of each of the studies.

### **1.6.2 The Contextual Profile (Section 2)**

The contextual profile provides background to the research, and to the area where the research took place. This helped me to understand the social, environmental, political, historical and economic factors that influence teaching and learning processes in schools. It also helped me to understand the policy changes in education, particularly the introduction of Outcomes Based Education (OBE), Curriculum 2005 (C2005) and the National Curriculum Statements (NCS). The contextual profile also helped me to scope different professional development projects, and to understand the specific issues relevant to individual schools involved in the SANBI greening project.

Research methods used to compile the contextual profile include:

- Document analysis
- Interviews
- Questionnaires, and
- Observation

These methods were used within an interpretative methodology, and are explained fully in Section 2.

### **1.6.3 The Stakeholder Analysis (Section 3)**

While the contextual profile provided valuable insight into the context of the study, it did not provide adequate insights into the interests of various stakeholders (teachers, learners, parents and others) involved in the greening of schools in the SANBI initiative. I therefore undertook a stakeholder analysis which considers (a) who the stakeholders are in the SANBI school greening project and (b) how the different stakeholders can participate in the SANBI project (what roles they can play) and (c)

what knowledge and skills the stakeholders have to share with a specific focus on plants; on cultivation, care, cultural value, and the use of it.

The stakeholders' analysis also considers how the knowledge and skills can be used to contribute to the SANBI project, and the learning processes in the schools. The information from the contextual profile provided background for the selection of stakeholders for the stakeholder analysis in the two schools.

I found that this research project provided useful background information for considering how to support teachers when including greening activities in lesson planning. The stakeholder analysis also explains why stakeholder participation is important in the educational transformation process. It explains that with the advent of democracy, participation is seen to be important, and that in order to improve relationships between schools and communities it is important to know what community members have to contribute to the Greening of the Nation activities as an educational process. The stakeholder analysis addressed educational policy requirements for greater community involvement in schools confirming what was identified in the contextual profile. Research methods used for the stakeholder analysis include:

- Questionnaires
- Interviews
- Observations

These methods were used within an interpretative research methodology, described fully in Section 3.

#### **1.6.4 The Action Research Project (Section 4)**

As indicated above, the stakeholder analysis identified what possible resources teachers could draw on from amongst the stakeholders, but it did not provide insight into the actual curriculum change process in the school (namely lesson planning) nor how teachers should be supported in professional development. The action research project therefore focused on how one stakeholder (the DoE) could support teachers to make curriculum changes using the gardens. The action research could have focused

on the other stakeholders as well, but because of the scope of the study, only the DoE was considered. The action research project investigates a specific research question focusing on an aspect of curriculum implementation in Learning Areas of the NCS, where teachers and learners are using the school gardens as a resource for teaching and learning. My research question is focused on the professional development support needed by teachers to use school gardens effectively for lessons in the Natural Sciences. The action research project involves researching a process of actively contextualizing Learning Outcomes and Assessment (use of Assessment Standards). There are many different aspects to contextualizing the Learning Outcomes, for this study, professional support is highlighted as a focal concern for data gathering and reporting. The action research process involved a process of planning, acting and reflecting, and in this small-scale study, I worked through three cycles.

#### **1.6.5 Concluding recommendations (Section 5)**

The portfolio ends by making recommendations on the SANBI Greening the Nation Programme. The recommendations are linked to the key focus of the research, and they bring together all three of the small-scale studies. Section 5 also comments on the challenges that I experienced when undertaking these studies, as well as what I have learned through the research process.

## **SECTION 2**

### **THE CONTEXTUAL PROFILE**

#### **2.1 INTRODUCTION**

To provide insight into the contextual profile and its construction, I begin with a section that explains the research question and methodology used to compile the contextual profile. I then discuss the study area and the two schools that I worked with (in all of the three small-scale studies mentioned in Section 1). I then go on to review the broader context with a focus on policy change, professional development and curriculum change. This is followed with local perspectives on the environmental issues and risks pertaining to the schools in the Bizana area, as well as curriculum issues and educational responses.

As indicated in Section 1, Bizana is a district with 227 public schools and 4 private schools. 31 Schools in this district have been selected to participate in the Greening the Nation Project implemented by the South African National Biodiversity Institute. During the selection of the schools to be greened, issues and risks that may lead to the delay or failure of the implementation of the project were not considered. This contextual profile was conducted to provide insight into these issues and risks, so that it is possible to understand what needs to be considered when supporting teachers to include greening activities in their lesson plans. As indicated in Section 1, this is the broader interest of this entire portfolio, and also the action research project in Section 3. I now discuss how the contextual portfolio was constructed, using research methods.

#### **2.2 RESEARCH QUESTION AND METHODOLOGY**

##### **2.2.1 Research question**

According to Lotz-Sisitka and Janse van Rensburg (2000) a contextual profile illuminates the contextual factors or issues in the communities and how these may

have influenced the study. To develop a contextual profile of policy changes, issues and risks that influence the school communities involved in the SANBI Greening the Nation Programme in the Bizana area, and to understand contextual curriculum issues better, I identified this research question to guide the contextual profile research:

*What environmental and curriculum related issues may influence schools in implementing greening activities in lesson plans?*

### **2.2.2 Methodology**

To gather information for the contextual profile, I used different methods such as document analysis, questionnaires and interviews. According to Cohen, Manion and Morrison (2000) research methods refer to the different approaches and techniques used in gathering and analyzing data. In more traditional research orientations, the word has been associated with positivist techniques of responding to predetermined questions, recording measurements, describing phenomena and performing experiments (ibid). In this study I use methods qualitatively within an interpretative research orientation. As a researcher I begin with individuals and set out to understand their interpretations of the world around them. When referring to interpretive research, Cohen et al. (2000:23 cited in Glaser and Strauss, 1967), who explain that ‘theory’ (or understandings of the world) can be emergent and can arise from particular situations. In this way, I hoped to understand the situations of the schools better by interpreting what teachers and learners have to say about the school, and also through analyzing documents that are relevant to changes in the school.

In this study I was trying to understand contextual influences on two schools that are involved in the Bizana Greening the Nation Programme. I used qualitative methods to develop this understanding, which I discuss in more detail below.

### **2.2.3 Methods**

In this sub-section I describe the data collection techniques or methods that I used. In some cases, there are similarities between one method and the other. I used three methods in this study:

- Document analysis,
- Questionnaires, and
- Interviews.

I used questionnaires and interviews as a means of getting first hand information from the people concerned in two schools (Cohen et al, 2000:271). I needed to talk to teachers and community members as the Bizana issues are quite unique to the area, and little information is written down as many community members are not literate, and the area is rural. However, I also needed to consult and analyse documents, as the information about the changes in education is mostly contained in documents. I discuss document analysis first, and then explain how I obtained information from teachers and community members.

### ***2.2.3.1 Identifying the schools and getting permission to do the research***

I decided to work with two schools (Ntlalontsha Junior Secondary School and Ncura Junior Secondary School) as they are both in the SANBI Greening the Nation Programme, and they have received school gardens from SANBI. I also chose these two schools out of the 31 schools involved in the programme in the district because they are the most rural of the 31 schools, and few people work with these schools, as they normally only concentrate on schools near to town.

To get permission for the research, I wrote a letter to the School Governing Bodies of the two schools to request permission to conduct research in their schools. I was planning to work with these schools for all three of the small-scale research projects, so permission was sought for a period of two years (2005 – 2006) (see **Appendix A**). After this I phoned the schools to follow up. I received letters of permission from the two schools, both of which were happy for me to conduct the research (see **Appendix B 1, and B2**). This took care of some of the ethical requirements for conducting research. As I was an employee of the Department of Education, working in the role of a subject advisor (see Section 1), some of the teachers wanted to know what I would do with the information, as they did not want me to use the data to report what they were doing to the Department of Education.

I assured them that the data would not be used in this way, and that it was for positive benefit to learn about how to support the schools. I attended to what Bassey (1999) would refer to as respect for persons, by making sure they were happy with the way I would use the data.

### ***2.2.3.2 Selection of research participants***

In this study I requested the principals to nominate teachers to work with. The principals nominated the Natural Science teachers. I worked with Natural Science teachers who teach senior phase in the two schools and the principals as accounting officers at the school. The principals identified those teachers who were attending workshops by SANBI in Bizana. These teachers had previously been selected by other teachers to take the responsibility for the Greening the Nation Programme. In both schools I requested to work with Grade 07 learners because other senior phase grades were not trained for using the NCS. The School Governing Body members and the community people that I worked with in this study were selected by the teachers of both schools because of their involvement, participation and interest in school development. Some members were selected because they know the life history of the school and the community. I worked with teachers, learners and community people because my interest in this study was to see how the school greening activities could contribute to teaching and learning activities in the school, and to the professional development of teachers. For the contextual profile, I needed to understand the schools and their histories as well as how the school gardens were being viewed, hence the involvement of teachers, principals, learners and community members.

### ***2.2.3.3 Document analysis***

During the process of document analysis, I came across a number of documents with different purposes and they are important because:

- they are a basic source of information about the programme decisions and background, or activities and processes; and
- they can give the researcher ideas about important questions to pursue through more direct observations and interviewing.

Most of the documents I analyzed are related to curriculum and curriculum change in South Africa. These included:

- the Constitution of South Africa,
- education policies including the White Paper on Education and Training, Revised National Curriculum Statements and the Curriculum 2005 documents,
- reports on Outcomes Based environmental education projects (the National Environmental Education Project for General Education and Training), and
- SANBI documents, and
- Documents containing information about Education for Sustainable Development.

I also reviewed some school documents including Learning Programmes, Work Schedules of Teachers and the Schools Assessment Programme.

The reason for considering these documents was to analyse the curriculum context at a broader level, and to understand its expectation and standards as required by the Constitution of South Africa (Act 108 of 1996), as well as some of the environmental education history in South Africa, particularly since the introduction of Outcomes-Based Education in 1992.

I went through these documents to identify aspects that were relevant to explaining the context of curriculum change in South Africa, particularly aspects relevant to the study. I used the following categories (developed from the Research Question) to review the documents:

- Aspects of the national policy relevant to the Greening the Nation Programme and the schools
- Aspects of the National Curriculum Statement relevant to the Greening the Nation Programme and the schools
- Aspects relevant to professional development of teachers
- Aspects relevant to environmental projects in schools, such as SANBI and the National Environmental Education Project

The information in the documents was useful to help me identify some of the questions for the interviews and questionnaires.

#### **2.2.3.4 Questionnaires (see Appendix C1 and C2)**

The use of questionnaires in the research allows people to respond to questions as much as they can and to make their own choices. Lupele (2004, citing Jackson 1995) describes questionnaires as being made up of a series of set questions, which may provide a space for an answer or give a number of fixed alternatives from which respondents are required to make a choice. Questionnaires are widely used and useful instruments for collecting survey information, providing structured, often numerical data and can be administered without the presence of the researcher. They are often comparatively straight forward to analyse (Cohen et al., 2000, cited in Wilson and Mc Lean, 1994).

In this research, I used data from ten questionnaires to compile the contextual profile. These were given to 2 principals, 4 teachers and 4 community members (5 people from each school), as indicated in Table 2.1 below. For ease of access, questionnaires were coded (Q1-10) as indicated. Q7 and Q6 are contained in the Appendices as examples, and are labeled **Appendix C1** and **Appendix C2**).

**Table 2.1 Questionnaires administered in this research**

	<b>Ntlalontsha J.S.S</b>	<b>Ncura J.S.S</b>
Principals	Mr Msana (Q10)	Mr. Mvunelo (Q5)
Teachers	Ms Loko (Q9) Ms Mphayise (Q6)	Mr. Mnisi (Q2) Miss Ntola (Q4)
Community members	Mr Tshaka (Q8) Mr Mntu (Q7)	Mrs Mthantatho (Q3) Mr Sogoni (Q1)

I requested the principals to assist in the distribution and administration of questionnaires to the teachers and community members because they understand them. The Principals distributed the questionnaires, and he collected them on the next day. There was no need to mediate the questionnaires with the community members, as they are literate members of the school community – and they were identified by the school principal.

The questionnaire was designed to gather data on participant's perceptions and their expectations of SANBI's Greening the Nation programme. I also used the questionnaires to collect data on historical, economic, social and environmental factors relevant in the Ncura J.S.S. and Ntlalontsha J.S.S. (see Appendix C1 and C2). The data that I collected using these questionnaires helped me to understand the two schools and their communities better, and how they view the SANBI project, and environmental education and other aspects of the curriculum. Questionnaire data was complemented and extended through interviews, which I discuss next.

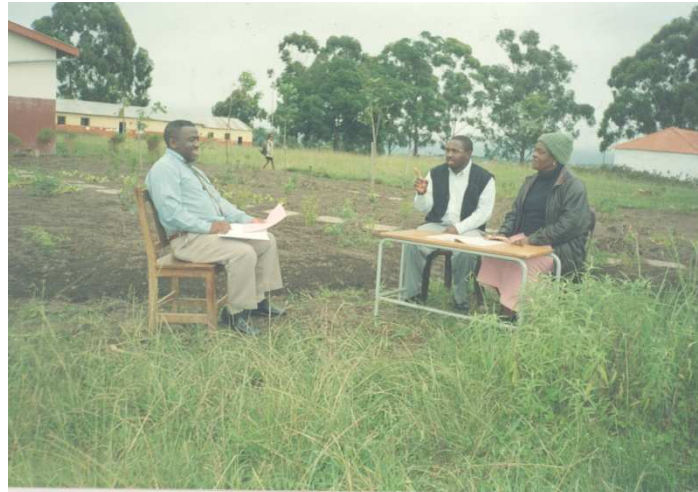
#### **2.2.3.5 Interviews (see Appendix D)**

I decided to use both interviews and questionnaires in this research because they are useful methods in obtaining information from the people in the community or school contexts that I was focusing on. As explained above, there is not much that is written down about the Bizana area. Before conducting interviews we agreed with the principals of both schools to use participants with more knowledge and better understanding about the school and the community.

Cohen et al. (2000:169) describe interviews as an important tool to collect or gather information through conversation between the researcher and the researched. Group interviewing is a useful way of conducting interviews, and while I intended to use mostly individual interviews, in both schools the principal preferred me to use a group interview situation as he did not want to be seen to be talking about the school or community without teachers present. Cohen et al. (2000, cited in Watts and Ebbutt 1987) said that group interviews include the potential for discussions to develop, thus yielding a wide range of responses. They explain, "such interviews are useful...where a group of people have been working together for some time or common purpose, or where it is seen as important that everyone concerned is aware of what others in the group are saying". The group interview can also bring together people with varied opinions, or as representatives of different collectives.

Lupele (2004, cited in Koul, 1984; Chambers, 1994; and Mikkelsen, 1996) notes that there are three common types of interviews used in a qualitative research.

These include structured, semi-structured and unstructured interviews. Structured interviews are those interviews in which the procedure to be followed is standardized and is determined in advance (ibid). Unstructured interviews provide greater flexibility although the series of questions and procedure to be followed are decided upon beforehand. I used semi-structured interviews which were directed mainly at the teachers but as it was a group situation, the principal also shared his views (see **Appendix D**).



***Figure 2.1 Interviewing Mr. Mvunelo and Miss Msuthu (on the right) at Ncura J.S.S.***



***Figure 2.2. Interviewing Mr. Tshaka, Miss Sontube and Mr. Msana (from left to right) at Ntlalontsha J.S.S.***

I conducted four interviews, as shown in Table 2.2.

**Table 2.2. Interviews conducted at the two schools**

	<b>Ntlalontsha J.S.S</b>	<b>Ncura J.S.S</b>
Interview 1		Ms Msutu (teacher) Mr Mvunelo (principal)
Interview 2		Ms Mbaligontsi (parent) Ms Mlata (parent)
Interview 3	Miss Sontube (teacher) Mr Msana (principal)	
Interview 4	Mr Tshaka (parent)	

Before conducting interviews I asked permission telephonically and the principals made arrangements after discussing the process with the teachers. We agreed to conduct interviews. The interviews took about 15 to 20 minutes. I recorded all that was said by the interviewees (see Appendix D for an example) and I asked a teacher to take photos as evidence of the interview process. During the interviews with the parents I used IsiXhosa to ask questions, but I record their responses in English.

I used the questions outlined in **Appendix D** in all four of the interviews to find out how schools were incorporating environmental education into the Learning Areas, to identify school plans about food gardening, strategies to sustain greening, how they use what is said by the Constitution of South Africa about including a focus on a healthy environment in teaching and learning situations, and to probe what the local environmental issues were. The interview with community members (interviews 2 and 4 with parents) was to find out more about the history of the school and the community in order to understand the historical context of the school and the community. Interviews were also focused on environmental issues.

#### **2.2.4 Data Analysis**

I used the questionnaires and the interview data together to identify the following: historical views and information on the area and the schools,

- environmental issues,
- curriculum issues, and
- educational responses.

These were the categories that were most relevant to the research question. I triangulated the data sources, using the questionnaires and the interview data, and comparing it to get a fuller picture and to provide a thick description. This allowed me to get a better understanding of the context of the schools.

The document analysis was undertaken separately as this provided a much broader view of the context. As mentioned above, I covered the following categories or themes in the document analysis:

- aspects of national policy
- aspects of the National Curriculum Statement
- aspects related to professional development
- aspects related to environmental education projects (SANBI and NEEP-GET).

Together this data was used to produce the contextual profile. I first discuss the broader context, and then the context specific to the schools.

## **2.3 THE BROADER CONTEXT: POLICY, PROFESSIONAL DEVELOPMENT AND CURRICULUM CHANGE**

### **2.3.1 National Policy**

The Ministry and the Department of Education officially launched the National Environmental Education Programme for General Education and Training (NEEP-GET) in January 2001. This committed the government to giving attention to environmental education in South Africa. The aim was to show the power and relevance of environmental education in South African context, as one of the means of achieving the former Minister of Education's *Tirisano* or "Call to Action", which he launched in January 2000. The development objective of the NEEP-GET project was to develop the capacity of teachers in South Africa, to enable them to implement environmental learning at compulsory school level integrated in the Outcomes Based Education Curriculum (Umdibanisi, 2004:2).

This NEEP-GET was a means to implement the principle of the White Paper on Education and Training (RSA, 1995:18), which stated the need for integrating environmental education, "... involving an inter-disciplinary, integrated and active approach to learning, as a vital element of all levels and programmes of the education and training system". This principle was included in the White Paper on Education and Training "... to create environmentally literate and active citizens and ensure that all people enjoy a decent quality of life through the sustainable use of resources" (ibid).

The Constitution of South Africa (Act 108 of 1996) (RSA, 1996) supports national commitment to environmental responsibility. It links environmental issues to values underpinned by human rights and social justice. The Constitution guarantees basic human rights and provides principles for society. The South African Constitution guarantees that environment is a human right and states that:

Everyone has the right:

- (a) to an environment that is not harmful to their health or well-being; and
- (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
  - (i) prevent pollution and ecological degradation;
  - (ii) promote conservation; and
  - (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (RSA, 1996:11).

According to these clauses in the Constitution we all need a healthy environment to live healthy lives: clean air and water, safe living areas, sufficient and healthy food. People need to be actively involved in creating a healthy environment, which means that the education system must be involved, with schools and teachers playing a key part. In practice the Constitution means that:

- our daily living and working environment must be improved,
- everybody must have equal access to land and natural resources,
- we must use social, cultural and natural resources in a sustainable manner, and
- we must promote public participation in decisions about how the environment is used (NEEP-GET, 2005).

According to the National Environmental Management Act of 1998 (Section 28) “everyone has the right to demand that the environment is taken care off” (RSA, 1998). This policy framework requires South African citizens to take care of the environment. Anyone who has cause to harm the environment is required to take reasonable measures to avoid or minimize such harm even if the harm was authorized by law (ibid).

In addition to this policy, South Africa also has a National Biodiversity Conservation Act (RSA, 2004) which has been developed for “the management and conservation of South Africa’s biological resources, the protection of species and ecosystems under threat, the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits arising from bio-prospecting indigenous biological resources” (C.A.P.E. 2006: 13). This Act suggests that there is a need to control the loss of biodiversity in South Africa because people depend on biological resources to a far greater extent than in many other parts of the world. This policy framework for managing the environment influences the education system. For example, Biodiversity has been included in the Natural Sciences Learning Area.

### **2.3.2 The National Curriculum Statement**

These Constitutional clauses and environmental policies have been considered in the National Curriculum Statement which is being implemented in all schools across South Africa. Environmental learning is reflected in one of the principles of the National Curriculum Statement (Grades R-9), i.e. the principle of human rights, social justice, healthy environment and inclusivity (DoE, 2002a, 2002b). Environmental concerns have been integrated into the Learning Areas, as shown in the Natural Science Learning Area Statement (DoE, 2002b:4) which deals with the promotion of scientific literacy. It does this by:

- the development and use of science process skills in a variety of settings.
- the development and application of scientific knowledge and understanding.
- appreciation of the relationships and responsibilities between sciences, society and the environment (ibid).

According to training materials provided by the Eastern Cape Department of Education for teachers, entitled '*Exploring the RNCS in the Senior Phase: General Overview*' (DoE, 2005:3, my emphasis) curriculum change in South Africa is informed by "... a vision for **democracy** and **redress** in South Africa". It states that "A critical examination of our educational system revealed that in order for this vision of democracy to be realized, there was an urgent need to **address issues of educational access, redress, equity and quality**". With this in mind, the government decided to make the vision for educational transformation a reality in South Africa through introducing an Outcomes Based Education curriculum, called Curriculum 2005 (C2005) in 1998. The Department of Education states that "Through its **Outcomes Based education (OBE) approach** to teaching, learning and assessment, South Africa finally had a teaching methodology that would transform teaching and learning in South Africa after the era of apartheid" (ibid).

The first round of implementing Curriculum 2005 was plagued by numerous problems including difficulties with complex terminology, inadequate professional development of teachers and other structural issues such as inadequate teaching and learning support materials (Review Committee, 2000). The Minister of Education commissioned a review of C2005, and in 2000 a report was submitted which indicated that C2005 was too complex, over-designed and under-resourced (Review Committee, 2000). As a result, C2005 was streamlined and strengthened between 2000 and 2002. Towards the end of 2002 the previous Minister of Education, Professor Kadar Asmal launched the Revised National Curriculum Statement (RNCS) for Grades R-9. After curriculum statements had been developed for Grades 10-12, the RNCS was renamed the National Curriculum Statement (NCS) (R-12) (DoE, 2005).

There have been many in-service training programmes to support the introduction and implementation of Outcomes Based Education, C2005 and the NCS. There are also serious problems associated with curriculum implementation, which affects the quality of education, and hence the results that learners get (Harley & Wedekind, 2004, NMF, 2005).

Learners produced through the existing education system (which until now has been using the old curriculum) hardly attain the accepted entrance requirements at tertiary institutions. For example in Bizana, in 2007 only 6 high schools achieved more than a 50% pass rate in Grade 12.

The Department of Education (2002a: 2) argues that Outcomes Based Education can assist learners to achieve their full potential. It states that “Outcomes Based Education forms the foundation of the curriculum in South Africa. It strives to enable all learners to achieve to their maximum ability. It does this by setting outcomes to be achieved at the end of the process”. The DoE (2002a:2) further explains that outcomes encourage a “... learner-centred and activity-based approach to education”. The Critical and Developmental Outcomes, developed through a democratic process are used to guide the design of all education and training programmes in South Africa, including the National Curriculum Statement. As such, the Learning Outcomes for the General Education and Training Band for Grades R-9 (for schools) are derived from these outcomes, and the intention of the Constitution.

The Critical Outcomes in the NCS Grades R-9 envisage learners who are able to:

- identify and solve problems and make decisions using critical and creative thinking;
- work effectively with others as members of a team, group, organization and community;
- organize and manage themselves and their activities responsibly and effectively;
- collect, analyse, organize and critically evaluate information;
- communicate effectively using visual, symbolic and /or language skills in various modes;
- use science and technology effectively and critically showing responsibility towards the environment and the health of others; and
- demonstrate an understanding of the world as an asset of related systems by recognizing that problem solving contexts do not exist in isolation.

The developmental outcomes envisage learners who are also able to:

- Participate as responsible citizens in the life of local, national and global communities;
- Reflect on and explore a variety of strategies to learn more effectively;
- Explore education and career opportunities;
- Develop entrepreneurial opportunities. (DoE, 2002b: 1)

In addition, issues such as poverty, inequality, race; gender, age, disability and challenges such as HIV/AIDS all influence the way in which learners can participate in schooling (ibid). The NCS for Grade R-9 (schools) adopts an inclusive approach by specifying the minimum requirements for all learners (DoE 2002a). The first principle of the RNCS strives to make learners and teachers sensitive to issues such as poverty, inequality, race, gender, age, disability and challenges like HIV/Aids. By promoting values of inclusivity, justice, human rights and a healthy environment in this principle, the Department of Education aims to support learners to contribute to a National South African identity that respects all people and the environment (NEEP-GET, 2005). The DoE (2005) training materials refer teachers to this principle statement, and indicate that all the Learning Area Statements try to create an awareness of the relationship between **social justice, human rights, a healthy environment** and **inclusivity**. The training materials explain these principles in the following ways:

**Social Justice** relates to:

- Our responsibility to care for others.
- Our efforts in meeting the needs of everyone in our society, particularly basic needs, such as employment, housing and access to clean water.
- Striving to create equal opportunities for all people.
- Empowering learners to be responsible for their own lives and their environment.
- Encouraging people to participate in the decisions that affect their daily lives.
- Recognizing and respecting that all people have basic human rights.

**A Healthy Environment** relates to:

- People accepting that a healthy environment is everyone's responsibility.
- Promoting educational values that emphasize preserving our environment and keeping it clean from pollution, waste and abuse.
- Preserving the assets in our environment, such as natural resources, water, air and soil.
- Protecting the environment for the benefit of present and future generations.

- Promoting conservation of the natural environment.

**Human Rights** relates to:

- Promoting human rights.
- Protecting our right.
- Developing a human rights culture that not only respects our individual and group differences but also celebrates them positively.
- Protecting the rights of people with disabilities.
- The realization that with each right come a responsibility.

**Inclusivity** relates to:

- Dealing with a wide spectrum of issues, such as racism, culture, gender, disabilities, HIV/Aids and other transmittable diseases.
- The school curriculum: ensuring the full participation of all learners, irrespective of their ability, disability, culture, race, gender, language and socio-economic status.
- An acceptance of those learners who come with different experiences, interests, strengths and barriers to learning, which need to be accommodated in the classroom. (DoE, 2005: 4-5)

Within this framework, learners are encouraged to develop knowledge and understanding of the rich diversity of this country, including the natural, cultural, religious and ethnic components. In the first principle of the NCS, it is clear that South Africa has a commitment to ensuring a sustainable future for its citizens, and that it is committed to achieving this through the priority given to educating its people according to these values and principles.

From this policy review, it is clear that education is recognized as a strategy to ensure improvements in the quality of life, the eradication of poverty and placing South Africa on a path of sustainable development. The education system is attending to social and economic development that values human rights, social justice, inclusivity and environmental protection through its policies and curriculum. From the history of curriculum implementation it is also clear that such an ambitious project cannot be achieved without adequate attention to structural issues, and teacher professional development (Review Committee, 2000).

### **2.3.3 Professional development**

Changes in a national curriculum process require adequate support for teachers. Effective professional development is needed to address changes from teacher-centred traditional approaches, to learner-centred approaches. Traditional teaching approaches have been criticized for being fragmented, unproductive, inefficient, unrelated to practice and lacking intensity and follow-up (DoE, 2002a; DoE, 2005). With the introduction of C2005, the Department of Education also introduced some programmes for training teachers. However, when C2005 was reviewed, the Review Committee (2000: 19) stated that “Many problems and difficulties were experienced in the process of training. These related to models, duration and quality of training”. These were caused by a focus on terminology (at the expense of depth and conceptual understanding of the curriculum), the cascade model (which assumes easy transfer of knowledge), and the knowledge of district trainers (trainers themselves had an inadequate understanding of the curriculum). In my experience of working in the DoE processes of training teachers, there is still a need to improve the quality of training and training materials, as well as to provide follow-up-in-class support for teachers, hence my interest in this research. The Review Committee recommended such improvements in 2000.

One of the processes that teachers need to understand is the process of planning. This includes three forms of planning, namely Learning Programme planning (phase planning), Work Schedule planning (grade planning for the year) and Lesson Plan development (shorter units of work) (DoE, 2005). Based on research with teachers, the NEEP-GET (2004) identified that Lesson Planning involved a range of different aspects. These include linking Learning Outcomes to Assessment Standards, integrating the curriculum principles into lessons, ensuring integration across Learning Areas, and linking content and context, and considering how to use learning and teaching materials in teaching (see Section 4). There are few professional development programmes available to support teachers in this task, and most teachers have only had exposure to short one week workshops provided by the Department of Education (NEEP-GET, 2005).

Professional development of teachers has remained a difficult aspect of the implementation of the NCS. The Department of Education took a risk by introducing a new curriculum without making sure that there were adequate human resources to guide, support and monitor educators when implementing the new curriculum. Besides professional development for implementing the NCS, there are other forms of professional development that are introduced by NGOs and other groups who work with teachers, for example activities to support the development of environmental clubs at schools. Such professional development is also needed to consider broader school-community issues and relationships.

#### **2.3.4 National Environmental Education Project-GET and SANBI's Greening Project**

As mentioned above, there are a number of programmes and projects that provide teachers with various forms of professional development run by the Department of Education, as well as other partners such as SANBI (see Section 1). As indicated above, environmental learning has become a new focus of the NCS, and has required professional development support, which the former Minister of Education tried to support through establishing a donor funded project, called the NEEP-GET. This project encouraged partners such as SANBI and others to support teachers to implement the environmental focus of the NCS (DoE, 2004b; NEEP-GET, 2005).

Environmental education processes are seen to be those processes that involve educators and learners in "... promoting sustainable development and improving the capacity of people to address environment and development issues" (UNCED, 1992:2). According to Fien (1998) mainstream education has not responded well to the environmental crisis, highlighting the paradox that while mainstream educationists ignore the environmental crisis, education plays a key role in perpetuating unsustainable environmental practices. This is because without attention to sustainability principles, education can uncritically accept and replicate the *status quo* of unsustainable practices, such as economic exploitation of resources, social injustices and poverty.

To guide and support educators and education systems, the United Nations has led a process of developing principles for environmental education. These principles, first developed in the 1970's, are still widely used today. They can provide a useful starting point for the development of educational programmes or processes. The Tbilisi principles defined a framework for environmental education processes, which noted that environmental education should:

- View the environment in its totality.
- Be a continuous life-long process.
- Be interdisciplinary in its approach.
- Examine issues from local, national, regional and international point of view.
- Focus on current situations while taking a historical perspective into account.
- Promote the value of co-operative, prevention and solutions of problems.
- Consider environmental aspects of development and growth.
- Enable learners to plan their learning experiences.
- Help learners to discover symptoms and 'real causes' of environmental problems.
- Emphasize the complexity of environmental problems and the need for critical thinking and problem solving skills.
- Utilize a diverse array of educational approaches to teaching and learning from the environment with emphasis on hands-on, practical activities (UNESCO 1997).

Irwin and Lotz-Sisitka (2005:40) indicate that these principles have provided "sound guidelines for the practice of environmental education on a global, regional and national scale". They have been fairly widely institutionalized by governments around the world who have made commitments to include environmental education in national curricula and teacher education programmes, although not all countries responded with "alacrity or enthusiasm" (ibid). Many authors including Fien (1998) and UNESCO (1997) have commented on the fact that the challenges associated with responding appropriately to the current social, economic, political and biophysical dimensions of the environmental crisis are fundamental, complex and enormous. They have outlined how environmental education has been globally defined as an educational response to the environmental crisis (see also Irwin and Lotz-Sisitka, 2005). Irwin and Lotz-Sisitka (2005: 42) explain that Chapter 36 of Agenda 21, produced out of the Rio Earth Summit in 1992, emphasizes the need for wide scale environmental education programmes which are aimed at a re-orientation of society

towards sustainability, "...while the Biodiversity Convention includes education and capacity building, as do many other international conventions, aimed at responding to a wide range of environmental issues".

South Africa is a relatively new democratic country, and consequently many of its policies are in a state of continuous change. Many issues are arising as educators attempt to implement curriculum and other policies, one of which is the need to integrate environmental concerns into lessons. It is in this wider context of international emphasis on environmental education and curriculum policy implementation in South Africa, that the Ministry of Education established the National Environmental Education Programme (NEEP), as mentioned above.

The NEEP-GET was a donor-funded project of the National Department of Education involving a donation of R32 million from the Danish Government for a four year period (2001-2005). It focused on the General Education and Training (GET) band of the South African education system, and it worked to support educators in implementing the environmental focus of C2005 and the NCS, through professional development, curriculum development, materials development and improved co-ordination of school-based implementation (NEEP-GET, 2005). In preparation for the broader rollout of the NEEP-GET, a pilot project was run in 2001, to interface with the Grades 4-8 C2005 programmes (Lotz-Sisitka & Raven, 2001). A key aspect of the pilot programme was recognition of the importance of learning support materials and a resource-based approach to implementing the NEEP, in line with Department of Education (DoE) curriculum policy. This pilot was undertaken in 6 Provinces concentrating on the use of learning support materials and a research-based approach to professional development (Lotz-Sisitka & Raven, 2001). An associated Danish funded project, called the *Learning for Sustainability* pilot project preceded the NEEP-GET. This pilot project focused on school-based environmental education curriculum development, innovations in environmental education. It also developed a spiral and cluster based professional development model (Lotz-Sisitka & Olivier, 2000). Both of these pilot projects found that teachers in South Africa did not have experience of integrating environmental concerns into Lesson Plans. They also found that environmental education lesson planning requires an engagement with contextual issues, as well as content.

The NEEP-GET produced a workbook which aims to support provinces and teachers in environmental learning, and lesson planning (NEEP-GET, 2004). This book suggests an approach to Lesson Planning that can help educators bring their own contexts into teaching and learning processes, and contribute to developing learners as critical and active citizens of a democratic South Africa (ibid). The booklet provides various examples of Lesson Plans. These contain ideas and suggestions that help teachers and learners explore and take action in their local environments while implementing the NCS. The ideas and suggestions need to be looked at critically and adopted to suit particular contexts; Learning Areas and particular learners (see Section 4).

With this work, the NEEP-GET emphasized that it is not only what is taught, but also *how* teaching takes place that is important in achieving the curriculum's goal of developing the full potential of every learner as a citizen of a democratic South Africa. The NCS (DoE 2002a) states that "the South African education system encourages the adoption of learner-centered methodologies, because they can improve the quality of teaching and learning in our schools, but also because they reflect the principles and rights enshrined in the Constitution of the Republic of South Africa".

The NEEP-GET placed emphasis on learner-centred methodologies, and argued that

... teachers and learners need to find more flexible and responsive ways of working with knowledge. Meaningful environmental learning can involve finding information about issues, exploring these issues through experiences in the environment, and taking action based on what we know, for a better world, all of which contribute to better environmental management and better lifestyle choices. (NEEP-GET, 2004: 26)

Subject advisors are responsible for educational support visits and guidance of educators in the implementation/incorporation of environmental education in Learning Areas. The NEEP-GET (2005) found that this involved supporting teachers to develop a deeper knowledge of environmental issues and their Learning Areas, and greater confidence in teaching the subject. It also involved developing better expertise in classroom management, being aware of and becoming proficient in new teaching strategies such as the active learning approaches mentioned above.

The NEEP-GET also found that “it was not enough to have an environmental focus in the Learning Areas, and that further initiatives were needed to support curriculum support staff, and teachers to ‘make sense of’ and to ‘apply’ this focus in their day to day curriculum work” (NEEP-GET, 2005: 8). As mentioned in Section 1, SANBI is rolling out a ‘Greening the Nation’ programme to support schools in making sense of and applying the environmental focus in their Learning Areas, by providing schools with gardens (a resource for learning) and by training teachers and community members.

According to the SANBI Greening the Nation Project background statement (SANBI, 2005:1) environmental degradation comes in many forms ranging from destruction of vegetation through veld fires, overgrazing, over-harvesting of natural resources such as grass for weaving, forest resources for firewood, building materials, woodcarving, medicinal use and others. The destructing of vegetation in one way or the other results in soil erosion, persistent pollution owing to the lack of forest and grasslands as pollution sinks, desertification, and soil degradation.

SANBI (ibid) is involved in greening projects around South Africa because of the big role played by vegetation both for a healthy environment and in the lives of people. They argue (ibid) that “... rehabilitation of degraded lands, rehabilitation of degraded forest patches, planting of trees and indigenous vegetation becomes a potential solution to restore and create a healthy environment for all and to restore lost habitats”. As such, greening activities can therefore be a relevant focus for learning in the curriculum. Gardens also provide opportunities for engaging learners in active learning, as recommended by the NEEP-GET (2004).

As indicated in Section 1, the SANBI programme aims to include environmental awareness, poverty alleviation, provision of employment, skills, sustainability of environmental learning and care. The school greening programme implemented by SANBI under the broader Greening the Nation programme is designed to support teachers with implementation of the National Curriculum Statements (DoE 2002b:5). The school gardens have potential to support the Natural Sciences Learning Area which requires learners to learn about ‘Life and Living’, as well as ‘Biodiversity and Change’.

The Natural Sciences Learning Area therefore focuses on life processes and healthy living, understanding balance and change in the environment and the importance of biodiversity. Through providing biodiversity resources in schools (through the gardens) SANBI is therefore assisting and supporting the Department of Education to practically implement environmental education in the schools. The NEEP-GET (2004) emphasises the relationship between content and context, and it also indicates that context is an important aspect of environmental learning. For this reason, I sought to understand the specific context of two schools involved in the SANBI programme in the Bizana area.

## **2.4 THE SPECIFIC CONTEXT: TWO SCHOOLS IN THE BIZANA AREA**

### **2.4.1 Introduction to the specific context and some issues**

The specific focus on two schools in this contextual profile provides insight into the environmental issues and risks as well as the curriculum issues experienced in the schools, so that it is possible to understand what needs to be considered when supporting teachers to include greening activities in their Lesson Plans.

The Bizana area, where I am doing this research, is a victim of irresponsible veld fires that destroy slow growing indigenous vegetation. This vegetation is replaced by fast growing, quick spreading exotic vegetation. Some of the schools are surrounded by black wattle and gum trees, which take a lot of water from the soil. The damage caused by these plants is becoming irreparable as the plants take over the most valuable land and cause a decrease in water resources. The environmental issues in the area are influenced by political, social and economic factors. In order to gain more insight into the local contexts, I have developed a contextual profile on two schools considering the historical background, political, social, economic and environmental issues. The two schools that I have selected and visited are situated in poverty-stricken rural communities where unemployment is a serious social problem amongst the community. In these communities, community members depend on subsistence farming, pensions and grants. In these communities they depend on the water they fetch from the rivers, there is no electricity and they were neglected by the old

government. In my observations, people cultivate crops to feed their families and not for economic purposes because of poor production, a shortage of economic and production skills and inadequate marketing opportunities for produce.

## **2.4.2 Brief background to the two schools**

### ***2.4.2.1 Ncura Junior Secondary School***

Ncura Junior Secondary School (J.S.S) is situated on the left hand side of the R61 between Flagstaff and Bizana about 21km from Flagstaff. Ncura J.S.S. was established in 1915 and it was known as Ndakeni Bantu Community School at Ndakeni Location under Chief Sigcau in Ntlenzi Administrative Area. The headman of the place was Mthandeni Mboyi. According to Mrs. Francine Mbaligontsi (pers.comm. 24/02/2006) the place was named Ndakeni because it was where the British Settlers stayed with their cattle. The mixture of cattle dung and soil is called *indaka* and hence they named the place *Ndakeni*.

Ndakeni Community School was established because learners had to travel a long distance to Mfundisweni School for their education, and parents wanted a school closer by to make it easier for the children to access education. The first principal of the school was Mr. S. Mboyi. After a while the name of the school was changed to Ncura J.S.S. because the letters posted to the school were delayed due to confusion as there were many places called Ndakeni (such as the one in Tabankulu District). When the school was established there were many wattle trees in the area, which people harvested for the purposes of firewood, making kraals for cattle and building their houses. Today the school is surrounded by gum-trees, which serve as a windbreak. The SANBI contractors who were responsible for greening the school tried to remove them because they say gum trees are alien trees and they use a lot of water. However, they were not able to remove all the trees.

The area has a good climate and has an adequate rainfall in summer; it is warm in summer and cold in winter. The soil is good for plants and natural vegetation.

Crops planted in the area include maize, beans, peas, potatoes, pumpkins, sorghum, sweet potatoes, *amadumbe* and others. The school vegetable garden is well cared for by the caretaker, the community members and the learners after being re-established in 2002 with the aim of producing vegetables to feed the vulnerable learners, the hospice and to raise funds. The vegetables planted are carrots, spinach, peas, cabbages, lettuce, potatoes, pumpkins, beans and maize. Learners look after their own plots, while the community members take care of the school vegetable garden during holidays. Teachers use the school garden for teaching and learning purposes and monitor everything that is taking place in the garden under the control of the principal. SANBI greened the school with the indigenous plants, and then thereafter trained the teachers on how to maintain the garden.

Most of the people in the community are unemployed; some are suffering from HIV/AIDS, while others survive on social grants. The community and the school get water from a river on the Northern side of the school known as Bantuni River. Animals drink water from the same river where people fetch water for cooking and drinking purposes. On the Eastern side of Ncura J.S.S. there is a mountain called Dumsi with an indigenous forest known as Ntlenzi forest. Local people harvest *impepo* and other indigenous plants for commercial purposes from this forest.

The school has grown since its establishment, and today Ncura J.S.S. has approximately 800 pupils, and 16 teachers. It has a principal and a deputy principal who manage the school. The school has a strong management team, and is functioning effectively. It is a Section 21 school, which means that it is able to manage its own funding after funds are allocated by the Department. The school grounds are also well managed well fenced, classrooms are neat and walls are painted (see Figure 2.3 below). The teachers work and learners work is checked by the school management team monthly and they record the findings. Two community members are employed to look after the school garden and there is a security taking care of the school at night.



**Figure 2.3** *Ncura school, showing the way the school grounds are managed.*

#### **2.4.2.2 Ntlalontsha Junior Secondary School**

Ntlalontsha J.S.S. is situated on the right-hand side of the R61 between Flagstaff and Bizana at about 34 km from Flagstaff. Ntlalontsha J.S.S. was established in 1930 at Mampingeni Location under the school manager Mr. Jordan. The place was managed under Chief Vukayibambe Sigcau. Mr. Sicanulo Mqhokiyana and Mr. Gininda Ngingolo are two of the community members who requested the chief to assist with the building of a school. The Chief gave them the land for the school, and worked with them to have a school built. The school was named *Ntlalontsha* because people believed that if you build a new house, you stay for a long time and enjoy new life. The school does not have easy access to water. Learners have to travel a long distance to fetch drinking water from the Nyokweni River and Swane River, which comes from the Ntlenzi indigenous forest. This was the only source of fresh water in the school until it got water tanks.

According to a report from the Principal, before 2000, the school had a small garden that was being cultivated by the learners and not widely shared by teachers. It was not a very productive garden. It was used to teach learners practical part of gardening as demanded by the curriculum of that time. With the introduction of the new curriculum and the idea that came from some school teachers, the school garden became one of the centres of attraction for the school community members. The school garden was extended and large scale cultivation started.

Potatoes, cabbage, spinach and tomatoes are mostly cultivated. Part of the produce is sold to the public and the rest is cooked for learners. This programme is run by a special committee composed of two parent members, two teachers and two learners. They constantly report their progress to the SGB. The SGB, which also involves the Principal, assists the committee with what they need to improve in the school garden. The school garden is now an important part of the culture of the school. Learners are fully involved in the cultivation process. They are the ones who cultivate and plant. Parents are very supportive of this initiative in the schools and the teachers are beginning to use the garden for curriculum purposes.

After the recent greening programme, the school installed plastic water tanks. There are mountains across the Nyokweni River that is known as the Spongompo and Mcetyane Mountains. On the far West of Ntlalontsha J.S.S. one finds the Ntlenzi forest, which is controlled by the headman. There is also another forest called Spongompo. With permission from the headman, the forest is used by the community for medicinal plants and other forest products. The area has a good climate and it is warm in summer with rain and cold in winter. Because of the rich soil in the area, people grow maize, pumpkins, beans, pears, potatoes, cabbage, spinach, sweet potatoes, *amadumbe* and other food plants. The school is in a flat area with no indigenous trees nearby. People from Mampingeni location travel long distances to fetch water because of the scarcity of rivers, dams, water tanks, and taps, and there is no water supplied by the Municipality. According to an old man from the community, Mr. Gumbela Tshaka (pers. Comm. 02/03/2006, I4) people are vulnerable to HIV/AIDS, unemployment, poverty and other diseases because of Government neglect. Most of the people in the area depend on social grants, food parcels from the Municipality, their livestock and from crops they grow in their fields. There are few educated people because young people look after their fathers' cattle and the majority does not understand the importance of education.

According to Mr. Tshaka (I4), people were happily employed with practising their farming and were living without poverty. They were governed by the headman who even looked after the indigenous forests.

The community believed that the indigenous forest brought rain, and it was used as a place of ancestral worshipping. He reported that anyone who contravenes the community's rules and regulations was exposed to harsh treatment. In this case, people were not allowed to harvest without permission from the headman. Some trees were considered holy and sacred, and for this reason the harvesting of important trees for firewood was not allowed (ibid). Mr. Tshaka (I4) explained further that in the past, community people relied on an agrarian life style. They cultivated land and kept livestock for their own survival. They pounded maize and other crops to feed themselves. Education was considered less important during this period, and parents encouraged and motivated children to learn how to do things in the communities. The duty of boys was to look after cattle and girls did household duties supplemented by collecting of firewood from the forests. Women's responsibilities included harvesting and taking care of the children (ibid).

Today the school has approximately 650 learners, with 14 teachers. The school has a principal and deputy principal. The school is well managed, and the principal recently employed a clerk for the school, using school funds. It is a Section 21 school, and governs its own expenditure, after allocations from the Department of Education. The school has computers and well managed school grounds (see figure 2.4 below). SANBI have supplied the school with mowers to keep the grass cut.



**Figure 2.4**

***Ntlalontsha school, showing the well managed school grounds and garden***

There are, however, a number of environmental issues and curriculum issues experienced by the schools, which I discuss next.

### **2.4.3 Issues identified by parents, teachers and principals in the two schools**

#### **2.4.3.1 Environmental issues**

The environmental issues identified by both parents of Ncura J.S.S. and Ntlalontsha J.S.S. in their community contexts are poverty, unemployment, HIV/AIDS, depletion of natural resources, child abuse, use of drugs, water scarcity, alcoholism, and veld fires (see Appendix C1&C2 as well as Q3, Q4, Q5, Q6, Q7, Q8). Both parents and teachers cited water-related issues as being important. In the questionnaires, mention was made of water-related issues, which include: inadequate water supply and water scarcity, pollution of ground water and local rivers, and leaking of water tanks (see Appendix C1&C2 as well as Q3, Q4, Q5, Q6, Q7, Q8). Some teachers were concerned about planting trees in schools when there was not enough water for watering plants (Msuthu, pers. com, 15-02-06). In my conversation with educators, the Ncura J.S.S. faces a water crisis, as there is a critical shortage of water due to inadequate supply (ibid).

Water supply is not only the problem of the school. It is also a problem affecting the broader community because of the previous regime which neglected to provide formal water supplies to the rural areas. As there is no municipal water supply to both areas it is the responsibility of women and children to fetch water from rivers, as was indicated in the questionnaires (see Appendix C1 & C2 as well as Q3, Q4, Q5, Q6). Although people use water from rivers and nobody can guarantee cleanliness, hygiene and water quality is a key issue. One of the respondents in one questionnaire mentioned the use of boiled water and jik (Chemical) as a measure used for safety purposes (see Appendix C1). Community members and educators both proposed that the municipality and voluntary NGO's should aid them with water tanks and water taps (see Appendix D1 & D2). They feel that tanks and water taps will help the community to ensure better health, and to avoid vulnerability to epidemics like cholera, typhoid and diarrhea which affects many children in the school community.

The issues of poverty, unemployment and other socio-economic environmental issues were identified by teachers as they affect the context of teaching and learning, as well as the environment in which learners are living (see Appendix C1 & C2 as well as Q3, Q4, Q5, Q6). Poverty and unemployment characterizes the rural areas in South Africa more widely than just the Bizana area. In this area however, poverty and unemployment have been exacerbated (made worse) by historical educational neglect which caused many of the adults to be illiterate. The issue of illiteracy amongst the community members resulted in them only being able to find employment in unskilled jobs. Such jobs were available to some of the community members previously, but more recently these jobs have not been so available. This is because of technology use in the sugar cane farming industry. As a result many community members were retrenched because of the use of technology on these farms, which replaced them in their jobs. This is particularly the case for those who were employed for sugar cane cutting, for which farmers now use machines. There are also a number of people that have been retrenched from the mines as a result of economic policies that have increased unemployment, particularly amongst lower skilled workers. These wider socio-economic and technological developments have therefore made poverty and unemployment worse in the rural areas.

Since there is a problem of unemployment, people depend on social grants; child support grants and others collect vegetables from the fields. People in both communities harvest wood and grass to build their houses because of unemployment and the small incomes earned by those who are working. For example, one community member indicated that the household income is R500 per month, while another indicated that the household income per month is R1500. Six out of ten questionnaires indicated household income of less than R1000 per month (Q1-10). Oxen are used to cultivate the fields and to collect wood from the forest because people are unable to hire trucks and tractors to help them (ibid). The main agricultural activity practiced in both communities is the cultivation of maize, beans, pumpkins, sorghum, potatoes, cabbage, *amadumbe* and others. According to Miss Mphayise (Q6), the main environmental problem facing the area where they live is soil erosion, risk of tornadoes, hailstorms, insects, drought and frost in winter.

Although people have a shortage of knowledge and skills in farming and agricultural production they use their local knowledge to survive.

The two communities do not have access to electricity because of the historical imbalances related to formal energy supplies of the past (former homeland areas, and particularly rural areas were not supplied with electricity in the same way as other places (e.g. urban areas) in South Africa). Consequently the two communities are on the waiting list of the electrification by Eskom, and their main source of energy is firewood, which is collected by women and children (Q1-10). People dispose of waste by burning not knowing that there are various ways that could be used for waste management. This is because they lack skills on how to recycle and re-use the waste material, and there are inadequate systems in the area to collect the waste. These issues affect the communities negatively, and it is possible to find recyclable material lying everywhere, which spoils the environment. To show that there is a need for environmental sustainability in both areas, people suggested involvement of youth structures in environmental awareness campaigns and a support from parents and local leaders in managing waste material (ibid).

The issues like unavailability of water, poverty, unemployment and unavailability of electricity have a negative impact on greening of the nation. In an area where there is no water you can not expect green plants as plants need water to survive. People who are unemployed will be affected by poverty and result in over using indigenous plants around them for survival. The over usage of resources affects the environment negatively. The removal of plants leads to loss of valuable top soil, and dries the land, which in turn affects successful greening activities. These issues affect lesson planning as teachers will need to take such issues into account when they are using gardens for curriculum activities.

#### ***2.4.3.2 Curriculum issues***

During interviews (see Appendix D), teachers indicated that they have mixed feelings about the incorporation of environmental education in Learning Areas because they don't know whether the project is going to create interest or not amongst learners and

teachers. One teacher said, “ teachers and learners are working hard at school to produce vegetables but they need support in terms of seeds and fencing from the Department of Education so that they produce more” (I3). According to the teachers, the food garden could be used as a teaching and a learning tool to develop learners’ environmental knowledge and skills in Natural Sciences, Economic and Management Sciences, Arts and Culture, and Life Orientation Learning Areas. However, it was not clear that teachers knew how to do this (I1, I3), and because of an apparent lack of understanding of environmental education amongst teachers, one interviewee mentioned a need for a workshop on how to integrate greening activities in Lesson Plans or curriculum (Q2).

In a conversation with Miss Msuthu (pers. Comm. 24/02/2006, I1) on the Natural Sciences Learning Outcome #1: ‘Scientific Investigation’ which expects learners to be able to “act confidently on curiosity about natural phenomena and to investigate relationships and solve problems in scientific, technological and environmental contexts” (DoE, 2002b), she mentioned that this should be done by using what is available at school rather than by only theorizing about how the outcome should be achieved. Broader issues affecting the school environment, and the curriculum, were noted as being: lack of resources; unsafe and unhealthy surroundings; lack of support from the government and the municipality; stealing of teaching and learning aids; absence of a caretaker; vandalism and theft (I1, I2, I3, and I4). The level of parental education also affects the curriculum, and most of the questionnaires indicated that parents in the community are mostly educated at a junior level, which means that most parents have not gone beyond grade 8 (Q1-10).

The lack of knowledge and support from the government affects the project negatively as government has a responsibility to ensure that teachers are trained on how to integrate greening in their lesson plans. As greening is dealing with areas owned by the municipalities, such municipalities have a responsibility to assist in developing those areas. In the case where local municipalities don’t have a budget to assist schools (e.g. with water and energy resources) those areas will not develop as planned.

Lack of parental education influences their ability to support learners' learning and curriculum activities. Teachers and learners therefore have to take the responsibility for educational aspects of the greening programmes. Teachers need to take these issues into account when doing their lesson planning.

#### **2.4.4. Educational responses**

As indicated above, the schools experience both environmental and curriculum issues. There are, however, also a number of projects and programmes that are trying to respond to these issues. These projects are launched by other government departments in partnership with the Department of Education, and by NGOs and parastatal organizations such as SANBI.

The Department of Education is working with the Department of Agriculture in introducing 4H clubs and food gardens to promote thinking, care and use of soil to produce food for feeding and economic use by people for themselves. While this programme is available in the Bizana district, the two schools were not participating in the 4H programme.

The Department of Social Development is giving foster care grants to support orphans and there are grants to help people affected by HIV/AIDS. There is a feeding scheme for learners from Grade R-6, which is implemented by the Department of Education through its budget. At both schools orphans are benefitting from the foster care grant scheme, and the feeding scheme is operating effectively in both schools. The school gardens supplement the feeding scheme in both schools.

At Ndakeni location near Ncura J.S.S. there is a hospice for people living with or affected by HIV/AIDS. Learners from the hospice attend school at Ncura J.S.S. The SANBI Greening the Nation programme, through its emphasis on food gardens, supports these initiatives to provide for orphans and other people affected by HIV/AIDS and poverty. As the programme is also a poverty relief programme, it

provides contract employment for some members of the community, who also benefit from the skills development component of the programme.

## **2.5 CONCLUSION**

This Section of the portfolio provides insight into the contextual factors that influence use of school gardens in the curriculum in the Bizana district. These are of a broad nature, and include policy changes and policy developments, including issues associated with introducing a new National Curriculum Statement, and are also specific to the school environment and context. As shown in this contextual profile, South Africa has introduced environmental education into the school system, based on Constitutional rights and values. These also govern environmental policies, and reflect international developments to strengthen environmental education towards a sustainable future. The contextual influences affecting environmental education in schools on the other hand, include local environmental issues such as lack of water supply, quality of the soil, and local management of resources. In the two schools, water issues were prominent, as well as socio-economic factors linked to poverty and health. Curriculum issues identified in the schools included uncertainty as to how teachers and learners would respond to the new environmental focus, and a lack of knowledge and experience of environmental education amongst teachers, together with other factors such as parent education levels.

The contextual profile also indicated that there are activities in place that are addressing some of these issues such as the programme to support orphans, and the school feeding scheme. The two schools also have productive food gardens, which have been supported by SANBI. The gardens are not only food gardens, but also provide a resource for learning about biodiversity, and can be used as a resource for teaching, as knowledge of biodiversity is included in the Life and Living theme of the Natural Sciences Learning Area. As indicated in Section 1, my interest in this study is to support teachers to gain knowledge and skills that will increase their ability to provide improved opportunities to learn for all their pupils, using the gardens. This

study has provided useful background information for this process (see Section 4). However, the study did not provide enough in-depth insight into the knowledge resources available in the local context, or the interests of the different projects or programmes working in the area, and to find out more about these, I conducted a stakeholder analysis (Section 3), which is the focus of the next section of this research portfolio.

## APPENDIX A

To : THE PRINCIPAL  
: NCURA J.S.S.AND NTLALONTSHA J.S.S.

FROM : MR M.N. FINCA  
: DEPARTMENT OF EDUCATION  
: BIZANA DISTRICT OFFICE

PHONE: 039 2510427/0834335339  
DATE : 07 FEBRUARY 2005

SUBJECT: REQUEST OF ACCESS TO CONDUCT A RESEARCH IN YOUR SCHOOL.

DEAR SIR/MADAM

I am a candidate Master of Education student at Rhodes University in Grahamstown. I am required to undertake a research as part of course requirements, leading to a long-term participatory research from 2005 to 2006. The topic of my study is "Professional development support for lesson planning including greening activities in schools". In my work context I am a mathematics learning area subject specialist. I therefore request you to allow me to carry out this exercise in your school as your school is participating in the Greening of the Nation Programme. I further request to work with the teachers teaching mathematics and natural science learning areas.

I would be pleased if we can arrange when, how and what to do during school visit. I hope that this study will improve teachers in using greening in learning activities.

Thanking you for your co-operation.

Yours truly  
M.N.Finca



APPENDIX B1



Department of Education  
Eastern Cape Province  
**Ncura Junior Secondary School**  
P O Box 290  
Flagstaff, 4810



Enquiries: 082 7044 657

EMIS NO.: 500849

11 February 2005

Dear Mr Finca

SUBJECT: PERMISSION TO CONDUCT AN ACADEMIC RESEARCH

Firstly, I acknowledge the receipt of your letter dated 07 February 2005.

Secondly, it is with great pleasure to officially inform you that, you are granted the permission to conduct your research during the period requested.

Furthermore, kindly furnish my office with your action research plan so that I notify the teachers you will be working with, in advance.

Hoping that you will find this to be in order.

Good luck with your studies.

Yours sincerely,

M.D. Mvunelo (Mr)  
Principal

**NCURA J.S.S.**  
P.O. BOX 290, FLAGSTAFF 4810

11. 02. 2005

APPENDIX B 2

# Ntlalontsha Junior Secondary School

Postal address P O Box 525  
Flagstaff  
4810

Physical address

Zone 3 Loc  
Ntlenzi Admin Area  
Flagstaff  
4810



Emis No. : 500961

Enquiries : P.T. MSANA

Contact number : 0834706504

Date : 08-03-05

RE :- ACCEPTANCE TO A REQUEST

IN RESPONSE TO YOUR LETTER DATED 07-03-05  
THE SCHOOL HAS NO OBJECTION IN ALLOWING YOU  
TO CONDUCT YOUR RESEARCH AS PER YOUR  
REQUEST.

LOOKING FORWARD TO MEETING YOU

YOURS FAITHFULLY

P. T. MSANA (PRINCIPAL)

NTLALONTSHA J.S.S.

BOX 525

FLAGSTAFF 4810

DATE 08-03-05

CELL : 083 470 6504

## APPENDIX C I

### GREENING PROJECT QUESTIONNAIRE

Date: 15/03/2006

Questionnaire developed to assist in collecting information about historical, economical, social and environmental data of Neura and Ntlatontsha J.S.S. and their communities where greening is taking place. The data collected by means of this questionnaire will help the project and the researcher to understand the two schools and their communities better. Your participation in answering this questionnaire will be highly appreciated.

#### A. LOCATION DETAILS.

1. District..... BIZANA
2. Municipality..... MBIZANA LOCAL MUNICIPALITY
3. Ward..... 07
4. Village..... MAMPINGENI Village
5. Distance from the main road..... 3 km
6. Common physical features (i.e. names of nearby rivers/stream, mountains/hills etc)..... SWANE RIVER

#### B. COMMUNITY MEMBER PARTICULARS.

7. Name of the respondent ..... N. MNTU
8. Sex of respondent male  female
9. Age of respondent ..... 39 YRS
10. Number of people residing with the respondent..... 4

#### C. ETHNIC, CULTURAL AND RELIGIOUS

11. What tribe are you? ..... XHOSA
12. What language (s) are you able to speak fluently? ..... XHOSA
13. What language(s) are you able to write and read fluently? ..... XHOSA, ENGLISH
14. What is your religious denomination? ..... METHODIST CHURCH
15. What nationality are you? ..... SOUTH AFRICAN
16. How long have you been living in this village? ..... 39 YRS

#### D. EDUCATIONAL LEVEL

17. What are the educational levels of parents? ..... JUNIOR LEVEL
18. What are the educational levels of the children? ..... PRIMARY LEVEL

#### E SOCIAL-ECONOMIC INFORMATION

19. What is your occupation? ..... UNEMPLOYED
20. What is the household income (per year) from different sources? ..... DEPENDS
21. What is the household expenditure (per month) from different sources? ..... R500-00

environmental resources in the area? We benefit by collecting vegetables from the fields. We get wood from the forest and also get grass that helps us in building.

#### F. SOURCES OF DOMESTIC WATER AND ENERGY

24. what is the main source of drinking water? Rivers
25. Who draws household water most of time? WIFE AND CHILDREN
26. How does the household ensure that water is safe for drinking? WE ENSURE BY BOILING AND ALSO POURING JIK IN IT.
27. What is the household's main sources of energy? FIREWOOD
28. If you use firewood, who is the main collector? Women
29. How do you transport firewood? BY MANPOWER
30. How do you dispose off waste? Burn it
31. How many toilets does the household has? 1

#### G. AGRICULTURE

32. What is the household main agriculture activity? PLANTING AND CULTIVATION
33. How big is your cultivation field? (in hectares) 3 HECTARES
34. The household land is mainly cultivated by OXEN
35. List five main problems that you face in agriculture in this area
1. TORNADO
  2. DROUGHT
  3. INSECTS
  4. SOIL EROSION
  5. WILD ANIMALS

36. Any general comment that you think will help greening project /programme in schools to understand the importance's of environmental education

By using local people and their knowledge generally in agriculture and farming  
Active involvement of youth structures, support from parents and local leaders

Thank you for answering this questionnaire.

APPENDIX C 2

GREENING PROJECT QUESTIONNAIRE

Date:..... 15/03/2006 .....

Questionnaire developed to assist in collecting information about historical ,economical ,social and environmental data of Ncura and Ntlalontsha J.S.S. and their communities where greening is taking place .The data collected by means of this questionnaire will help the project and the researcher to understand the two schools and their communities better. Your participation in answering this questionnaire will be highly appreciated.

A. LOCATION DETAILS.

- 1.District..... BIZANA .....
- 2.Municipality..... MBIZANA LOCAL MUNICIPALITY .....
- 3.Ward..... .....
- 4.Village..... KU-BHA LOCATION .....
- 5.Distance from the main road..... 300 M .....
- 6.Common physical features (i.e. names of nearby rivers/stream , mountains/hills etc)..... Not available .....

B. COMMUNITY MEMBER PARTICULARS.

- 7.Name of the respondent ..... MISS N. MPHAYISE .....
- 8.Sex of respondent male  
female
- 9.Age of respondent ..... 33 YRS .....
- 10. Number of people residing with the respondent... 5 .....

C. ETHNIC, CULTURAL AND RELIGIOUS

- 11.What tribe are you ? ... XHOSA .....
- 12.What language (s) are you able to speak fluently ?  
XHOSA AND ENGLISH .....
- 13.What language(s) are you able to write and read fluently ?  
XHOSA AND ENGLISH .....
- 14.What is your religious denomination ? FULL GOSPEL CHURCH .....
- 15.What nationality are you ? SOUTH AFRICAN .....
- 16.How long have you been living in this village ? 3 YRS .....

D. EDUCATIONAL LEVEL

- 17.What are the educational levels of parents ? TERTIARY LEVEL .....
- 18.What are the educational levels of the children? JUNIOR .....

E SOCIAL-ECONOMIC INFORMATION

- 19.What is your occupation ? EDUCATOR .....
- 20.What is the household income (per year) from different sources ?  
R150 000 .....
- 21.What is the household expenditure (per month) from different sources ?  
R1500 - 00 .....
- 22.What is the household main source of income ? TEACHING .....

environmental resources in the area? WE HAVE RECEIVED DIFFERENT MEDICINES, FRUIT AND VEGETABLES.

#### F. SOURCES OF DOMESTIC WATER AND ENERGY

24. what is the main source of drinking water? RIVERS / RAIN
25. Who draws household water most of time? WOMEN and girls
26. How does the household ensure that water is safe for drinking? Boiling
27. What is the household's main sources of energy? Dried dung of live stock and firewood
28. If you use firewood, who is the main collector? Girls and their Mothers
29. How do you transport firewood? using donkeys and cattle
30. How do you dispose off waste? BY BURNING it
31. How many toilets does the household has? 1

#### G. AGRICULTURE

32. What is the household main agriculture activity? CULTIVATION
33. How big is your cultivation field? (in hectares) 1 HECTARE
34. The household land is mainly cultivated by TRESTOR
35. List five main problems that you face in agriculture in this area
1. FROST IN WINTER
  2. HAIL
  3. TORNADO
  4. LACK OF WATER
  5. SOIL EROSION
36. Any general comment that you think will help greening project /programme in schools to understand the importance's of environmental education
- ENVIRONMENTAL education must be introduced to the members of communities where greening is taking place.

Thank you for answering this questionnaire.

# APPENDIX D

## INTERVIEW QUESTIONS

Interview questions based on environmental education at school.

Name of school : Ncura J.S.S. or Nhalontsha J.S.S.

Principal of the school: *M. A. MUVUNZO*

Date of interview: *15-02-06*

Place of interview: *NCURA J.S.S.*

People interviewed: *MISS. B. MSUTU*

Post level : *02*

Teacher for grade : *06*

Number of learners in the grade: *49*

Subject/Learning area he/she is teaching : *MATHS, NATURAL SCIENCE*

### Question 1

How do you feel about the incorporation of environmental education in learning areas?

*I have mixed feelings about this because I don't know whether it is going to create interest to the learners and teachers.*

### Question 2

How do you think your school can use greening to improve teaching learning situation?

*school  
It can use it by integrating it with the current (KNCV).*

### Question 3

What are your plans about food garden?

*We plan to use it as a teaching and learning tool. To develop the love in the learners for the environment.*

### Question 4

In which learning areas are you comfortable with the incorporation of environmental education?

*NS, EMS, A&C, NO*

Question 5

What strategies are you applying to sustain greening in your school?

Since the process is at the beginning, the strategies in the pipeline are to aim at having independent plants to call the affected parties of in the school.

Question 6

What support and assistance do you need in the greening programme?

We need to be workshopped on how to incorporate the greening programme into NCS.

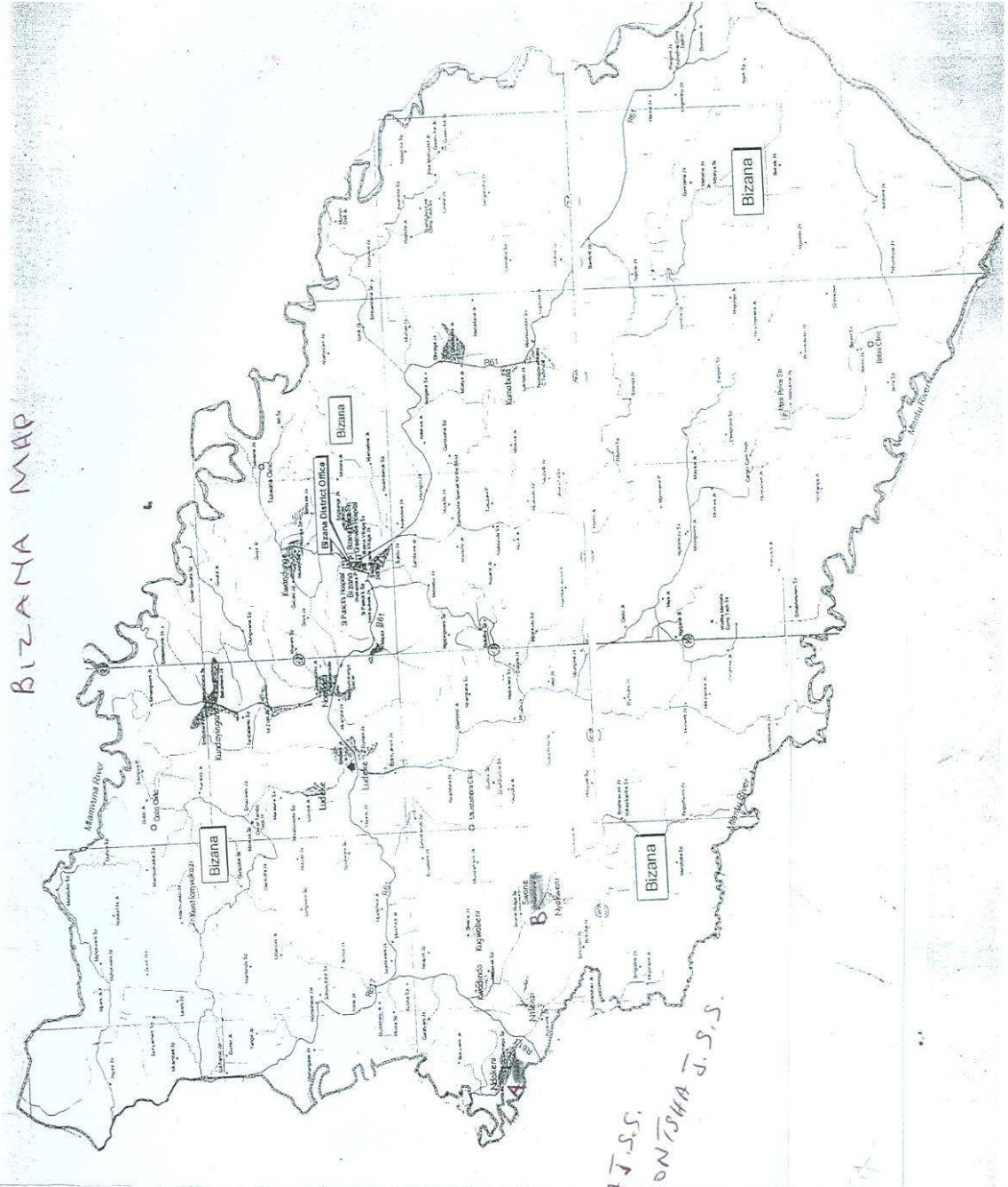
Question 7

What part of greening is helping you and how?

Greening has started to develop respect in the learners for the plants. Learners now don't walk anyhow and anywhere.

APPENDIX

BIZANA MAP



A = NCURA J.S.S.  
B = NTLALONTSHA J.S.S.

## **SECTION 3**

### **THE STAKEHOLDER ANALYSIS**

#### **3.1 INTRODUCTION**

This section of the portfolio reflects on and provides information about stakeholders' roles, knowledge and interests in the greening of schools. The stakeholder analysis provides further information for understanding the schools, and the school community, particularly from a contextual knowledge point of view. As indicated in Section 2 of the portfolio, the National Curriculum Statement in South Africa has a focus on environmental learning, and this requires teachers to integrate content and context in Lesson Plans (NEEP-GET, 2004). It is for this reason that I decided to examine the views, knowledge, and potential contributions of the different stakeholders involved with the Greening the Nation Programme in the Bizana District.

#### **3.2 WHO ARE STAKEHOLDERS?**

As indicated in Section 1 and Section 2, there are 31 schools in the Bizana district that are being greened by SANBI. For the purposes of this research, I planned to work with only two schools that are participating in the greening programme in Bizana. In this study, I therefore limited my analysis of who the stakeholders are to those that are associated with the Ncura J.S.S. and Ntlalontsha J.S.S. schools. As indicated in Section 1, I am also involved and interested in the professional development of teachers, and I therefore also thought to identify those stakeholders that could potentially contribute to the professional development of educators with regards to school greening and use of gardens in schools for learning. Stakeholders are people who have an interest in something (in this case greening of schools for the purpose of improving learning in the schools). According to Sisitka (2006: 34, cited in the WIOMSA Training Manual, 2002: 131), "Stakeholders are: Groups and individuals who are directly or indirectly affected by the objectives and implementation of an effort – a project or programme ..." such as the greening of schools in this case. I initially identified a range of stakeholders (people who have an interest in the greening programme in the schools for the purposes of improving learning), based on

my knowledge of the context and the SANBI project. I identified the following stakeholders: **learners, community members, educators, school governing bodies, the Department of Agriculture, the municipality, the service provider** who is greening schools and **SANBI** because of their direct involvement in the programme.

Stakeholders can be classified into primary stakeholders and secondary stakeholders (Kemmis, 1988). The primary stakeholders are the beneficiaries of the project such as the learners and community members that could gain knowledge about indigenous plants and food gardens. The secondary stakeholders include the Department of Agriculture, municipality, ward councilors and SANBI employees and service providers who provide support services, manpower and garden resources. In the case of teacher professional development, teachers would also be primary stakeholders, who would benefit from learning how to use the garden for teaching and learning purposes.

### **3.3 CONTEXT AND PURPOSE OF CONDUCTING THE STAKEHOLDER ANALYSIS**

In my experience, one of the most important focal points for creating a context that supports continuing professional development is the culture of teaching, which is a key focal point for improvement and change. The IMBEWU project, an in-service professional development project of the Eastern Cape Department of Education, indicates that there is growing evidence that the development of collaborative school cultures, where teachers routinely support, learn from and work with each other, is related to successful implementation of educational change, a strong record in school-fostered improvement, good practices in professional development and positive outcomes in pupils achievement (IMBEWU, 1999). This stakeholder analysis focusing on greening of schools for the purpose of improving learning, aimed at understanding the values, interests, concerns and the views of the stakeholders as people who belong to and want their community and the learning in the school to improve, and who could potentially contribute to the development of a collaborative school culture.

According to Najam Jam (2004:27), “Stakeholders inputs are ... important and involve civil society representatives having more opportunities to provide inputs into public policy planning”. One of the objectives of the NEEP-GET project (see Section 2) was to help the Department of Education to co-ordinate the interests and inputs of a wide range of environmental education stakeholders or partners. The NEEP-GET found that there were a wide range of stakeholders that are interested in environmental learning in schools, but that these stakeholders often use different methods, and rely on content of varying form and quality. The NEEP-GET identified the Department of Education, and subject advisors in particular as having an important role to play in ensuring that these contributions benefit the schools, and to ensure that the knowledge of partners is shared in ways that are ‘curriculum aligned’ (NEEP-GET, 2005: 44). In the case of education projects or programmes therefore, stakeholder contributions to public policy as explained by Najam Jam (2004) above, are to benefit learners in schools through contributing to the curriculum, the learning process and the well-being of the school.

The purpose of including stakeholders in this research was therefore to create cultures and practices that ensure that there is a full participation in greening the schools and the incorporation of environmental education in Learning Areas. As indicated by the NEEP-GET (2005), by Fien (1998), and UNESCO (1997), environmental education is not just about endangered plant species, wild animals and recycling. The environment encompasses the whole context of life itself which include social, political, economic and biophysical dimensions (NEEP-GET, 2004; 2005). As indicated in Section 2 of this portfolio, environmental learning is closely linked to human rights, social justice and inclusivity in the revised National Curriculum Statements Grades R-9.

Environmental education, because it focuses on the learners’ environment can potentially also ensure that learning is contextualized. According to Cornbleth (1990:3) in order for curriculum to further critical purposes, it must be seen and treated as “... value laden and contextualized” so that learners develop skills to reflect on what they know in relation to what they experience in their surroundings.

According to Janse van Rensburg (2000:10), who was commenting on the South African *Learning for Sustainability* pilot project (see Section 2), environmental learning processes can contribute to transforming society, and teachers' role in this process is as an 'agent of change'. She explains further that in professional development programmes that support teachers to take up such roles, active methods are introduced that include a focus on:

- Teachers constructing knowledge with students, through dialogue
- Grounding learning within the real-life experiences of learners; making links between scientific knowledge and common-sense knowledge;
- Recognizing and working with learners' own culture, developing critical thinking and becoming aware of the problems of the society in which they live (ibid);

She explains that such education is "... socially engaged and linked to social practice" (ibid). In my view, for education to be 'socially engaged' and 'linked to social practice' it is necessary to understand the interests of stakeholders who can contribute to such education, hence this study. As indicated in Section 2 of this portfolio, when South Africa's new Constitution was adopted in 1996, it linked environmental injustices to human rights and social responsibilities. The Constitution signaled a national commitment to environmental action, which is reflected in the constitution in the Bill of Rights as every citizen's right to an environment that is not harmful to his or her health or well-being (See Section 2). Environment is also linked to many others human rights in the Constitution, such as the right to adequate water, food and shelter. This Constitutional commitment indicates that the government and its various Departments such as the Department of Agriculture, Health, Environmental Affairs, Water Affairs and Forestry, (and others) are likely to have a people's interest in ensuring that this human right is protected. They are therefore likely to have an interest in environmental education programmes (see Section 2, NEEP-GET, 2005). These sectors have responded with policies to protect the South African environment, and therefore the rights and health of its citizens and future economic development (see Section 2).

However, it is not only the government that has an interest in environmental issues, but learners and teachers who are engaged in the process of knowledge construction through the use of resources such as food gardens and other learning and teaching

support materials (LTSM) in the school. As indicated in Section 2, communities that find themselves affected by poverty have a direct interest in gardens for supplementing food in the school feeding schemes, and the gardens therefore have a local economic value for the communities. Educator interviews have, for example, also indicated that communities have information about useful plants, which can benefit learners and assist them to gain more knowledge and understanding for future purposes, which is one of the aims of environmental learning (see *Appendix 1b*).

The NEEP-GET pilot research project (Lotz-Sisitka & Raven, 2001:5) states that South Africa has a history of socially unjust environmental laws. Natural resources were preserved for the benefit of the few to the disadvantage of others. This was also shown in Section 2 in the contextual profile where communities in rural areas, for example, don't have the same access to water resources as in the urban areas, or on formal farms (e.g. the sugar cane industry). The majority of South African people was denied access to natural resources and was also disproportionately affected by environmental degradation such as soil erosion, unhealthy work places and unhealthy living areas (ibid). Government and their agents such as SANBI are therefore also likely to have a political transformation interest in their environment and environmental education work, as shown by the objectives of the SANBI programme (see Section 1 and 2).

This brief analysis of potential stakeholder interests shows that there are different interests amongst stakeholders involved in environmental education. As indicated above, one of the aims of the NEEP-GET project was to address the coordination of environmental education activities in schools, as well as curriculum and teacher development. The NEEP-GET project however, only managed to ensure such co-ordination at provincial levels (NEEP-GET, 2005), as the limited resources in the programme did not allow for local, contextual and school based stakeholder analysis. This study can therefore contribute new insights (at a local level) on the issue of co-ordination of environmental learning in schools.

According to NEEP-GET pilot research project (Lotz-Sisitka & Raven, 2001:6) an understanding of the multi-dimensional nature of environmental issues (which are complex because they involve social, economic, political and biophysical dimensions)

and their links to human health, quality of life and the policies that have been developed to address them (e.g. the Constitution and NEMA, see Section 2), shows that there is a need for:

- Active and critical public participation in addressing environmental issues;
- A broad but also quite in-depth understanding of environmental issues, of the way they relate to our everyday lives, and of possible solutions to them; and therefore, for
- Each Learning Area to make its unique contribution in building an environmentally literate and responsible population (ibid).

A stakeholder analysis therefore has the potential to relate public contributions to an understanding of environmental issues and how they relate to learners everyday lives, and ultimately to the Learning Areas, as explained above. Sisitka (2006:35) in his review of stakeholders in natural resource management indicates that “... differences exist amongst stakeholder groups ... stakeholder groups are not homogeneous ... all stakeholders are not necessarily organized in formal groups, and ... even when stakeholders are organized in a group, they may not have the capacity to effectively articulate and represent their interests”. Understanding stakeholder interests and roles is therefore not a simple matter, and requires careful research and analysis.

To explore the knowledge, interests and roles of stakeholders I identified a research question, and I used qualitative methods in this study, which I describe next. This study was designed to extend the contextual profile in Section 2, by generating more data on stakeholders in the two school communities, and their knowledge, roles, interests and potential contributions to the school greening programme and its environmental education objectives.

### **3.4 RESEARCH QUESTION AND METHODOLOGY**

#### **3.4.1 Research question and goals**

To guide the stakeholder analysis research, I developed a **research question**:

*What are the roles, interests and contributions of stakeholders involved in the school greening project in Bizana? What knowledge do they have that can be shared?*

With an insight into the knowledge, roles, interests and other potential contributions of the stakeholders, I hoped to gain insight into the following broader **research goals**, which are:

- To examine how local community people could potentially be engaged in curriculum implementation and improvement at school level.
- To examine how the schools could potentially make better use of internal or local expertise to improve teaching and learning.
- To examine how knowledge of stakeholder interests could potentially help to develop closer links between the community and school, to support teachers to use real world experiences to facilitate learners learning.

### **3.4.2 Research methodology**

The methodology applied in this research was qualitative and interpretive in orientation. This approach was chosen because it enables the researcher to study social and cultural phenomena in detail. Terre-Blanche, Durrheim and Kelly (2002) define interpretive research as a method that describes and interprets people's feelings and experiences in human terms rather than through quantification and measurement. As mentioned in the goals above, this research is aimed at understanding what the knowledge, roles, interests and contributions of stakeholders in the school greening project in Bizana are, with a view to contributing positively to the learning process in schools. Qualitative research helps the researcher to understand people and the social and cultural context within which they live (Cohen et al., 2000). People communicate their ideas and feelings about social phenomena that surround them, and qualitative research techniques allow the researcher to capture these. Their behaviours and attitudes can also be studied and understood through this process (Terre-Blanche et.al 2002).

### **3.4.3 Methods for data collection**

In order to get the required information to answer my research question and to develop the stakeholder analysis, I used two sources of data generation:

- Interviews

- Focus group discussions

Cohen et al. (2000:169) describe interviews as an important tool to collect or gather information through conversation between the researcher and the researched. Interviews allow the researcher to interact directly with people (in this case stakeholders) to get original information about something in a situation. As mentioned in Section 2, group interviewing is a useful way of conducting interviews.

Watts and Ebbutt (1987 cited in Cohen et al, 2000) said that group interviews include the potential for discussions to develop, thus yielding a wide range of response. They explain, “such interviews are useful... where a group of people have been working together for some time or common purpose, or where it is seen as important that everyone concerned is aware of what others in the group are saying” (Watts and Ebbutt, 1987,cited in Cohen et al, 2000:169). The group interview can generate a wider range of responses than individual interviews. The group interview can also bring together people with varied opinions, or as representatives of different collectives (see *Appendix 1a & 1b*).

The purpose of conducting interviews was to find out how people describe and interpret their feelings and experiences in human terms. In this research I conducted nine interviews with the following stakeholders, using a semi-structured interview format (see table 3.1 below).

Table 3.1 Interviews conducted for the stakeholder analysis

<b>Stakeholder group</b>	<b>Who was interviewed and date of interview</b>	<b>Type of interview</b>
<b>Learners</b>	<b>Learners of Ncura J.S.S.:</b> Lwandile Nomdlembu, Asanda Mnisi and Nomvelo Nontsumane (25 May 2005)	Group interview
	<b>Learners of Ntlalontsha J.S.S.:</b> Phumza Jabavu, Vuyisile Zungu and Siphokazi Nomhlaba (25 May 2005) <i>(Included as Appendix 1b and 2b)</i>	Group interview
<b>Educators</b>	<b>Educators of Ntlalontsha J.S.S.:</b> Ntombifuthi Mphayise and Nomvume Sontube (25 May 2005)	Group interview
	<b>Educators of Ncura J.S.S.:</b> Buyiswa Msuthu, Nomanene Ntola and Vuyokazi Mthanthantho (25 May 2005)	Group interview

	(Included as <i>Appendix 1a and 2a</i> )	
<b>School Governing Body</b>	Four members of the school governing body at Ncura J.S.S. (2 teachers and 2 parents) Four members of the school governing body at Ntlalontsha J.S.S. (2 teachers and 2 parents) (included as <i>Appendix 5a and 5b</i> )	Group interview
<b>Department of Agriculture</b>	Mr. Mpukwana (18 March 2005) Included as <i>Appendix 6</i> )	Individual interview
<b>SANBI</b>	Small group of employees of SANBI (field workers) who have established and maintained the greening of schools and school vegetable gardens, and their supervisor Mr. Vuyani Zondani ( included as <i>Appendix 7</i> )	Informal group interview
<b>Ward Councillor</b>	Mr Mfingwana (26 March 2006) (included as <i>Appendix 3</i> )	Individual interview
<b>Community members</b>	Mrs Njkeni( included as <i>Appendix 4</i> )	Individual interview

These interviewees were selected in the following way:

- Learners were selected by the class teachers. They were involved in the Greening the Nation Project and in the school garden development.
- Teachers and School Governing Body members (community member above) were selected by the principals (as described in Section 1)
- Other stakeholders such as the Department of Agriculture, SANBI, and the Ward Councillor were on the Greening the Nation Committee, and were identified as being the three most important stakeholders contributing to the School Greening Programme. This was done in consultation with the principal.

Due mainly to page limitations, I have only included the interviews reflected in the table above in the appendices, to give the reader an insight into the interview process and the data collection process. When conducting the interviews with the SGB members and community members I used isiXhosa to ask the questions and then I transcribed their responses into English, and captured the essence of the answers on my interview sheets (See Appendix 1-6). Some of the stakeholders (e.g. the Principal and teachers) I used English in conducting the interviews and they also responded in English.

I used a digital camera to take photos and a tape recorder to record the responses of the participants. I used this to check that my notes on the interviews were correct.

#### **3.4.4 Data analysis, ethics and validity**

As indicated in Section 2, I obtained permission to conduct research in the two schools over a two year period. I did not have to re-negotiate permission to do the research again, but I did inform the principal and the educators of the purpose of the stakeholder research. For the other stakeholders, I had to explain to each of them what I was planning to do, and to ask their permission to conduct the research. I also showed them the interview transcripts to make sure they were happy with what I had captured from the interviews.

To analyse the data, I used a simple set of categories that relate to the research question. These are:

- Stakeholder knowledge,
- Stakeholder roles,
- Stakeholder interests, and
- Stakeholder contributions.

For each stakeholder I used the same set of categories, which are also used in the discussion on the stakeholder's knowledge, roles, interests and contributions in sub-section 3.5 below. I found this structure easy to use, as it helped me to focus on what the stakeholders were saying, in relation to the research question. To ensure trustworthiness, I have tried to give an accurate account of what the stakeholders said, and I have tried to provide a thick description of the data, as recommended by Lather (1986), and Cohen et al. (2000), and Terre-Blanche et al. (2002) who see thick description as an important strategy for ensuring validity in qualitative research.

### **3.5 STAKEHOLDERS KNOWLEDGE, ROLES, INTERESTS AND CONTRIBUTIONS**

In this section I report on the different stockholder's knowledge, roles, interests and contributions, as revealed through the interviews. The following stakeholder categories are used:

- Community members (see section 3.5.1)
- School Governing Body (see section 3.5.2)
- Learners (see section 3.5.3)
- Educators (see section 3.5.4)
- Ward Councilor (see section 3.5.5)
- SANBI and Department of Agriculture (see section 3.5.6)

These were all identified as having a direct interest in the SANBI Greening the Nation programme, and in particular in the greening of schools for environmental education purposes.

#### **3.5.1 Community member's knowledge, roles, interests and contributions**

##### ***3.5.1.1 Knowledge***

As indicated in Table 3.1 above, I interviewed an old community member (Mrs. Njekeneni) who belongs to the area of Ncura J.S.S. but lives close to Ntlenzi Mountain and forest (see **Appendix 4**) The following are issues and risks that were identified by her in the community, where Ntlenzi forest is situated:

- Soil erosion/land degradation
- Deforestation
- Water related issues e.g. unclean water, cholera/diarrhea
- Poverty
- Cutting and digging out of indigenous plants
- Overgrazing

Mrs. Njkeni reported that there is a problem of *soil erosion* at Ntlenzi Mountain where Ntlenzi forest is situated because of the livestock that uses the same route/way everyday and it has resulted in the formation of dongas.

There is a problem of veld fires in winter, which is caused by people who do not care about plants and animals. People of the communities around Ntlenzi Mountain use the same mountain for grazing and there is no other mountain to be used that is why there is overgrazing.

*Deforestation* is one of the issues of concern in the area because most people use trees for commercial purposes, to make fires, fence and build kraals. Currently there is no one responsible for taking care of the forest because the person responsible was arrested for the illegal selling of poles, which he chopped from the forest without the permission of the Chief of the area.

Mrs. Njkeni identified *unclean water*, as a cause of cholera/diarrhea because there are homes without toilets and people respond to the call of the nature in the forest, yet there is a river. She reported that people of the community fetch the same water in the forest because there are no water taps and there is no water supplied by the municipality in any form. The same water is used for washing clothes, for drinking by the animals and the whole community depends on the same river. Mrs. Njkeni was unhappy to say that her daughter (Zintle) was raped and killed in the same forest by an unknown man when she was collecting wood for fire.

According to Mrs. Njkeni's interview, *poverty* is a problem in their community because of unemployment and retrenchment of people from their work. People survive through planting their fields, selling their livestock and small-scale farming. She also reported that *cutting and digging out of indigenous plants* is high because it is where traditional healers and circumcision school people live and they get their medicines from plants. As a result indigenous plants like *Iqwili, Ixonya, Impepho, Intolwane, Izichwe, Iswati* are no longer there. The things mentioned above are seen as issues and risks because they affect the lives of people.

### **3.5.1.2 Roles**

According to Mrs. Njkeni, it is the role of the community members to stand up and fight poverty, soil erosion, deforestation and digging of indigenous plants. It is also the role of the community members to support the greening project for the future so that children can learn from them. People need to cultivate their fields, practice farming, control the use of indigenous trees and plants and educate children for their future. It is the role of the Chief to call people and inform them about their role and responsibilities for example to take care of their land and to stop harvesting indigenous plants.

### **3.5.1.3 Interests and contributions**

Members of the communities have an interest in the greening project as they say they are going to get employment, knowledge, skills and it is going to contribute in the communities' development economically, socially and culturally. The learners during the interviews also indicated that the community was interested in school greening "because parents will get employment so that they can pay school fees and they will be able to feed their families" (see *Appendix 2b*). Economically they mention plants and animals as a source of money where they sell what they have in order to get money, for example vegetables from their gardens and livestock. Socially they mention the way that economic development can help to solve poverty, and they also mentioned the role of the headman or the Chief, which is to maintain law and order for example by disciplining those who destroy indigenous forest and natural resources.

People enjoy practicing their culture through the use of indigenous plants for example there are plants that are scarce like *Izichwe* which is used by boys during the circumcision period at Ebhomeni. From the above, it seems that community members such as Mrs. Njkeni have a number of possible *contributions* to the school greening project. They can share their knowledge of the environmental issues in the area, and their knowledge of how local people live with, depend on and use plants. The teachers interview also showed that this is a potential role for communities when Mrs. Msuthu

said “As a school we need to inform / advise the Sangomas and traditional healers to take care of our indigenous plants and to work together with us because they know and can give us information on medicinal plants” (see *Appendix 1a*). They can also share their experience of how to manage the plants (e.g. the role of the chief), and harvesting practices.

### **3.5.2 School Governing Body knowledge, roles, interests and contributions**

#### ***3.5.2.1 Knowledge***

In the interviews with the School Governing Body members, it was clear that people define ‘environment’ differently, based on their understanding and the context in which they find themselves. For example some of the points that came up when we talked about environment, that reflected their knowledge of environmental issues were:

- the setting in which living and non-living things interact,
- litter and dongas,
- wildlife and conservation, and
- concern for the general surroundings (see **Appendix 5a and b**).

The SGB members indicated that the environment is no longer seen as nature only but is a result of the way we interact with each other and with nature. They saw a cultural value in the environment, as stated by one SGB member who said “*According to our culture we use and believe in indigenous plants in our cultural activities. Therefore, we need to go back to our indigenous type of living where we used to live on indigenous plants and fruit*”.

They reported that when people settle in any area, they create a different environment from the natural one they found, they build houses, roads, schools, shops, clinics and others; for this they use resources from nature like water, wood, soil, metal and many other things. The environment that they create is called the ‘built environment’. Hence, they reflected that human beings and their activities are seen to form a central part of the environment.

The focus group interview also indicated that environmental issues are not simple issues, and that they are often complex and that conflicts can result.

The respondents reported that at Ndakeni location there are families that raise chickens and the smell of waste where the chickens live affects those that are near. However, at the end of the day many people benefit from the chicken farming activity, as they buy chickens for food, and they use the chicken manure to plant seeds, and improve the soil.

### **3.5.2.2 Roles**

The School Governing Body expressed that it is their role to develop the school and to manage every thing done for the benefit of every member of the society, as indicated in this statement “*As SGB members our role is to develop the school as a whole for the benefit of our society.*” (see Appendix 5b) The School Governing Body assists the educators and learners when they are cultivating in the garden by supplying them with the kraal manure and by taking care of everything when the schools are closed. When the greening project had finished the members of the SGB promised to promote educational values that emphasized preserving the environment and keeping it clean from pollution, waste and abuse. They promised to protect the environment for the benefit of the present and future generations, secure sustainable development and sustainable use of natural resources, as shown in this statement:

*When the greening project has finished the work we will promote educational values that emphasises preserving the environment and keep it clean. We will protect the environment for the benefit of our present and future generations.*  
(see Appendix 5b)

Besides the management and care-taking role described above, the teachers also saw a communication role for the SGB when they stated that “the school and SGB members are having a responsibility to inform the community about the programme and its importance” (see *Appendix 1a*).

### **3.5.2.3 Interests and contributions**

According to the School Governing Body lack of education hampers economic and social development, which triggers a vicious cycle that contributes to unsustainable resource use and environmental degradation. The School Governing Bodies of the two schools seemed to have an interest in the greening project as it helps learners and the communities develop a better understanding of a healthy population and safe environment. They were concerned about the school environment being safe and healthy, and emphasized for example the importance of fencing, as indicated by the statement of this SGB member who said “*There is a need of a strong fence and water taps so that what is planted at the school garden is protected from being eaten by animals and there is enough water for everything done at school*” (See **Appendix 5b**). They also saw the school greening project as developing schools, not only as centres for academic learning, but also as supportive venues for the provision of essential health education and places to develop knowledge of good agricultural practices and food security that could benefit the parents and the community. The School Governing Body’s interest was therefore to have a school that could also benefit the community. As indicated above, the School Governing Body had a number of *contributions* towards the successful functioning of the greening projects. They had a management and caretaking contribution, especially when the schools were closed, and after the project ended to ensure that the gardens continue successfully. They also had some understanding of environmental issues which could be shared with learners and teachers. The teachers also thought that the SGB had a communication contribution which could facilitate communication between the school and the community.

### **3.5.3 Learner’s knowledge, roles, interests and contributions**

#### ***3.5.3.1 Knowledge***

Learners indicated that a source of food in rural areas was from gardens, and expressed a need for knowledge and skills on how to plant vegetables, fruit trees and indigenous plants (see **Appendix 1b and 2b**). They associated trees with wind protection, as they indicated that the greening project should help the schools to plant indigenous trees that can protect classrooms from strong winds (see **Appendix 1b**). They also showed knowledge of uses of plants in the community, and according to the

learners there are various ways of using indigenous plants and trees in rural communities for example trees are used for fencing, building kraals for livestock, plants are used for medicinal purposes and to beautify homes.

They also showed knowledge of the threats to plants, and of strategies to better manage the gardens. For example they said that “the school needs water tanks and taps so that clearing and watering of plants can be done regularly”, and “there is a need of a strong fence and water taps so that what is planted at the school garden is protected from being eaten by animals ...” (see *Appendix 1b, and 2b*).

According to learners interview in the Natural Science Learning Area includes environmental education and learners practice what their teachers taught them in the school garden. One learner stated that “since environmental education is about life and living it is important for learners to understand how to protect indigenous plants and to keep the world beauty [beautiful] as it will be led by us tomorrow”. This shows that learners have knowledge of the links between the gardens and the curriculum, and the purpose of learning about the environment in schools. This also showed that learners have knowledge of what needs to be taught in schools, and that the gardens could be used for a resource during teaching and learning (see *Appendix 2b*). The learners interviewed expressed considerable variation in their understanding of the greening project as a way of providing parents or community members with employment, knowledge and skills on how to cultivate and grow plants on their own (see *Appendix 2b*). They saw that the greening project is encouraging values to care about indigenous plants and food gardens, which is a source of nutritious food for people.

### **3.5.3.2 Roles**

According to the learners it is important for them to have knowledge and skills for planting vegetables, fruit trees and indigenous plants because it is their role and responsibility to take care of them at home and at school for example, they are involved in watering. Learners involved in the interviews all come from rural

communities where most of the food eaten in their households comes from the garden. From the interviews, it seems that learners see their role as one where they transfer knowledge by taking what they are learning at school to their homes to improve home life and to assist parents (see *Appendix 1b and 2b*).

### **3.5.3.3 Interests and contributions**

Learners' interviews showed that they were interested in the greening project because it is where they learn more about indigenous plants, fruit trees and vegetables for health (appendix 1b). They mentioned a number of fruits and vegetables that they like, for example *Amagquzu*, Mango, Granadilla, *Intebe* and *Amaqunube*, etc. (see *Appendix 1b*). They mentioned wild plants, which were used by their grandmothers and their mothers as food in rural communities like *Isigwampa* and *Ilaxa*. Learners indicated that they like indigenous plants and trees, fruit trees and vegetables because when you eat them you “get a healthy life” (see *Appendix 1b*).

Learners were also interested in the gardens for their value in beautifying the surroundings. During interviews learners of Ntlalontsha (appendix 2b) mentioned a need for evergreen trees, shrubs, a flower garden, a lawn with ground cover, fruit trees and indigenous plants to beautify the school and to be used for medicinal purposes. Both learner interviews reflected an interest in trees to surround their school for protection of the school against the strong winds and hail storms, and to have shade to protect cars and learners on sunny days. One of the interviewees suggested that the school should have fruit trees so that learners could buy fruit produced in their school, and so that the trees and flower garden could attract birds which can be used as a resource during teaching and learning and to beautify the school (*Appendix 2b*).

Learners were also interested in the gardens for their wider contribution to the community. During interviews learners mentioned that they are interested in the greening project because parents of the surrounding communities will be employed and they are going to get money, knowledge and skills on how to plant trees and vegetables. They were also interested in the garden for its educational value, as one

learner said that they practice and implement what their teachers taught them at school (see *Appendix 1b*), and others mentioned how the garden can be a resource for teaching and learning. Learners mentioned that the gardens also provided food for learners. During sports days learners cook vegetables taken from the school garden. Both schools used their garden for economic purposes and to extend the feeding scheme in the schools. Parents support the school financially by buying vegetables from the school garden. From the discussion above, learners also have a *contribution* to make to the school greening programme, as they can share knowledge and skills with their parents and other community members.

Through participating in the gardening practices (e.g. watering and planting) they can also help to improve the school and contribute to food production for learners on for example the sports days.

### **3.5.4 Educator's knowledge, roles, interests and contributions**

#### **3.5.4.1 Knowledge**

The teachers interviewed indicated an understanding of some aspects of the Constitution of South Africa (Act 108 of 1996 Section 28), which states that everyone has the right to demand that the environment is not detrimental to their health or well being (see Section 2). For example, when talking about the Constitution, Mrs. Msuthu mentioned the need to involve the Sangomas and traditional healers to help them take care of the environment. According to the teachers of Ncura J.S.S. (see *Appendix 1a*) the school has a problem of water scarcity. Rivers are far away from the community and as a result plants grow slowly in their gardens. They hope that the greening project is going to assist in bringing water closer to the community. As teachers are the implementers of the curriculum they showed knowledge of the curriculum and its requirements. They mentioned that environmental education is part of their lessons and all Learning Area Statements reflect the principles and practices of social justice, respect for environment and human rights (see *Appendix 2a*). They also showed knowledge of curriculum integration, as shown by this statement by Mrs. Mtantatho

“When planning, integration takes place in our lesson plans and in that way we are able to share our understanding around environmental education”.

They also showed knowledge of management practices associated with the gardens, and indicated that it is the responsibility of the SGB to protect the school by involving the community and learners in protecting the school. From their experience there is no vandalism in their school and community members are supportive in managing their school. Teachers also had knowledge of the economic value of the gardens. During interviews educators indicated that the greening project will assist the school during fundraising, for example they will sell seeds, plants, fruit and vegetables from their school garden (see *Appendix 2a*). They stated that when the school nutrition programme is taking place, mothers will cook vegetables taken from the school garden instead of buying them from the local business people, as stated in this way by Mrs. Mtantatho “The feeding scheme project will benefit from the greening project because fruit and vegetables will be taken from the school garden” (see *Appendix 2a*).

#### **3.5.4.2 Roles**

During interviews one of educators indicated that they integrate environmental education into their Lesson Planning, and in that way they are able to share their understanding about the environmental education (see *Appendix 1a*). This refers to their curriculum development role. As educators are the implementers of the curriculum it is their role to work together with people that have knowledge about plants that they have at school for example Sangomas and Traditional healers. One of the purposes of working with people who understand plants is to get more knowledge about the functions or use of plants and their local names. Teachers also have a role in identifying what is needed, and in managing the activities that take place in the gardens as one teacher mentioned that “One of the most important things in our school is the practice of ploughing plants and taking care of what is in the garden and school”. In the interviews teachers identified the following things that needed to be done to ensure successful gardening: the types of plants that are needed in the school; the water system needed to support the gardens, different roles for different groups (e.g. SGB and Sangomas). They also had a role of ensuring communication between the school and community, as expressed by one teacher who said that the school

should “workshop community people about how to keep environment clean ... [and] ...ask the Municipality to provide people with toilets” (see *Appendix 1a*). However, teachers seemed to want to share this role with the SGB, as Miss. Msuthu mentioned that it is the role and responsibility of the school and SGB to inform the community about the greening programme and its importance.

#### ***3.5.4.3 Interest and contributions***

According to Mrs. Ntola (see *Appendix 1a*) their interest in the greening project is to beautify the school with evergreen trees, to protect the school from strong winds, to get shelter to protect vehicles in the parking zone and to have school garden full of plants for the school nutrition and economic purposes (see also *Appendix 2a*). She further explained that in their Circuit educators are interested in promoting teamwork and to assist the disadvantaged schools by giving them seeds from what they are able to produce at school. Educators believe that education is the primary agent of transformation towards sustainable development, increasing people’s capacities to transform their visions for society into reality. Educators hope that the greening project will assist in developing school grounds by fencing, surrounding school grounds with trees, planting evergreen grass and building a ground to accommodate all types of sporting activities. Both educators and learners also expressed their interest in the gardens as these could be used as a resource for teaching and learning and to attract animals like birds, and thus for addressing aspects of the curriculum.

One of the interests of educators was to address the water problems by requesting SANBI to provide the school with borehole and water taps or any form of water that would help to maintain plants and keep the school green. Both educators and learners indicated their interest in the school greening programme for extending the school nutrition programme and fundraising purposes. The educators interviewed also expressed their interest in building stronger community relationships and addressing community issues through, for example, workshopping community members about how to keep the environment clean, by fencing rivers and requesting the Municipality

to provide every home with toilets with running water to avoid diseases like cholera, diarrhea and others.

This analysis shows that educators have wide interests in school improvement projects such as gardens, which are not only curriculum related. Teachers interests seem to be broader than just teaching the curriculum, and are also oriented towards the well-being of learners and the community (as shown by the economic interest in the gardens, and also their interest in getting water to the school). In the interviews they said they strive to improve the quality of life of the learners and community now and in future. They said that they needed indigenous plants so that they can be used to cure diseases and to help those that use them to make medicine. Educators mention a need for indigenous plants to cover or protect school grounds against soil erosion and to make the environment beautiful (see *Appendix 2a*). They also wanted to, during Heritage Day; teach learners more about indigenous plants and their beliefs. From the above, it would seem that teachers have various *contributions* to make which include: teaching learners and broadening their knowledge of gardens, plants and their value in and for the community and a better quality of life; drawing on the knowledge of others (e.g. *Sangomas*) in the school; helping to manage and plan for the establishment and maintenance of the school gardens; building links between the school, community and other structures such as the municipality; and contributing to the well-being of learners and the community more broadly.

### **3.5.5 Ward councillor's knowledge, roles, interests and contributions**

#### ***3.5.5.1 Knowledge***

During the interview with the ward councillor (see *Appendix 3*) it appears that local people of ward 08 are facing a challenge of veld fires, soil erosion and shortage of water, reflecting his knowledge of environmental issues. He believed that “People need to be informed about land care and how to practice organic farming and water conservation appropriately”. He also showed knowledge of over-exploitation of natural resources when he said that “resource such as grass and trees are exploited by both people and animals”, and he showed knowledge of how to resolve such issues by

stating “As community members we need to practice rotation of crops and grazing of animals in camps, prevent fire and stop deforestation, [and] erect anti-erosion walls” (see *Appendix 3*). He went on and said, “Although people accepted Greening the Nation project as an important activity in their community and the fact that they believe it improves their environment it helps people to get employment”, showing his understanding of the link between the environmental aspects and the employment / poverty relief aspects of the project. He emphasised the importance of giving the responsibility to the local leaders and the community to take care of environmental issues for future generations. This means that people should be trained to increase production and they need to understand social or environmental consequences.

He also showed knowledge of facilities, projects and programmes that were available to the community to assist with responding to their development needs. For example he indicated knowledge of the Ixabiso Lomntu hospice which takes care of HIV/AIDS affected and infected people, agricultural days and agricultural extension services, the 4H clubs, and the O.R. Tambo District Municipality and its role in water delivery.

#### **3.5.5.2 Roles**

According to the ward councillor (see *Appendix 3*) he believes that his role is to assist the community and the school by applying for water in OR Tambo District Municipality so that they are supplied with water during drought and when they have big occasions at their schools. The ward councilor went on and explained that he organized HIV/AIDS programmes and Ixabiso Lomntu hospice in his ward in order to take care of infected and affected people. He also organizes events where the agricultural officer advises people on sustainable farming and products that must be used as well as pest insecticides to control their gardens (see *Appendix 3*). From this, it is clear that this ward councillor is fulfilling one of the main functions of ward councillors which is to facilitate service delivery to communities, and to organize and manage programmes for development.

### ***3.5.5.3 Interests and contributions***

The ward councillor is interested in doing advocacy among its subjects to avoid over utilization of natural resources in order to take care of their environment, as he indicated that some natural resources that are available in the ward have been over-exploited for example, grass and trees. He provided proposed solutions to these issues. He also has an interest in bringing more community projects to develop his ward and to assist people to survive independently by improving the socio-economic status of his people. He wants to see more people of in his ward taking care of the environment in order to bring about change that can result in self-employment.

From the above analysis, it is clear that the ward councillor can make the following *contributions*: he can provide information on solutions to environmental problems, he can link community members to existing projects and programmes that can support them, and he can assist the community to get water through his links to the O.R. Tambo Municipality's water supply system.

### **3.5.6 SANBI's knowledge, roles, interests and contributions**

#### ***3.5.6.1 Knowledge***

The employees of SANBI had knowledge of what is expected of them in the Greening of the Nation Project like landscaping, how to plant trees or plants, which plants are to be planted, names of plants to be planted, security measures for the workers, time frames for the project, programmes to be run for the community members for example a workshop of skills development, etc. They had knowledge which ensures that all relevant stakeholders and beneficiaries should actively participate in decision-making processes regarding the implementation of the SANBI project in their area (see **Appendix 7**). They had experience of identifying suitable candidates from the community to fill the limited temporary job opportunities. They were transparent and democratic in exercising their work for example all people were allowed to visit their workplace and to ask questions of concern in order to understand the project.

### **3.5.6.2 Roles**

The main role of the SANBI employees was to landscape the schools and assist in the implementation of the greening process, for example planting of trees and vegetables. In each school local people were employed and trained on how to plant trees and vegetables. The other main role was to assist schools to maintain what has been done by SANBI until the end of their contracts, after which the school was to take over the responsibility of managing the school gardens, implemented by the project.

### **3.5.6.3 Interests and contributions**

The interest of SANBI employees was to see to it that the project comes to an end with the people having gained knowledge and skills in environmental education issues. They were interested in the sustainability activities of Greening the Nation Project in the schools and communities where they were working. They were also interested to see how the schools are using greening in their curriculum in the teaching and learning situation. As a result they conducted some workshops to empower both educators and learners by using the food garden available to the schools as a source of learning. The project was working towards the following targets in all occupational categories with respect to employment:

- 60% women
- 20% youth (between 18 and 25 years old)
- 2% disabled

The reason for the percentages above was to empower more women than men to fight poverty and to develop the knowledge and skills of women and youth, as they are primarily responsible for feeding families, and they are in the majority but not in terms of employment. SANBI therefore also had a political transformation and empowerment interest. From the above SANBI made an important *contribution* by providing and planning the gardens in the schools, and by educating schools and communities to sustain the gardens after the project. They also made a contribution to the empowerment of women and youth.

### **3.5.7 Department of Agriculture knowledge, roles, interests and contributions**

#### ***3.5.7.1 Knowledge***

In the Department of Agriculture Mr. Mpukwana acknowledges that “we need to empower and develop a sense of ownership among the community members by improving their capacity to address environmental and agricultural issues in their own communities” (see **Appendix 6**). He went on to say that as extension officers they know the importance of agriculture and environmental education in changing the life of people. According to him people are lazy to use the land which is available to them properly, and as a result they depend on those using the land effectively.

#### ***3.5.7.2 Roles***

According to Mr. Mpukwana from the Department of Agriculture their role is to empower community members on agricultural practices and farming and also to assist in the Greening of the Nation Project. The department’s role is to supply a certain number of schools with seeds of good quality and to workshop the participating schools in effective utilization of the products. If the community needs help the Department of Agriculture has a responsibility to assist at all costs if possible. Mr.Mpukwana also indicated that their role is to provide the community members with training, knowledge and skills about agricultural practices, and to advise people about anything related to agriculture and farming. Another role is to visit and support projects that deal with agricultural practices (see **Appendix 6**).

#### ***3.5.7.3 Interests and contributions***

The interest of the Department of Agriculture is to see schools and communities developing their agricultural activities. According to Mr. Mpukwana their interests are to alleviate poverty, to develop knowledge, skills, values and positive attitudes amongst community members. They are interested in seeing the number of people practicing agriculture increasing and empowered communities who are able to do things themselves. From the above analysis it would seem that the Department of Agriculture can make the following *contributions*: Sharing knowledge of appropriate

farming practices, helping schools to obtain plants for the gardens, and empowering people in the community to practice agriculture.

### **3.6 HOW STAKEHOLDER PARTICIPATION ACTUALLY WORKED**

As indicated in Section 2 and in the stakeholder analysis above, Ncura J.S.S. and Ntlalontsha J.S.S. stakeholders have a range of interests in the school greening programme. These include:

- An educational interest (to develop the knowledge, skills and values of the learners and the community),
- A school improvement interest (to beautify the school),
- A resource interest (to provide resources for teaching and learning),
- A poverty relief interest (to feed children and extend the school nutrition programme),
- A community well-being interest (to strengthen links with, and development in the community).

Other stakeholders share these interests, but their interests are also more specific. For example, the ward councillor's interest was to address development issues; while the Department of Agriculture was to address the issue of agricultural practice in the community more broadly. Teachers acknowledged that these stakeholders are needed to help with the gardening programme for example, they identified that water provision was necessary, and that they could draw on and work with the Sangomas and traditional healers to teach learners about cultural use of plants. The analysis also shows that each of the stakeholders can make different *contributions* to the greening of schools, and the Learning Outcomes that can be achieved through the curriculum. If a school wants greening project to work effectively, that school needs to be able to mobilise and manage the potential contributions of the different stakeholders. In the greening of the two schools, problems were experienced with fencing of the schools at the start of the project. Both schools also experienced problems with water. As mentioned in Section 2, and in this stakeholder analysis, water is a huge problem in Bizana schools and the Department of Education didn't have the budget to help the

schools selected for greening to organize water for the plants, as their main interest is the training of teachers and provision of books to the schools.

In the first steering committee meeting the service provider (Ms. F. Dlongolo) announced that the project cannot green schools where there are poor or no fences and that this would also delay the supply of fruit trees to schools. Through working in a partnership, the Mbizana Municipality decided to fence five schools for the greening project and Mbizana Trust on the other hand selected five schools in the year 2005 to be fenced so as to assist the project. The project decided to green nine schools in the year 2005 and those schools were 100% fenced. Ntlalontsha J.S.S. and Ncura J.S.S. were in the list of schools to be greened in the year 2006 due to the problem of fencing. In the meeting I attended with the project steering committee on 28 September 2005, Mbizana Trust promised to fence Ntlalontsha J.S.S. and Ncura J.S.S. before the end of the year. This shows that when different interests are brought together, progress can be made.

When greening was taking place at schools the steering committee agreed to involve teachers, learners and parents for learning purposes, skills, maintenance and sustainability. Parents were able to provide information on the kinds of plants that they would like the school to have which included: *Umhlonyane, Umhlaba, Ingcwelani, Iboza, Usalenxiweni, Ikolofile, Uphantsi kwesibaya, Idolo lenkonyana, Ikhala, Umhlontlo, Umsintsi, Inqwebebe, Isixhonxo, Ibhucu, Ingeva, Isiqalaba, Udubu, Umatshitshiti, Intolwana, Indoda emnyama, Impunye, Umthathi, Umlungumabele, Amasethole, Umfutho, Umsintsi, Isikhomakhoma*. Through consulting the parents, and through attending to their interests, the parents in the two schools were fairly keen to help the school with whatever they could do because they said that the school belongs to them and their efforts would be for the future of their children. This is another example of how different interests can be brought together. In this case, the schools were drawing on the parents' knowledge of plants, and their interest in the education of their children. Although both schools did have water tanks there was not enough water for drinking and watering of the plants. Both schools had the common problem of not being able to adequately maintain things like water tanks and other equipment in the school due to the failure of the Department of Education to give them enough funds for maintenance and monitoring.

In a meeting with parents, educators and learners it was suggested that the Councillor and the Headman should attend all the meetings so that they could be informed of the new developments, the shortage of water supplies and other needs of the school. By doing this, they were planning to mobilise the possible contributions of the Ward Councillor and the Headman.

The school gardens at the two schools were planted in August 2005. A few parents were involved during the process of ploughing the food garden and some of parents helped by supplying the school with kraal manure. Learners of grades 7, 8 and 9 were part of the process of planting for the purpose of teaching and learning in the food garden. Food plants that were planted included potatoes, pears, cabbage and spinach. The teachers assessed the learning that was taking place in the food garden, and gave learners marks according to their work as part of an assessment activity focusing on practical work. This shows that the teachers and learners interests in *learning* were also being attended to in the project.

### **3.7 CONCLUSION AND RECOMMENDATIONS**

This small-scale study of the knowledge, interests, roles and contributions of a variety of stakeholders associated with the SANBI School greening projects in two schools has shown that there is potential to make use of the knowledge and contributions of different stakeholders in achieving school improvement and Learning Outcomes in schools. As discussed in sub-section 3.3 above, a stakeholder analysis has the potential to relate public contributions to an understanding of environmental issues and how they relate to learners' everyday lives, and ultimately to the Learning Areas. In this study, a better understanding of the links between public contributions, environmental issues and learners' lives was gained, but not enough about how this links to the Learning Areas.

In sub-section 3.3, I drew on literature by Sisitka (2006:35) who stated that "... differences exist amongst stakeholder groups ... stakeholder groups are not homogeneous ... all stakeholders are not necessarily organized in formal groups, and ... even when stakeholders are organized in a group, they may not have the capacity

to effectively articulate and represent their interests”. This study has shown that differences exist amongst the stakeholder groups, and that they are not homogenous, and that stakeholder groups are not necessarily organized in formal groups. It did not assess whether stakeholders were fully and effectively representing their interests, but it did give an indication that the identified interests were relevant, as the schools had already made use of stakeholder assistance

**This study recommends that the two schools make use of the different knowledge, interests, roles and potential contributions of the stakeholders for further development and sustainability of the school greening project.** This will take further the progress that is already being made in this regard.

This study identified the *educational interest* of the schools and the community as it relates to school greening. It also identified some of the *knowledge* held by various stakeholders involved in the school greening project, and their potential *contribution*. It did not, however, provide insight into the teachers Lesson Plans, and the teaching and learning activities that are needed for implementing the National Curriculum Statement (see Section 2). It did not give much insight into *how* teachers are teaching using the school gardens for teaching, or *what* learners are learning when the school gardens are being used for teaching and learning. **The study recommends that the educational aspects (teaching and learning) associated with the school greening project be investigated further.** This will be the focus of the next section of this research portfolio (see Section 3).

## APPENDIX 1 (a)

### Interview with Ncura J.S.S. Educators

1. Date of interviews: 25 May 2005.
2. Place where interviews were conducted: Ncura J.S.S.
3. **Names of educators participating in the interviews:** Mrs.Nomanene Ntola, Miss Buyiswa Msuthu and Vuyokazi Mtantatho.
4. Ncura J.S.S.has been selected by the Department of Education to participate in the greening programme that is to be done by SANBI. What are your interests as a school in the greening programme?  
Mrs. Ntola (the deputy principal of the school),: The school needs to be beautiful with ever green trees which are indigenous, medicinal plants, trees to protect school from the strong winds, to protect vehicles in the parking zone and garden full of plants for school nutrition and economic purposes. She further explained that Ncura J.S.S. is a centre for a cluster of schools therefore greening programme is going to help in the development and teamwork for those schools, which are disadvantaged. Education is the primary agent of transformation towards sustainable development, increasing people's capacities to transform their visions for society into reality.
5. Explain the things you like to have when greening is taking place?  
Miss Msuthu: As our school was ones blown out by strong winds we would like trees to surround our school, strong fence to protect our school, sport grounds to be leveled and having good grass like stadiums and grounds must accommodate all types of sporting activities.
6. How are you involving environmental education in your lesson plans?  
Miss Mtantatho: When planning, integration takes place in our lesson plans and in that way we are able to share our understanding around the environmental education. One of the most important things in our school is the practice of ploughing plants and taking care of what is in the garden and school.
7. How are you prepared to maintain and implement your plans on greening the school?  
Miss. Msuthu: The school and SGB members are having a responsibility to inform the community about the programme and its importance's. The school is planning to buy water tanks and to request SANBI to provide school with water taps or any form of water that would help to maintain plants and keep school green.  
  
According to the Constitution of South Africa (Act 108 of 1996 Section 28) everyone has the right to demand that the environment is taken care of. All persons must take care of the environment. Any person who harms the environment must take reasonable measures to avoid or minimize such harm even if the harm was authorized by law. As a school we need to inform/advise the Sangomas and traditional healers to take care of our indigenous plants and to work together with us because they know a lot and can give us information on medicinal plants.
8. How is greening programme going to help your school?  
Miss. Mtantatho: At Ncura J.S.S. garden plants help the school on fundraising, during sport days they cook the vegetables from the school garden and they practice agriculture. The feeding scheme project will benefit from the greening project because fruit and vegetables will be taken from the school garden.
9. What environmental challenges are confronting teachers and learners at school?

Mrs. Ntola: The school is facing a problem of having water far away and animals from the community are damaging plants from the food garden. It is high time for the school and SGB members to workshop community people about how to keep environment clean e.g. fencing rivers and ask the Municipality to provide people with toilets.

## **APPENDIX 1 (b)**

### ***Interview with Ncura J.S.S. learners***

1. Date of interviews: 25 May 2005.
2. Place where interviews were conducted: Ncura J.S.S.
3. **Names of learners participating in the interviews:** Lwandile Nomdlembu, Asanda Mnisi and Nontsumane Nomvelo.
4. All the learners were doing grade 09.
5. Ncura J.S.S. has been selected by the Department of Education to participate in the greening programme to be done by SANBI. What are your interests in the greening programme?  
Lwandile: Ncura J.S.S. should be surrounded by indigenous trees, strong fence and have a beautiful garden with plants.
6. Explain the things you think are important when greening is taking place in your school?  
Asanda: All learners come from rural communities where every food eaten comes from the garden and therefore it is important for learners to be given skills for planting vegetables, fruit trees and indigenous plants. The school needs water tanks and taps so that cleaning and watering of plants is done regularly.
7. How is environmental education used in your lessons during teaching and learning?  
Nontsumane: In natural science there is a lot of environmental education and we practice what our teachers taught us in the school garden.
8. Which plants do you like most?  
Lwandile: We like indigenous plants and trees, fruit trees and vegetables because from them we gain healthy life. The plants/ fruit that we like most are oranges, apples, pears, mangos, granadilla, amaqunube, amagquzu, amakati, etc. Vegetable that we like are umambumbu, intebe, irwaba, cabbage, spinash, etc.
9. Why it is important to have a garden with plants every time?  
Asanda: At Ncura J.S.S. garden is used for economical purposes and school feeding scheme.  
  
During sport days we cook vegetables taken from the school garden and our garden is used as a resource during teaching and learning. Parents support us financially when we are preparing for sport by buying vegetables from our school and we use that money to buy food.
10. What should be done to maintain the garden at school?  
Nontsumane: There is a need of a strong fence and water taps so that what is planted at the school garden is protected from being eaten by animals and there is enough water for everything done at school.

## APPENDIX 2 (a)

### *Interview with Ntlalontsha J.S.S. Educators*

1. **Date of interviews:** 25 May 2005.
2. Place where interviews were conducted: Ntlalontsha J.S.S.
3. **Names of educators participating in the interviews:** Miss Sontube Nomvume and Miss Mphayise Ntombifuthi.
4. Ntlalontsha J.S.S. has been selected by the Department of Education to be one of schools participating in the greening programme by SANBI. What are your interests as a school in the greening programme?  
Nomvume: At Ntlalontsha J.S.S. there is a need of ever green trees, plants like shrubs, flower garden, and lawn to have ground cover, indigenous trees and fruit trees. One of our main needs is trees to surround our school for protection against strong winds and to have a shade to protect cars and learners during sunny days.
5. What things do you need when greening is taking place in your school?  
Ntombifuthi: We suggested that our school should have fruit trees and evergreen trees to surround school grounds and the school. We need flower garden to attract birds which we can use as a resource and to beautify our school.
6. Is environmental education part of your lesson plan?  
Nomvume: Yes, all the Learning Area Statements reflect the principles and practices of social justice, respect for the environment and human rights. They specify minimum requirements for all learners and that RNCS should adopt an inclusive approach (RNCS overview, 2005:10).
7. What are your plans in greening the school?  
Ntombifuthi: We need water tanks and we are planning to talk to the ward councilor about water taps for our school so that learners do not fetch water from the river. We need a strong fencing for our garden, equipment and indigenous plants like medicinal plants.
8. How are you going to make sure that you maintain your plans on greening?  
Nomvume: It is the responsibility of the SGB to protect the school, to involve the community and learners in securing the school. From our experience there is no vandalism in this school and people of this area are supportive in managing their school.
9. Why do you think to plant indigenous plants in your school?  
Ntombifuthi: We need a healthy environment to live healthy lives: clean air and water, safe living areas, sufficient and healthy foods.  
  
We all strive for an improved quality of life now and in future. Our brothers and sisters affected by many diseases like HIV/AIDS which we believe it can be cured using the indigenous plants. We need indigenous plants to cover or protect soil against soil erosion and to make school beautiful. During the heritage day we need to teach our learners more about indigenous plants and our beliefs on them.
10. How is greening going to help your school?  
Ntombifuthi: Greening will assist us as a school during fundraising period for example we will sell seeds, plants and flowers from our garden.  
  
When school nutrition programme is taking place our mother will cook vegetables taken from our school garden instead of buying from the local business people.

11. What environmental challenges are confronting learners and teachers at school?  
Indigenous forests are far from school; our school is exposed to strong winds and there is no water supply in any form (Nomvume).

## **APPENDIX 2 (b)**

### ***Interviews with Ntlalontsha J.S.S. learners***

1. Date of interview: 25 May 2005.
2. Place where interview were conducted: Ntlalontsha J.S.S.
3. **Names of learners participating in the interviews:** Phumza Jabavu, Zungu Vuyisile and Siphokazi Nohlaba.  
Grade 09 learners: Zungu Vuyisile and Siphokazi Nohlaba  
Grade 08 learners: Phumza Jabavu.
4. Ntlalontsha J.S.S. has been selected by the department of Education to be one of the schools to participate in the greening programme to be done by SANBI. Is the school interested in the programme? If yes, what are your interest areas?  
Vuyisile: the school is happy about greening programme because parents will get employment so that they can pay school fees and they will be able to feed their families. People from the surrounding community will get more skills on how to plough plants and how to take care of them. Trees that will be planted to surround the school will protect the school buildings from strong winds and will provide shelter from the sun.
5. What are the important things that need to be considered when greening is taking place?  
Siphokazi: School grounds should be leveled and it must have evergreen grass with trees on each sides. In front of the class rooms there should be flowers and beautiful plants. School garden should have a water tap for watering plants and a strong fence to protect everything at school. From being damaged by animals.
6. Why do you think that environmental education should be part of your lessons?  
Vuyisile: Environmental education should be part of the lessons because for learners to understand and respect the environment they should be taught how to care about plants and animals. Since environmental education is about life and living it is important for learners to understand how to protect indigenous plants and to keep the world beauty as it will be led by us tomorrow.
7. Which plants do you like most for your school?  
Phumza: Ever green plants and garden plants are important to beautify the school and they can be used as food.  
  
Long trees are needed to protect the school from strong winds in winter and to get shade when hot during sport days. We need to plough plants like umambumbu, irwaba, amagquzu, amaqunube, etc.
8. Is there a need of having a garden in a school?  
Siphokazi: yes, because we sell plants from the garden to get money and the same plants are used as a resource during teaching and learning. During sport days we use the same plants for cooking.

9. What should be done to keep the school and a garden green?  
Vuyisile: At present learners fetch water from the river and that cause everybody to be responsible to what he/she has planted in the garden. To keep the school and the garden green we need to have taps of water and water tanks.
10. What are your dreams about greening programme in your school?  
Siphokazi: All school grounds must be leveled with a green grass and be surrounded by trees. We need a small stadium for to play all sport codes.

### ***APPENDIX 3***

#### ***Interview with Ward Councillor***

1. Name of the interviewee: Monwabisi Mfingwana
2. Place where interview was conducted: Ncura J.S.S. (Ward 08)
3. Date: 21 March 2006
4. Position of the participant: Ward councillor of Ward 08
5. Is there some issue or risk associated with the biodiversity and ecosystem services which communities have focused on?  
Yes, veld fires, soil erosion and animals such as sheep and goats.
6. Are some natural resources being over-exploited in your ward? How? What suggestion do you have to control over use of natural resources?  
Yes, resources such as grass and trees are exploited by both people and animals. As community members we need to practice rotation of crops and grazing of animals in camps, prevent fire and stop deforestation, to erect anti-erosion walls.
7. Is your area running short of water? What plans do you have as a councilor to assist?  
Yes, as ward councilors we have a role to apply for water at OR Tambo District Municipality to supply us with water during droughts and when we have big occasions at our schools. Delivery of water to the wards is the responsibility of OR Tambo District municipality.
8. Should we really be bothered about global warming?  
Yes, we should be bothered because there are gradual changes in weather that might end up affecting our lives negatively i.e. not with standing the heat exposed on us by the sun etc.
9. What strategies are you using in your area to minimize/control the spread of HIV/AIDS?  
HIV/AIDS programmes are occasionally held in our ward. An Ixabiso Lomntu hospice also takes care of infected and affected people. It is located at Ndakeni Village.
10. How do you promote an understanding of sustainable agricultural practice and emphasizes the sustainable use of natural resources and management of the environment?  
We do have agricultural days where agricultural officer advise people on sustainable farming and products that must be used and insecticides.

11. Are there community projects to sustain environmental learning/education in your ward? If there are any, please name them and their roles and how they assist the community people?

Yes, projects like Greening the Nation and 4 H clubs. These projects assist people by supplying knowledge on how to grow plants and how to survive independently. People get employment opportunities and their socio economic standards are improved. These plants beautify our schools. The environment becomes acceptable to all.

12. Is greening helpful in your ward? How?

Greening is very much acceptable because it uses our natural plants that are found in our forests and are indigenous. It improves the environment of our places. It creates employment opportunities among our communities. It improves socio-economic standards of our communities.

#### **APPENDIX 4**

##### ***Interview with community member***

1. Date of interviews: 26 May 2005.
2. Place where interview was conducted: Ntlenzi location
3. Name of the interviewee: Mrs. N. Njeken
4. What are the environmental problems that affect the community of Ntlenzi including areas that benefit from Ntlenzi Mountain? People are cutting and digging trees and plants in our forest as a result we lose all the important trees which are indigenous. There is overgrazing, soil erosion and our water is not clean. People are suffering from diarrhea because we do not have toilets and we are facing poverty. Our sons and daughters are unemployed and we hope that Greening the Nation Project will help by giving our children employment.
5. Now that there is no electricity what do you use to cook food? In order to cook food we collect wood from the forest as a source of electricity. We are facing a challenge of rape when we collect fire wood in the forest for example my daughter was raped and killed at Ntlenzi forest by unknown man when she was collecting wood for fire.
6. How is the environmental education important to you and your community?  
Environmental education is important to us but we need workshops on how to keep our environment clean, how to avoid deforestation and soil erosion. We depend on plants and trees to survive because from them we get medicine, fruit and vegetables. The traditional healers use them to treat/help the sick people. We use trees to build our houses and therefore we can not live without them.
7. Which plants and trees do you like most?  
We grow up eating indigenous and wild plants I therefore like umambumbu, intebe, umsobo, ukakayo, irhwaba and usololentaka. As community people we need a workshop on cultivation, farming and how to control the use of indigenous plants. There are important plants that we have lost at Ntlenzi forest like iqwili, ixonya, impepho, intolwane, izichwe and iswati.
8. What should be done by SANBI during greening so that you maintain the food garden at school and in the community?

SANBI must employ our children, teach our children how to live without being employed, how to cultivate and care about our indigenous trees and plants. The headman must play the role of managing and maintaining the law and order so that we live in a free society with out fear of the unknown.

#### ***APPENDIX 5(a)***

##### ***Interview with SGB of Ntlalontsha J.S.S***

1. Date of interviews: 26 May2005.
2. Place where interviews were conducted: Ntlalontsha J.S.S.
3. Names of SBG members participating in the interviews: Mr. P.T. Msana, Mrs. L.N.Shibase, Mrs.N. Gqamane and Mrs. N. Siyocolo
4. Ntlalontsha J.S.S. has been selected by the Department of Education to participate in the greening programme to be done by SANBI. What are your interests in the greening programme?  
N. Siyocolo: We need indigenous trees, strong fence and a beautiful garden with vegetables, plants and fruit trees so that we chase away poverty in our community. We need an assistance to control dongas and littering and employment.
6. Explain the things you think are important when greening is taking place in your school?  
N. Gqamane: We need employment, knowledge and skills on how to live with out being employed by somebody else. It is important for us to have a school with plants and trees that are good for our health so that our learners can care about our environment.
7. How is the environmental education important to you and your children?  
L.N. Shibase: In natural science there is a lot of environmental education and we teach children and allow them to practice what they have learnt in the school garden. N. Siyocolo: According to our culture we use and believe in indigenous plants in our cultural activities. Therefore, we need to go back to our indigenous type of living where we used to live on indigenous plants and fruit. We need to teach our children to take care of the environment and learn not to litter anywhere.
8. Which plants do you like most?  
N. Gqamane: Because we are unemployed we believe and like indigenous plants and trees, fruit trees and vegetables because from them we gain healthy life. The plants/ fruit that we like most are oranges, apples, pears, peaches, plums and amakhiwane. amaqunube, amagquzu, amakati, etc. The wild vegetables that we like are umambumbu, intebe, irwaba, ukakayo etc.
9. What should be done to maintain the garden at school?  
P.T.Msana: There is a need of a strong fence and water taps so that what is planted at the school garden is protected from being eaten by animals and there is enough water for everything done at school. We need resources like spade, rake, watering can and fork spade. As SGB members our role is to develop the school as a whole for the benefit of our society. When the greening project has finished the work we will promote educational values that emphasises preserving the environment and keep it clean. We will protect the environment for the benefit of our present and future generations.

## ***APPENDIX 5(b)***

### ***Interview with SGB of Ncura J.S.S.***

1. Date of interviews: 26 May 2005.
2. Place where interviews were conducted: Ncura J.S.S.
3. Names of SBG members participating in the interviews: M.D. Mvunelo, B. Msuthu, N. Ncumatha and M. Mbooi
4. Ncura J.S.S. has been selected by the Department of Education to participate in the greening programme to be done by SANBI. What are your interests in the greening programme?  
M. Mbooi: We need fully fenced food garden with fruit trees, and vegetables, indigenous plants, beautiful play grounds so that we alleviate poverty in our community. We need seeds so that we encourage other community members to plant their food garden to feed their children.
6. Explain the things you think are important when greening is taking place in your school?  
M. Mbooi: The project is important because our children will be employed; they are going to get knowledge and skills on how to plant trees and vegetables. It is important for us to have a school with plants and trees that are good for our health so that our learners can care about our environment.
7. How is the environmental education important to you and your children?  
N. Ncumatha: In natural science learners learn about plants and animals which are part of environmental education and we teach our learners how to practice farming and how to do food garden. Our lives depend on plants and animals therefore it is important to take care of our environment and to minimize global warming.
8. Which plants do you like most?  
B. Msuthu: Culturally we believe and like indigenous plants trees, fruit and vegetables because from them we gain healthy life and we use them to get medicine. The plants/ fruit trees that we like most are oranges, apples, pears, peaches, plums, grapes, granadilla, mangoes and amakhiwane. The vegetable that we like is cabbage, spinach, carrot, beetroot, etc.
9. What should be done to maintain the garden at school?  
N. Ncumatha: SANBI should supply the school with water tanks and the municipality should supply the school with water taps. As the SGB of the school we are prepared to manage everything done to benefit both our learners and community members. When greening is finished we will promote educational values that emphasizes preserving the environment and keep clean from pollution and abuse. We know that lack of education hampers economic and social development of our country. In our school we practice agriculture every year as a result we have a garden care take that is doing his best for the school and the community.

## ***APPENDIX 6***

### ***Interview with department of agriculture***

1. Date of interviews: 18 March 2005.
2. Place where interview was conducted: Bizana Agricultural office
3. Name of the interviewee: Mr. Mpukwana
4. What are the roles and responsibilities of the department of agriculture in the Greening the Nation project? Our role as the department of agriculture is to empower and develop a sense of ownership amongst the community members by improving their capacity to address environmental and agricultural issues in their own communities. We empower community members on agricultural practices and farming. It is the role of the department of agriculture to supply a certain number of schools with seeds of good quality and to workshop the participating schools. We provide the community members with training, knowledge and skills about agricultural practices and advise where necessary.
5. What are your plans and interest to assist in the project?  
Our interest is to see schools and communities developing their agricultural activities. Our plans and interest is to alleviate poverty, to develop knowledge and skills amongst the community members. We want to see the number of people practicing agriculture increasing.
6. If the department of education seeks assistance in terms of knowledge and skills how can you assist?  
We can assist the department of education by conducting workshops for teachers in the content they need.
7. What are you planning to do to control deforestation in the communities? We are doing campaigns in the communities about management, care and control use of indigenous plants and forests. We motivate the headman and chiefs to assist in the management of forests for the future of our children.
8. Is the SANBI programme not taking your job? No. SANBI is working hand in hand with the department of agriculture to sustain and promote planting of trees and plants. We promote good practices of agriculture so that people became independent and take care of their lives.

## ***APPENDIX 7***

### ***Interview with SANBI supervisor***

1. Date of interviews: 18 March 2005.
2. Place where interview was conducted: Bizana Cultural village
3. Name of the interviewee: Mr. Vuyani Zondani
4. What are your target areas as SANBI?  
Our targets as SANBI are schools, teachers, learners and community members.
5. What are you planning to do to assist the community members?  
We are planning to alleviate poverty by employing community members so that at the end of the project people can survive using knowledge and skills they have gained through the programme. People should be able sustain greening through planting and maintaining their food garden.
6. What are the roles and responsibilities of SANBI employees in the project?  
The employees of SANBI are playing an important role in the project like they identify plants to be planted, do the landscape, plant trees and plants, workshop the community members and monitor the programme. They assist schools to maintain what has been done by both SANBI and department of

agriculture.

7. What are the interests of the employees in the SANBI project?

Employees are interested in employment, knowledge and skills on how to plant Trees and plants. They are also interested to see the schools using greening in the Curriculum during teaching and learning. They are interested to teach and workshop teachers to sustain the Greening of the Nation.

8. How will you assist the schools to maintain their food garden?

SANBI will assist by supplying each greened school with resources like spade, fork, rake, watering can and other garden resources but will not take the responsibility to employ people to look for the school or food garden.

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## **SECTION 4**

### **ACTION RESEARCH**

#### **4.1 INTRODUCTION**

As indicated in Section 1 of the study, I am a Subject Advisor in the Bizana District where I have the task of supporting the professional development of the teachers I work with. In Section 2 of the study, teachers and parents in the two schools identified a number of environmental and curriculum issues. Section 2 of the study reported on the introduction of a new National Curriculum Statement in South Africa and indicated that the professional development of teachers was an issue in the implementation of the curriculum. The curriculum issues reported on by the teachers indicated some uncertainty around the environmental focus of the curriculum and how to implement it. In Section 3 of the portfolio, the stakeholder analysis reported that teachers and learners have a teaching and learning interest in the school greening project which is linked to the implementation of the curriculum. However, no in-depth insight was gained into how this is taking place in the schools i.e. what teachers are teaching using the gardens, or what learners are learning.

In doing this research project (the third small-scale study in this portfolio) I therefore wanted to focus on a research project which would contribute to the professional development of teachers in lesson planning and greening activities in schools. This chapter builds on the analysis of the contextual dimensions influencing teaching and learning in Bizana (reported in Section 2) and the importance of stakeholders' contributions (reported in Section 3). Due to my research focus area I worked mostly with teachers, who are an important group in ensuring that teaching and learning takes place according to the intended policy. The background of my role, and the SANBI project (Section 1), the contextual profile (Section 2), and the stakeholder analysis (Section 3) all provide insight into the broader context in which I carried out this research.

In the first part of this small-scale action research study, I firstly discuss the changes taking place in South Africa's education system, drawing particular attention to the

recent National Curriculum Statement (R-9), and I discuss how environmental education has come to be an integral part of the NCS (R-9). I then review issues associated with lesson planning as identified by NEEP-GET (2004) who worked with a number of teachers to plan lessons. The contextual profile and the stakeholder analysis lay a foundation for the action research study. The useful background knowledge of the two schools and the greening projects in the two schools allowed me to consider researching what had not yet been dealt with, namely the curriculum aspects of the school greening programme (see Section 1). In this study I was able to concentrate on the teaching and learning aspects of the school greening programme.

## **4.2 LITERATURE REVIEW**

### **4.2.1 Curriculum change in South Africa**

In Section 2 the curriculum change process in South Africa was introduced with a focus on policy changes and how environmental education had come to be integrated into the NCS (see also Lotz-Sisitka, 2002). The Section did not comment much on the challenges associated with the curriculum changes. C2005, which represents a direct statement of what a society believes schooling is about, displayed an overt political agenda to guide educational change in South Africa. It also introduced a radical change in thinking about teaching and learning. This was evident in the Minister of Education's foreword in an early promotional document:

The curriculum will begin to integrate education and training incorporating a view of learning which rejects rigid division between academic and applied knowledge, theory and practice, and knowledge and skills.

It will also foster learning which encompasses a culture of human rights, multilingualism and multi-culturalism and sensitivity to the values of reconciliation and nation building (DoE, 1997:1).

As indicated in Section 2, however, this new political agenda was not supported with a statement or strategy on how to support teachers to take up the agenda. As mentioned in Section 2 and in the curriculum review of 2000 (Review Committee, 2000), when the curriculum was introduced, teachers were given only short term training in the form of OBE workshops. This became known as 'OBE training'.

Given the very short time between finalization of the curriculum and its implementation (the curriculum was finalized in 1996 and implemented in 1997), the National Department of Education (NDE) and the various provincial departments of education, were involved in providing what was little more than “crash-course” training for teachers (Review Committee,2000). The cascade model was adopted in the form of a National Training Team with materials produced at national level, which were then passed on to Provincial Training Teams, who in turn passed them on to district officials (like myself). This model sought to cascade the training down through the system. Because of a lack of internal capacity within the Departments of Education, and the complexity and newness of the curriculum this training was sub-contracted to consultants and NGO’s. In the Eastern Cape for example, the IMBEWU project based in the Provincial office, contracted consultants to write training materials for the Eastern Cape. According to the NEEP-GET pilot research project (Lotz-Sisitka & Raven, 2001:20-26), and the Review Committee (2000: 52-55), the quality of training was uneven. The Review Committee report states that

... the cascade model has been widely criticized as an inadequate model for delivering adequate training.... It failed to prepare either officials or school based educators for the complexity of C2005 implementation. In the first instance the ‘cascading’ of information resulted in the ‘watering down’ and/or misinterpretation of crucial information. Secondly, trainers lacked confidence, knowledge and understanding to manage the training process (Review Committee, 2000:55).

Complex issues of pedagogy were reduced to simplistic dichotomies such as ‘teacher-centred’ (an old undesirable practice) and learner-centred (a new desirable practice). Similarly, ‘content’ was replaced by ‘outcomes’, and an entirely new pedagogy and the structure for lesson planning were introduced with minimal support for teachers (Review Committee,2000).

#### **4.2.2 Changes in pedagogy**

One of the more complex aspects of C2005 and the NCS is the change in pedagogy, as it establishes a new framework for how teachers should teach, and how learners should learn. This framework which is committed to learner-centred education was,

according to Kraak (1999), linked to the objectives of People's Education which was part of the struggle for social change against the apartheid regime before 1994.

The following statements are from the National Education Department, '*Curriculum Policy and Model*' publication produced before the policy change (1991) which shows that thinking about learner-centred education was a wider trend than just the social change agenda before the change in government. The extract provides insight into an ambitious pedagogical framework that characterizes learner-centred education.

Effective learning takes place when:

- Pupils are actively involved in learning, either inside or outside the classroom;
- Pupils discover things for themselves by asking questions, investigating and solving problems, experimenting using references;
- Pupils are involved in differentiated learning experiences that are appropriate to their interests experience, needs and level of cognitive development.
- The learning environment is stimulating and non-threatening.
- Pupils should be encouraged to be independent, original and creative thinkers.
- Pupils are individuals who have different needs and learning styles and the curriculum must make provision for this (NED: 1991).

Given that a learner-centred framework was also supported by the People's Education movement, it was a key aspect taken forward into the OBE curriculum. These progressive pedagogical ideas were taken into the design of the OBE curriculum and into the environmental education aspects of this curriculum, which were piloted in 2000 in the context of a national pilot project (the NEEP-GET pilot project, see Section 2; Lotz-Sisitka & Raven, 2001)). Developments such as these are not only relevant in South Africa. For example, Gough, (2006:49) writing about similar curriculum changes in Australia, states that "implementing Education for Sustainable Development (ESD) in schools involves approaches to teaching and learning that integrate goals for conservation, social justice, appropriate development and democracy into a vision and a mission of personal and social change". She also argues that environmental education and Education and Education for Sustainable Development requires pedagogies that involve developing the kinds of civic virtues and skills that can empower all citizens and through them, social institutions, to play leading roles in the transition to a sustainable future. Writing from Zimbabwe, Chikunda (2007:159) writes that international conceptualizations of Environmental Sustainable Development propose that education at all levels and in all forms should help people of all ages better understand the world in which they live and the

complexity and interrelationship of problems such as poverty, wasteful consumption, environmental degradation, population growth, gender inequality, health problems, conflict and violation of human rights-all of which threatens our future. This, he argues, requires active transformative pedagogy.

According to the report of the NEEP-GET pilot research project (Lotz-Sisitka & Raven, 2001:67), one of the key issues to be addressed in the OBE curriculum, is the way in which environment is included in the curriculum. The 1995 White Paper on Education and Training (RSA, 1995) advocated an integration approach to environment in the curriculum by noting that environmental education "...involving an interdisciplinary and *active approach to learning* should be integrated across all phases and levels of the education and training system" (ibid: 18). When Curriculum 2005 was first implemented, it introduced 'environment' as an organizer which meant that environment was a focus across different Learning Areas. Curriculum 2005 also contained a number of environment specific outcomes that also reflected active learning approaches to environmental education. When the curriculum was renewed in 2000, the Council of Education Ministers recommended to the committees working on the streamlining and strengthening of Curriculum 2005 that environmental education should receive special attention in the revised curriculum. Because of the recommendations by the council, the Revised National Curriculum seeks to create "... a lifelong learner who is confident and independent, literate, numerate, multi-skilled, with a *respect for the environment and the ability to participate in society as a critical and active citizen*" (DoE, 2002b: 3, my emphasis). This statement again emphasises an active learning approach.

The NEEP-GET (2005: 31) explains that the origins of this attention to active learning lie in a response by the new government to outdated learning theories such as behaviorism. The NEEP-GET explains further that when C2005 was introduced, the government showed an "explicit commitment to constructivist approaches to learning" (ibid). Because of its links to the cultural context of learning, and the need for learner-centred planning and responses, this approach is not an easy approach to implement, and was reported by Taylor and Vinjevold (1999) as the most difficult approach to implement in schools. Moll (2002, cited in NEEP-GET, 2005:32) also said that the Department of Education was misinterpreting constructivism in C2005.

He argued that educators were "... misinterpreting the cultural processes of knowledge construction", and he noted that "everyday knowledge (culturally embedded) and school knowledge (not so contextually situated) contexts were different, and that it was important to understand this difference" (NEEP-GET, 2005:32).

Within the broader trend towards constructivist learning theory, the NEEP-GET (2005) introduced teachers to an active learning framework, which gave attention to what learners already know, what information is needed, what enquiries and actions can the learners be involved in, and how they can report what they find out (ibid). The NEEP-GET (2005:33), through their work with this framework found that "... teachers developed a range of different strategies to mobilize learners' prior knowledge ... teachers also attempted various activities to foster enquiry skills" and that "... it was not always possible to plan action projects".

#### **4.2.3. Integration of Environmental Education in the Learning Areas**

Learner centred pedagogy and active learning approaches as discussed above, could also assist the Greening the Nation Programme to integrate environmental concerns into the Learning Areas. For example, learners can use the gardens to study (through active learning approaches) what biodiversity exists in and around the garden.

Approaches such as this that involve learning in school gardens, have the potential to provide a way of overcoming the separation in practice, as well as in theory, between 'classroom' knowledge that is usually acquired didactically and 'action- knowledge' (Wells, 2000 cited in Atiti, 2004). In Section 3, members of the School Governing Body indicated that school gardens could help learners understand the cultural values of plants. Atiti concurs with this, when he reports from his study of using botanical gardens in schools for curriculum purposes that "Communicating cultural uses (indigenous knowledge) of plants may enable learners to explore their cultural perceptions and identities in different ways" (Atiti, 2004:381). Atiti's study illustrated that interpretive processes (where children can interpret the cultural and biodiversity value of plants in the school gardens) have "the potential to foster curriculum-centred and socially critical environmental learning processes in schools". The South African curriculum encourages learners to engage with aspects of their culture in the Learning Areas. However, as Atiti argues further, developing activities using biodiversity

interpretation in curriculum activities will require an understanding of how to support learners to undertake such interpretations.

Such interpretations should be seen as educational processes of meaning-making and critical reflection which can be integrated into Learning Areas such as Natural Sciences. The South African Natural Sciences Learning area (as discussed below) requires learners to undertake such investigations, including investigations focusing on biodiversity. Atiti also points to the important role of the teacher in supporting these kinds of activities when he says that “Successful meaning-making occurs when learners are able to actively engage in environmental learning experiences based on the object being interpreted” (ibid, pg. 381).

Fien (1993), drawing on earlier work by Lucas (1979) identified three forms of environmental education that may be useful to teachers who have to use school gardens for curriculum purposes. The three forms that he describes are:

- Education *about* the environment,
- Education *in* the environment, and
- Education *for* the environment.

Education about the environment emphasises knowledge about natural systems and ecological factors. In the context of Natural Sciences and the biodiversity component of the curriculum, teachers would emphasise knowledge *about* biodiversity.

Education *in* the environment on the other hand, emphasizes educational experiences *in* the environment. In the context of Natural Sciences and the biodiversity component of the curriculum, teachers would take learners out *into* the gardens to investigate biodiversity. Education *for* the environment would emphasise economic and political factors that influence decisions about how people use the environment. In the case of biodiversity in the Natural Sciences curriculum, teachers may emphasise cultural values of biodiversity and draw learners’ attention to why these have been neglected or marginalized in the past. This could bring a new focus on indigenous knowledge of biodiversity into the curriculum. Previously, most education emphasized education *about* the environment. There was little chance for learners to learn *in* the environment, and few learners developed critical skills needed for education *for* the environment (Fien, 1993). Chikunda (2005) argued that approaches on education *in and for* the environment need to be emphasized in transforming education.

To make education in and for the environment more accessible to teachers, O'Donoghue (2001) proposed an open learning framework to assist educators to consider the relationship between action and learning in environmental education. The framework encourages learners and teachers to engage in dialogue, have encounters *in* the environment, and reflect on *why* certain issues need to be covered. As seen in Section 2, learners, teachers and community members have been able to identify what needs to be learned and how this can be facilitated in the Greening the Nation Programme. This shows that learners, teachers and community members can be seen as agents for producing worthy knowledge through interaction with others. For example, learners and the community can engage in collaborative community projects focusing on biodiversity and school gardens, which can also respond to community concerns and which can, at the same time, engage learners in high quality learning, collaborative reflection and learning from direct experience. As reported in Section 2, the schools already have such relationships with community members, but it was also clear that these relationships are not extended to curriculum activities. Environmental education encourages interaction amongst learners, between learners and educators, and between learners and community members in order to address local environmental issues and risks (Chikunda, 2005; Fien, 1993; O'Donoghue, 2001).

#### **4.2.4. Learning Area Expectations and Lesson Planning**

The changes affecting pedagogy discussed above have also shaped the Learning Area statements. According to the Natural Science Learning Area Statement (DoE 2002b:5), "... meaningful education has to be learning-centred and help learners to understand not only scientific knowledge and how it is produced, but also the contextual environmental and global issues that are intertwined within the Learning Area". One of the Critical Outcomes encourages the "... use of science and technology effectively and critically, showing responsibility towards the environment and health of the others" (DoE 2002b:1), again supporting active approaches to learning. All three Learning Outcomes of Natural Sciences Learning Area listed below are about or based on the environment and also support active approaches to learning:

- **Learning Outcome 1:** Scientific Investigations: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.
- **Learning Outcome 2:** Constructing Science Knowledge: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.
- **Learning Outcome 3:** Science, Society and the Environment: The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment (DoE, 2002b: 6).

The Revised National Curriculum Statement (R-9) requires that Natural Science teachers should provide learning opportunities for the three Learning Outcomes (DoE, 2002b), which implies that teachers should be able to plan for, and develop lesson plans that allow for learner-centred, active approaches to learning. As can be seen from the Learning Outcomes, such lessons should assist learners to ‘act confidently’, ‘investigate’, ‘solve problems’, ‘know and interpret’, ‘apply knowledge’, and ‘demonstrate understanding’.

As explained in Section 1, the purpose of developing school gardens by SANBI is to allow both teachers and learners to use the garden as a resource for teaching and learning. Malone and Tranter (2003: 285) argue that “The potential of school grounds is to provide natural learning environments for children throughout their school day”. They make mention of “cognitive play” which allows children to act on the environment and discover and understand relationships through their own behavior. They explain further that this type of play usually has as its goal “problem solving, choosing, constructing, exploring and discovery and is unstructured informal learning” (ibid). According to Malone and Tranter (ibid), school grounds are a valuable resource for the kind of learning suggested by the Learning Outcomes described above. This is also argued in Atiti’s (2004) paper, as discussed above. Malone and Tranter argue that the “... size, design, and the features they [school grounds] contain, how they are utilized, managed and perceived by staff and students of a school, can all have a significant influence in the life and work of the school and on the quality of education provided for students”. Atiti’s (2004) study showed how botanical gardens in schools had cognitive benefits for learners in the school, and how it improved not only the motivation of the learners, but also the teachers. From these studies, it is possible to propose that school grounds have potential as a rich resource

for formal learning; they are “outdoor classrooms” that can be extended and explored by children outside the formal classroom, in and out of curriculum time, depending on how the teacher plans to use the gardens for learning. As argued above, school grounds provide access to real-life natural experiences *in* the environment (for example exploration of living and non living things, interdependence, biodiversity, life-cycling and food webs) , and other concepts such as these that are included in the Natural Sciences Learning Area. Activities in the gardens also have potential to develop other skills and values such as “cooperation, ownership, belonging, respect and responsibility” (Malone and Tranter, 2003). These values are supported in the South African National Curriculum Statement.

According to NEEP-GET (2004: 14), all of the Learning Outcomes in the Natural Science Learning Area contribute to knowledge and skills to enable a healthy environment, but Learning Outcome 3 specifically emphasizes the relationship between science, technology, society and environment. This Learning Outcome is similar to Learning Outcome 3 in Technology which also emphasizes the relationship between science, technology, society and environment.

The Natural Sciences Learning Area expects learners to undertake ecosystem and biodiversity studies, and to develop a good understanding of the threats to biodiversity, and why biodiversity is an important dimension of ecosystem maintenance. This includes developing an understanding of human activities such as the introduction of alien species, population growth, habitat destruction, pollution and over-consumption, all of which result in a loss of biodiversity (ibid).

According to Nguse et al. (2005:79), ecology is the study of how things live in relation to their surroundings. Ecology also helps people understand how plants and animals depend on each other and their surroundings in order to survive, and can help people work towards saving animals and plants from extinction and solve the problems caused by pollution. Nguse et al. (ibid) argue that the Natural Sciences curriculum of the schools needs to plan for this, and to provide tasks which elicit this type of thinking.

This requires teachers to think about the *content* of what they are teaching, as well as the learning *process*, and how their lessons can develop knowledge, skills and values

in an integrated way. In 2004 the NEEP-GET published a book on lesson planning entitled “*Lesson planning for a healthy environment*”.

Drawing on a number of examples of Lesson Plans developed by teachers in the NEEP-GET, this book identified aspects that are important to the lesson planning process (see Table 4.1 below).

**Table 4.1** *Aspects of lesson planning for a healthy environment (Source: NEEP-GET, 2004: 36-59)*

<b>Aspects important to Lesson Planning</b>	<b>Why this aspect is important</b>
Making links between Learning Outcomes and Assessment Standards	This helps teachers to interpret what is required for Learning Outcomes (LO’s) in each grade. It also provides some ‘content’ guidance and ensures that appropriate activities are structured for learners at different grades and phase levels.
Interpreting the environmental focus in a Learning Area	In the NCS Grade (R-9), environment is integral to each Learning Area.
Integrating the curriculum principles	Each of the Learning Areas (LA’s) has a contribution to make towards enabling learners to understand the relationship between human rights, social justice, a healthy environment and inclusivity. Each of the Learning Areas has a contribution to make in enabling the values of sustainable living, as outlined in the SA Constitution and in the curriculum aims.
Planning for assessment	Assessment involves gathering and organizing information about learners in order to make judgments and decisions about their learning. Teachers should plan for assessment while planning their lessons so that assessment can be continuous and developmental, and not just summative and judgmental.
Ensuring meaningful integration of Learning Areas	Meaningful integration of Learning Area’s can ensure greater relevance and application of learning, and provides learners with a more holistic learning experience. Meaningful integration helps to situate ‘classroom learning’ in real-life experience and context, and helps learners to understand these better.
Thinking about learning	Learning is the heart of all lesson planning. Teachers should support learning in different ways <i>e.g.</i> by situating learning in an appropriate context; giving the learners some questions to guide their investigation, etc. The teacher has a role to structure and support the learning process.
Considering the context	Environmental issues and risks are often context-specific, and different in different contexts. This means when dealing

	with environmental issues and risks, teachers need to consider context from different perspectives.
Mobilizing indigenous knowledge	Mobilizing indigenous knowledge allows learners to encounter more than one way of knowing, and more than one knowledge system. Through mobilizing indigenous knowledge learners are able to explore indigenous knowledge in local cultural context.
Using different teaching methods	Different teaching methods are used to give learners a range of different opportunities for learning. It also allows use of different learning styles and variety which helps to keep interest.
Using learning and teaching support materials	Learning support materials assist learners to construct new knowledge. It also provides information that can inform investigations and action planning to solve or address problems. It also provides useful structure and guidance for fieldwork and other kinds of investigative or action-centred activities.
Contributing to school improvement	Taking positive action for a healthy environment will enable learners to develop a sense of ownership and pride in their school.
Making school-community links	Environmental issues and risks are often context-specific and they affect lives of learners in schools and communities. Involving community members in some of the Lesson Plan activities is one way of fostering better school-community links. Asking learners to present their work to community members is another strategy for fostering better community links.

In this action research study, I draw on these aspects to reflect on the professional development activities and processes that were part of the programme I worked on to assist teachers in the two schools (Ncura J.S.S. and Ntlalontsha J.S.S.) to develop Lesson Plans for the Natural Science Learning Area using the school gardens.

### **4.3 RESEARCH METHODOLOGY AND PROCESS**

#### **4.3.1 Research question and goals**

As in Section 2 and 3 of this portfolio, I developed a research question to guide the small- scale study. The question that guided this study was:

*How can lesson planning using garden-based activities in the Natural Sciences be improved?*

This question was supported by a set of goals, which gave me more specific direction for this research project. The goals were:

- To investigate lesson planning processes in the Natural Science Learning Area.
- To investigate how garden-based activities are incorporated into lesson planning.
- To identify issues related to lesson planning and garden-based activities to inform professional development work with teachers.

#### **4.3.2 Action research methodology**

The implementation of a new National Curriculum Statement, with an environmental education focus in each Learning Area, is a major challenge for any nation (as discussed by the NEEP-GET, 2005), but it also provides opportunities for professional development and reflection which can encourage teachers and subject advisors to take ownership of the process (ibid). Action research approaches have been used by teacher researchers such as Mvula Jamela (2007) and Ncura (2007) who were interested in how garden activities are included in the Lesson Planning and teaching processes in their schools. Both of their studies showed improved understandings of lesson planning by teachers following the action research process.

Kurt Lewin (1948:5, cited in Cohen et al., 2000: 226) defined action research as the reflective process whereby

... in a given problem area, where one wishes to improve practice or personal understanding, inquiry is carried out by the practitioner - first, to clearly define the problem, secondly, to specify a plan of action - including the testing of hypothesis by application of action to the problem. Evaluation is then undertaken to monitor and establish the effectiveness of the action taken. Finally, participants reflect upon, explain developments and communicate these results to the community of action researchers. Action research is systematic, self-reflective, scientific inquiry by practitioners to improve practice (ibid).

I support the views of Davidoff et al. (1993:46) when they state that "... action research is concerned with answering the questions: what must I do to get the best results and how do I do it? Also what must I do in order to understand what is happening in the social context?" They argue that in South Africa, action research needs to develop its own distinctive characteristics. They state that action research has the potential "... to turn the attention of teachers to the constraints under which they work and to the broader social effects of that work, and to the improvement of the quality of teaching and learning" (ibid). As mentioned in Section 1, the focus in this study was on considering how to improve lesson planning for the Natural Sciences to strengthen active approaches to learning using school gardens. Working from a critical perspective on society and learning, Davidoff et al. (1993:33) explain that action research is a form of educational research in which participants engage in "... a critical process of deconstructing the values, assumption and interests underlying social practice to uncover different understanding of reality and existing power relations". They state that the process is not "objective", "value-free" or "neutral" and the aim is not for an "expert" to construct theories which others have to implement. It could rather be described as praxis in which there is "a reflexive and dialectical relationship between reflection and action, where emancipation and transformation are made possible through such interaction". In this study I tried to involve teachers in such a process of planning, reflection and action.

This action research project was undertaken using three cycles with the two rural schools in Bizana which have been used throughout the research process. As indicated in Sections 2 and 3, the two schools are Ntlalontsha J.S.S and Ncura J.S.S. Both schools start from Grade R-9. These schools are under section 21 (schools given budgets by the Department of Education to perform their functions independently). They have poor fencing but they manage to plant in their garden and they believe in maintaining their vegetable gardens for learning and fundraising purposes.

Some of the problems in these schools include water availability and parental literacy levels. Teachers in the two schools are dedicated to their work, and are prepared to use the school gardens for teaching and learning (see Section 2 and 3). However, both Section 2 and Section 3 of this portfolio indicated that teachers need support for this task.

As indicated earlier, I have a responsibility for professional development, which can bridge the gap between where experienced teachers are now (i.e. their existing teaching practices) and where they can change or move to, to provide for and respond to the new challenges of the curriculum (see Section 2 and 3, and sub-section 4.2 above), in order to enable students to achieve higher standards of learning and development. This action research was designed to enable me to stimulate such a process of change, and observe issues associated with Lesson Planning, and to inform me as to how to enhance this work in future.

According to Kertfoot and Winberg (1997:82) “if teaching is regarded as an intellectual activity and teachers are amongst those who have the authority to generate knowledge about teaching, this then means that teachers need to be not only critical consumers and interpreters of other people’s knowledge but also knowledge makers...”. To become ‘knowledge makers’ about their own practice, teachers would need to formulate and analytically develop ways of collecting and connecting evidence on teaching practices, in order to make decisions about teaching. I wanted this research to be based on, and to inform my knowledge, and teachers’ knowledge of lesson planning. To allow teachers to be part of the ‘knowledge making’ process, I decided to use an action research design for this study. I designed an action research process that included three cycles of planning, action and reflection:

- **Cycle 1:** Planning for and conducting a lesson observation at one of the schools to identify what the issues were with Lesson Planning. This took place in August 2006.
- **Cycle 2:** Planning for, and conducting a workshop with teachers to respond to some of these issues and to support the process of Lesson Planning, with post workshop reflections. This involved a pre-workshop observation to schools in January 2007, followed by a workshop held in early February 2007.
- **Cycle 3:** Planning for, and conducting two lesson observations in the two schools to observe how the lesson planning process was improving, involving teachers and learners in reflections on the lessons and the entire process. The lessons were observed in mid February 2007.

The stakeholder analysis identified that an important focal point for creating a context that supports continuing professional development is to strengthen the culture of teaching using resources that are within the communities, which is a key point for improvement (see Section 3). The participants in the action research study are teachers and learners. The purpose of my action research project was to assist teachers to develop their understanding, knowledge, love and care for indigenous plants and to strengthen their use as resources at school, within the requirements of the Natural Sciences Learning Area and the Department of Education planning processes, and encourage them to make use of the available community resources (as identified in Section 3).

### 4.3.3 Methods for data gathering

#### 4.3.3.1 Using multiple methods

The methods that I used in the action research process were related to the three planning, action and reflection cycles. Like other researchers doing school-based action research focusing on Lesson Planning, I used multiple methods (Mvula Jamela, 2007; Ncura, 2007). To develop my insights into the research question, I started the process by conducting interviews with a teacher at Ncura J.S.S. I subsequently also conducted observations of lessons in the schools, and I interviewed learners. In the workshop I also used evaluation questionnaires to assist teachers to reflect, as well as documents produced in the workshop. Table 4.2 below shows how these methods were used in the context of each action research cycle (see table 4.2 below)

**Table 4.2**      *Data gathering techniques*

<b><u>Cycle 1: Lesson observation at Ncura J.S.S.</u></b>	
Planning	<ul style="list-style-type: none"> <li>• School observation visits (<b>Appendix 2a, 2b</b>)</li> <li>• Interview with the teacher (<b>Appendix 7</b>)</li> <li>• Design of observation schedule (sub-section 4.4. below).</li> </ul>
Action	<ul style="list-style-type: none"> <li>• Lesson observation using schedule (see sub-section 4.4. below).</li> </ul>

Reflection	<ul style="list-style-type: none"> <li>• Interview with learners</li> <li>• Review of teacher's Lesson Plan (<b>Appendix 1</b>)</li> <li>• Reflection using NEEP-GET frameworks (see sub-section 4.4. below, and table 4.1).</li> </ul>
<p><b><u>Cycle 2: Teacher workshop</u></b></p> <p>Planning</p> <p>Action</p> <p>Reflection</p>	<ul style="list-style-type: none"> <li>• Setting up dates and venues for the workshop</li> <li>• Reviewing school observation visit reports (<b>Appendix 2a</b> and <b>2b</b>)</li> <li>• Preparing material for the workshop</li> <li>• Workshop observations (participant observation)</li> <li>• Workshop documents (see sub-section 4.4. below)</li> <li>• Workshop evaluation questionnaires (<b>Appendix 3a</b>, and <b>3b</b>)</li> </ul>
<p><b><u>Cycle 3: Lesson observations at Ncura J.S.S. and Ntlalontsha J.S.S.</u></b></p> <p>Planning</p> <p>Action</p> <p>Reflection</p>	<ul style="list-style-type: none"> <li>• Design of observation schedule (see sub-section 4.4. below).</li> <li>• Design of evaluation tool (<b>Appendix 6a</b> and <b>6b</b>).</li> <li>• Lesson observation using schedule and review of learners work and teacher Lesson Plans (see sub-section 4.4. below, <b>Appendix 4a, 4b, 4c</b> and <b>Appendix 5a, 5b</b>).</li> <li>• Filling in of evaluation tool (<b>Appendix 6a</b> and <b>6b</b>).</li> <li>• Interview with educator (<b>Appendix 7</b>).</li> <li>• Reflection using evaluation tool (<b>Appendix 6a</b> and <b>6b</b>)</li> <li>• Reflection using NEEP-GET framework (see sub-section 4.4 below and table 4.1)</li> </ul>

#### ***4.3.3.2 Observations***

As indicated in the table above, I conducted three lesson observations in which each took a period of one hour. For recording purposes I used an observation schedule and a digital camera. The observation in cycle 1 at Ncura J.S.S. (in August 2006) was to help me identify issues that need to be addressed in Lesson Planning using school gardens. In this observation I observed teaching practice in the gardens, and I was more observer than participant. I used school observations to inform the planning of the workshops (January 2007), where I visited both schools to find out how things were going, and what should be done in terms of support for Lesson Planning using

the gardens. During the workshop in cycle 2 (held on 8 February 2007) I also used observations, but this time I was a participant observer, as I was involved in the running of the workshop. In cycle 3 I also used observations of teaching practice in gardens (14 February 2007), and I was more of an observer than participant again. In the lesson observations I used observation schedules to guide my observations (see sub-section 4.4 below). In the workshop I relied on field notes, and the workshop documentation.

According to Cantrell (1993:93), the purpose of observation is to give the researcher direct, first-hand experiences with the phenomena under study to “walk in the shoes” so to speak. Observations gave me first-hand experience of the strategies teachers used, and some of the issues to consider in Lesson Planning. I also needed to consider issues of trust in the observations, given that I am a subject advisor, and for many years teachers have not always welcomed subject advisors into their classrooms. Fien (cited in Lotz, 1996:98) argues that “... there is a need to balance the degree of participation in the fieldwork to obtain the trust of the teachers with the constant monitoring of the effects of one’s participation on these participants”. This indicates that as an observer, one has to be aware of your role and effect on the activities being observed, as well as the relationships with teachers.

#### ***4.3.3.3 Interviews***

As shown in Table 4.2 above, I interviewed teachers and learners for planning and reflection purposes in the action research. In cycle 1 I interviewed teachers and learners after the lesson, and in cycle 3 I interviewed teachers only after the lesson. I used an interview schedule to record and to capture the data. I found interviews to be very useful in the reflection process. Cohen et al. (2000:267 cited in Knale, 1996:11), when saying that “... interview is an interchange of views between two or more people on a topic of mutual interest” and interview “...sees the centrality of human interaction in knowledge production and emphasizes the social situations of research data”. They go on to say that “interviews enable participants to discuss their interpretations of the world in which they live and to express how they regard situations from their own point of view”. The interviews I conducted were short, and

were semi-structured, as I wanted to encourage teachers to reflect on their experiences with lesson planning, and the learners to reflect on the process in the same way. In a semi-structured interview, the interviewer has an idea of what questions he or she wants to cover, but allows for the respondent's contribution as relevant (ibid). (see interview schedule questions in **Appendix 7**)

#### ***4.3.3.4 Questionnaires***

Cohen et al., (2000:245, cited in Wilson and McLean 1994) and states that "... the questionnaire is a useful instrument for collecting survey information, providing structured, often numerical data, being able to be administered without the presence of the researcher, and often being comparatively straightforward to analyze". In this small- scale study, I used open-ended questions because they can serve to invite an honest, personal comment from the respondents (Cohen et al., 2000:255). I used two different questionnaires in the research: 1) evaluation questionnaire at the end of the workshop to assist with reflections in cycle 2 (see **Appendix 3a** and **3b**) and 2) a questionnaire at the end of the study to help me reflect on the outcomes of the entire process (see **Appendix 6a** and **6b**). I gave the questionnaires to the teachers, and I waited a day and then went to the schools to collect the questionnaires.

#### ***4.3.3.5 Document analysis***

I also analysed documents in the research through reading and interpreting the responses of the participants. I was interested to see how the documents reflected key criteria for lesson planning as outlined in the NEEP-GET (2004) guidelines on lesson planning, and I used this for analysis. In particular I reviewed learners' work (see **Appendix 4c** and **5b**), teachers' Lesson Plans (produced in the first lesson, and after the workshops) (see **Appendix 1, 4a** and **5a**); and workshop documentation (what was produced in the workshop, see sub-section 4.4. below). I mainly used a content analysis approach to analyze these documents, to see what the documents reflected in terms of lesson planning aspects and issues.

#### **4.3.4 Ways of working with data**

The data analysis process was linked to the action research cycles.

At the end of cycle 1, I reported my observations to the teacher (Mr. Mnisi), who together with me, discussed how to plan the next cycle, which was the workshop. This was supplemented with data from the school observation visits in January 2007, which also helped me to plan the workshop in cycle 2. At the end of the workshop we reflected on the workshop process together, and teachers filled in evaluation forms (**Appendix 3a** and **3b**) which I analysed, together with the documents that were used and produced in the workshop. This was used to inform the next phase, which was the teaching and observation of lessons in the two schools. Throughout the process I met with the teachers of the schools involved in the study to report the findings, developed action plans from these discussions, implemented and reflected on it (Elliot, 1992:69).

When I was collecting the data I organized it according to the cycles of the action research process and compared the data in each cycle, to see new issues emerging and new relationships between the issues (Kertfoot and Winberg, 1997:85). I analysed and reported the data according to the action research cycle process: planning, action and reflection for each cycle (see sub-section 4.4 below). In this process, I drew on all of the data sources to provide a credible account of what happened. However, as this is only a small-scale action research project, I had to avoid data overload, and I used a data analysis tool (a reflection tool) to help me synthesise what was evident about the Lesson Planning process, to stay focused on the research question. I used the 'Aspects of Lesson Planning' outlined by NEEP-GET (2004) (Table 4.1) to develop a reflective tool for this purpose, as this provided me with a very useful way of keeping focused. I used this tool to synthesise what was in the data in cycles 1 and 3 as an analysis strategy.

Following all three of the action research cycles, I then reflected on the entire process and all of the data, and provided a final discussion and recommendations.

#### **4.3.5 Validity and ethical considerations**

When taking and using data from teachers and other informants, I did so in ways that recognized initial ownership of data. I considered their privacy, for example I did not record a conversation without informing them. When writing discussion reports, I did not reveal their identities without their approval and did not quote our private

conversations for use as data. Although I did not prepare an ethical statement, I verbally explained to the participants during our preliminary consultations the purpose and procedures of the research. I described to them the arrangements for protecting their privacy and also indicated how findings were to be shared and reported, with the emphasis of acknowledging their contributions. The negotiating of access discussed earlier (see Section 2 and 3) also formed part of the research ethic on respect for persons (Bassey, 1999). I made it clear from the start that the educators selected to work with me at the school were viewed as co-researchers not 'subjects' that I would use in the research. I requested teachers to play a major role in the study by generating knowledge together with me. In the research, I let all interested parties know what I was doing and also ensured participants' right to withdraw from the research as a way of respecting their democratic values (Bassey, 1999).

To ensure validity or trustworthiness, and 'respect for truth' (Bassey, 1999), I used the strategy of triangulation (Lather, 1986) in which the researcher uses more than one source of data in a comparative manner to draw conclusions from the study. I also tried to reflect the detail of the activities using thick descriptions (Cohen et. al. 2000), although this was limited by the length and scope of this study, but detailed evidence of the research process is included in the appendices of the study, which provides a 'data trail', and authenticates the research process (see **Appendix 1-7**).

#### **4.4 THE ACTION RESEARCH PROCESS**

##### **4.4.1 Cycle one of the action research: Lesson observation at Ncura J.S.S. (August 2006)**

###### ***4.4.1.1 Planning***

I visited Ncura J.S.S. on the 14<sup>th</sup> of August 2006 to do observation in Grade 7 during the Natural Science Learning Area period. A month before I visited the school, I phoned the principal and the teacher who teaches Natural Science to request permission to do the lesson observation. On the next day they informed me that I was welcome and we arranged the date for the lesson observation. On the day of lesson observation, I phoned again to confirm my visit and the principal responded by saying

they were ready and waiting for me. I went to the school to do observation and the lesson was about the structure of a plant (See **Appendix 1**) and the teacher responsible was Mr. Mnisi. Before he began his lesson, I interviewed him to find out what his intentions were for the lesson, what his aims were, what material he planned to use, and what results he expected to get from the lesson. I also reviewed his Lesson Plan to get this information. The outcomes of the interview and Lesson Plan analysis are summarized in Table 4.3 below

**Table 4.3** *Lesson intentions, aims, materials and expected results (see Appendix 1)*

Intentions for the lesson	To teach learners about the structures of a plant
Aims	To achieve Learning Outcome 2: Constructing Scientific Knowledge and Assessment Standard 2: Categorises information: Compares features of different categories of objects, organisms and events.
Materials planned	School vegetable garden
Expected results	Classification of familiar plants according to their root types

The interview took approximately twenty minutes. After the interview, I showed him the observation schedule that I had drawn up (based on DoE observation schedules) and he agreed that I could use it to observe his lesson. I explained to him that I was trying to understand the process of lesson planning and using school gardens to further support teachers with this task in the Natural Sciences.



**Figure 4.1** *Interviewing Mr. Mnisi (on the left) the teacher.*

#### **4.4.1.2 Observing the lesson**

### *The observation process*

I sat down in the classroom and observed while Mr. Mnisi was conducting the lesson. I used a digital camera to capture pictures of key aspects of the lesson and made field notes to record my observations. I used an observation schedule as a guide throughout the lesson, to direct my attention towards key contextual factors, teaching and learning processes, and interactions between teachers and learners, and among learners themselves. I then used the observation schedule to summarise what happened in the lesson, so that I could identify issues that needed to be attended to in the Lesson Planning process, so as to inform the workshop on Lesson Planning (see table 4.4 below).

### *The lesson process*

The lesson started in the classroom, continued to the garden and ended in the classroom where learners were given assessment tasks based on the garden activities (see **Appendix 3b** and **3c**). Mr. Mnisi started by introducing me (the observer) to the learners and explained the purpose of the visit.

He started his lesson by explaining the Learning Outcome and the Assessment Standards and later the content in the context of the lesson, which would be in the school vegetable garden. As mentioned in the planning section above, the lesson was focused on Learning Outcome 2, and Assessment Standard 2. Learners were therefore expected to categorise information of different plants.

He asked the learners to mention the different types of plants they know and places where they are found. After a few minutes, he took the learners to the garden where he grouped them and asked them to dig out some of the different types of plants available. After digging, he asked them to name the different parts of a plant and to explain the functions of each part.

The picture below reflects Grade 7 learners of Ncura J.S.S. explaining different parts of a plant and its functions.



**Figure 4.2** *Grade 7 learners explaining the parts and functions of a plant*

Learners were involved in actions of investigating and answering questions related to the lesson (see the picture above).

Teachers have a role to manage the process carefully and, as they cannot be everywhere at the same time, they need to consider the safety aspects of each activity, while also considering the learning processes associated with the activity and their intentions. During the process we moved around and Mr. Mnisi assisted the learners, making sure that each learner could engage in, and participate actively in the activity. He interacted with the learners through using a question and answer method, and through discussions to assess whether they understood or had achieved the Learning Outcomes or not. For example, he asked “Are the types of plants you have the same? If not, how are they different?”



**Figure 4.3** *Mr. Mnisi is asking learners questions about the different parts of a plant*

The **context** was relevant to the Learning Area because the lesson was about the structure of the plant, which belongs to the Natural Science theme ‘Life and Living’ (DoE, 2002b), and learners were using plants that were available in their own school garden. As far as **content** was concerned, he was preparing the learners to understand different part of a plant, in order for them to understand processes of photosynthesis which is required in Grade 8. He indicated in the Lesson Plan that learners were to “group root types of familiar plants” and in the garden he pointed out the differences between monocotyledonous and dicotyledonous root types. To do this, he asked learners’ to dig out a maize plant and a bean plant, and to show the differences in their root systems.

The atmosphere was positive and learners seemed to enjoy the lesson. The activities were learner- centred because the teacher gave learners questions and learners were doing activities in groups, discovering information on their own. According to the DoE teachers’ resource book (2005: 77), learning in the Natural Science Learning Area is a holistic activity involving the learners’ hands, minds and hearts.

This means that for learners to fully learn and appreciate science they need to develop their attitudes, experiences and knowledge through activities which challenge and stimulate them, and in which they find success and satisfaction.

During group discussions learners followed instructions and responded appropriately although some experienced a problem of responding to the teachers' questions in English. Some learners were able to respond to the teachers questions independently, while others were in need of guidance. The teacher responded to the different needs of the learners e.g. he asked both simple and difficult questions. Slow learners were given a chance to answer the questions as he assisted them in their vernacular. When learners were removing plants from the soil they were encouraged to avoid damaging the roots, stem and leaves showing knowledge, values and skills. Learners explained or discussed in groups the structure of a plant, particularly the root systems (i.e. knowledge). Although there were many learners, they were all listening and doing what they were expected to do in the garden (i.e. values and attitudes). Learners helped each other in groups, and those who were unable to speak English were using their home language and were assisted by others.



*Figure 4.4 The educator is assessing learners by giving them class work*

The assessment activity asked learners to provide information on different types of plants, why plants were needed and used, and to distinguish between different indigenous vegetables (leafy vegetables and root vegetables) (see Appendix **4b** and **4c**). The assessment activity was based on a Grade 7 textbook activity, and Appendix **4c** shows that learners were able to complete the task successfully. My observation

showed that not only this learner, but other learners were also able to respond to the task and about 80% of the learners achieved more than 40% for the task. In this way the teacher got positive feedback from the learners, because he could see that they had gained from the lesson as anticipated. While the assessment was successful, it did not seem to fully address the intended focus of the lesson, which was to distinguish different parts of the plant. This would seem to be an issue that needs to be considered in Lesson Planning (i.e. that assessment activity should be focused on the intentions of the lesson, and on what the assessment standard expects – in this case to categorise different aspects of the plants, particularly the root systems).

In the senior phase the learner is expected to take more responsibility for his or her learning and to manage his or her time and studies with less guidance from others. During the assessment period in a class work task, learners were answering questions independently e.g. doing research on an individual basis. The teacher used plants that were available in school garden and at the end he referred learners to different textbooks. The teacher used a book called *Natural Science Plus* as a resource to give learners homework.

**Table 4.4. Observation schedule questions, with summary of lesson process, and implications for lesson planning.**

<b>Social Processes</b>	<b>Brief summary</b>	<b>Implications for Lesson Planning using gardens</b>
What does the teacher do during teaching and learning?	Introduced the lesson, took learners outside, he set an assessment task, he explained concepts, he asked learners questions, and responded to learners.	Teacher should plan the entire teaching and learning process, and be prepared to support and assess learners throughout.
How does teacher introduce the lesson to the class?	Told them what the purpose of the lesson was, and checked their prior knowledge of the topic.	Be clear on what the purpose of the lesson is, and what the LO's and AS's are so that the lesson can be appropriately introduced. Plan for checking the learners' prior knowledge.
What is his/her role during the lesson presentation?	Guide and mediate the learning, and to ensure that all	The teacher should plan how to mediate learning in

	learners are keeping up with the topic and activities.	the garden, how he/she will guide and assist learners during the activities.
Is there any LTSM used by the teacher? If so, which ones, and how are they used?	The garden was a key resource for learning. Plants were used, as well as the textbook and another book for extension activities	Plan what LTSM would be useful for the lessons? How can the garden be used with other LTSMS e.g. textbooks
How does the teacher interact with the learners?	Used question and answer methods. Used code switching and talked to learners in vernacular where necessary.	Plan what questions should be asked prior, during and after the lesson.
Is the context relevant to the Learning Area?	Yes, the garden can help to develop knowledge, skills and values in NS. However, the level of content did not correspond with the content expectations for the Senior Phase.	Think about how the garden can develop knowledge, skills and values in NS. Plan the content at the appropriate level (as indicated in the NCS documents and AS).
How is the atmosphere (no tension, nervousness, harassment)?	Mr. Mnisi promoted a good, calm learning environment.	Plan activities and classroom organisation and own role, to create a calm learning environment.
Learner-centeredness (is learning and learning activities learner-centred)	Through use of questions and activities, the lesson was more learner-centred	Plan for a lesson to be learner-centred e.g. activities should actively involve learners meaningfully.
Do learners follow instructions and respond appropriately?	Yes, but there were some difficulties with language	Plan for language diversity and ensure that instructions and questions can be understood by all the learners.
Is active participation, communication/interaction amongst learners promoted?	Yes, learners were encouraged to help each other, discuss topics together and report together	Plan to engage learners' in active participation in groups for meaningful learning.
Problem solving (are learners able to discover and solve the problems on their own?)	Learners had to identify plants and report on what they were seeing independently	Plan to enable learners to discover and solve problems on their own (but also give them support where needed).
Use of games (do activities include games as they learn better by playing?)	No games used in the lesson	Plan for games where necessary and appropriate, if it can strengthen the learning.
Differentiation/diversity (is the teacher able to differentiate learners' level of development?)	Different types of questions, language support and assessment were used to help learners.	Plan to cater for different levels of learners' development.
Holistic development (are knowledge, skills and values attended to?)	Yes, values were emphasized during activities, along with content (knowledge) and skills (identification and	Identify what skills, knowledge and attitudes can be learned in the garden that are relevant to

	categorization skills)	the NS Learning Outcomes and Assessment Standards for the grade. Plan for these skills, knowledge, attitudes and values during lesson planning.
Promotion of ubuntu (working together, helping each other promoted?)	Yes, as reported above	Consider how learners are to be grouped for working together, in the classroom and in the garden-based activities.
Integration within and across (does the lesson show integration within and across?)	Yes, integration was done to link the lesson with other Learning Areas.	Plan for <i>meaningful</i> integration with other Learning Areas, if this will extend the NS learning.
Constructive feedback (is feedback positive without humiliation?)	Yes, positive feedback was reflected from the assessment when most of the learners achieved more than 40%.	Teachers should plan assessment strategies and marking of learners' work so that they give learners regular, constructive and positive feedback.
Assessment (how are learners assessed?)	Assessment tasks were broad (did not focus on the purpose of the lesson)	Assessment planning and assessment tasks need to be focused on the purpose of the lesson and the Assessment Standard.

#### ***4.4.1.3 Reflection on the lesson and the research question (Lesson Planning improvement)***

At the end of the lesson I interviewed two learners: Mdlangaso Sinethemba and Cele Sixole. According to Mdlangaso they learnt a lot during the lesson on the importance of plants, different structures and functions of different parts of plants. The learners interviewed argued that the lesson was "... talking to them" (i.e. it was meaningful to them) because previously they had "... ignored the life of other living things within their environment and it was their responsibility to find more information about plants". This shows the learners having a sense of responsibility for the learning, and an interest in the topic. Cele, one of the learners, confirmed that they enjoyed the lesson "... because it is difficult to forget something you have seen and performed", indicating that the active learning approach was meaningful to them.

They also reported that the lesson "... encouraged them to love plants, to know the differences, how to plant them and to understand their functions", indicating that the lesson had met the intentions of the teacher.



**Figure 4.5** *Interviewing Mlangaso Sinethemba and Cele Sixole*

***Comment on the teaching process and its implications for Lesson Planning***

The above description and analysis indicate that the outcomes-based approaches in the Natural Science Learning Area, when practiced in the school garden, can strengthen active learning approaches. This, however, has various planning implications for teachers, as shown in Table 4.4 above. For example, the teachers needs to plan for learner-centred activities, different types of questions, how to mobilise learners prior knowledge, how to mediate and guide the learning process, how to give meaningful feedback to learners, and to plan for language diversity, and how learners could best be grouped together. Vygotsky (1987, cited in Daniels, 2001) believes that children should learn together or with others in a meaningful way in order to be motivated, therefore teachers need to think carefully what meaningful learning in a garden context would be in the Natural Sciences. Vygotsky (ibid) explains that inter-subjectivity (meaning making) as the basis for communication encourages the extension of learners understanding of new information and further activities (Tudge, 1990). Mr. Mnisi used different questions for example discuss, explain and give reasons for your answer in learner activities to create inter-subjective meaning making opportunities. However, his assessment, while being successful as an activity, did not fully extend the meaning making as anticipated by the purpose and Assessment Standard guiding the lesson.

Cornbleth (1990:25) notes that the curriculum should be contextualized and recontextualized. Curriculum as a contextualized social process encompasses both subject matter and social organization and their interrelations. In the lesson of Mr. Mnisi, the subject matter of different parts and functions of the plant was mediated through group activities which took place in the classroom and the garden. Social organizations, including teacher and student roles and patterns of interaction, provide a setting for academic activities that can extend or constrain student's learning opportunities, as shown by the way Mr. Mnisi asked questions in the lesson.

I now reflect on the entire lesson, using the NEEP-GET framework (see Table 4.1) to reflect on the Lesson Planning issues that were identified by NEEP-GET in relation to planning for environmental learning in the NCS.

**Table 4.5 Reflecting on key aspects of Lesson Planning using the NEEP-GET framework**

<b>NEEP-GET Lesson Planning Factors</b>	<b>What I learned from the lesson observation</b>
Making links between Learning Outcomes and Assessment Standards	The teacher should make links between Learning Outcomes and Assessment Standards and be clear about the purpose of the lesson.
Interpreting the environmental focus in a Learning Area	The teacher should plan the lesson thoroughly and incorporate an environmental focus in NS. This means that the teacher needs to think about how the garden can develop knowledge, skills and values during planning.
Integrating the curriculum principles	The teacher should plan how to integrate the curriculum principles e.g. learners should be treated equally. In this lesson the teacher focused on the science content that could be learned in the garden only, and did not consider this in terms of the principle of a healthy environment.
Planning for assessment	Assessment tasks need to be focused on the purpose of the lesson, Learning Outcomes and the Assessment Standards.
Ensuring meaningful integration of Learning Areas	Integration with other Learning Areas should be meaningful to extend learning. In the case of this lesson, the teacher integrated with languages, as there was new vocabulary in the Science lesson in the gardens. Integration needs to be <i>within</i> the Learning Area (in this case the teacher integrated LO2 with LO1 in the NS Learning Area); and <i>across</i> Learning Areas (with Languages LO2) – see

	<b>Appendix 1</b>
Thinking about learning	The teacher should start the lesson by probing learners' prior knowledge and assist learners throughout the learning process. In particular, teachers should consider language issues, and different levels of learner performance and ability. The teacher should also consider active participation of learners through active learning strategies, as learners indicated that this helped them to learn.
Considering the context	The lesson should focus on the local context in which learners live. Gardens provide a meaningful context for Natural Science learning, especially to develop knowledge of plants, and values of caring for plants and other living things. Skills of identification, categorization and investigation can also be developed using gardens as a context for learning, as shown in this lesson.
Mobilizing indigenous knowledge	In NS LA the teacher should mobilise knowledge by using indigenous plants when necessary. This did not happen in this lesson, but because the school has an indigenous garden, the teacher could have used the indigenous plants. He only used the vegetable plants. He passed through the indigenous plants, because he did not have a good knowledge of the indigenous plants (terminology and names).
Using different teaching methods	The teacher should use individual and group work activities for active learning. Classroom based work (as used at the start of the lesson, and in the assessment activity) as well as field work in the garden can provide the teacher with different methods, as shown in this lesson.
Using learning and teaching support materials	The teacher should plan what LTSM can be used, and how the LTSM can be used in the context of garden-based activities. Also key here, is to consider how the garden can be used as a resource in NS. This lesson showed that it can be used for achieving the Learning Outcomes and Assessment Standards, with good teaching practice.
Contributing to school improvement	The teacher should be clear in his lesson so that learners understanding can contribute to the school improvement. In this lesson, the teacher did not focus on this, as he was more focused on the science knowledge of plants.
Making school-community links	The teacher should encourage school community links through activities that need learners to work with community members in NS. In this lesson this did not happen, as the teacher was more focused on the science knowledge of the vegetable plants.

	Perhaps if he had drawn on community knowledge of indigenous plants, learners could have extended their investigations and categorization activities to include these plants as well.
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From this analysis, it seems that areas that could be strengthened when it comes to supporting the use of school gardens in Lesson Planning would be:

- How to strengthen the integration of the principle of a healthy environment into Natural Science learning,
- How to plan for assessment so that assessment addresses the purpose of the lesson and the Assessment Standard directly
- How to mobilise indigenous knowledge using indigenous plants in the school garden
- How Natural Science learning in the garden can also contribute to school improvement and making school-community links

#### **4.4.2 Cycle two of action research: The Lesson Planning Workshop**

##### ***4.4.2.1 Planning: Setting up the workshop***

In cycle two of action research I planned and organized a workshop for Natural Science and Mathematics teachers of Ntlalontsha and Ncura J.S.S. and the venue was Ntlalontsha J.S.S. I planned to run one workshop on the Department of Education’s planning framework which includes the development of Learning Programmes (a phase plan), Work Schedules (a year plan) and Lesson Plans (shorter units of work in a specific grade). In particular, as I was focusing on gardens and their use in Natural Sciences learning, the workshop was planned to support teachers to incorporate environmental education topics in the Natural Science Learning Area in the Senior Phase, as these are now an integral part of the National Curriculum Statement. To explore the needs of the schools further, and to identify what the key issues were that teachers were concerned with regarding using gardens for Lesson Planning, I visited the two schools in January 2007, before the workshop. I completed school observation questionnaires (see **Appendix 2a** and **2b**) to capture what the teachers and the principal were saying about these issues.

Through an analysis of this data, I identified the following issues related to Lesson Planning (see **Appendix 2a** and **2b**):

- Integration of environmental education in Learning Areas (teachers were unsure how to do this),
- How to teach using indigenous plants (teachers indicated that they were unsure of how to use indigenous plants in their teaching),
- There are plants and their functions that are not known (teachers did not know the names of the plants, and did not have available information on the plants),

This data confirmed the observation that I made in the first lesson (see section 4.4.1 above).

The purpose of the workshop was therefore to close the gaps that I noticed during lesson observation in cycle 1 e.g. assessment that is not focused on the purpose of the lesson; and teachers not confident and sure about planning and incorporation of environmental education in Learning Areas. Preparation for the workshop involved planning the workshop structure, objectives for the workshop and the materials and other practical arrangements that needed to be made. After compiling the objectives of the workshop, it became apparent that one workshop would be a minimum contact required to establish a process, which would be in any way participatory. The number of participants in a workshop was an important consideration, and the workshop was planned to limit the number of participants to six. To enhance the scope of the study, I attempted to arrange at least one workshop with the participating schools that would enable a sustainable interaction with teachers. For the purposes of this research, I will only report on the first workshop, and the lessons that teachers developed after the workshop, as it was not possible to cover all the issues thoroughly. These are being dealt with in a longer term process that falls outside of the scope of this study.

The first workshop was therefore introductory, and focused more on the structures of the planning framework of the DoE, and how to consider environmental learning in the curriculum. It did not deal with the other issues related to use of indigenous plants.

#### ***4.4.2.2 Action: The workshop***

At the start of the workshop teachers were requested to state ground rules and their expectations of the workshop. They wanted to understand how to use gardens in the Natural Science Learning Area, so that they could understand how to integrate environmental education in the curriculum. The material used in the workshop was the *Revised National Curriculum Statement Grades R-9 Natural Sciences*, (DoE, 2002b); the DoE Teachers Guide for the Natural Sciences Learning Area which gives an overview of the planning framework, and explains what is needed in Lesson Plans; the DoE Teachers Resource Book Grade 8&9, (DoE 2005); the textbook used by the schools for Natural Sciences ‘Successful Natural Sciences Teachers’ Book’ (Nguse, et al., 2005a) and the Learners’ Book that goes with the Teachers’ Book (Nguse et al., 2005b).

The workshop started with a detailed discussion on the Learning Programme and the Work Schedule in Natural Sciences Learning Area referring to the Learning Area Statements. In the end we agreed to use the template below for all the grades, which comes from the ‘Successful Natural Science’ Teachers’ Book. In the table below, the areas where gardens can be used as a context for learning are indicated in bold, showing how environmental learning using gardens can be integrated into the Natural Sciences Learning Area at the level of Learning Programme.

**Table 4.6 Exemplar of a Senior Phase Natural Science Learning Programme**

<b>1. Life and living</b>	<b>Grade 07</b>	<b>Grade 08</b>	<b>Grade 09</b>
Life processes and healthy living	<b>Photosynthesis;</b> food groups; digestion; puberty	Human reproduction; sexually transmitted diseases	Osmosis,; circulation; excretion; control of water content respiration
Interactions in the environment	<b>Adaptations of plants and animals to their habitats</b>	<b>Animal behavior;</b> human reproduction	<b>Ecosystem; food webs; competition; sustainability; pollution; role of micro-organisms</b>
Biodiversity, change and continuity	<b>Characteristics of living things; biodiversity; classification;</b> cells	Variations and natural selection; <b>extinction</b>	<b>Loss of biodiversity;</b> evolution; <b>extinction</b>
<b>2. Energy and change</b>			
Energy transfers	Heat transfers;	Forms of energy;	Light; contact and

and systems	insulation	<b>energy transfers in systems; energy storage in systems;</b> energy loss from systems	field forces e.g. magnetic forces, uses of forces
Energy and development in South Africa	Types of fuels; <b>renewable</b> and non-renewable <b>energy sources</b>	Electricity generation; impact of use of electricity; alternative sources of electricity	Supply of electricity in poverty relief; improving efficiency of energy use
<b>3. Planet Earth and beyond</b>			
Our place and space	The solar system; moon, planets, Sun, Asteroids and comets	Movement of objects in solar system; phases of moon, eclipses; sun as a source of energy	Gravity and orbits; space exploration
Atmosphere and weather	Temperature variation, <b>rain fall types and variation; climatic regions; adaptation of plants and animals</b>	The <b>biosphere and the atmosphere components and properties</b> at different heights; atmospheric pressure and winds; ocean currents	Importance of atmosphere as climate regulator; human interference <b>and climate changes</b>
The changing Earth	Structure of Earth; rocks, tectonics, earthquakes, volcanoes	Constructive and destructive forces and resultant land forms; <b>erosion</b> and weathering	South Africa's fossil record, fossil fuels; mining-its importance to South Africa and legislation with regard to safety and environmental effects
<b>4. Matter and materials</b>			
Properties and uses of materials	Properties of matter; pure substances, mixtures, elements and compounds; radiant energy	Static electricity, magnetism; electric circuits	Properties of gases; chemical separation of substances; raw materials
Structure, reactions and changes of materials	Particle model of matter; physical and chemical changes	Periodic table; elements, compounds; acids, bases, neutralization, acid reactions	Oxygen reactions; corrosion of iron; reaction of oxygen with food.

This was discussed in the workshop and the participants agreed to use this Learning Programme as they said it is clear, understandable and user friendly.

Participants mentioned that during NCS training workshops they expected the trainers to do all the levels of planning for teachers, but this had not been done, so they

remained unclear of these levels of planning after the NCS training, hence this workshop was seen to be useful to the teachers. From this teachers could also see how they could integrate garden-based learning activities into the Natural Sciences Learning Area for each Grade in their Work Schedules.

For the rest of the workshop we focused on Lesson Planning, and how to construct a Lesson Plan using the DoE framework for Lesson Planning, and some of the insights that I had gained in cycle 1 of this research after the Lesson Observation in Ncura J.S.S. (see table 4.4 and 4.5 above)

### **Lesson planning**

In the workshop we discussed various issues associated with Lesson Planning in an outcomes based curriculum. For example: you should plan your lessons so that outcomes, assessment and classroom practices are all integrated. Assessment is done through the lesson presentation, and assessment should be focused on the Assessment Standards and the purpose of the lesson (see section 4.4.1 above). We discussed how a series of activities are planned within one Lesson Plan, to enable learners to achieve the Assessment Standards associated with the Learning Outcomes described in the curriculum. Planning in this way helps to align assessment with Learning Outcomes and with practicable approaches and activities in the classroom. To facilitate discussion on what should be contained in a Lesson Plan (according to the DoE lesson planning process), the following Lesson Planning table was prepared for use in the workshop.

***Table 4.7 Things to consider when planning a lesson***

<b>Outcomes</b>	<b>Things to work and to plan for</b>
Learning Outcome (LO)	Identify the outcome in the Learning Area Statement that you are working from, e.g. Constructing science knowledge
Assessment Standard (AS)	List the Assessment Standards that you are working towards
Content theme or key concept	To what overarching theme or concept do all lessons belong e.g. Life and Living: Environmental changes, natural selection and extinction, and how does this relate to the garden?
Exactly what will learners	How will learners achieve the Learning Outcome?

learn in this lesson?	List the appropriate: <ul style="list-style-type: none"> <li>• Knowledge to acquire</li> <li>• Skills to develop</li> <li>• Values and attitudes to adopt</li> </ul>
Number of lessons to be taught	How many lessons approximately do you plan to teach?
Topic for this lesson	Which subsidiary topics are you covering in this lesson? What knowledge, skills, values or attitudes are you hoping to develop in this lesson?
Purpose	Why is it useful to learn this anyway, now or in life? (It is helpful for learners to know the reason for learning something.)
<b>Assessing progress</b>	<b>Things to think through</b>
Evidence of learning	What will you look for in each learner's work? Write down the success criteria. Is the criterion linked to learners' knowledge, skills and values, and is it linked to the Assessment Standard and its expectations of learners?
The way learning will be assessed	Examples of methods of assessment: <ul style="list-style-type: none"> <li>• Formally, e.g. written work,</li> <li>• Informally, e.g. teacher observation in a small task or large project, in class, as homework, in a test.</li> </ul> Is assessment focused on the Assessment Standard for the Grade and the purpose of the lesson?
<b>Classroom practice</b>	<b>Things to consider</b>
Methods of activity	What will you consider and what will the learners do and in what sequence?
Time	How much time will you take to explain? How much time will the learners take for each activity?
Teaching organization	How exactly will you arrange learners? Working as a class, working in groups, working in pairs, working alone. Where will the learners be? In the classroom or outside.
Resource needed	List any resources you may need, e.g. magazines and newspapers, and the resources from the Teachers' Book. How will you use the gardens as a resource?

During the workshop teachers were asked to fill in a table, using these questions, to plan a lesson that they had in mind for using the gardens. They used the Learning Area Statements and the text book and I assisted them through the question and answer method in the workshop. Teachers asked questions like “if the garden is a resource for learning, how can I integrate it into the lessons?”

I replied by giving them the example of how Mr Minisi did this kind of work to use the plants to help learners to categories parts and functions of a plant for AS 2 of LO 2

in the Natural Sciences Learning Area. This provided a practical example to demonstrate how this kind of learning is possible. During the workshop they were preparing Lesson Plans which they were going to teach in the schools.

As shown in Table 4.6 above, and in earlier discussions on the Natural Sciences Learning Area, the Natural Science Learning Area is rich with opportunities for meaningful environmental learning, particularly since it has a strong focus in undertaking investigations, knowledge construction and in the Senior Phase, it also emphasizes action taking. The table also shows many opportunities for using gardens for learning in the Natural Sciences.

#### **4.4.2.3 Reflection**

As shown above, the workshop was focused on developing skills for Lesson Planning, with a focus on using school gardens as a resource. We discussed the many possibilities for such learning, which included: interactions in the environment looking at ecosystems, food webs, the importance of biodiversity in ecosystems, protecting biodiversity, effects of human actions on biodiversity, natural extinction and effects of human actions on the rate of extinction etc. (as shown in Table 4.6). In the evaluation of the workshop we ended by saying, every living thing has its place in nature, and the gardens can help teach learners about this. Teachers reported learning the following from the workshop:

- more about the environment e.g. the importance of indigenous plants in the environment, including wild plants, fruit trees and root vegetables
- ability to differentiate between alien and indigenous plants
- how to care for the environment (**Appendix 3a and 3b**)

Teachers appreciated the following aspects of the workshop:

- ability to ask questions freely
- new knowledge gained
- the way that the workshop was managed (**Appendix 3a and 3b**)

Teachers found the following aspects dealt with in the workshop challenging:

- integration of other Learning Areas

- integration of environmental education into the Learning Areas (**Appendix 3a** and **3b**)

Teachers' offered useful suggestions for improving the in-service professional development on Lesson Planning. They suggested more demonstrations in the gardens, involving learners in activities, longer or more workshops to consolidate their learning. They wanted to spend more time on the Learning Outcomes, as one said he wanted to spend "3 hours per Learning Outcome" (**Appendix 3a**), while others wanted to focus more on the content of the Learning Area and knowledge of the environment (**Appendix 3b**).

The participants were positive about learning how to incorporate environmental education in Learning Areas and were motivated during the workshop (see **Appendix 3a** and **3b**). Participants also indicated that (see **Appendix 3a** and **3b**) more workshops are needed on how to contextualise the curriculum in different Learning Areas, which points to the issue of inadequate professional development that I outlined in the literature review section of this research project (see Section 4.2 above). The participants argued that environmental education was not given enough attention during the NCS training in the Intermediate Phase and Senior Phase as a result not all schools are incorporating environmental education in Learning Areas, even though it is an integral focus in the Learning Area, as demonstrated in Table 4.6 above.

#### **4.4.3 Cycle three of action research: Lesson observations**

##### ***4.4.3.1 Planning school visits***

At the end of the workshop reported in Section 4.4.2 above, teachers undertook to finalize their Lesson Plans, and we agreed that I would visit the schools to observe the lessons to see how the Lesson Planning was progressing. A week after the I had conducted the workshop on the three levels of planning, incorporation of Environmental Education in Learning Areas and assessment, I visited Ncura J.S.S. and Ntlalontsha J.S.S.. My purpose was to see how the Lesson Plans had been developed after the workshop (Appendix 4a and 5a). I wanted to do lesson

observation on what we did in the workshop to observe how the Lesson Plans were actually working in the classroom situation. This is because simply looking at a Lesson Plan on paper, does not give the full picture. On the 14<sup>th</sup> February 2007 I visited both Ntlalontsha J.S.S. and Ncura J.S.S. to do lesson observations in grade 7 during the Natural Science Learning Area period. In the next section I report briefly on the two lessons that I observed, with the main analysis relevant to the Lesson Planning focus of this research being in Table 4.8.

#### ***4.4.3.2 Action: Lesson observations and field notes 1***

**Name of the school:** Ntlalontsha J.S.S.

**Name of the teacher:** Miss Nomakhosazana Zithutha

**Grade teaching:** 7

**Learning area:** Natural Science

**Number of learners:** 53

**Length of the period:** one hour

**Content in context:** Life and Living

The educator started her lesson by introducing the Learning Outcome and the Assessment Standards to be achieved by the learners. Resources used during the lesson presentation were charts, chalkboard, textbooks and plants available at school. At the beginning of the lesson the teacher asked questions to arouse the interest of the learners and to link the previous lesson with the new lesson. Learners were asked to give examples of different types of plants found in the school garden, examples of leafy vegetables, root vegetables and fruit vegetables (see **Appendix 4a**). The atmosphere was positive, but at the beginning learners were nervous until the time when the teacher asked them to use the chart, which was pasted on the wall. The activity seemed to give them more confidence. The context was relevant to learning because they used their garden to scaffold the knowledge, skills, values and attitudes. They used the plants available in their garden as a reference for the discussion related to the chart, and this connected the ‘school knowledge’ contained in the chart, with learners’ everyday knowledge (what they saw and knew about the plants in the garden). The activities were learner-centred because the activities drew on learners’ prior knowledge, and involved them in discussions and debates about whether their

answers were correct or not. The learners appeared to enjoy the lesson (see Figure 4.6 below).



**Figure 4.6** Miss Zithutha and grade 7 learners of Ntlatontsha J.S.S.

The teacher gave attention to the quality of the information being shared by learners, and she tried to ensure that the activities allow learners to develop a high level of skills. She gave special attention to how learners' access and use knowledge, and how they develop skills, to ensure that some learners are not disadvantaged as a result of, for example, language use or type of activities developed. She did this by summarizing what the learners were saying, and by doing this she was making sure that all learners fully understood the content of the lesson.

As shown in the Lesson Plan (Appendix 4a), more activities were planned to extend this first activity using the poster (which was the one I observed). Learners were to follow up with more activities on nutrition and food substances which were to address AS 3 of LO 2, which required learners to “interpret information by identifying key ideas in a text [the poster], finding patterns in recorded data, and making inferences from information in various forms”. From the lesson it seemed clear that the teacher was working with this AS in mind in the way she used the poster.

This shows that her lesson and assessment was focused on the purpose of the lesson and the requirements of the Assessment Standard. The assessment activity was designed for the entire Lesson Plan, and was focused on the information that learners

had gained during the lesson, although it did not expect learners to find patterns in recorded data, or to make inferences, which shows that the AS was only partially assessed.

According to Andile Keswa, one of the learners, (pers.com.14/02/2007), the lesson about Life and Living was an eye opener because he learned that "...the indigenous fruit vegetables that were talked about during the lesson are nutritious, they cost no cent [money] and they are available in their local areas". He continued reflecting on learning about indigenous food by saying that "... the problem with young people is to [that they] undermine indigenous food by saying is for poor people or for the areas that experience poverty problems". This shows that the learners' meaning making was directly related to knowledge about the local context.

The teacher ensured school-community links through a number of different strategies e.g. in question three of the class work (see **Appendix 4b**) where she asked learners to give examples of indigenous leafy vegetables and indigenous root vegetables. Miss. Zithutha was happy with her lesson. She also indicated that the food garden had broader value in the school, as it had done wonders for them because they managed to get an amount of R1180.00 from the vegetables produced from their school garden in November/December 2006. She said that her plans were to organize more indigenous plants for the school, and to integrate this into her teaching so that she could encourage learners to start doing food gardening at home. According to Miss. Zithutha (pers.com.14/02/2007), her expectations were met and that this was reflected in the learners' response to the questions and from the class work she gave the learners. All of the learners achieved more than 40% in the assessment task she set for them.

#### ***4.4.3.3 Action: Lesson observations and field notes 2***

**Name of the school:** Ncura J.S.S.

**Name of the teacher:** Mr. Phumzile Mnisi

**Grade teaching:** 07

**Learning Area:** Natural Science

**Content in context:** Life and living (absorption of water by plant roots).

**Number of learners:** 54

**Length of the period:** 2 hours

The lesson on the absorption of water by plant roots took place at Ncura J.S.S. food garden and the educator grouped the learners before he started his lesson presentation. The lesson once again involved Mr Mnisi, who had taught the lesson in Cycle 1. Before Mr Mnisi started his lesson I asked him, why he decided to take the learners to the garden. He responded by saying that, learning science is something that learners do, not something that is done to them. He emphasized “hands-on” and “minds-on” activities to develop learners understanding of science by combining scientific knowledge, reasoning and thinking skills, with practice. He linked his lesson to the previous lessons by asking learners to mention different parts of a plant. Learners were asked to examine the root system of different plants found in the school garden, to check whether a plant has a taproot or a fibrous root, and to discuss the root systems of different plants (see **Appendix 5a**). The lesson was learner-centred because besides getting guidance from the teacher, learners were also able to assist each other through sharing what they were observing and discussing what they know and have discovered about plants with taproot or a fibrous root system.



**Figure 4.7**

*Grade 7 learners of Ncura J.S.S. explaining parts of a plant*

During the lesson, learners were actively participating by discussing in groups, which reflected aspects of co-operative learning. Learners were responding to the questions posed by the teacher, based on what they were investigating about the different root systems of the plants. The teaching and learning strategies used by the educator to

accommodate learners with different levels of understanding were co-operative group work, questions and discussions (see Figure 4.7 above). After an hour, the teacher asked the learners to do an oral group presentation for the purpose of assisting them in learning. He asked them to talk about the root systems of the plants they had dug out from the garden and to explain to him and the other learners what they now knew about the plant root systems. He then extended their knowledge by explaining the absorption of water by plant roots e.g. taproots and fibrous root system. The teacher assessed his learners during the lesson by giving them a table to fill in the characteristics of dicotyledonous (beans) and monocotyledonous plants (maize), and this time he worked with the indigenous plants in the garden. He asked learners to dig out some samples of indigenous plants, and compare their root systems to the bean and maize plants with their different root systems. He still struggled to name the plants, and used locally used names (Xhosa names) used by the community to name the plants as the scientific names were not available to teachers in the school, but he and the children, through their everyday knowledge, were able to identify the plants from their experience in the community and their cultures.

Mr Mnisi reflected that the lesson had been successful in his Lesson Plan reflections (see Appendix 5a), but mentioned that difficult terms such as ‘adventitious roots’ presented barriers to learning. His Lesson Plan showed that he had considered integration within the Learning Area (with LO 3 which focuses on science, society and the environment), and with the Languages Learning Area. The Assessment Standard that he was working with was AS2, and this time the assessment activity was focused more on the purpose of the lesson, and on the AS which was an improvement from the previous lesson that I observed.

#### ***4.4.3.4 Reflection***

As indicated above, Mr Mnisi's Lesson Planning seems to have improved in the area of assessment. Many of the other aspects of his lesson remained the same, except this time he also tried to make more use of the indigenous plants in the garden.

The activity- centred nature of his teaching remained the same, as did the other strategies used, for example use of different teaching methods, language support to learners, and use of questions to support learning.

#### **4.5 CRITICAL REFLECTION ON BOTH LESSONS AND IMPLICATIONS FOR FUTURE TEACHERS' SUPPORT**

As indicated in Section 4.3 above, the research question guiding this study was to investigate how Lesson Planning could be improved in the Natural Sciences Learning Area using school gardens. As described in Section 4.4 above a number of issues were identified that needed improvement with regards to lesson planning from cycle 1 of the research, and from the school visits prior to the workshop. A workshop was run to strengthen lesson planning skills for the two schools, and the lessons observed showed that there had been some improvements in the lesson planning processes, and that teachers had developed a better understanding of the process. Reflection on both of the lessons together, give a fuller picture of what was learned in this research project about lesson planning.

As explained above, at the end of both lessons learners were given class work / assessment tasks to do. This helped the teachers to assess the learning, and it helped them to see if the Lessons were achieving what they had intended in the Lesson Plans that they developed. This provided them with a form of doing evaluation on their own practice. Teachers also seemed to use learners' responses as a way of evaluating the success of the lessons, and were able to identify areas that created barriers to learning (e.g. language issues). The lowest mark for a class work done at Ncura J.S.S. was seven out of fifteen and at Ntlalontsha J.S.S. it was thirteen out of thirty. The performance of learners in the class work / assessment task shows that the learners understood the lessons because they all achieved more than forty percent.

As indicated both educators designed the activities with the Assessment Standards in mind, which helped to make sure that the lessons were at the right level and scope. Educators also fulfilled their role as mediators of learning, by deciding what content

and what approaches to learning would be the best to use in order to achieve the outcomes. They were able to decide on how best to use the garden as a resource for learning. The main area that still seems difficult is assessment (as in one case the AS was only partially assessed) and use of indigenous plants in teaching.

**Table 4.8 Summary of reflections on the two lessons, using the NEEP-GET framework for reflection**

<b>Lesson Planning Factors</b>	<b>Lesson 1 (Ntlalontsha J.S.S.) – see Appendix 4 a,b,c)</b>	<b>Lesson 2 Ncura J.S.S. – (see Appendix 5 a,b)</b>
Making links between Learning Outcomes and Assessment Standards	The teacher was able to make links between Learning Outcomes and Assessment Standards	The teacher was able to make links between Learning Outcomes and Assessment Standards
Interpreting the environmental focus in a Learning Area	The teacher interpreted environmental focus in the Learning Area by using charts and plants from the food garden	The teacher interpreted environmental focus in the Learning Area by doing lesson activities in the food garden
Integrating the curriculum principles	The lesson was about life and living which deals with the healthy environment, particularly since the lesson included a focus on nutrition	There was no integration with the curriculum principles in the lesson, the teacher again focused on the science knowledge only
Planning for assessment	The teacher assessed learners on cultivated and uncultivated fruit and vegetables orally using the wall chart and later by writing class work. The AS was only partially assessed, as more complex aspects in the AS were not dealt with.	The teacher assessed learners practically in groups in the garden and later as individuals writing the classroom. Assessment met the requirements of the AS.
Ensuring meaningful integration of Learning Areas	There was meaningful integration with Mathematics, Learning Outcome: Data Handling. There was also integration within the Learning Area with LO3.	There was meaningful integration with First Additional Language, Learning Outcome: Writing. There was also integration within the Learning Area with LO 3.
Thinking about learning	The teacher asked questions at the beginning of the lesson to arouse the interest and to link the new lesson with the previous knowledge. She also encouraged debate amongst the learners, and challenged them to link the ‘school knowledge’ in the poster to their everyday	The teacher asked the questions at the beginning of the lesson to arouse the interest and to link the new lesson with the previous knowledge. He also used familiar plants (beans and mielies) to develop the concepts, and he related this to indigenous plants known

	knowledge of what was in the garden.	to the learners.
Considering the context	The lesson focused on the local context in which learners live e.g. cultivated and uncultivated fruit and vegetables	The lesson focused on the local context in which learners live by using plants that were available in the school garden, and that were familiar to learners.
Mobilizing indigenous knowledge	Indigenous knowledge was mobilized by referring to uncultivated fruit and vegetables using wall charts	Indigenous knowledge was mobilized by using different indigenous plants (and learners' knowledge of plant names) to find their characteristics.
Using different teaching methods	The teacher used a poster, question and answer method, and a group discussion to help learners to share ideas.	The teacher used field work, question and answer method, learners' investigations, and group discussion to help learners to share ideas.
Using learning and teaching support materials	The wall charts were used to explore local environmental knowledge of plants.	The food garden was used as a source of information for Natural Science lessons
Contributing to school improvement	There are uncultivated plants that need to be taken care of because they are good in life.	Plants should be planted differently according to their root system to avoid damage of others or loss of water.
Making school-community links	The teacher made school-community links by allowing learners to use the local terminology of cultivated and uncultivated plants in the lesson, and by allowing them to learn about fruits that were freely available to them and the community.	The teacher ensured school community links by allowing learners to use the local terminology of plants in the lesson (local community knowledge).

From this table, it seems that some of the key issues identified at the end of Cycle 1 notably assessment, use of indigenous plants, school improvement and school-community links were being addressed by teachers. However, areas that still appear to need ongoing attention are integration of the principle of a healthy environment into science lessons, and assessment (to ensure that assessment standards are fully assessed).

After the lessons, I also used an evaluation questionnaire to get feedback from the teachers on the environmental education research process that I had been involved in with them (see **Appendix 6a** and **6b**). The evaluations indicated:

- that teachers had gained knowledge of how to integrate environment into the Learning Areas
- more knowledge of environment and its relationship to everyday life, and the contributions of the Learning Areas to “building an environmentally literate and responsible population” (**Appendix 6b**)
- improvements in school practice, particularly use of the gardens for teaching and learning, and different environmental activities
- teacher empowerment to deal with latest teaching and planning skills
- that workshops need to be ongoing (**Appendix 6a & 6b**)

The evidence of the lessons also showed that teachers had developed Lesson Planning skills through the process and that they felt more empowered in planning their lessons. According to the teachers (see **Appendix 6a**), the activities used by the researcher broaden their knowledge about how to take care of the environment and the activities were not only theoretical but also practical.

One of the interesting aspects that emerged in the research was the relationship between school knowledge and everyday knowledge referred to by Moll (2002) in constructivist learning. The school gardens seem to provide a space where teachers and learners can bring these two forms of knowledge together, and where teachers can use learners knowledge of everyday plants (such as beans and mielies) to teach complex science concepts such as monocotyledonous and dicotyledonous root systems. Use of everyday knowledge (e.g. of local plant names) also helped the teacher to extend this science lesson to other plants, giving learners a broader view of different root systems in different plants. From the learners’ reports, this aspect was significant in the learning process as it helped them with meaning making, and also helped to overcome language barriers. These are key issues in rural schools, as reported by the Nelson Mandela Foundation research which was undertaken in 2005 in the Eastern Cape and other rural provinces (NMF, 2005).

This created an environment in which learners were free to respond and think critically, and engage in dialogue with each other and the teachers. In this way, the school garden can help to scaffold complex concepts introduced in the Natural Science curriculum. As shown in the lessons, making links between what learners

were learning through plants as resources, wall charts and textbooks, and their own environment and experience were an important dynamic in linking everyday knowledge and school knowledge in the knowledge construction process, and also as an important aspect of using LTSM in the classroom.

The school garden also provided a good context for integrating knowledge, skills and values, which was evident in some of the lesson, where learners were sharing their values with peers and with the teacher and when the teacher, for example, encouraged them not to damage the plants when working with them in the school garden. This helped them to develop values of caring for the environment in the process. Use of food plants and indigenous plants can therefore contribute to the development of values, which are an important aspect of all Learning Areas in the NCS.

Another important outcome of the study of using gardens in Natural Science, was to observe the process of curriculum praxis where learners and teachers were able to discuss realities in their environment e.g. use of wild vegetables and fruit, in relation to the expectations of the Assessment Standards and Learning Outcomes. The lessons reflected Cornbleth's (1990) view of curriculum, which she views as contextualised social process where teachers were working with the structural factors (the policy statements and available resources) and with socio-cultural aspects (learners' language and prior knowledge).

As indicated in the literature review, one of the four core principles of the revised National Curriculum Statement is 'A Healthy Environment' (DoE, 2005). These lessons have shown that greening is a practical way to create a healthy environment where learners live and work. It also provides numerous opportunities for active learning in all the Learning Areas, and therefore assists teachers to make meaning of the 'complex pedagogy' that underpins the NCS (as reported in section 4.2 above).

One of the issues raised in the study, which was not resolved in the time available, was teacher's knowledge and use of indigenous plants. As shown in other studies (e.g. Asafo-Adjei, 2004; Shava, 2000), teachers knowledge of indigenous plants can be extended by drawing on the knowledge of local people. A constructivist-driven

teacher development model (such as the one experimented with in this research through the action research processes followed) (Walker, 1995), would allow teachers to suggest a certain course of action for addressing this issue. For example, knowledgeable community members (as identified in Section 3 of this research portfolio) could be invited to a teachers' workshop on learning more about indigenous plants in the school community, and they could also assist teachers during plant identification lessons so that teachers and learners can learn more about local biodiversity, which is a knowledge area in the Natural Sciences Learning Area as identified in Table 4.6.

I used the NEEP-GET (2004) framework for analyzing the lesson plans of the teachers and this gave me a useful tool for 'looking into' the teachers practice. However, the NEEP-GET (2004) framework is an ambitious framework for use in reviewing lesson planning as not all aspects of lesson planning will be covered by teachers all of the time. The NEEP-GET (2004) framework is guided by the goals and structures of the National Curriculum Statements which in themselves are also ambitious, and set out a complex range of things that teachers have to attend to at once. For example, it is not always easy to make school-community links in all lessons. It is also not always easy to use a lot of different teaching methods, especially with large classes, and if teachers do not have appropriate training to use learner centred approaches to the curriculum, as shown in this research.

#### **4.6 RECOMMENDATIONS FOR SUPPORTING LESSON PLANNING**

Based on the findings and discussions above, it is possible to make the following recommendations from this small-scale action research project:

- There should be more workshops for educators on integrating environmental education in all the learning areas and lesson planning
- Teachers should be encouraged to continue using the school garden as a resource for Natural Sciences learning, as there are many possibilities for such learning, as shown in this study, and by researchers such as Atiti (2004) and Malone and

Tranton (2003) and Chikunda (2005). When use of gardens is complimented with use of other LTSMs such as wall charts and textbooks, the lessons are strengthened. During learners interviews it was reflected that the garden is used as a resource only on the days of visits by the researcher, which shows that this resource could be more frequently used for learning. Chikunda (2005) and Atiti (2004) both argue that use of the garden is an important tool for transformative learning, and for the NCS to meet its objectives, the garden can be more fully utilized by teachers to teach concepts as well as values.

- The study has shown that the learners enjoy practical lessons done in the school garden and they are able to make meaning of the lessons when connections are made to their everyday experiences. It helps them to grasp the new knowledge and concepts, and thus to improve learning. Such practices should be further encouraged. This can be done through using a variety of teaching methods and by involving the learners actively in the lesson process, as shown by the lessons in this study. As indicated by Fien (1993) such learning can also be learning *for* the environment, and not only learning *in* the environment. This will require teachers to plan for more socially critical lessons.
- Contextualisation of learning is strengthened through making links with what is in the learners' environment (e.g. familiar plants and community knowledge of plants), as shown in these lessons. Such practices should be further encouraged. As indicated by Atiti (2004) the garden is a place for enabling meaning making and for bridging the gap between theory and practice. This potential has not been fully realized by the teachers in this study.
- As shown in this study, assessment practice needs to be improved to a) address the purpose of the lessons which is b) defined by the Learning Outcomes and Assessment Standards. Further support for teachers in using the Assessment Standards needs to be provided to improve the quality of teaching and the quality and scope of the Learning Outcomes achieved by learners.

- As indicated in the curriculum principles, teachers and learners need to investigate key questions about the interactions between people and places, how these have changed over time and what their implications are, in terms of social justice, environmental impacts and social and environmental conflicts. The Learning Area provides opportunities to explore issues like threats to biodiversity, but also encourages a pride in place, identity and heritage. This is similar to what Gough (2007) mentioned when she discussed the kind of learning that should take place in ESD. However, this learning be extended, and learners need to be taught to actively participate by identifying environmental health issues in their homes, school and community, and such issues can be integrated into the Natural Science learning process, as demonstrated by the teacher in Ntalontsha J.S.S., but not by the teacher in Ncura J.S.S., who concentrated mainly on the science concepts. While it is important to teach the science concepts effectively, as was done by Mr Mnisi, it is also important to give learners a broader experience which is what the curriculum principle requires. This is also an area that seems to need additional support in future professional development. Malone and Tranton (2003) argued that the school grounds provide many different opportunities for the learning of new concepts and values, again this was not fully developed in the lessons and can be taken forward in future.

#### 4.7 CONCLUSION

Action research is one the tools or methods that can be used in schools and in the education system more broadly to make a changes in the school environment, in the teaching and learning situation and to improve the use of indigenous knowledge, assessment practices and Lesson Planning (amongst others). Based on what I have learned in this study, I support the view of Mc Taggart and Kemmis (1991: 178) when they state that action research is not only about ‘doing’, it is about *learning by doing*. He further explains that action research is about making changes and that *change is a process not a product*.

Without the involvement of the stakeholders in education programmes there will be no success because to improve we need to look at the past, present and future. According to Grundy (1987) this research recognises that education practices and the

curriculum do not exist apart from beliefs about people and the way in which they do and ought to interact in the world. The need to relate the curriculum to social context is expressed by Grundy (1987) as a way of organizing a set of human educational practices.

As shown in this research report, the participatory action research played an important role in developing teachers' understanding, knowledge, care and love of indigenous plants in Ncura J.S.S. and Ntlalontsha J.S.S. (see **Appendix 6a** and **6b**). In both schools teachers have gained knowledge and skills through participation in the action research process (see **Appendix 6a** and **6b**). This kind of research recognises the importance of educators' subjective experiences and is sensitive to context. According to Grundy (1987) the cultural view of curriculum is concerned with experiences people have as a consequence of the existence of curriculum.

As researcher and subject advisor responsible for the professional development of teachers in the Natural Sciences in Bizana area, and as an educator involved in the Greening the Nation Programme, I have learned much from this study. I have learned that action research is a good strategy for supporting the development of teachers (see also Stenhouse, 1981), that observing classroom practice provides good insight into Lesson Planning issues, and that the follow up process in schools (after DoE workshops) is very significant in ensuring that workshops lead to the envisaged changes in schools. On the other hand, I have noticed that the DoE needs to pay more attention to the curriculum principle on a healthy environment, as it was clear in this research that the teachers required support for this new aspect of the curriculum, and without such support, the principle remains a theory that is not put into practice.

I have also learned that doing research can assist with the process of change, although it is not an easy process, and requires one to consider the details in the data very carefully and one has to be prepared to face the challenges that are presented in the data (for example teachers lack of knowledge about indigenous plants, their lack of confidence with Lesson Planning using gardens, and the assessment challenges identified in this study). As mentioned earlier, the scope of this study did not allow me to address all of these issues, but they have provided a good way forward for

ongoing work with schools involved in the greening programmes, and in the Natural Sciences Learning Area.

Appendix 1 : Lesson plan (Ncura J.S.S. Cycle 1)

LEARNING AREA : NATURAL SCIENCES  
GRADE : 07      DATE : 14-08-2006  
LESSON PLAN : STRUCTURE OF A PLANT  
DURATION : 2 HOURS

Learning Outcomes & Assessment Standards	Integration :
LO <sub>2</sub> : Constructing Scientific Knowledge AS : Categorises information Compares features of different categories of objects, organisms and events. Bullet : Uses simple classification to group root types of familiar plants	LO <sub>1</sub> : AS <sub>2</sub> (within) Across FAL ; LO <sub>2</sub> ; AS <sub>1</sub>
Links with previous lesson :	links with next lesson :
Follows a lesson on different types of crops.	Vegetable adaptation (according to seasons)
Core knowledge :	Context :
life processes and healthy living. Green plants (vegetables)	School vegetable garden

Learning activities and assessment

Tuning in : Ask learners to mention examples of different types of vegetables.  
 E.g. ...

Give learners information sheet with names of different types of vegetables eg. Spinach, Cabb, Carrots and Beans.

Take learners to the garden to identify the structure of a plant eg. Tomato tree.

Let them pick up a tomato tree and identify parts like a root, stems, leaves, branches or fruit or flowers. Let them brainstorm the function of each part. Educator supports learners in stating functions of each part

Roots : plant uses them for water absorption the soil.

Stem : transport water and keeps plant firm and upright.

Branches : bear leaves, transport water and support the structure of a plant.

Leaves : through veins they support water and release water by means of transpiration.

Fruit/Flowers : produce fruit and nectar for making products like medicines and jams.

Conclusion !

Learners brainstorm advantages of having veg gardens in our home.

# Appendix 2a: School observation visit (cycle 1)



Province of the Eastern Cape  
 DEPARTMENT OF EDUCATION  
 ISEBE LEZEMFUNDO  
 DEPARTEMENT VAN ONDERWYS  
 Private Bag X0032, BISHO, 5605, SOUTH AFRICA

**ANNEXURE 1**

**Chief Directorate: Curriculum Management**  
 Siyasebenzisana • Working Together • Samewerking

**ANNEXURE 1: REPORTING AND RECORDING INSTRUMENT FOR SCHOOL SUPPORT VISITS**

Name of District: MBIZANA Date: 25-01-2007  
 Name of Curriculum Official: M.N. FINCA

Please indicate the primary purpose of your visit and the nature of interaction in the table below:

**A. PURPOSE OF THE VISIT**

Purpose of the Visit	Please indicate (✓) if the primary reason for visit is for monitoring, support purposes or both	
	Monitoring	Support
<b>NCS IMPLEMENTATION</b>		
→ NCS Planning	✓	✓
→ NCS Assessment	✓	✓
→ NCS Classroom implementation	✓	✓
→ Content knowledge development	✓	✓
<b>CLASSROOM PRACTICE</b>		
→ Teaching and learning methodologies	✓	✓
→ Classroom Management/organisation	✓	✓
→ Resource development/management	✓	✓
<b>LTSM</b>		
→ Selection/utilisation/management	✓	✓
<b>CURRICULUM COMMITTEES</b>		
→ Establishment/functionality	✓	✓
<b>OTHER</b>		
→ Needs Analysis	✓	✓
→ Data Collection	✓	✓
→ Learner support and welfare	✓	✓
Not specified above (Please indicate): <u>CURRICULUM</u> <u>MANAGEMENT</u>	✓	✓

Please indicate (✓) the nature of interaction to be used during the visit:

- Classroom visit
- Demonstration lesson
- Co-operative planning
- Team teaching
- School-based workshop
  - Grade 07 teachers
  - Phase
  - SMT
  - Whole staff
  - Other (specify)

Meeting (please specify):  
PHASE TEACHERS

- Cluster workshop
- Presentation
- Interview
- not specified above (please indicate)

**B. SCHOOL VISIT INFORMATION**

Name of School: NCURAJ.S.S. EMIS No. 500849  
Name of Principal: M.D. MVUNELO  
Name/s of teacher/s visited:  
MR P. MNISI  
.....  
.....  
Name of District Curriculum Official: MR M.N. FINCA  
Designation: SES  DCES  CES  | FP  IP  SP  FET   
Other (please specify): .....  
Learning Programme/Learning Area/Subject: NATURAL SCIENCE  
Other (please specify): MATHEMATICS

**B. OUTCOMES OF SCHOOL VISIT**

Section A provides a quick reference as to the purpose of the visit and the nature of interaction. In this section, please provide more specific details.

Details of purpose of visit: (be specific, e.g. to assist in the development of lesson plans)

The purpose of the visit is to check learning programme, work schedule and lesson plans. To check a year plan for assessment

Nature of interaction: (indicate sequence e.g. classroom observation, group discussion, individual meeting etc.)

Group discussion looking at how integration of environmental education is done in learning areas.

### C. REPORT ON SCHOOL VISIT

#### Activities

The school is doing well in curriculum activities although there is still a room for improvement.

#### Highlights of Visit (include strengths, positive comments about school/teachers/learners etc.)

The school is doing well in classroom activities and food garden. There is a ~~need~~<sup>need</sup> of cleaning outside the classroom e.g. to cut the grass and remove alien trees.

#### Challenges (include specific problems, concerns etc.)

There are about 26 alien trees which need to be removed. There are plants that are planted within the school which are not known by educators. The school is struggling without money.

#### Recommendations/follow up activities (address each challenge identified above and indicate strategies as well as timeframes for further assistance)

There is a need of fundraising by the school since it is a no fee school. Teachers should invite people from the community to explain the names <sup>and</sup> functions of plants that are planted at school. There should be team work amongst educators, learners and parents.

D. COMMENTS

Teacher/s comments

.....  
.....  
.....  
.....  
.....

Teacher/s signature: .....

Curriculum Official: Overall Comment

The district officials must do regular visit to the streets that are in the greening project. The SMT need to be workshopped about maintenance of the school especially greening part of the school. Supervision by all people should be done regularly.

M.N. FINCA  
Name of Curriculum Official

*M.N. Finca*  
Signature

M.S. MUNELO  
Name of Principal

*M.S. Munelo*  
Signature

School stamp  
NCURA J.S.S.  
P.O. BOX 290, FLAGSTAFF 4810  
PRINCIPAL: .....  
DATE: .....

25-01-2007

## Appendix 2b: School observation visit (cycle1)

### B. SCHOOL VISIT INFORMATION

Name of School: NTLALONTSHA J.S.S. EMIS No. 500 961

Name of Principal: MR. P.T. MSANA

Name/s of teacher/s visited:  
MISS T.P.I. LOKO  
MISS M.T. ZITHA

Name of District Curriculum Official: MR. M.N. FINCA

Designation: SES  DCES  CES  | FP  IP  SP  FET   
Other (please specify): .....

Learning Programme/Learning Area/Subject: NATURAL SCIENCE

Other (please specify): MATHEMATICS

### B. OUTCOMES OF SCHOOL VISIT

*Action A provides a quick reference as to the purpose of the visit and the nature of interaction. In this section, please provide more specific details.*

**Details of purpose of visit:** (be specific, e.g. to assist in the development of lesson plans)

The purpose of the visit is to check learning programme, work schedule and lesson plans. To check a year plan for assessment.

**Nature of interaction:** (indicate sequence e.g. classroom observation, group discussion, individual meeting etc.)

group discussion looking at how integration of environmental education is done in learning areas.

### HIGHLIGHTS OF VISIT

- The school managed to get R1180,00 from the vegetables they produced from the school garden.
- All teachers are interested to learn more about environmental education.

### CHALLENGES

- The school depends on water tanks for water only.
- No body is employed to maintain plants and vegetables at school.
- Teachers need to be assisted in planning.

**D. COMMENTS**

Teacher/s comments

Our problem is how to integrate environmental, <sup>education</sup> in learning areas e.g in mathematics.  
How to teach using indigenous plants.

Teacher/s signature: T.C.T LOKO

Curriculum Official: Overall Comment

The school is doing well in terms of curriculum management, school management and the educators are doing their best to improve learner performance. The RNCSS is implemented in all the classes / grades.

M.N. FINCA  
Name of Curriculum Official

*[Signature]*  
Signature

P.T. Msana  
Name of Principal



**Appendix 3a: Workshop evaluation form, Ntalontsha J.S.S. (cycle 2)**

08/02/2007

APPENDIX B

NTALONTSHA JUNIOR S. SCHOOL

- A

Evaluation Form

1. What did you learn from the workshop?

From the workshop I learn more about environment e.g. the importance of indigenous plants in our environment, wild plants, fruit trees - and root vegetables.

2. What did you like about the workshop?

I ~~was~~ <sup>am</sup> very interested in that workshop because I found that it is necessary for me to take care of my environment.

3. What did you not like about the workshop?

Nothing

4. Did you find the workshop challenging? Please explain your answer.

Yes! At first, it was not easy because we were dealing with different learning areas.

5. What do you think could have been done differently?

It could be good if the facilitator can take a week to conduct a workshop and demonstrate in the classroom.

6. Do you think the workshop was...(please tick)?

Too long	Long <input checked="" type="checkbox"/>	As long as it need to be	Not long enough
----------	--	--------------------------	-----------------

7. Which section or topic would you have liked to spend more time on?

3 hours per learning outcome

10. Do you think the content of the workshop was enough? If no what other topics do think should have been part of this workshop?

I think the content of the workshop was enough.

11. Have your expectations been met as initially table before the start of the workshop? If no which topic do you think was not covered?

My expectations have been met.

12. Please write any suggestions for change to the workshop space below.

I suggest that the workshop should be during the week end.

13. Please comment on the following about the trainers.

Rating: Please tick a box	1 Very bad	2 Poor	3 Average	4 Good	5 Excellent
Knowledge about subject					✓
Easily heard				✓	
Easily understood				✓	
Answered questions effectively				✓	
Encourage participant's involvement.				✓	

14. Please add any other comments you may have about the workshop.

The workshop was very interesting to because it motivated me to <sup>take</sup> care of my environmental - and it gives me more knowledge about Natural Science as a whole.

THE WORKSHOP TAUGHT ME ABOUT HOW TO CARE ABOUT THE ENVIRONMENT AND HOW IT MUST BE KEPT ALSO TO TAKE NOTE OF THE INDIGENOUS VEGETABLES THAT ARE IN OUR ENVIRONMENT

2. What did you like about the workshop?

THE WORKSHOP WAS VERY NICE BECAUSE EVERYBODY WAS FREE TO ASK QUESTIONS AND I GET SOME KNOWLEDGE ABOUT OTHER THINGS WHICH I DON'T KNOW

3. What did you not like about the workshop?

NOTHING

4. Did you find the workshop challenging? Please explain your answer.

YES IT WAS CHALLENGING BECAUSE IT WAS NOT EASY AT FIRST TO INTERGRATE ENVIRONMENTAL EDUCATION WITH OUR LEARNING AREAS

5. What do you think could have been done differently?

DO DO THE WORKSHOP OUTSIDE IN OUR SCHOOL GARDEN. LEARNERS BE INCLUDED WHEN DEMONSTRATING IN OUR SCHOOL GARDEN

6. Do you think the workshop was... (please tick)?

Too long	Long	As long as it need to be	Not long enough <input checked="" type="checkbox"/>
----------	------	--------------------------	---

7. Which section or topic would you have liked to spend more time on?

IN INDIGENOUS VEGETABLES AND FRUIT TREES

8. What do you think of the time management as a whole? (Please tick)

Very bad	Poor	Average	Good	Very good <input checked="" type="checkbox"/>
----------	------	---------	------	---

10. Do you think the content of the workshop was enough? If no what other topics do think should have been part of this workshop?

THE CONTENT OF THE WORKSHOP WAS ENOUGH

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---

11. Have your expectations been met as initially table before the start of the workshop? If no which topic do you think was not covered?

MY EXPECTATIONS WERE MET

---



---



---

12. Please write any suggestions for change to the workshop space below.

THE WORKSHOP SHOULD BE DONE AFTER HOURS

---



---



---

13. Please comment on the following about the trainers.

Rating: Please tick a box	1 Very bad	2 Poor	3 Average	4 Good	5 Excellent
Knowledge about subject					✓
Easily heard				✓	
Easily understood				✓	
Answered questions effectively				✓	
Encourage participant's involvement.				✓	

14. Please add any other comments you may have about the workshop.

I SUGGEST THAT THERE SHOULD BE WORKSHOP THROUGH OUT THE YEAR OR AFTER CERTAIN MONTHS SO THAT AS TO GET MORE KNOWLEDGE ABOUT OUR HEALTHY ENVIRONMENT.

---



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Thank you for taking the time to answer these questions.

Appendix 3b: Workshop evaluation form, Neura J.S.S (Cycle 2)

APPENDIX B

NEURA JUNIOR SEC. SCHOOL

08-02-2007

TEACHER C

Evaluation Form

1. What did you learn from the workshop?

The workshop made me to be aware of the environment of which we live. It also enabled me to differentiate between alien and indigenous plants.

2. What did you like about the workshop?

It was an eye opener and I learnt a lot from this workshop. Moreover, I think workshops of this nature should carry on.

3. What did you not like about the workshop?

Nothing

4. Did you find the workshop challenging? Please explain your answer.

It was challenging - the integration of other learning areas was not easy with the environment.

5. What do you think could have been done differently?

Learners to be included and actively involved when planting plants in the garden.

6. Do you think the workshop was... (please tick)?

Too long	Long	As long as it need to be	Not long enough <input checked="" type="checkbox"/>
----------	------	--------------------------	---

7. Which section or topic would you have liked to spend more time on?

The wild vegetables because learners showed interest and enthusiasm when we mentioned these wild vegetables.

8. What do you think of the time management as a whole? (Please tick)

Very bad	Poor	Average	Good	Very good <input checked="" type="checkbox"/>
----------	------	---------	------	---

9. Please rate the workshop as a whole. (Please tick)

Very bad	Poor	Average	Good	Very good <input checked="" type="checkbox"/>
----------	------	---------	------	---

10. Do you think the content of the workshop was enough? If no what other topics do think should have been part of this workshop?

*It was enough and interesting*

11. Have your expectations been met as initially table before the start of the workshop? If no which topic do you think was not covered?

*They were met with distinction*

12. Please write any suggestions for change to the workshop space below.

*The workshop should be done after hours*

13. Please comment on the following about the trainers.

Rating: Please tick a box	1 Very bad	2 Poor	3 Average	4 Good	5 Excellent
Knowledge about subject					X
Easily heard				X	
Easily understood				X	
Answered questions effectively				X	
Encourage participant's involvement.					X

14. Please add any other comments you may have about the workshop.

*The workshop should be conducted on an ongoing basis so as to familiarise ourselves with the content of the L.A. We can also gain more knowledge about the environment.*

Thank you for taking the time to answer these questions.

# Appendix 4a: Lesson Plan, Ntlalontsha J.S.S. (Cycle 3)

## APPENDIX C1

### LESSON PLAN

GRADE : 07

L/A : NATURAL SCIENCE

DATE : 14/02/2007

DURATION : ONE HOUR

CONTENT IN CONTEXT : LIFE AND LIVING (NUTRITION)

to verbal content of  
understanding of  
biology in general  
understanding of  
plants and animals  
understanding of  
plants and animals  
understanding of  
plants and animals

LO'S AND AS	LEARNING ACTIVITIES	DETAILS OF ASSES	SKILLS	BARRIERS TO LEARNING
<p>LO 2 CONSTRUCTING SCIENCE KNOWLEDGE Ass: Interprets information: Interpretation Information by identifying key ideas in text, finding facts, recording data, and making inferences from information in various forms.</p> <p>LO 3 Ass: APPLIES KNOWLEDGE: Applies conceptual knowledge by linking a taught concept to a variation of a familiar</p>	<p>Activity 1 Learners have to give types of plants they see in the school garden.</p> <p>Activity 2 Learners have to give the examples of leaf vegetables and root vegetables found in the school garden.</p> <p>Activity 3 Learners have to give food substances found in nutrition.</p> <p>Learners have to give an examples of each food substances.</p>	<p>FORMS Response to text Performance and Presentation.</p> <p>METHOD Teacher</p> <p>TOOLS memorandum and Rubric</p>	<p>Observing Listening Comparing Differentiate KNOWLEDGE Differentiate Explain fruit or vegetables</p>	<p>KNOWLEDGE Not understanding English Difficulty understanding of Science terminology.</p> <p>MULTI-LEVEL OF CLASS Level of understanding not the same.</p>
<p>LO 5 Ass: Select appropriate sources for the collection of data. Use simple questions and design and use questionnaires in order</p>	<p>Activity 4 Learners have to give definition of the word Nutrition</p>		<p>ATTITUDES AND VALUES Respect other views Sharing Co-operation Curiosity</p>	
<p>INTERGRATION ACROSS MATHEMATICS: LO 5 - Data Handling</p>				

To collect data to answer questions, - organises (including grouping) and recording data using tally's tables and stem and leaf display

Resources : Charts , Chalkboard

Expanded Opportunity : Learners should be given more functions for food & substances

TEACHER REFLECTION : Learners actively participating and curious about indigenous plants, learners were enjoying the lesson, There was a problem of language since learners were using first additional language and not their home language :

Appendix 4b: Assessment task, Ntlalontsha J.S.S. (cycle 3)

APPENDIX C1 (a)

GRADE: 7

L/A: NATURAL SCIENCE

DATE: 14/02/07

QUESTION 1

1. List the following plants:

- a) Leaf Vegetables
- b) Root Vegetables
- c) Fruit Vegetables
- d) Bulbous Vegetables (5)
- e) Tuberos Vegetables

QUESTION 2

a) Define Nutrition (2)

b) Give three reasons why you need food (3)

c) What type of food substances do you get in each type of food you eat. (6)

d) Mention one function of the following:

- i) Carbohydrates
- ii) Proteins
- iii) Fats and oils
- iv) Minerals
- v) Vitamins (10)

QUESTION 3

a) Give an example of an indigenous leaf vegetable.

b) Give an example of an indigenous root vegetables.

## MEMORANDUM

GRADE :- 07

L/A :- NATURAL SCIENCE

DATE :- 14/02/07

### QUESTION 1

- (a) Leafy vegetables → Spinach
- (b) Root Vegetables → Carrots
- (c) Fruit Vegetables → Tomatoes
- (d) Bulbous Vegetables → Onion
- (e) Tuberos Vegetables → Potatoes

### QUESTION 2

- (a) NUTRITION → Is the study of how our bodies need and use the nutrients that are found in the food we eat.
- (b) We need food in order
  - i) To grow
  - ii) To get energy
  - iii) To be healthy
- (c) Food Substances are
  - i) Carbohydrates
  - ii) Fats and oils
  - iii) Proteins
  - iv) Vitamins
  - v) Minerals
- (d) Functions
  - i) Carbohydrates → gives us energy in our bodies
  - ii) Proteins → Repair <sup>repair</sup> worn out tissues,
  - iii) Vitamins → protect our bodies

QUESTION 3

a) Leaf indigenous Vegetables

Umdumbu

Ucadolo

Intebe

b) Root indigenous Vegetables

Inkomfu

Inqoba

Amagele

c) Fruit indigenous Vegetables

Umsobo

Amajozi

Amagquzu

Appendix 4c: Completed assessment task, Ntlalontsha J.S.S (cycle 3)

APPENDIX C 1 (b)

Wardile Kheswa Grade 7 21/02/2007

Nutritional Science

Question 1 Classwork 27  
30

- a leafy vegetable Cabbage ✓
- b Root Vegetable Carrots ✓
- c Bulbous Vegetable Onion 5
- d Tuberosus Vegetable potatoes ✓
- e Fruit Vegetable Orange ✓

Question 2

Nutrition is a word for talk Government gives our food our schools

- 1 We eat Food for ~~they~~ us Grow ✓
- 2 We eat Food for Strong bodies ✓ 6
- 3 We eat Food for healthy and get Apartail

C

- 1 Porish <sup>get</sup> give us Carbohydrates ✓
- 2 Fruit Orange get us Vitamins ✓
- 3 Rama get us Fats and Oil ✓ 5
- 4 Milk get us Proteins and Oil
- 5 Salt get us Mineral Salt

- d Carbohydrates give us energy in our bodies
- e Proteins - Repair <sup>our</sup> worn out <sup>issues</sup> tissues in our bodies 8
- 3 Fats and Oil - give us healthy ~~diseases~~ against diseases
- 4 Mineral Salt
- 5 Vitamins Protect our bodies us healthy

Fats and Oil

Question 3

a Leaf vegetable

- 1 Umambumbu ✓
- 2 Ucadolo ✓

b Root vegetable

- 1 Inkomfete ✓
- 2 Inqoba

3

c Fruit vegetable

- 1 Umsobo ✓
- 2 Amalshweleshwe ✓

Appendix 5a: Lesson Plan, Neura J.S.S. (cycle 3)

APPENDIX C 2

LESSON PLAN TEMPLATE ON:

L.A. : NATURAL SCIENCES  
 FOCUS AREA : ROOT TYPES OF FAMILIAR PLANTS  
 GRADE : 07  
 DURATION : 2 HOURS

Learning outcomes and assessment standards: LO# 2 Constructing science knowledge. AS 2 : Categorises information. Compares features of different categories of plants, organisms and animals. bullet : 1	Intergration within: LO# 3 : Science, society and the environment. AS2 Intergration across: FAL : LO# 4 and LO# 5
Links with previous lessons: Different parts of a plant	Links with next lessons: Absorption of water by plant roots.
Core knowledge: life and living (plants)	Context: School garden with different types of crops.
Learning activities and assessment	
Learner activities: 1. 2. 3. 4.	Teacher Activities: 1. 2. 3. 4.
Planned Assessment for recording: learners are given a table to fill in characteristics of dicots and monocots.	Resources: school garden, textbooks
Details of Assessment: Forms: Oral presentations, e/works Methods: Group, teacher Tools: Rubrics	Teaching and Learning strategies: Co-operative group works, Discussions, question and answer.
Expanded Opportunities: learners bring plant roots from different plants and classify them	Teacher Reflection: The lesson was successful.
Barriers to Learning: Difficult terms like adventitious.	Remedial Strategies: Give learners more exercises in the textbook, Rewrite the test.
Critical Outcomes: CO 1,2,3	Developmental Outcomes: DO 3, 4
Skills :	Knowledge :
	Values and Attitudes:

## Learning activities and assessment

Tuning in: Ask learners to mention examples of different types of vegetables.

- Learners are grouped into groups and identify types of root systems.
  - Groups examine the root systems and look for depth in the soil and check whether plant is a taproot or a fibrous root.
  - Each group discusses about the development of each root system.
  - They draw and label each root type.
- Groups then discuss and decide which root system will allow the plant :-
- (a) To get water that is deep in the soil
  - (b) To get water from a very wide area
-

Appendix 5b: Learners work, Ncura J.S.S (cycle 3)

Somkanda Zukiye grade 07 15 February

13  
15

Natural Science class work

- 1. a) lettuce ✓
- b) cabbage ✓
- c) Spinach ✓

15/02/07

- 2. The roots absorb water and mineral the soil to the parts of the plants. Roots holds the plant.
- 3. A maize plant is an example of a monocot
- 4. A bean plant is an example of a dicot
- 5.

Structure	Monocotyledon	dicotyledon
1. Roots	Fibrous roots ✓	Tap Roots ✓
2. Stem	1 member <sup>vascular</sup> bundles ✓	Straight stem ✓
3. Leaves	parallel ✓	Looks like net ✓

- 6. Mambumbu ✓
- Unomambumbu ✓

Appendix 6a: Evaluation of the research (Ntlalontsha J.S.S.) (Cycle 3)

APPENDIX D I.

Q1

EVALUATION OF ENVIRONMENTAL EDUCATION RESEARCH

NAME OF SCHOOL: NTLALONTSHA J.S. SCHOOL

NAME OF THE PRINCIPAL: MR P.T. MSANA

SCHOOL ADDRESS: P.O. BOX 525  
FLAGSTAFF  
4810

NAME OF THE TEACHER INVOLVED: Ms T.C.I. LOKO  
Mrs N.T. ZITHUTHA

GRADE: 7

LEARNING AREAS: NATURAL SCIENCE

YEAR OF RESEARCH: 2007

THE ROLE OF THE TEACHER AT SCHOOL: Is to deal with environmental education at school amongst learner and colleagues.

THE WAY IN WHICH ENVIRONMENT WAS REFLECTED:-  
The environment intergrade in almost all the learning areas taught at school e.g Maths.

HOW USEFUL WERE THE ACTIVITIES IN THE WORKSHOP:-  
They broaden the knowledge about how to take care about the

DO TEACHERS FEEL PERSONALLY EMPOWERED AND MORE EFFICACIOUS? - The educators tried by all means to include environment in their learning areas after the workshop.

IS THE SCHOOL PRACTICE IMPROVED? - Yes, because the teachers were directed to do different duties based on environment education.

WHAT CAN YOU SAY ABOUT LESSON PLANNING? - By receiving a format from the facilitator it is easy to prepare a lesson.

WHAT SUGGESTIONS WOULD YOU MAKE FOR IMPROVING THE WORKSHOP? - It should not be done during the working hours because there is a lot to be done which is interesting. i.e. during the week end or have a special day for it.

GENERAL COMMENTS? - The workshop was interesting and it should be done regularly.

RECOMMENDATIONS? - The facilitator was fully prepared to present the workshop. He also advised the teachers how to integrate environment to all the learning areas. As the teachers we learnt a lot about environment, theoretical and practical. The facilitator must <sup>come</sup> to observe what the educators with learners are practising at school.

Appendix 6b: Evaluation of the research (Ncura J.S.S.) Cycle 3)

APPENDIX D 2.

02

EVALUATION OF ENVIRONMENTAL EDUCATION RESEARCH

NAME OF SCHOOL : NCURA J.S.S.  
NAME OF PRINCIPAL : M.D. MUUNELLO  
SCHOOL ADDRESS : P.O. Box 290  
FLAGSTAFF  
4810  
NAME OF THE TEACHER INVOLVED: MR P. MNISI  
GRADE : 7  
LEARNING AREAS : NS AND MATHS  
YEAR OF RESEARCH : 2007

THE ROLE OF THE TEACHER AT SCHOOL:

The interaction of environmental education with the lesson. Also to enable learners to be environmental aware. Environmental learning should influence what is taught and how it is taught

THE WAY IN WHICH ENVIRONMENT WAS REFLECTED:

It was reflected that environment is our life, what is around us. Each learning area to make its unique contribution in building an environmentally literate and responsible population.

HOW USEFUL WERE THE ACTIVITIES IN THE WORKSHOP:

They were interesting and thought provoking and I really enjoyed the workshop.

DO TEACHERS FEEL PERSONALLY EMPOWERED AND MORE EFFICACIOUS:

Teachers are empowered as the workshop is developmental and equip teachers with the latest teaching and planning skills.

IS THE SCHOOL PRACTICE IMPROVED:

Yes, it has improved a lot especially with regard to the healthy environment where we live eg. the school.

WHAT CAN YOU SAY ABOUT LESSON PLANNING:

It has empowered me a lot because it has all the features and the qualities desired.

WHAT SUGGESTIONS WOULD YOU MAKE FOR IMPROVING THE WORKSHOP:

If workshops should be conducted on an ongoing basis at least quarterly they can be effective to educators.

GENERAL COMMENTS :

I think workshops of this nature should be sustained as they develop educators.

RECOMMENDATIONS:

None

## **Appendix 7: Interview schedules**

### **Interview with Mr Mnisi at Ncura J.S.S. (before the teachers' workshop) (cycle 1)**

1. What is the intention of the lesson?
2. How do you plan to use the gardens for teaching?
3. What issues are you experiencing in your lessons?
4. Do you need any support with Lesson Planning?

### **Interview with learners at Ncura J.S.S. (before the teachers' workshop) (cycle 1)**

1. How was the lesson?
2. Is the use of the garden important for teaching and learning as a resource?
3. Did you understand the lesson and can you assist someone who has not understood the lesson?

### **Interview with teachers after the lessons (cycle 3)**

1. How did you find the lesson?
2. Do you need any further support with Lesson Planning?
3. Were you able to use what we did in the workshop in your planning?

## **SECTION 5**

### **REFLECTIONS ON THE PORTFOLIO**

#### **5.1 CHALLENGES**

##### **5.1.1 The challenges I come across during the research period**

The challenges that I come across when conducting the research include the following:

- Poor fencing at schools.
- Non-availability of water for plants at schools as a result water tanks were used for watering plants, although there are only a few water tanks.
- The failure on the part of the service provider to remove all alien trees at Ncura J.S.S.
- Shortage of money to employ enough people for the work to be done and to maintain plants at school.
- Shortage of garden equipment or tools.
- Poor attendance of parents when called for school meetings.
- Change of the allocation of subject teaching to different teachers, and teacher's leave periods which disrupted continuity of the process.
- Failure of learners' and teachers' to meet deadlines.
- Overload of work in my role as subject advisor where many demands are placed on us. This affected my ability to do the research, as sometimes I was not allowed to go out and do the research in the schools.
- High expectations by both the school and community members e.g. they expected financial assistance when doing interviews.
- At times I was not allowed to take photos and to record interviews.

#### **5.2 WHAT HAVE I LEARNED THAT CAN INFORM THE GREENING THE NATION PROJECT?**

I learned that the Greening the Nation Project in schools could have been better facilitated if SANBI had undertaken thorough stakeholder analyses before the time.

In this way they would have been able to establish better structures and roles within the project for various stakeholders. In this way, all community organisations could have been involved from the start, and could have been represented to avoid clashes. This would also have helped to better understand the needs of the communities before the action was taken. For example, community leaders like headman and councillors could have been given roles and responsibilities which would have helped the schools.

Since SANBI is running the Greening of the Nation Programme as well as Environmental Education throughout South Africa, for the country to recover the loss of biodiversity it is important to have workshops for all the stakeholders where greening is taking place so that people take action to improve their land care practices. These programmes are also addressing the poverty alleviation strategy that was declared by the National Government through the Extended Public Works Programme, therefore it is important to consider poor and unemployed people. As shown in this research, the Greening of the Nation Project can be sustained through encouraging the schools to incorporate the use of gardens in the Learning Areas. The research has also shown that the gardens themselves, supplemented by books and posters that are aligned with them, and relevant to the curriculum can improve the use of gardens as a resource for learning. Thus, SANBI could provide such resources to schools for the different Learning Areas, to help teachers make better use of the gardens (especially the indigenous gardens) for learning about biodiversity and plants in Natural Sciences. Supporting the professional development of teachers is also an important activity to consider, in partnership with the Department of Education.

### **5.3. WHAT HAVE I LEARNED ABOUT CURRICULUM CONTEXTUALISATION AND RE-CONTEXTUALISATION?**

I have learned that for the curriculum to be effective and meaningful to learners we need to contextualize and re-contextualize it, by looking at the background and the learner environment, for example, learners' use of indigenous plants in rural areas as this helps learners to make meaning in the learning process. This study has shown that curriculum emerges from the dynamic interaction of action, reflection and setting, not action and reflection alone, therefore it is important to contextualize and re-

contextualise it so that learners participate in teaching and learning with understanding. The study has also shown that contextualizing the curriculum is also dependent on teachers' knowledge (e.g. of indigenous plants, and of the assessment requirements). Active approaches to learning are also an important aspect of contextualizing the curriculum, involving different methods.

#### **5.4 WHAT HAVE I LEARNED ABOUT THE CONTEXT I WORK IN?**

From the learner responses to the lessons (Section 4) and their interests in the gardening activities (Section 3) it is encouraging to see that learners in schools that are participating in Greening the Nation Programme have positive attitudes towards the environment and using the gardens for learning. In particular it was encouraging to see how this helps them to make meaning in the learning process.

Having said this, I have also noticed that the Department of Education is failing to implement environmental education in all the schools because only those schools that are involved in environmental projects like Greening the Nation Projects are incorporating environmental education into the Learning Areas. In the context that I work in, all the subject advisors like myself need to understand the potential that environmental education activities have for enhancing learning in schools, so that they can monitor and conduct workshops when there is a need. As indicated environmental learning is now an integral part of the Learning Areas in the NCS, and is therefore relevant to all Learning Areas.

In this study I have learned that there are many environmental issues that are facing people and that they should be empowered to address these through education processes. For example, learners and communities need to be able to control deforestation, desertification, soil erosion, overgrazing, veld fires and how to practice farming (Section 2). I have learned that the Natural Sciences Learning Area provides opportunities for such learning, as do other Learning Areas. I have learned that for the Department of Education to sustain environmental education, planning must aim at developing environmentally literate learners; that is, to equip the learners with action competence (knowledge, skills, values and attitudes) that will enable them to participate and contribute responsibly as citizens in a democratic society in order to

solve environmental problems and sustain living conditions. From the above aim, it can be deduced that the role of environmental learning in the Learning Areas is to assist learners with:

- Knowledge and understanding associated with environmental issues.
- Skills necessary and relevant to participating and contributing responsibly to the resolution of environmental issues.
- Attitudes and values necessary for effective participation in environmental issues.

#### **5.4 CRITICAL REFLECTION ON THE RESEARCH PROCESS**

I found the research process to be a process of ongoing learning. Through the three projects I was able to discover what happened before (through the historical research and the contextual profiling), what is happening currently (from the stakeholder analysis and the observations of teachers practice) and what could happen in the future (from insights into how the stakeholders could assist the community, and from the recommendations for improving lesson planning). In particular, the research has given me close insight into how the teachers plan, teach and assess. The research process has also helped me to understand the roles and interests of the stakeholders (community members, SANBI, department of agriculture, ward counselor and SGBs') in teaching and learning.

I have also learned a lot about the process of doing research. For example, I learned that the research demands the resources and a lot of time for it to be a success. It demands patience and knowledge of how to handle the participants, because the participants always think that the researcher will assist them in overcoming their domestic problems. I have learnt that when doing the research, my research plans were always affected by prevailing circumstances in the research site. I overcame the challenges by negotiating with the affected stakeholders, in assisting one another for the successful implementation in the programme.

I have also learned that it is not easy to manage a lot of data, and that it is important to keep accurate records of what people say. I also found it difficult to interpret what

they say in relation to the research questions and the literature, and this took time. It was also difficult to manage the process of writing critically about what I saw, and I slowly learned to see more about what was happening in the research site from using literature. It was also difficult to manage this research within a work context that places high demands on one's time.

## **5.6 RECOMMENDATIONS**

In closing this study, I make brief recommendations based on the three studies together. The recommendations are targeted at SANBI (who is implementing the Greening the Nation Project), the DoE (who is the custodian of the schools, and who are responsible for the quality of teaching and learning), and the schools themselves (who are responsible for Learning Outcomes achieved by the learners, and the quality of the learning experience offered to learners).

### *To SANBI:*

- To continue supporting the schools to maintain and sustain the gardens through mobilizing multi-stakeholder support
- To strengthen the partnership with the Department of Education to provide adequate professional support for teachers involved in the programme to use the gardens as a resource for learning
- To provide LTSMs that can be used in conjunction with the gardens in the different Learning Areas as resources for learning.

### *To the DoE*

- To support teachers to understand and implement the environmental learning aspects of the NCS through workshops, follow up and ongoing monitoring.
- To support teachers with appropriate assessment practices that address the Assessment Standards and Learning Outcomes
- To support schools to finance the school improvements that are linked to the gardening practices

### *To the two schools involved in the study*

- To continue with the progress being made with Lesson Planning, and to make continuous use of the gardens as a resource for learning, given their strengths in helping learners with meaning making and integrating everyday knowledge with school knowledge (science concepts).
- To take responsibility by establishing environmental education structures in the school that can support integration of environmental learning into all Learning Areas.
- To make use of the stakeholder contributions to enhance the greening project, and teaching and learning in the school.

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