

**RHODES UNIVERSITY
DEPARTMENT OF EDUCATION**

**An exploration of school-community links
in enabling environmental learning
through food growing:
a cross-cultural study**

VOLUME 1 of 2

by

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Abstract

An exploration of school-community links in enabling environmental learning through food growing: a cross-cultural study

or

The importance of being earnest.

Agricultural and educational researchers recognize the critical value of an integrated, multidisciplinary approach to education in building a food-secure world, reducing poverty, and conserving and enhancing natural resources. However, schools generally contribute little to communities in the context of food growing and environmental learning. The main objective of this qualitative research was to explore the role of school-community relationships in enabling environmental learning in the context of food growing activities. Findings suggest that the role of school-community links in enhancing environmental learning is more likely where community members are actively involved in school programs that have an emphasis on an experiential learning approach. However, this depends to a large extent on the availability of parents or concerned community members and their willingness to engage in voluntary school-based activities. Factors that could potentially strengthen the role of school-community links in supporting environmental learning include: allowing space for informal learning, mediating learning in civil society settings, ongoing facilitation by a committed coordinator, community buy-in and accountability, and addressing public interests through tangible benefits. A major challenge is to find an appropriate balance between social justice and practical food security concerns, while remaining true to ecological considerations.

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List of acronyms / abbreviations

AEI	Africa Education Initiative
AF	Agroforestry
AIDS	Acquired Immune Deficiency Syndrome
Agri SA	Agri South Africa
ANAFE	African Network for Agriculture, Agroforestry and Natural Resources Education / African Network for Agroforestry Education
CBO	Community-based organisation
CCE	Cornell Cooperative Extension
CGIAR	Consultative Group on International Agricultural Research
CIDA	Canadian International Development Agency
CIIFAD	Cornell International Institute for Food, Agriculture, and Development
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo (International Maize and Wheat Improvement Center)
CSA	Community Supported Agriculture
DFID	Department for International Development (UK)
ETDP	Education, Training and Development Practices (South Africa)
EE	Environmental education
EEASA	Environmental Education Association of Southern Africa
EFA	Education for All
ESD	Education for Sustainable Development
FAO	Food and Agriculture Organisation of the United Nations
FEE	Foundation of Environmental Education
FFA	Future Farmers of America
FGF	Food Gardens Foundation
FoF	Farmers of the Future
GBL	Garden-based learning
GM	Garden Mosaics
GMO	Genetically modified organism
HIV	Human Immuno-deficiency Virus
HPS	Health Promoting Schools
ICRAF	World Agroforestry Centre (International Centre for Research in Agroforestry)
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDRC	International Development Research Centre
IFT	Indigenous fruit tree
IIED	International Institute for Environment and Development

IIEP	International Institute for Educational Planning
IK	Indigenous knowledge
IUCN	World Conservation Union / International Union for Conservation of Nature and Natural Resources
LEAP	Leadership Enhancement in Agriculture Programme
LO	Learning Outcome
MDG	Millennium Development Goal
MLPTS	Multi-purpose leguminous tree species
NAAEE	North American Association for Environmental Education
NCS	National Curriculum Statement
NEPAD	New Partnership for African Development
NGO	Non-governmental organisation
NPO	Non-profit organisation
NRM	Natural resource management
NSF	National Science Foundation
NYC	New York City
PTA	Parent and Teachers Association
REEC	Regional Environmental Education Centre
RELMA	Regional Land Management Unit (of Sida)
RUAF	Resource Centres on Urban Agriculture and Food Security
RUEESU	Rhodes University Environmental Education and Sustainability Unit
SADC	Southern African Development Community
SAIE	South African Institute for Entrepreneurship
SA-RAFT	Southern Africa Regional Agricultural Forum for Training
SDC	School Development Committee
SGB	School Governing Body
Sida	Swedish International Development Agency
TALULAR	Teaching And Learning Using Locally Available Resources
UK	United Kingdom
UNDESD	United Nations Decade of Education for Sustainable Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
USA	United States of America
USAID	United States Agency for International Development

USDA	United States Department of Agriculture
WEEC	World Environmental Education Congress
WEHAB	Water Energy Health Agriculture Biodiversity
WESM	Wildlife and Environment Society of Malawi
WESSA	Wildlife and Environment Society of South Africa
WFP	World Food Programme

Grammatical abbreviations

<i>ad hoc</i>	improvised or impromptu (Latin: <i>ad hoc</i>)
anon	anonymous
<i>ca</i>	approximately (Latin: <i>circa</i>)
<i>et al</i>	and others (Latin: <i>et alibi</i>)
<i>ibid</i>	cited just before (Latin: <i>ibidem</i>)
nd	no date
np	no page numbers
pers comm	personal communication



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¹ Retrieved February 3, 2009, from <http://www.freewebs.com/authorco-op/ir.htm> and December 7, 2009, from <http://www.baylor.edu/christianethics/CatechismArticleGriffin.pdf>

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1. INTRODUCTION

Understanding is not a private possession to be protected from theft, but rather a capacity to be developed through the free exchange of ideas (Martha Stone Wiske 1994: 19).

1.1 Background

This study is conducted in the context of a complex and changing environment in which issues such as poverty, food security and health draw attention to the need for strengthened educational processes in southern Africa. Humankind faces a legacy of environmental degradation and risk to human livelihoods, a context in which the design and implementation of educational programmes to promote sustainable agriculture is essential. Research by Temu (2004: 9) suggests that most school children in rural areas in southern Africa land up farming and conducting trade in agricultural products, despite their low levels of understanding or practical knowledge. This places agricultural output at risk, which in turn has implications for food security, nutrition and health. A multidisciplinary approach that integrates agricultural education and “Education for Sustainable Development”, supported by contextually relevant curricula and learning support materials, active and experiential learning, and school-community links, has been recommended as a way of addressing poverty, food security and health (Vandenbosch, Taylor, Beniest & Bekele-Tesemma 2002: 29). However, Vandenbosch, Sambili, Tombo and Whitehead (2004: 25) found limited evidence to link the quality or relevance of education with improved agricultural production required to build a food-secure world, reduce poverty and conserve and enhance natural resources. Furthermore, in the context of food growing and environmental learning, Jacquet de Haveskercke (2004: 63) suggested that schools contribute little to communities. It would seem, therefore, that education researchers and practitioners should be open to new ways of responding to sustainability challenges in the agricultural sector and to strengthening the educational focus of food growing activities.

This research was conducted under the auspices of the USA-based Borlaug Leadership Enhancement in Agriculture Programme and in collaboration with Cornell University and the World Agroforestry Centre / ICRAF (International Centre for Research in Agroforestry) in Malawi. The Borlaug Leadership Enhancement in Agriculture Program (LEAP) is a fellowship programme that falls under the ambit of the United States Department of Agriculture’s (USDA) Norman E Borlaug International Agricultural Science and Technology Fellows Programme. It was established in 2005 through the collaborative efforts of the United States Agency for International Development (USAID) – which provides the funding – Texas A&M University, the International Maize and Wheat Improvement Center (CIMMYT), the University of California, Davis, and the

USDA (Borlaug LEAP nd: np). The programme focuses on the development priorities of USAID-assisted countries, including support of agriculturally based research in Sub-Saharan Africa and the advancement of developing countries in order to improve food security and support social, economic and political stability (*ibid*).

The Borlaug LEAP grants funding to “outstanding graduate students to support internships of up to 12 months at a CGIAR international agriculture research center” (*ibid*). The fellow works under the guidance of a mentor from a recognised USA-based university, in collaboration with an experienced scientist at a Consultative Group on International Agricultural Research (CGIAR) centre. The researcher was among the first group of fellows to join the Borlaug LEAP programme in 2006, and spent a month at an approved CGIAR centre in order to conduct research that addressed the criteria of the Borlaug LEAP, namely, agricultural development and associated fields of endeavour. See Appendix A.

The USA mentor identified a CGIAR centre in Malawi where research was being conducted on strategies for productive and sustainable land-use. The CGIAR researcher, based at the World Agroforestry Centre (ICRAF) in Lilongwe, was working with adults and children in his investigation of the domestication and improvement of indigenous fruit trees – as part of an initiative aimed at starting a ‘Tree Revolution’ (CGIAR 1995: np). At the time, his work was becoming aligned with an educational initiative called the Farmers of the Future. This context offered potential for the researcher to explore the role of school-community links in educational processes aimed at addressing sustainability concerns.

In addressing the objectives of the Borlaug LEAP in this study, it was considered important to explore ways of responding appropriately to agricultural practices that impact negatively on environmental sustainability. Many agricultural researchers have responded by including environmental education, as noted by Jackson (2003: 108). The synergies that the Borlaug LEAP has with environmental education research are already apparent in its links with the CIMMYT – an NGO that supports education and training in addition to research and development (R&D). In this study, it was considered appropriate to collaborate with one of the five CGIAR centres located in Africa, in order to draw on experience and solutions relevant to the African context.

1.2 Objectives of research

The primary objective of this research is to explore the school-community relationship in the context of food gardens, agricultural and/or agroforestry activities – referred to generically as food growing – and its role in enabling environmental learning and action. This will be consid-

ered in terms of a broader understanding of curriculum, namely, (i) contextual factors, (ii) pedagogic approach and (iii) curriculum content.

The way in which **contextual factors** influence school-community links, food growing activities, and environmental learning is explored. This includes consideration of the place in which food growing occurs, what motivates schools or communities to grow and/or harvest food plants, and how formal learning may contribute to school children's futures. The way in which **pedagogic approach** influences school-community links, food growing activities and environmental learning is explored. This includes consideration of how teaching and learning take place, whether formal or informal, what learning support materials educators use, and what conditions promote intergenerational learning and mentoring. Similarly, the way in which **curriculum content** influences school-community links, food growing activities and environmental learning is explored. This includes consideration of scientific knowledge and research, community-based knowledge, food growing or agricultural practices, and environmental concerns. The aforementioned three strands of inquiry may in turn provide some idea of what the key ingredients are for sustained, effective and relevant food growing projects that promote food security, nutrition and health, as well as learning for sustainability.

The naturalistic methodology of this study is considered appropriate for exploring a broad range of issues, while recognising human action as meaningful, complex, unique to particular contexts, and responsive to variable and changing situations. The symbolic interactionist approach, which engenders symbolic meaning to social action, helps the researcher see situations through the eyes of research participants and recognise how particular actions may be shaped by the way in which others interpret it. Investigation of food growing activities in South Africa, Malawi, Zambia and New York in the United States of America (USA) reveal a number of ways in which education for sustainability may be supported through school-community links in the context of food growing. As is the case with *The Making of Green Knowledge*, this dissertation is one of juxtapositions, drawing on "past and present, local and global, national and international, academic and activist, personal and political" (Jamison 2001: 36).

The conceptual framework emerging from this study is intended to support environmental learning through school-community links in food growing settings, with the intention of stimulating further questions and generating not only responsive but also pro-active approaches to promoting social change and sustainability. These tentative guidelines should not be seen as comprehensive but as a contribution to the ongoing process of 'education for sustainability'.² An assumption un-

² The term 'sustainability' is used in this report for pragmatic purposes. The reader should remain conscious of the contestable nature of knowledge, and hence of the numerous possible interpretations of 'sustainability' and 'sus-

derpinning this research is that the lessons learned from cases in the Malawi and the USA could be applied – at least in a modified form – to the South African context.

1.3 Structure of dissertation

The research dissertation forms the body of Volume 1. An introductory overview of the research was provided in this chapter. Chapter 2 reviews the literature and other sources in order to shed light on the contextual factors in this research. In Chapter 3, the research process is described, including research orientation, methodology, data analysis, and concerns relating to research ethics, validity and trustworthiness of the research. In Chapter 4, the emerging issues from site and place are presented. Chapter 5 discusses the emergent concepts, based on the findings. These are synthesised in Chapter 6, including a conceptual framework, and the research findings are critically evaluated. The dissertation is concluded with a number of suggestions and possible future research directions, followed by a reference list. A collection of appendices is provided in Volume 2.



tainable development'. The author suggests that a meaningful interpretation of 'sustainability' would include reference an alignment of our social and cultural practices with the sustaining capacities of our life-supporting ecosystems.

2. CONTEXTUAL FACTORS and LITERATURE SURVEY

‘More clever’ does not mean ‘ecologically wise’:
*A frog will... sit calmly in water brought slowly to a boil. Cumulative processes of climate change, soil erosion, deforestation, species extinction, and acid rain are slowly bringing **our** water to a boil... the most destruction has been caused by educated peoples* (David Orr 1992: 149).

In this chapter, the contextual features of the study are outlined and discussed, drawing on relevant literature as well as other sources. Attention is drawn to the interrelatedness of issues such as population growth, agriculture, socio-cultural factors and environmental degradation, and how this impacts on food security. This leads into discussion regarding modern agricultural technologies, traditional ecological knowledge, sustainable agriculture, and research and development in agriculture and agroforestry. The links between agroforestry, urban agriculture and food security are demonstrated, followed by consideration of ‘education for sustainable development’, concepts linking food growing and education, and various educational initiatives linked to food growing. Relevant aspects of education research and theory are discussed, including types of learning associated with food growing and the role of ‘place’ in learning. Discussion of school-community links in the context of food growing, a central focus of this project, includes consideration of the role of garden-based learning and educational practices, and the implications for environmental sustainability and food security.

2.1 Population growth, environmental degradation and food security

... producing a decent diet for 3 billion people would require less cultivated land, less intensive farming, less disruption of natural ecosystems, less freshwater, and less energy for production and transportation [than with 30 billion] (Thomas Prugh & Erik Assadourian 2003: 12).

All countries in the southern African region are former European colonies, in which large areas were utilised for livestock farming and agriculture. Unchecked population growth, overcrowding, poor farming methods and over-exploitation of environmental resources has led to widespread land degradation. This undermines food security, economic growth and human development. It should be noted that the purpose of this section is not to allocate blame to one or another group, but to highlight the key issues pertaining to the topic of this research. Environmental degradation and food insecurity are closely linked to the state of agriculture, increasing population pressure and socio-cultural factors.

2.1.1 Population growth

Population growth places pressure on natural resources, diminishing ecosystem services and undermining food production capacity. Sen (2008: np) asserted that “while population growth accounts for only a modest part of the growing demand for food, it can contribute to global warm-

ing, and long-term climate change can threaten agriculture”. Groups like Population Communications International and Population Crisis Committee appear to have done little to effectively address the issue. Scientists have stressed the urgency of the situation:

I believe we agricultural scientists have a moral obligation to warn the political, educational, and religious leaders of the world about the magnitude and seriousness of the *arable land, food and population problems* that lie ahead. (Borlaug quoted in Hesser 2006: 205)

Others (Jahan 2003: 5-6; Tiffen *et al* quoted in Fabricius, Folke, Cundill & Schultz 2007: 29) present an alternative view, suggesting that in some cases higher population density may contribute to innovative management practices that support environmental sustainability. However, many experts and agriculturalists agree that population growth has played a key role in depleting soil fertility and food security (Borlaug 1996 in Gabre-Madhin & Haggblade 2003: 25; Law 1996: 4; Prugh & Assadourian 2003: 12; Sanchez *et al* 1997 in Gabre-Madhin & Haggblade 2003: 15). Where subsistence farming is practiced, growing population numbers leads to diminishing availability of farmland, thus limiting opportunities to leave lands fallow or practice ‘shifting cultivation’ (Sanchez *et al* 1997: 15).

Population growth has also been linked to diminishing quality of education, and to increased unemployment. Matanzima (quoted in Malherbe 1977: 560) believed that large numbers of children would reduce the quality of education. A study conducted by Joubert (quoted in *ibid*: 608)³ showed that without education, people tend to resist new ideas or better practices, and are less resilient to social, economic and environmental change. Matanzima (quoted in *ibid*: 560) stated that without “planned parenthood as a national way of life, the prosperity for which we yearn will elude us for ever”. There has been little educational response to this insight.

2.1.2 The role of agriculture in environmental degradation

According to a UNESCO (2008) report, “35% of the earth’s severely degraded land has been damaged by agricultural activities”. Modern agriculture is considered to be the third worst cause of environmental degradation after industry and transport (Gichuki, in Vandenbosch, Sambili, Tombo & Whitehead 2004: 87). Damage to living and non-living components of the biophysical world – termed ‘environmental assets’ by Narayan (2000: 39) is a threat to human food security.

³ Joubert’s findings (quoted in Malherbe 1977: 608) posed a direct challenge to the discriminatory practices of the apartheid system. He found that racially biased employment strategies had a negative effect on the country’s economy. The same logic may be applied to current affirmative employment policies in South Africa, which suggests that such processes should be approached with due care, or that the current regime should learn from the mistakes of the apartheid regime.

2.1.2.1 Use of land

Natural areas may be a source of wild foods and thus support dietary diversity in humans (Johns & Sthapit 2004: 144-145). Clearing natural vegetation for agriculture reduces genetic diversity and habitat for natural enemies of crop pests – examples are given by Annecke and Moran (1982). It also exposes the soil to natural elements, leading to increased wind and water erosion. Repeated ploughing breaks down the soil structure, and kills earthworms – natural ‘fertility engineers’ (Blane pers comm May 23, 2008). The ground below ploughing level becomes compacted, causing poor root penetration and water absorption. Excessive crop-growing also leads to diminished mineral levels and organic matter in the soil and reduced fertility, and erosion exacerbates the loss of phosphorus in the soil (CGIAR 1995: np; Garrity 2004: 7; Law 1996: 3; Raven, Evert & Curtis 1981: 552). Deficiency of phosphorus and nitrogen in food crops, and thus in human diets, has negative consequences for human growth and health (CGIAR 1995: np).

2.1.2.2 Use of water resources

Crop irrigation requires reliable water supplies. As demand for water increases, resources may become ‘over-allocated’. In the Eastern Cape of South Africa, hydrologists at the Department of Water Affairs and Forestry (DWAF) state that no more water is available from the Orange River system and Gariep Dam – some of which is already transferred into the Great Fish River system (Muller pers comm March 7, 2008). Harvesting rainwater off rooftops does not appear to be common in food gardens (Sherman 2007: 14). Unsustainable water use, drought and climate change pose a threat to agriculture, and thus to food security (Johns & Sthapit 2004: 145).

2.1.2.3 Reliance on plant species

Dependence on crop species that exacerbate loss of soil fertility, for example, maize (*Zea mays*) (Chakeredza pers comm May 25, 2006) poses a threat to human food security. By the 1950s maize – introduced into Africa in the 16th century – had become the third most popular source of starch for human consumption (Miracle quoted in Gabre-Madhin & Haggblade 2003: 18).

2.1.2.4 Use of chemicals

The correct application of fertiliser increases agricultural yields, but may be undermined by logistical challenges such as timing, cost or incorrect application rates, and thus negligible improvements in yields (Akinnesi, Kwesiga & Makumba 2004: 1). Where profitability of agriculture has increased, crop-growing areas have expanded; this is linked to further bush-clearing and deforestation (Angelsen & Kaimowitz 2001: 3-4). In their efforts to maximise production, farmers may be tempted to overuse fertilisers, which have negative consequences for groundwater and aquatic systems.

Chemical pesticides and herbicides mitigate crop damage, but also have negative consequences. While there has been a tenfold increase in the use of pesticides since 1945, insect damage to food crops has in many cases increased as they develop resistance to the ingredients (Annecke & Moran 1982: 70, 105, 123, 265; Carson 1962: 220-224, 239; Orr 1992: 172).

2.1.2.5 Use of fossil fuels

Fossil fuels are used to run machinery and equipment in modern agriculture, and are an essential ingredient in fertilisers, pesticides and herbicides. The global decline in fossil fuel reserves has serious implications for modern agriculture. Various experts infer that world peak oil production was probably reached in 2006, and that oil production will decline by 7% per annum (Brown, quoted online by Wilson 2007, November 20). Increasing fertiliser and fuel costs contribute to higher food production costs, with serious consequences for poor communities. Growing crops for biofuels – instead of food – also poses a threat to food security (UNESCO 2008).

2.1.3 The role of socio-cultural factors in environmental degradation

Agriculture in Africa, prior to colonisation, used indigenous food plants (Gabre-Madhin & Haggblade 2003: 4).⁴ Communities began to favour introduced crops like maize⁵ because it has higher yields, even though it is less tolerant to drought. Small-grain crops like sorghum and millet, which are vulnerable to decimation by birds, require labour-intensive processing and have lower economic returns, have lost popularity (Chakeredza pers comm May 25, 2006). Preference for growing maize, together with increasing population numbers, has implications for further environmental degradation and food insecurity, as noted in 2.1.1 and 2.1.2.

While increased productivity on existing farmland may reduce the demand for new land, and thus maintain sustainable ecosystems, Angelsen and Kaimowitz (2001: 2-3) suggested that this is a naïve presumption and that increased profitability would encourage an expansion of agricultural land use, thus accelerating deforestation. In discussing land distribution and tenure issues, Jahan (2003: 15) suggested that marginalisation of poor – often indigenous⁶ – people leaves them with little option but to live off inferior land, thus causing further environmental degradation.

⁴ Indigenous food plants in Africa include Sorghum (*Sorghum bicolor*), millet (*Eleusine coracana*), cowpea (*Vigna unguiculata* subsp. *unguiculata*), coffee (*Coffea* spp), palm oil (*Elaeis guineensis*), yams (*Dioscorea* sp), and African rice (*Oryza glaberrima*).

⁵ Maize is used to make ‘mieliemeal porridge’, ‘putu’ or ‘pap’ (South Africa), ‘ntsima’ (Malawi), ‘grits’ (parts of North America), and ‘polenta’ (widely used in Western Europe and the UK).

⁶ This term is used in the anthropological context. It has been suggested that the use of the word ‘indigenous’ in educational texts should be reconsidered in light of the wave of xenophobic attacks by ‘indigenous’ people on non-indigenous / alien immigrants in different parts of Africa and other parts of the world.

Fromm's (1976) vision for a 'being' mode in human society may be considered idealist or utopian by some scholars.⁷ However, it makes for an interesting thought experiment to consider the global impact of a loving attitude and concern with "shared experience and productive activity" on the sustaining capacities of our life-supporting ecosystems. A shift towards a new way of thinking and being is reflected in a ground-breaking report produced under the auspices of the International Institute for Environment and Development (IIED):

We are oriented towards *being* [emphasis added], rather than having. The same principle inspired our conversations and is at the center of all our attitudes, behavior and gazing. It is not a doctrinal or ideological principle. It is born from the heart, not the mind. Its name is spirituality. (Estevá *et al* 2007 quoted in Pimbert 2008: 55)

Pimbert (2008: 53) referred to critical social movements that are challenging current perspectives of food, agriculture and the 'good life' and proposing "radical pluralism and democracy, personal dignity and conviviality, autonomy and reciprocity, and other principles that affirm the right to self determination". This new social consensus, emerging from a grassroots movement (*Towards a Consensus of the Peoples*), is detailed in Appendix B.

2.1.4 Human livelihoods and food security

Modern farming methods, while to a large extent addressing food security challenges, have often had negative impacts on natural resources and biodiversity, as noted in 2.1.2. The implications are that food shortages will become more common (Qualman quoted in National Farmers Union 2007, May 11). As a result, "poor people [are] vulnerable to high food prices, [even] though they are also highly productive" (UNESCO 2008: np).

It should be noted, however, that reverting to pre-modern agricultural practices will also not address current poverty and food security concerns. In 2008, South Africa became a net importer of food. This has been linked, in part, to the conversion of large commercial farms – which previously generated excess produce that can be stockpiled for lean times – to low-production subsistence farms (Transcend Africa Network 2008; Irwin pers comm November 14, 2008). It would seem that one of the most profound challenges at the heart of establishing a new socio-cultural and economic order lies in finding an appropriate balance between social justice and practical food security concerns, while remaining true to ecological considerations. Humankind faces a legacy of environmental degradation and risk to human livelihoods, a context in which the design and implementation of educational programmes to promote sustainable agriculture is essential.

⁷ In some parts of southern Africa, school-going children (and those in their late teens or early twenties) are referred to as 'learners'. In this report the term 'scholar' is used.

2.2 Agriculture and food security

A new front should be opened on the war against hunger, inadequate shelter, and environmental degradation. This war can be fought with weapons that have been in the arsenal of rural people since time immemorial, and no radical change in their lifestyle will be required. This can best be accomplished by the creation of an internationally financed council for research in agroforestry, to administer a comprehensive program leading to better land use in the tropics... Beyond question, agroforestry can greatly improve life for people in the developing world, and do so within a reasonably short time (John Bene 1978 quoted in Dennis P Garrity 2003: np).

Agriculture may be defined as:

... the science and practice of activity related to food, feed, and fiber production, processing, marketing, distribution, utilization, and trade, and also includes family and consumer sciences, nutrition, food science and engineering, agricultural economics and other social sciences, forestry, wildlife, fisheries, aquaculture, floriculture, veterinary medicine, and other environmental and natural resources sciences. (Borlaug LEAP nd: np)

There have been various attempts over the millennia to address food security concerns; an interesting and accessible overview of the ‘Agricultural Revolution’ is provided by Law (1996). During the ‘Green Revolution’, the development of genetically improved food crops, together with fertiliser, irrigation and pesticides, was an attempt to increase productivity on existing farmland (Angelsen & Kaimowitz 2001: 2; Hesser 2006: 177).

2.2.1 Modern agricultural technologies

A number of modern technologies were touched on in section 2.1.2. Brief consideration will be given here to the role of the Green Revolution and genetically modified organisms (GMOs) because of their impact on food production and hence human food security.

2.2.1.1 The Green Revolution

In the 1940s, the vision for addressing hunger and poverty in developing countries led to the development and distribution of genetically improved wheat and rice varieties, together with the use of chemical fertiliser. This became known as ‘the Green Revolution’ – an innovative period of research, extension, and infrastructural development. It transformed agriculture in many developing nations. For an overview of the research conducted by Borlaug, the ‘father of the Green Revolution’, the reader may refer to Hesser (2006) and Borlaug LEAP (nd). See also section 1.1.

High-yield technologies were purported to save ecosystems by reducing the demand for new farmland – the ‘Borlaug Hypothesis’. However, Angelsen and Kaimowitz (2001: 2-3) asserted that this probably only held true for aggregate worldwide food production. They identified three main factors that influence the relationship between high-yield technologies and forest conservation: (i) the type of technology used, (ii) the context (market access and output, property rights and land access, labour market, access to credit, and agro-ecological conditions), and (iii) the

characteristics of the farmer (*ibid*: 6-7). According to Boserup's hypothesis (quoted in *ibid*: 6), as long as potential unutilised farmland exists, farmers in specific situations will choose to expand their cultivation area, using labour-saving technologies (such as equipment), rather than to intensify agricultural production using technologies that save land (such as fertilisers). In other words, agricultural intensification is not a necessary outcome of technological improvement.

2.2.1.2 Genetically modified organisms (GMOs)

The topic of GMOs is beyond the ambit of this research, so will be noted briefly. GM seed is costly to buy, and hence tends to be inaccessible to poor communities. The planting of genetically modified crops is associated with high yields, but the resultant crops produce non-viable seeds. Distribution of free GM seed to poor communities thus tends to create a cycle of dependency, which raises ethical questions.

2.2.2 Traditional ecological knowledge and sustainable agriculture

Various sources have identified sustainable agriculture and natural resource management (NRM) as key to mitigating poverty and food security concerns in Africa (Secretariat of the Convention on Biological Diversity nd: np; ICRISAT 2004: np). There appears to be a trend towards complementing modern farming systems with traditional agricultural and food systems and NRM strategies (Langill 1999: np; Nzuma, Mpeperki and Murwira 1997 quoted in FAO 2005-a: 70; UNESCO 2008 quoted in Wilson 2008: np).

2.2.2.1 Local / traditional / indigenous knowledge (IK) systems

Indigenous people may be viewed as 'original inhabitants' – or aboriginal people – whose knowledge systems are uniquely different from the global knowledge system (Johns & Sthapit 2004: 148; Langill 1999: np). "A body of knowledge built up by a group of people through generations of living in close contact with nature" (Johnson in Langill 1999: np), indigenous knowledge (IK) or local knowledge⁸ is rooted in local culture used to make a living in a particular place (Norgaard quoted in Orr 1992: 32; Tengö & Belfrage quoted in Folke 2004: np). It can play a large role in agriculture, agroforestry (see 2.2.3.1) and food growing (Langill 1999: np).

Mtshali's (1994: 53) and Shava's (2000: 49) IK research found widespread ignorance of edible food plants and a scarcity of local indigenous technologies in teaching and learning. Various authors have attributed this to a lack of intergenerational learning and mentoring as a result of children spending most of their time in school, rather than in non-formal learning settings (Shava 2000: 30; Heckler 2002, Zarger & Stepp quoted in Philander 2006: 38). Asafo-Adjei (2004: 106) and Shava (2000: 29) found that there was a social stigma attached to local/indigenous agricul-

⁸ Other terms in use include 'traditional ecological knowledge', 'rural knowledge', 'community-based environmental knowledge' (Gruenewald 2003-b: 6; Langill 1999: np; Shukla & Gardner 2006: 1).

tural knowledge and the use of wild foods, which undermined their incorporation into the school curriculum. It has also been asserted that agricultural education may be associated with the “poverty of subsistence and rural life” (Vandenbosch, Taylor, Beniest & Bekele-Tesemma 2002: 30; Vandenbosch *et al* 2004: 21).

Various studies, in identifying the need for an improved understanding of the bio-physical sphere, have recommended the incorporation of IK or local knowledge into agriculture, education, health and nutrition, and science (Mtshali 1994: 51, 71). However, in most parts of the world, formal and western education systems have had a ‘homogenizing effect’ that has undermined local knowledge (Hudson & Aldquist 2003, in Philander 2006: 38; Shava 2000: 34). However, educators are cautioned against reifying IK or uncritically asserting that all indigenous practices support environmental sustainability (Langill 1999: np). It would be pragmatic to subject both indigenous and technical forms of knowledge to critical scrutiny and synthesise those aspects that promote environmentally sound practices. For example, the village botanist programme modelled on Gandhi’s ‘Basic Education’ system in India was reported to incorporate complementary aspects of traditional ecological knowledge and informal education into a formal community-based NRM programme (Shukla & Gardner 2006: 4, 9) – see also 2.4.1.

2.2.2.2 Sustainable agriculture

One vision of agriculture in a post-peak oil world is one in which globalisation is reversed, and the trend is towards local farming and food growing, using organic methods (Heinberg, quoted by Eccleston 2007, November 22). Modern agricultural practices have serious implications for human wellbeing and food security. Already, there appears to be a shift towards ‘alternative’ approaches to farming which promote sustainability (CGIAR 1995: np; Mollison 1991). Sustainable agriculture⁹ may be interrogated in terms of culture, food systems, policy, farm design, till strategies and spiritual considerations – factors that are discussed by Orr (1992: 174-176).

It may be argued that use of traditional organic methods of farming with low yields runs counter to the intense work ethic of western society, and is unable to keep pace with the rising global food demand. It is difficult to imagine how society may be persuaded to revert to pre-modern practices which are highly unlikely to sustain the growing human population. On the other hand, if one takes into consideration Heinberg’s warning regarding present practices, and his vision of agriculture in a post-peak oil world, traditional organic methods may be considered inevitable rather than optional (quoted in Eccleston 2007, November 22).

⁹ Sustainable agriculture may also be referred to as ‘limited external input agriculture’, ‘organic’ farming/gardening, or ‘conservation agriculture’ (Gabre-Madhin & Haggblade 2003: 25-26; FAO 2007: 10; CIMMYT 2003: np).

There is a groundswell of thinking that identifies one of the key problems of the post-modern world as being spiritual impoverishment (McCallum 2005: 186; Myss 1997: 271-275; Orr 1992: 176; Wilber 1995: 231-232; Zohar & Marshall 2000: 186). The International Institute of Rural Reconstruction (IIRR quoted in Langill 1999: np) asserted that spirituality is intimately associated with culture, kinship and politics; “spiritual beliefs about nature may influence how resources are managed and how willing people [may be] to adopt[ing] new resource management strategies”. Bookchin (2005: 17) supported a balance between “reason and technology” and “organic thinking and spirituality”.

According to Maritim (in Vandenbosch *et al* 2004: 17), sustainable agriculture should address three key concerns: (i) food security, (ii) employment and income generation, and (iii) natural resource conservation and environmental protection. It has been suggested that sustainable agricultural intensification will minimise expansion of agricultural land and hence minimise further deforestation (Angelsen & Kaimowitz 2001: 8; FARM-Africa 2004: 3) – also refer back to 2.2.1.1. Agroforestry, an agricultural technology that is being researched globally, has the potential to address the criteria for sustainable agriculture, and is discussed in 2.2.6.

2.2.3 Agricultural and agroforestry research and development: an overview

A survey of successful African agricultural efforts led Gabre-Madhin and Haggblade (2003: 44) to conclude that “poverty reduction in Africa will simply not occur without a vibrant agricultural sector providing income, employment and affordably priced staple foods”. A number of global agricultural initiatives have been established to promote sustainability through education, training and development. This section considers activities relevant to this research project, namely, those of the World Agroforestry Centre (ICRAF) and the African Network for Agroforestry Education (ANAFE), and a strategically allied group, the Consultative Group on International Agricultural Research (CGIAR).

2.2.3.1 Agroforestry

‘Agroforestry’ emerged as a concept in 1977 through an International Development Research Centre (IDRC) study conducted by Bene, Beale and Côté which drew attention to the key role of trees in farming (ICRAF 2008: np; ICRAF nd-a: np). Agroforestry is an agricultural system that incorporates crops, and sometimes livestock, with trees and shrubs on one piece of land, to yield a diversity of products such as fruits, vegetables and protein-rich foods (Beetz 2002: 1; Kalumba, in Jacquet de Haveskercke, Shumba & Sifile 2004: 62; Vandenbosch *et al* 2002: 34). Combining food crops, trees, forest plants and animals is a “dynamic, ecologically based natural resources management system” that promotes “social, economic and environmental benefits for land users at all levels” (Forestry, Agroforestry & Environment nd: np; ICRAF nd-a: np).

Nitrogen-fixing plants are especially beneficial to agriculture when their aerial parts – where fixed nitrogen is accumulated – are reincorporated into the soil (CGIAR 1995: np). Agroforestry benefits include provision of timber and firewood, food, medicine, animal fodder, control of soil erosion, stabilising riverbanks or streams, improving water infiltration into the soil, forming ‘live fences’, providing windbreaks and shade, and enhancing apiary techniques (Kalumba, in Jacquet de Haveskercke *et al* 2004: 62). According to Garrity (2004: 6), agroforestry can play a major role in addressing the Millennium Development Goals (MDGs – see Appendix C) and the Water, Energy, Health, Agriculture, Biodiversity (WEHAB) initiative (Appendix D).¹⁰

2.2.3.2 World Agroforestry Centre (ICRAF) in Southern Africa

The history of the World Agroforestry Centre (ICRAF) goes back to the IDRC study conducted by Bene *et al* which found that deforestation in tropical areas was leading to rapid land degradation, and that the socioeconomic status of societies in these areas was very low (ICRAF nd-a: np). They identified the potential of agroforestry systems on marginal lands, and called for the establishment of an International Council for Research in Agroforestry. ICRAF was thus established in 1978 to “develop improved agroforestry technologies that would help mitigate the effects of deforestation, depletion of natural resources and poverty in rural areas” (ICRAF 2008: np; ICRAF 1979: 3). By promoting agroforestry alternatives to slash-and-burn agriculture, drawing on “local practices and cultures”, ICRAF aims to promote sustainable use of land and natural resources and improve “nutritional, economic and social well-being” in developing countries (ICRAF 2008: np; ICRAF nd-a: np).

An autonomous, non-profit organisation, ICRAF functioned in the 1980s as an “information council focused on Africa”, later adjusting its name to International Centre for Research in Agroforestry (ICRAF 2008: np). In 1991, ICRAF joined the Consultative Group on International Agricultural Research (CGIAR), thus becoming aligned with the aims of the CGIAR – reducing poverty, increasing food security and improving the environment – and conducting strategic research on agroforestry at a global level (*ibid*). ICRAF focuses on four themes, namely, (i) land & people, (ii) environmental services, (iii) trees and markets, and (iv) institutional strengthening (Garrity 2003; np).

In 2002, ICRAF (2008: np) adopted the name World Agroforestry Centre as it became “recognized as the international leader in agroforestry research and development”. From its head office

¹⁰ It appears that outside of Millennium Development Goal 7 (ensure environmental sustainability), environmental concerns are not well integrated in the MDGs, and do not make clear links between poverty and environment (Lee & Ghanime 2005: 11). It has been suggested that the MDGs could be promoted by the more practical focus of the WEHAB goals (Jahan 2003: 1, 19).

in Nairobi, ICRAF forms alliances with national research groups, universities and NGOs¹¹ to conduct research in 23 countries in Africa, Asia and Latin America (CGIAR nd: np). In southern Africa, ICRAF is active in Tanzania, Malawi, Zambia, Mozambique and Zimbabwe (Akinnifesi 2004: 5). Since 1987, ICRAF-SA has been working with partners and farmers to develop and disseminate sustainable agroforestry strategies that enhance soil fertility.

Fertiliser trees: Research indicates that ‘fertiliser trees’ / nitrogen-fixing trees¹² lead to significant improvements in agricultural lands (*ibid*: 7; Akinnifesi *et al* 2004: 1). Much of ICRAF-SA’s fertility tree research focuses on leguminous species, primarily *Gliricidia sepium* (Mexican lilac), *Sesbania sesban* (River bean tree), and *Tephrosia vogelii* (Vogel’s tephrosia) (Akinnifesi 2004: 2; Katanga, in Jacquet de Haveskercke *et al* 2004: 13; PIER 1999/2008: np). Other species are listed in Appendix E. Fertiliser trees may be used in a variety of ways, (i) *improved fallows* – rotating fertiliser trees with the food crop; (ii) *inter-cropping* – permanent rows of fertiliser trees between rows of the food crop; (iii) *relay cropping* – planting quick-growing fertiliser trees two weeks after the food crop begins to grow; and (iv) *biomass transfer* – incorporating the prunings of fertiliser trees into the soil (Akinnifesi 2004: 2-5). The use of fertiliser trees offers an affordable and sustainable solution to food production (*ibid*: 8).

Indigenous fruit trees: The use of indigenous fruit trees (IFTs) to supplement diets in southern Africa has been documented by various researchers. For example, Campbell *et al* (quoted in Akinnifesi, Kwesiga, Mhango, Chilanga, Mkonda, Kadu *et al* 2006: 107), found that about 42% of rural households rely on indigenous fruits as a source of regular nutrition in southern Africa. In South Africa, Shackleton (quoted in Akinnifesi *et al* 2006: 108-9) reported that 78% of households in the lowveld region of Bushbuckridge have marula trees (*Sclerocarya birrea*) in their home gardens, and 30% have intentionally planted this species. IFTs are consumed primarily by children and often become the main diet of poor families during years of maize shortage

¹¹ There is no clear definition of a Non-Governmental Organisation, other than the fact that it is *not* part of government. It is generally understood to apply to organisations that focus on development, environment and human rights, though not usually in the corporate or religious sector.

¹² Leguminous plants have nodules on their roots created by *Rhizobium* bacteria which are able to fix nitrogen in the soil. *Rhizobium* reduces the nitrogen to ammonia, thus enabling the plant to incorporate it into the nitrogenous components of its cells (Stanier, Adelberg & Ingraham 1977: 195). All leguminous plants are characterised by having a pea-like flower and a pod (legume) fruit type – found in three plant families: (i) Fabiaceae (previously Papilionaceae, pea family), (ii) Caesalpinaceae (the baubinia or cassia family), and (iii) Mimosaceae (the mimosa and thorn-tree family) (Coates Palgrave 1984; van Wyk & van Wyk 1997). There are also representatives from seven non-leguminous plant families which are able to fix nitrogen: *Alnus* (the north temperate zone alder, in the birch family, Betulaceae), *Casuarina* (the beefwood family, Casuarinaceae), *Coriaria* (Redoul, in the order Cucurbitales – of which squash and pumpkin are members – in the temperate zone family Coriariaceae), *Discaria* and *Ceanothus* (the buffalo-thorn family, Rhamnaceae), *Myrica* (the waxberry family, Myricaceae), *Trema* (the elm family, Ulmaceae), and *Hippophaë*, *Shepherdia* and *Elaeagnus* (in the temperate region oleaster family, Elaeagnaceae) (Raven, Evert & Curtis 1981: 551).

(Mithöfer 2005: 138). In 1997, ICRAF began research on IFT domestication – see examples of species in Appendix E.

2.2.3.3 African Network for Agroforestry Education (ANAFE)

In 1993 ICRAF launched the African Network for Agriculture, Agroforestry and Natural Resources Education – also known to as African Network for Agroforestry Education (ANAFE 2005). ANAFE is comprised of 74 universities and technical colleges in 31 African countries, and provides support for curriculum review and implementation, teaching materials development, and staff exchanges and research internships (*ibid*; CGIAR 1995). In 2006 they were setting up Farmer Learning Resource Centres in the SADC (Southern African Development Community) region and testing “schools as an extension vehicle” – a concept which was mooted at a global level as the thrust of ANAFE (2005-8: np) in this phase (Chakeredza pers comm June 1, 2006;).

The Southern Africa Regional Agroforestry Forum and Training (SA-RAFT), under the auspices of ANAFE, aims to incorporate agroforestry into the school curriculum via tertiary level training (Akinnifesi pers comm May 23, 2006). They also aim to provide scholarship support and curriculum review, and promote student exchange programmes (Chakeredza pers comm May 25, 2006). Twelve countries in the SADC region – with universities and colleges that offer courses in agriculture, agroforestry, forestry, natural resource management and environment – are members of SA-RAFT (Chakeredza 2006: np).¹³

2.2.3.4 Consultative Group on International Agricultural Research (CGIAR)

The Consultative Group on International Agricultural Research (CGIAR) was established in 1971 to support 16 International Agricultural Research Centres (IARCs) / Future Harvest Centres – five in Africa, five in Asia, three in Latin America, and three in developed countries (Acosta & Wilde 2002: i; FAO nd: np). Sponsored by the World Bank, the Food and Agriculture Organization (FAO) and the United Nations Development Program (UNDP), the CGIAR works with agricultural research systems, and collaborates with civil society groups (see 2.3.3.1) and the private sector (CGIAR nd: np). The CGIAR has thus been described as “a strategic alliance of countries, international and regional organisations, and private foundations”.

The CGIAR aims to mobilise science to improve agricultural productivity in ‘developing regions’, thus reducing poverty and hunger, and improving human nutrition and health, while at the same time protecting the environment. According to an International Crops Research Institute for the Semi-Arid Tropics ‘Vision and Strategy’ document, the CGIAR’s 2005-2015 research focus prioritises five key areas: (i) sustaining biodiversity, (ii) genetically improved food production,

¹³ The member countries of SA-RAFT are Zimbabwe, Zambia, Tanzania, Swaziland, South Africa, Namibia, Mozambique, Mauritius, Malawi, Madagascar, Lesotho and Botswana (ANAFE 2005: np).

(iii) agricultural diversification, (iv) sustainable natural resource management, and (v) institutional strengthening (ICRISAT 2006: np). The Borlaug LEAP programme (see section 1.1) supports research aligned with the mission of the CGIAR, “to achieve sustainable food security and reduce poverty in developing countries through scientific research and research-related activities in the fields of agriculture, forestry, fisheries, policy, and environment” (CGIAR nd: np).

2.2.4 Urban agriculture

Urban agriculture serves millions worldwide, providing food security, healthful nutrition and meeting economic and social needs (RUAF nd: np). It entails growing both food and non-food plants and trees and raising animals within cities (intra-urban) and the surrounding (peri-urban) areas according to the daily requirements of residents (Ganapathy, Ford Foundation, Siau & Yurjevic quoted in Mougeot 1994: 3; RUAF nd: np; UNDP quoted in Pimbert 2008: 9).

In Africa, urban agriculture appears to emerge out of urban forestry and greening initiatives. These mitigate environmental problems caused by urban expansion: reducing storm water runoff, improving air quality, acting as a noise buffer, and providing shade and insulation from extreme temperatures (Parkin, Shackleton & Schudel 2006: 178). In the USA, it seems to be linked to growing favourite food plants in community gardens, which are often favoured over public parks for cultural events, leisure, youth and schools, entrepreneurial and vocational activities, healing and promoting a sense of self-worth, place-making (creating safe neighbourhoods), community development, ecological restoration and demonstration activities (Hung 2004: 59, 62). According to Tembo (2005: 2-3), school-based urban agriculture has the potential to (i) empower scholars with agricultural knowledge, (ii) foster the development of community-based organisations, (iii) improve the relevance of education by integrating practical skills with theoretical learning, (iv) supplement scholars’ nutritional intake, and (v) promote the wider adoption of improved agricultural technologies by using school gardens as demonstration sites (see 2.3.3.2).

2.2.5 Links between agroforestry, urban agriculture and food security

It is evident from the above sections that food security, nutrition and health are considerations in rural and urban settings. In rural areas it has been suggested that certain ‘conditioning factors’ must be present when using high-yield technologies to promote agricultural intensification over expansion, and thus the conservation of naturally occurring vegetation (Angelsen & Kaimowitz 2001: 8). There is potential to learn from examples in dense urban settings where garden-based learning approaches are reportedly practiced, as food gardening may serve as an example of agricultural intensification. This underpins the decision to explore the role of agroforestry in rural areas of Malawi, and urban agriculture and related educational activities in New York, USA.

It is useful to bear in mind the distinction that may be made between ‘garden’, ‘orchard’ and ‘field’ crops. The latter covers graminaceous plants such as maize/corn, whereas the former may only be associated with vegetable-growing (Sherman 2007: 14). For this reason the term ‘food growing’ – rather than ‘food gardening’ – may be more useful in various educational contexts.

2.3 Education, training and development in the agricultural context

Although the close relationships between poverty, lack of food, health and absence of education have long been recognized and understood, development strategies at international and national levels have tended to treat equitable access to quality education and food as separate issues (Tom Vandenbosch, Peter Taylor, Jan Beniest and Azene Bekele-Tesemma 2002: 19).

It is widely thought that people with lower levels of education tend to be the first to suffer in times of economic instability and change. Malherbe (1977: 608) argued that without a broad-based foundation of basic education, the contribution of specialist training was doomed to failure.

2.3.1 Agricultural education: history and impacts

In proposing an educational strategy for rural development, Gasperini and Maguire (2001: np) argued that education was a prerequisite for building a food-secure world, reducing poverty and conserving and enhancing natural resources. Teaching food growing skills to children would provide a foundation for a productive agricultural economy. During the apartheid era in South Africa (1948-1994), Black African scholars who continued from junior primary to senior primary school had ‘gardening and agriculture’ as a subject (Christie & Collins 1986: 177). Riedmiller (quoted in Vandenbosch *et al* 2002: 29) held the view that political and ideological perspectives informed the teaching of agriculture in schools. From a Marxist perspective of Black education, the Nationalist government aimed to reproduce non-competitive and cheap labour to serve their economic needs (Christie & Collins 1986: 163 183).

It would appear that in southern Africa, agriculture has been a ‘Cinderella’ subject in schools for many decades (Malherbe 1977: 163; Taylor & Mulhall quoted in Vandenbosch *et al* 2002: 30). Because agricultural programmes were generally seen as a means of producing future farm labourers, the struggle against apartheid was linked to a resistance to agricultural or gardening programmes of any sort. This resistance has been strengthened in many cases through the use of gardening activities as a form of punishment for school children (Cockcroft pers comm May 9, 2006; FAO 2007: 24; Jantjie pers comm May 3, 2006; Ncula 2007: 14; Sherman 2007: 16). Post-independence governments, in their efforts to break away from their colonial histories, have also been eager to do away with primary school agriculture (Vandenbosch *et al* 2002: 29).

Research indicates that the majority (70-80%) of school children (primary and secondary) in rural areas end up farming and trading in agricultural products, but because of inadequate instruction, school leavers have lower levels of practical knowledge and experience than their parents (Temu 2004: 9). Findings in various countries indicate that primary and secondary school children have a poor understanding of ecosystem processes and concepts such as energy flow (Barman *et al* 1995; Webb & Boltt quoted in Dillon, Rickinson, Sanders, Teamey & Benefield 2003: 17-18). It has been suggested that education for sustainability tends to be undermined by an overemphasis on ‘academic achievement’ (Vandenbosch *et al* 2004: 99). These factors present a threat to agriculture, which in turn has implications for food security, nutrition and health.

Education appears to face challenges such as shortages of funding, teachers, and learning materials (AEI¹⁴ nd: np; Vandenbosch *et al* 2002: 48). It has been suggested that the inability of African governments to meet the costs and criteria for maintaining the westernised approach to education strengthens the case for a more collaborative educational model in which the community plays a supportive role in education provided by the government (Uemura 1999; De Keyser 2005: 23; Watt 2001: 1). At present, there is limited evidence to link the quality or relevance of education with improved agricultural production (Vandenbosch *et al* 2004: 25).

2.3.2 Environmental education and the United Nations ‘Decade of Education for Sustainable Development’ (UNDESD)

In South Africa, environmental education (EE) is a rapidly expanding field that has been defined as a socio-ecological movement that draws on ecological knowledge and understanding, total people-environment relationships, ethics, politics, culture, sociology and public participation in decision-making (Irwin 2002: np). A historical overview of EE in southern Africa is provided by Irwin and Lotz-Sisitka (2005).

The launch of the Decade of Education for Sustainable Development (DESD),¹⁵ 2005-2014, by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and the World Conservation Union (IUCN), is seen as complementary to EE. As a strategy for social change, ESD aims to motivate and empower adults and youth to consider the environmental and social consequences of their actions, and make informed decisions for a more sustainable world (IUCN 2003). Jahan identified four key areas in which sustainability should be promoted – social, economic, political and environmental (Figure 2.1). However, it is cause for concern that socio-economic and political factors are often portrayed as (partially) independent of ecosystem func-

¹⁴ USAID’s Africa Education Initiative was established to improve educational opportunities for children in Africa, “so that they may lead happier, healthier lives, and become more productive members of society” (AEI nd: np).

¹⁵ The Brundtland Commission views sustainable development as that which “meets the needs of the present without compromising the ability of future generations to meet their own needs”.

tioning, as depicted by the partial intersection between the four areas. It would seem that environmental sustainability receives inadequate attention in practice.

While the MDGs make use of education, this is an area that incorporates environmental concerns the least (Lee & Ghanime 2005: 12). It has been suggested that the MDG targets cannot be met without an “improved understanding of adaptive processes and the factors contributing to livelihood resilience” (Moench 2005: 3). Resilience is discussed in more detail in 2.3.3.1. Because agriculture is one of the key components of livelihood sustainability, it was proposed that:

... there are no clear boundaries anymore between agricultural education and education for sustainable development, because aspects of natural resource management have been integrated into agricultural education and almost all education for sustainable development programmes now contain important elements of sustainable agriculture. (Vandenbosch *et al* 2002: 29)

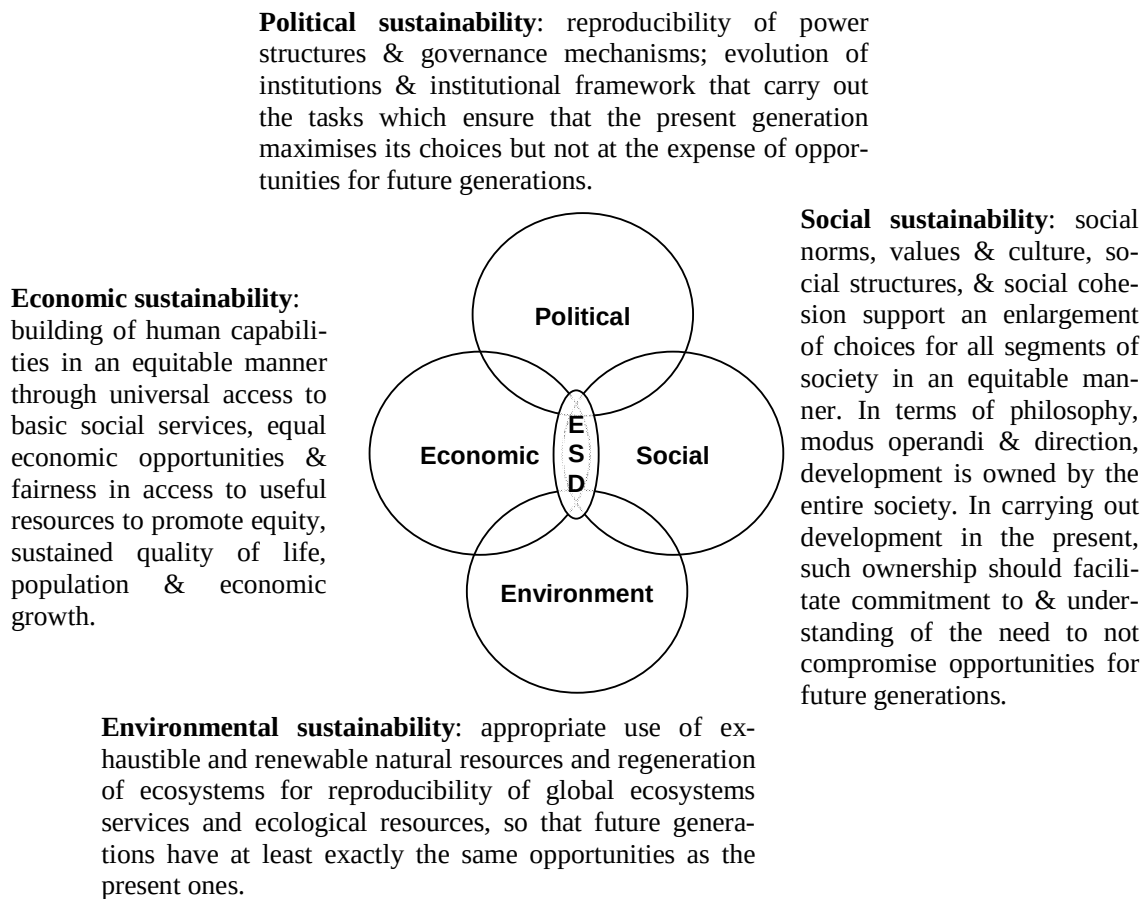


Figure 2.1: Spheres of consideration in sustainability and education for sustainable development (from: Jahan & Umana quoted in Jahan 2003).

However, sustainable agriculture requires an ability to assess the nature of relationship dynamics and to respond appropriately in each particular situation (Du Toit, Pollard, Dlamini & Chuma

2007: 18). Irwin (2001: 41) asserted that it is essential to have a grasp of how natural ecological processes work, in order to improve our understanding of and ability to predict the consequences of human activities that may compromise these processes in some way. The basic principles of ecology include trophic/feeding levels, energy flows between trophic levels, cycling of material (elements and molecules), physical and chemical factors that provide appropriate conditions for life, and the dynamic forces of change (*ibid*: 4). This poses a challenge to educators to adopt a more integrated approach to learning that addresses not only social and economic issues but also an improved understanding of the basic principles governing ecosystem resilience, in all forms of education for sustainability. This perspective is evident in Gorke's (2003: 123) model of holistic ethics (see Figure 2.2) and subsequently in Hattingh's (2004: 162) formulation of the notion of "strong sustainability".

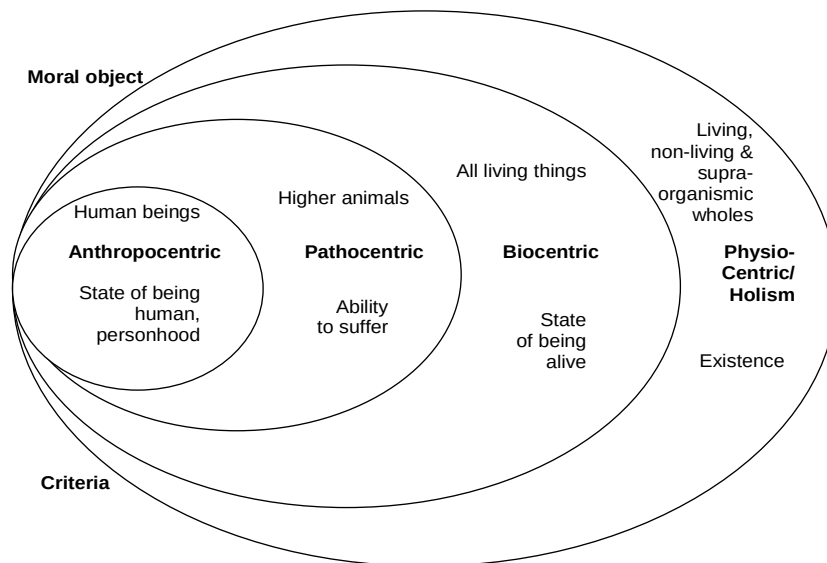


Figure 2.2: Thematic representation of four common ethical perspectives (from Gorke 2003: 123).

Figure 2.2 depicts the expansion of criteria in determining the object of moral concern. The 'anthropocentric' perspective is only concerned with human beings, the 'pathocentric' perspective extends concern to include all higher animals, and the 'biocentric' perspective extends concern to all living things. The 'holistic' perspective embraces all that exists, so that the entire system and its individual parts are seen to have intrinsic value (Gorke 2003: 124, 200).

Gorke's argument for a holistic ethic illuminates the indisputable relationship between society's ethical stance and the current ecological crisis (Köhly 2005: 277). For the purposes of this study, Hattingh's (2004: 162) three-sphere model of 'strong sustainability' has been adapted in Figure 2.3. It illustrates food growing activities and buying and selling of fresh produce within the economic sphere, which is dependent on the socio-political sphere – of which school-community links and educational activities are part. Both of these spheres are, in turn, dependent on the life-sustaining capacities of the biophysical sphere, a view that is also supported by Vandebosch *et al* (2004: 17). Thus the model depicted in Figure 2.3 supports the notion that agricultural education has much in common with education for sustainable development, and hence may be aligned with EE and the United Nations Decade of Education for Sustainable Development (UNDESD).

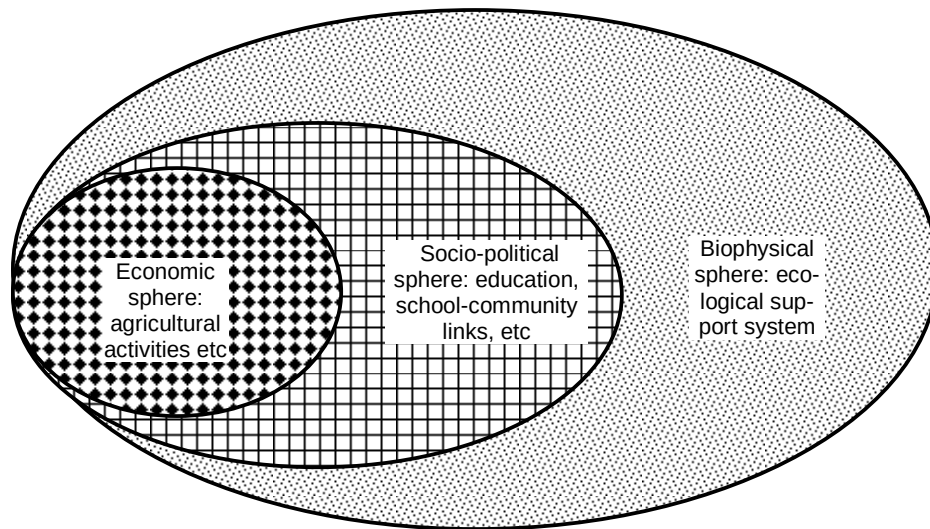


Figure 2.3: Alignment of the economic sphere and the socio-political sphere with the life-sustaining capacities of the biophysical sphere – 'strong sustainability' (adapted from Hattingh 2004: 162, and drawing on Gorke 2003: 123).

2.3.3 Concepts linking food growing and education

There are a number of concepts relevant to educational activities and food gardening, agroforestry or agriculture, bearing in mind the potential for environmental learning that promotes sustainability. Of particular interest in this study are the concepts of civic ecology and garden-based learning (GBL), which are explored in the sub-sections below.

2.3.3.1 Civic ecology

Krasny and Tidball (2006-a: 2) used civic ecology as a collective term to identify holistic approaches to building urban sustainability, for example, through community food gardening and

citizen science. Civic ecology may be defined as an integration of “civic action, a land ethic, natural resources, and scientific and community knowledge to build sustainable societies, particularly in the face of social and economic inequities, environmental degradation, disaster, and conflict” (*ibid*). Krasny and Tidball drew on the concept of resilience – usually associated with ecosystems – and applied it to urban systems and education.

Resilience is generally demonstrated by an ecosystem’s ability to “tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes” (Resilience Alliance nd: np). Resilience in a complex, integrated system in which people are seen as part of the natural environment – a socio-ecological system – may be defined by three aspects:

- how much change it can undergo while maintaining the same level of control on structure and function,
- its capacity for self-organisation, and
- its ability to develop further capacity for learning and adaptation. (Resilience Alliance nd: np)

A resilient agricultural ecosystem – a type of socio-ecological system – would be one that is able to “absorb the impact of droughts, economic fluctuations, wars and other disruptions without causing major declines in production, increases in poverty or the loss of key environmental values” (Moench 2005: 10). In their discussion of resilience and sustainable development, Folke, Carpenter, Elmqvist, Gunderson, Holling, Walker, *et al* (2002: 18-19, 23) identified how past natural resource management policies and activities have undermined the resilience of socio-ecological systems such as agriculture. These were underpinned by the assumption that the outcomes of human use on ecosystems would be linear and predictable, and hence controllable, and that human systems and natural systems are separate entities and can thus be dealt with independently. As a result of this flawed thinking, human activities have contributed to reducing the stability and productivity of natural resource systems, and thus to a loss of resilience, which in turn has impacted on human livelihoods by creating higher levels of risk and vulnerability.¹⁶ By contrast, a resilient socio-ecological system is underpinned by diversity, participation, and adaptive learning (Krasny pers comm November 15, 2006).

The concept of civic participation – or **civic engagement** – deserves closer attention. Civic engagement entails collective and individual action that identifies issues of concern to the community, drawing on a combination of knowledge, skills, values and motivations to take action at various levels (Delli Carpini nd: np; Ehrlich, in Boyte 2007: 4). It is inextricably linked to the

¹⁶ Vulnerability is the opposite of resilience, and is reflected in the tendency of social or ecological systems to “suffer harm from external stresses and perturbations”. Vulnerability is reflected in the level of sensitivity to and ability to anticipate such disturbance, and in the adaptive measures taken to reduce further damage (Kasperson *et al* 1995, in Folke *et al* 2002: 33).

notions of good citizenship and democracy, which cannot be learned through short courses or formal qualifications (Follett 1918: 363 quoted in Smith 2002-a).

Edwards (2005: np) held the view that civic engagement is essential to finding “lasting solutions to poverty, discrimination and exclusion”. His three-pronged interpretation of civil society highlighted the central role that the ‘public sphere’ plays as an intermediary between the ‘good society’ and ‘associational life’ (*ibid*). A strong critical perspective in civic engagement is exemplified by the ‘food sovereignty’ movement, where it may be argued that neo-liberal academic think-tanks “organise discussions to inform the choices of decision-makers” while failing to draw on the perspectives of food workers, ‘indigenous’ people or rural farmers (Pimbert 2008: 39).

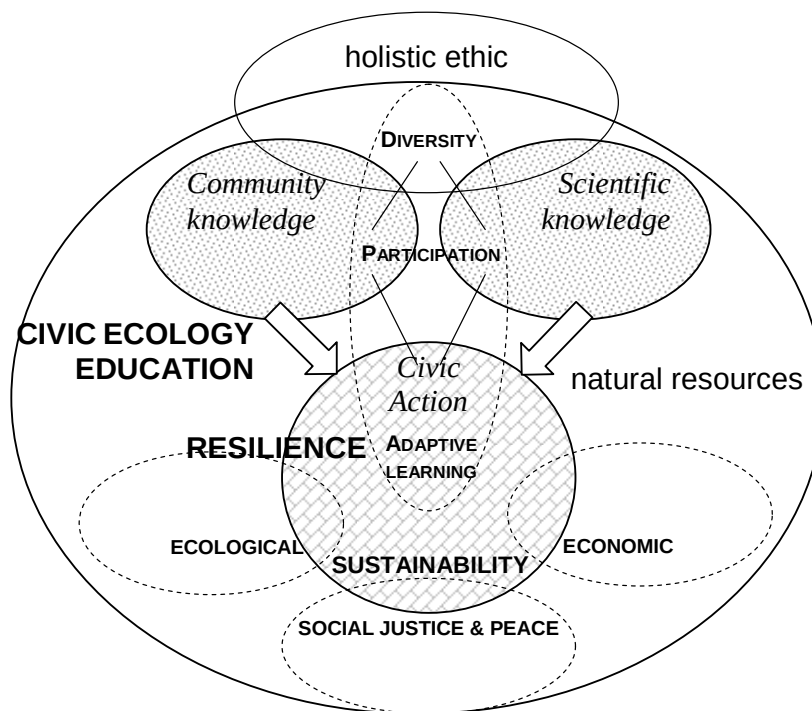


Figure 2.4: Conceptual diagram illustrating the complementary and mutually reinforcing roles of resilience (diversity, participation, adaptive learning) and of civic ecology education (knowledge diversity, civic participation/action, adaptive learning) in supporting sustainability (adapted from Krasny & Tidball 2007: 9; 2006-a: 3).

We turn now to explore the links between civic engagement and ***citizen science***. According to Bonney and LaBranche (quoted in Krasny & Tidball 2007), the concept and practice of citizen science first originated at the Cornell Laboratory of Ornithology, where volunteers are trained to collect data that will make significant contributions to scientific research. Prior to this, however, Irwin (quoted in Jamison 2001: 152) identified citizen science as a form of ‘community environmentalism’ that was evident in “grass-roots engineering or lay epidemiology”, in which broad-scale, long-term environmental monitoring of factors such as population and climate change help

track changes and trends over time. Fischer (2000: 7, 19, 83) proposed that the relationship between citizens and experts should be strengthened, in order to better integrate their complementary forms of knowledge – empirical and normative thinking – drawing on Dewey’s “methods and condition of debate, discussion and persuasion”.

The Garden Mosaics programme in the USA is viewed as an example of civic ecology education (Tidball pers comm December 6, 2006). According to Krasny (pers comm November 15, 2006), the Eco-Schools programme in South Africa is an example of an educational programme that integrates science, culture and civic action – a point that is debated further (5.2.3.3). The Garden Mosaics and Eco-Schools programmes will be discussed in more detail in 2.3.4. Consideration is given first to an educational phenomenon associated with food gardening, referred to as GBL.

2.3.3.2 Garden-based learning (GBL)

Garden-based learning (GBL) is a world-wide phenomenon in communities that teach their young about gardening to produce foods, fibres and traditional medicines (Meyer quoted in Desmond, Grieshop & Subramaniam 2002: 29). While there have been “cyclical swings [in GBL] in the more academic settings”, the vocational and practical aspects of GBL have continued uninterrupted in diverse formal and non-formal educational settings (Desmond *et al* 2002: 29). Its simple definition – “an instructional strategy that utilises a garden as a teaching tool” – fails to convey the depth and complexity of learning experiences in garden settings (*ibid*: 29).

... children are directly involved in 1) planting and/or growing a living organism, 2) use of a growing medium (soil, water, range land, etc.), 3) stewardship of plants and/or animals, harvesting of crops or products, 4) productive use or consumption of products, recycling of by-products, and 5) extensions to different levels of plant production in the community (nurseries, farms forests, etc.) (Desmond *et al* 2002: 52).

In the USA, interest in GBL peaked during the Progressive Education and Social Reforms of the 1900s to the 1930s, and again in 1960 to 1970 when environmental activism and counter-cultures were emerging. The phenomenon re-emerged in the last decade of the 20th century with the re-birth of Progressive Education and experiential education (discussed in 2.4.2.1) together with environmental education (discussed in 2.3.2) – and a renewed concern for children’s nutrition and health (Desmond *et al* 2002: 29). In launching an initiative for “a garden in every school” in the USA, Eastin (quoted in *ibid*: 26; quoted in Subramaniam 2002: 4) outlined five generic principles of GBL, namely, improved nutritional knowledge and skills, integrated learning, environmental understanding, community-building, and learning for sustainability.

According to a recent GBL workshop in southern Africa, GBL aims to “educate children about food production and natural resource management for good nutrition and improved life and livelihood prospects” (FAO 2007: 5). School gardens may be used to provide practical experience in

food production and natural resource management, to improve the quality and relevance of education, improve nutritional knowledge and skills,¹⁷ introduce innovative and applicable techniques, improved nutrition and health, help mitigate social diseases, improve business skills, and contribute to community education (Sherman 2007: 5; FAO 2007: 5).

In southern Africa, school gardens are used primarily to generate income and produce food. Less emphasis is placed on environmental learning or sustainability concerns, or on good nutrition (FAO 2007: 23). Research on GBL indicates that it may play a key role in promoting intercultural learning, where diverse groups work together in a garden, and intergenerational learning (Desmond *et al* 2002: 30, 39). Desmond *et al* (2002: 21) drew attention to the role of GBL in providing experiences that motivate scholars who may have been labelled as ‘slow’ or ‘socially disenfranchised’, and engaging different kinds of intelligence. GBL thus has the potential to foster ‘ecological literacy’ or ‘environmental understanding’.

Practical implementation of GBL has diverse examples around the world, and has been formally associated with youth development programmes that focus on education in agriculture and the environment, such as the FFA (Future Farmers of America) and 4-H programmes in the USA and South Africa (Desmond *et al* 2002: 60; Ncula 2007: 4, 10, 15). The 4-H programme – with a focus on using Head (to clear thinking), Heart (to greater loyalty), Hands (to larger service) and Health (to better living – for club, community and country) – makes use of gardens to teach entrepreneurial and personal skills (Vandenbosch *et al* 2004: 24). The FAO (2007: 25-26) issued guidelines for developing school gardens – summarised in Appendix F.

In the early 1900s in South Africa, Skaife (quoted in Malherbe 1977: 228) was sceptical about the educational value of having an ‘agricultural plot’ at the school, suggesting instead that children should carry out projects on aspects of agriculture prevalent in the area where they lived. Based on his observations in the USA of the ‘Home Project Plan’, Skaife held that nature studies at school could be made more relevant if they were linked to real-life farming at home (*ibid*). The idea of a ‘school farm’ – rather than a ‘farm school’ – was introduced by a teacher on the edge of the Kalahari Desert in the 1930s (Malherbe 1977: 229). In this ‘educational experiment’, the rural school ran a farm as a means of “supplementing and enriching the curriculum through the experience of the children”. Taking the children’s natural aptitudes into account in the division of la-

¹⁷ Sherman (2007: 10) quoted literature demonstrating that changes in dietary practices do not follow from the simple provision of nutrition information. She drew attention to new, more dynamic approaches to garden-based nutrition education that are being promoted, such as the creation of links between eating practices and academic knowledge, empowerment of children to plan and manage their own eating habits, linking nutrition to gardening by making decisions about what to grow and how it will be processed, and involving families.

bour, hands-on activities on the school farm supported the development of thoughtfulness, self-confidence and cooperative skills (Botha quoted in Malherbe 1977: 229-230).

Of concern in southern Africa is a lack of understanding of the links between food, nutrition and health (FAO 2007: 6). Poor community support, a lack of institutional support and inadequate monitoring and evaluation of school gardens also appear to be major limiting factors (*ibid*). Desmond *et al* (2002: 30) and the FAO (2007: 7) observed that while schools invest efforts in establishing infrastructural support and strategies to sustain their sporting facilities, school gardens are ignored. The school garden thus becomes a burden to “the creative energies of staff, parents, and community volunteers” (Desmond *et al* 2002: 71). To overcome this issue, Desmond *et al* suggested that the school garden should be treated as one of the educational resources of the school system, which is budgeted for as part of the school operating costs. Guidelines provided by the International Labour Organisation are designed to prevent the exploitation of children for intensive labour in school gardens (FAO 2007: 12) – see Appendix G.

Desmond *et al* (2002: 29) believed that GBL should not be a ‘forced add-on’, but integrated into all learning areas and practiced daily. By contrast, the FAO (2007: 5) saw the need to reconcile “learning objectives with food production and income generation”. Sherman (quoted in FAO 2007: 21) recommended that a “garden curriculum” should entail dedicated agricultural teaching and learning, incorporating “nutritional decision-making, planning, food preparation, and consumption” (*ibid*). Strategies proposed by the FAO (2007: 12) for strengthening GBL include (i) increasing community involvement, (ii) improving school feeding programmes, (iii) promoting GBL in the school curriculum, and (iv) introducing useful new technologies into communities. Further recommendations emerging from the FAO (2007: 27-28) workshop on GBL in southern Africa are listed in Appendix F.

It appears that civic ecology and GBL could make useful contributions to educational initiatives linked to food growing activities. This is evidenced to varying degrees in the educational programmes that will be discussed in the following section.

2.3.4 Educational initiatives linked to food growing activities

A number of educational initiatives were taken into consideration in the context of the foregoing agricultural or agroforestry contexts. These are discussed briefly below.

2.3.4.1 Farmers of the Future initiative

The Farmers of the Future (FoF) initiative was launched in Nairobi, Kenya, in 2002 in collaboration with the Regional Land Management Unit (RELMA) of the Swedish International Development Agency (Sida) (Chakeredza pers comm June 1, 2006; de Keyser 2005: 10). This was a

strategy of ICRAF-SA (introduced in 2.2.6.2) to support and capacity building “for institutions engaged in basic education in rural areas, for human resource development, and for *collaborative learning and action* between different stakeholders” (ICRAF nd-b: np). The ten fundamental conditions required for the integration of natural resource management into basic education were presented in a conceptual document (Appendix H).

ICRAF research indicated that agroforestry practices could serve as a tool for teaching and extension work and have a positive impact on education because of its potential application to many different disciplines and ability to address cultural, social, economic, political and scientific aspects of learning (ICRAF nd-b: np; Katanga, in Jacquet de Haveskercke *et al* 2004: 13-17; Mogotsi 2004: 108-122; Temu 2004: 8). Eight outcomes were envisioned for the FoF initiative (ICRAF nd-b: np; Vandenbosch & Nanok, in Vandenbosch *et al* 2004: 21):

- Improved knowledge, skills and attitudes of children and youth – regarding agriculture and NRM (natural resource management),
- Empowered youth – through active, experiential and contextualized learning,
- Collaboration and networking – through flexible participatory multi-stakeholder approaches,
- Making use of policies and agreements (national and global),
- Direct benefits for school children and their families
- Stronger linkages between schools, homes and communities (especially rural),
- Integration of sustainable NRM into basic education, resulting in
- Improved rural livelihoods, land use management and environmental conservation.

Krasny (pers comm August 29, 2006) equated the Farmers of the Future (FoF) initiative in southern Africa with the 4-H which focuses on agricultural sustainability and food security and has an ‘open-entry open-exit’ strategy. The researcher learned that the FoF initiative was flourishing in Zimbabwe and Tanzania. It was gaining momentum in Zambia, but was in an early pilot phase in Malawi.

2.3.4.2 Eco-Schools programme

The Eco-Schools project began in 1994 with the support of the United Nations Environment Programme (UNEP), under the auspices of the Foundation of Environmental Education (FEE International nd-a: np). According to SADC-REEC (2008-a: np), the Eco-Schools programme has been operating for six years in South Africa, with nearly 1000 participating schools. Popular opinion has it that Eco-Schools is the largest children’s environmental programme in the world. The aim of Eco-Schools is to promote sustainable environmental management in the school and

surrounding community through curriculum-linked activities relating to water, energy and waste in the schools (Vandenbosch, Taylor, Beniest and Bekele-Tesemma (2002: 67).

The Eco-Schools programme provides guidelines in the form of a '7-step process' for participating schools, namely, (i) to establish an Eco-School working group or committee, (ii) conduct annual environmental reviews of the school, (iii) formulate an 'action plan' based on the review, (iv) carry out monitoring and evaluation, (v) link their work to the school curriculum, (vi) inform and involve scholars, teachers and the local community, and (vii) establish a school 'eco-code'. In order to receive certification and a green flag which may be flown for one year, Eco-Schools are required to meet at least two of their 'action plan' objectives (FEE International nd-a: np). They are also encouraged to share ideas and information with other schools, by posting messages on the Eco-Schools website and establishing links across cultures.

Participating schools in the Makana district (Grahamstown) meet on an annual basis to agree on the three focus areas that they wish to address (Schudel pers comm December 13, 2007). While food gardening activities are not a requisite for Eco-Schools, some choose to develop a school garden in the context of the theme, 'school grounds and fieldwork' (FEE International nd-b: np). In 2007, the number of schools in South Africa who qualified for their green flags was 350, including 14 schools that received International Eco-Schools flags in recognition of their involvement in the programme since its pilot year in South Africa, in 2003 (Share-Net 2008: np).

2.3.4.3 Garden Mosaics programme

The Garden Mosaics (GM) programme in the USA is considered to serve a good example of civic ecology education, as noted in 2.3.3.1. The programme was initiated in 2001 by Cornell University principal investigator (PI), Dr Marianne Krasny, under the auspices of the Informal Science Education programme. It was funded at first by the United States Department of Agriculture (USDA), and then later by the National Science Foundation (NSF).¹⁸ At the end of 2005, the American Community Gardening Association adopted the GM programme as its flagship project for youth education, thus securing the sustainability of the programme beyond NSF funding. GM may now be seen as a set of resources, as well as a model for community-based education programmes (Krasny pers comm November 15, 2006).

The programme was inspired by a composting operation at a small community garden in New York City called Open Road, where the potential for science and environmental learning opportunities was evident in the cultural component of the garden and its diverse environmental innovations (Krasny pers comm November 15, 2006). She felt community gardens presented a viable

¹⁸ See also NSF (2005).

educational alternative to city parks or nature centres, as they are in neighbourhoods where youth spend time after school. In order to secure funding, Krasny first needed to recruit the input of potential stakeholders. Eleven key collaborators – mainly educators – contributed ideas and expertise to the development of the education component of the programme, including a project that was thought to provide motivation for youth to learn science (Krasny pers comm November 15, 2006). However, “there was relatively little participation by adults and youth in determining the overall program and research goals” (Krasny & Doyle 2002: 2-3). The GM principal investigators believed education programmes in development contexts need to be more representative of minority communities and should pay more attention to youth as they are an asset (Krasny pers comm November 15, 2006; Tidball pers comm December 6, 2006).¹⁹

The GM programme is unique in the role it plays in community green spaces and science and culture education (youth and community), using intergenerational and cross-cultural connections, and promoting action (Tidball pers comm December 6, 2006). In most cases, participants on the GM programme elect to work with existing gardens that had been established by a community group, where school children can interview older gardeners about how they grow plants, and then use resources developed by scientists to reinforce the learning process. Tidball (*ibid*) identified a number of ‘families’ of learning in the GM programme, which can be roughly divided into horticulture, agriculture, earth science, computer and information technology, experiential learning and civic action. The unifying theme in this ‘mosaic’ of activities is participation, or civic engagement (discussed in 2.3.3.1). The major focus of the GM programme is not on content knowledge but on action for sustainability (Tidball pers comm December 6, 2006) – see Appendix I.

The GM curriculum materials are disseminated as free resources on their website, and through workshops conducted by Cornell University Extension educators. PhD research by Kudryavtsev (in progress) has established that when people only have access to the GM DVD, they are less likely to implement the programme than when they have face to face interactions with facilitators (Krasny pers comm November 15, 2006). A major challenge facing the GM programme is the education system’s requirements. Teachers have to meet so many different standards they have no time to fit in extra-curricular material (Tidball pers comm December 6, 2006). The GM programme competed with established after-school programmes and summer camps. It appeared

¹⁹ An asset-based approach – in the context of civic ecology – is a participatory process in which all stakeholders play a role in identifying the assets in their community or a particular system, and have a sense of ownership in determining and achieving the goals, through a process of ‘adaptive co-management’. By contrast, a deficit-based approach focuses on the problems, and involves some kind of intervention or ‘deficit remediation’ (Tidball pers comm December 6, 2006).

there was a need to research the long-term impact of the programme and its materials on environmental learning (Krasny pers comm November 15, 2006).

In 2005, the GM programme was piloted in township schools near Durban, South Africa, in collaboration with the Environmental and Languages Education Trust (ELET), focussing on the integration of knowledge of women gardeners with classroom-based science learning (Krasny pers comm October 10, 2005). It was believed that GM could be implemented in other countries because the programme focuses on “a universally-relevant issue, i.e., sustainable food production”, and was “originally designed for use with multicultural and multi-lingual populations” (Liddicoat, Simon, Krasny & Tidball 2007: 14). It was assumed that educators would have the capacity to select activities and modify them appropriately for their particular settings. However, a number of challenges were encountered in attempting to adapt the USA-designed GM programme for the South African context.

2.3.4.4 Health Promoting Schools programme

The Health Promoting Schools (HPS) programme was established in 1999 in the Makana Local Service Area (Grahamstown) by the governmental Departments of Education, of Agriculture and of Health. The four schools that were ‘clustered’ under the HPS programme were sponsored by the National Department of Health through the Food Gardens Foundation (FGF).²⁰ The FGF focuses on empowering people to overcome hunger, malnutrition and disease (Pheto quoted in FAO 2007: 13). Its effectiveness has been attributed to successful relationship-building that leads to community spirit and self-empowerment (Pheto pers comm April 28, 2006).

The HPS programme was officially launched in Grahamstown on October 29, 2005 (Mothlabane pers comm April 12, 2006). It aims to promote a healthy school environment in collaboration with local communities; a food garden is a prerequisite for participation (Mtimkulu pers comm April 12, 2006). The HPS programme focuses on (i) developing personal skills, (ii) promoting community participation, (iii) building public policies, (iv) creating supportive and healthy environments and (v) re-orienting health services (Mtimkulu & Mothlabane pers comm April 12, 2006).

2.3.4.5 Umthathi Project

The Umthathi Project is a non-governmental initiative established in Grahamstown in 1992 to train unemployed people in home food gardening, efficient, nutritious cooking techniques, and business skills (Walker pers comm April 22, 2006). Participants were taught permaculture gardening, with plant seedlings provided by the Umthathi plant nursery (*ibid*). Until recently, Um-

²⁰ The Food Gardens Foundation was established in 1977 in Soweto and has expanded to include many urban and rural areas in southern Africa (Niland quoted in City Farmer 1995: np).

thathi worked in partnership with Goucher College in Baltimore, USA, with International Studies students coming every second year to visit the project in Grahamstown for one or more weeks. Umthathi is part of the International Network for School Gardens, and recently initiated an Agriculture Centre which promotes the cultivation of traditional and medicinal herb plants.

2.3.5 Synthesis of concepts and initiatives linking food growing and education

The synopses in 2.3.3 indicate that both civic ecology and garden-based learning have strengths that can enhance educational initiatives associated with food growing (discussed in 2.3.4). A focus on agricultural sustainability and food security is most evident in the Farmers of the Future initiative, which is linked to the CGIAR/World Agroforestry Centre in Malawi, and in the non-governmental Umthathi Project in South Africa, which focuses on practical skills in food gardening, cooking and business. A school garden is a necessary feature for schools participating in the government-run Health Promoting Schools programme, but their primary focus appears to be on promoting a healthy school environment. By contrast, a school garden is not a prerequisite in the Eco-Schools programme, where formal curriculum-linked environmental learning is given prominence, and community links seem to be encouraged. It is not clear how diversity, participation/civic action, and adaptive learning are practiced or how sustainability is fostered in a holistic way in urban settings through Eco-Schools. In the USA, the Garden Mosaics programme, which draws on existing community gardens, is cited as an example of civic ecology education.

It appears that the use of GBL is variable; none of the educational initiatives above make explicit use of the term GBL. As a pedagogic strategy, it may be that a blend of direct instruction – for example, training in growing food plants (as is the case with the Farmers of the Future initiative and the Umthathi Project) – and participation/civic engagement (in Garden Mosaics) would promote GBL that engages with sustainability and food security. This may provide the necessary impetus for GBL to be sanctioned as a formal pedagogic approach.

2.4 Aspects of education research and theory

Learning is the keystone... Somewhere along the learning continuum, we come to purposeful and assisted learning (education in its widest sense). When we control this and individualise it, learn what we want for as long as we want and stop when we want, we are engaging in informal education. When we step into a pre-existing learning programme but mould it to our own circumstances, we are engaged in non-formal education. When we surrender our autonomy and join a programme and accept its externally imposed discipline, we are immersed in formal education. (Alan Rogers 2004: np).

The primary focus of this research was on educational processes in the context of school-community food growing. Aspects of education research and theory are explored in this context.

2.4.1 Aspects of formal, informal & non-formal learning relating to food growing

Gardening activities can serve as a means for acquiring vocational skills in educational contexts and, according to the Encyclopedia of Informal Education, have links to Dewey's focus on interaction and environments for learning (Infed nd: np). Dewey (1906: 109-111) believed that the interpretation of phenomena at a societal level gives them meaning, because the individual mind is a function of social life. Human interests such as food security thus shape the full meaning of educational subject matter such as food growing.

Learning associated with gardens might be considered primarily to be 'informal' (Infed nd: np). Informal learning may be defined as an unorganized or unsystematic process which takes place outside the classroom, through "direct participation in the events of life" (Houle quoted in Smith 2001-a; Infed nd: np; Rogers 2004: np). It promotes an engagement with and enlargement of experience (Coombs & Ahmed quoted in Rogers 2004: np; Infed nd: np). Rogers stressed the distinction between 'informal education' – unstructured and "highly contextualised, highly participatory educational activities" – and 'informal learning' – as unorganised, lifelong learning. The point of this distinction appears to be focused on the intentionality of 'education' – whether structured or not – compared with the incidental nature of 'learning'. Further research on informal learning may provide more clarity (Dillon 2003: 222).

Gardening and agricultural activities may be linked to non-formal education, especially where an organisation or community group is involved, for example, in agricultural and health extension (Rogers 2004: np). Non-formal education may be defined as any organised, systematic, educational activity that takes place outside the formal system, such as 'flexible schooling' or extramural learning (Dillon 2003: 218; Rogers 2004: np; Smith 1997/2005: np). It provides "selected types of learning to particular subgroups in the population, adults as well as children" (Coombs & Ahmed quoted in Rogers 2004: np).

Gardens may also constitute a practical component of formal, curriculum-linked education (Infed nd: np). Formal education is usually associated with formal training institutions, and may be defined as "a highly institutionalized, chronologically graded and hierarchically structured education system" within schools and universities (*ibid*). Various views have been expressed regarding the limits of formal education on opportunities for incorporating non-traditional (innovative) content into learning programmes (Shukla & Gardner 2006: 12).

It has been argued that the notion of 'curriculum' may serve as a boundary between formal and informal education (Jeffs & Smith quoted in Smith 1996/2000: np). Curriculum may be defined as "all the learning which is planned and guided by the school, whether it is carried on in groups

or individually, inside or outside the school” (Kelly quoted in *ibid*). A synopsis of the four approaches to curriculum theory and practice – as (i) a body of knowledge to be transmitted, (ii) a product, (iii) a process, and (iv) praxis – is provided by Smith (*ibid*). ‘Curriculum as product’ has been associated with “vocationalism and the concern with competencies” – a ‘scientific curriculum’ which serves an economic system of division of labour (Kliebart quoted in *ibid*). This resonates with the approach adopted in agroforestry learning (Rudebjer, Temu & Kung’u 2005: 17).²¹

Dewey (1906: 35) argued that if appropriately designed, the curriculum should give the child direction and minimise aimless meandering in search of understanding, providing a systematic summary of previous experiences which serves as “guide to future experiences”. However, if material is formal and foreign – for example, advanced scientific facts and figures – and is ‘abruptly’ presented, it will have no symbolic meaning to the child (*ibid*: 39). At the other end of the spectrum, if the material is so drastically simplified that the thought-provoking aspects are omitted, there is no opportunity to stimulate the child’s powers of reasoning and logic (*ibid*: 43). Similarly, if instruction is not organic and vital, the child has no motivation to learn (*ibid*: 41). Dewey (*ibid*: 38) advocated an approach in which the teacher’s main concern should be with the subject matter – as “*representing a given stage and phase of the development of experience*”, so that it originates within the child’s growing experience – and how the subject may become part of the child’s experience. In other words, the subject matter should be ‘psychologised’ so that it is “viewed as an outgrowth of [the child’s] present tendencies and activities”.

There is no explicit reference to food security or gardening in the junior or senior curricula in South Africa. However, the principles enshrined in the National Curriculum Statement (NCS) for grades R to 9 make links between “social justice, human rights” and a “healthy environment” (NCS1). The Learning Outcomes (LOs) allow consideration of issues relevant to food security, for example, through ‘exploring issues’ (Social Sciences LO3), and engaging with gardening or agroforestry through ‘technology, society and the environment’ (Technology LO3). Many South African teachers, mainly in rural areas, find it difficult to make use of the NCS (Ncula 2007: 17). It is widely thought that because “formal educational systems alone cannot respond to the challenges of modern society”, the complementary role of non-formal educational practices is required (Rogers 2004: np). For example, the village botanist programme in India (see 2.2.2.1) in-

²¹ “Curriculum is used to describe the teaching and learning events that lead to a desired (and often explicit) competence, which is formulated according to a set of agreed standards. Curriculum development is therefore much more than a listing of course content, because it includes the entire process of planning, implementing and evaluating an educational programme. The quality of the final curriculum is based on our ability to describe the functions of programme graduates, and then to decide what knowledge, skills and attitudes are required to perform those functions effectively” (Rudebjer, Temu & Kung’u 2005: 17).

corporate informal education and traditional ecological knowledge into a formal framework (Shukla & Gardner 2006: 9).

From the perspective of group dynamics and organisational theory, “a formal group is one which does not change as new members join it. ... An informal group is one which is highly dependent on the individual members... if someone joins or leaves, the nature of the group and the activities... will also change” (Rogers 2004: np). It may be concluded that informal learning experiences are interwoven with any education process, and that there is a somewhat graded interface between informal/contextualised/participatory, non-formal/flexible and formal education. This is depicted in Figure 2.5.

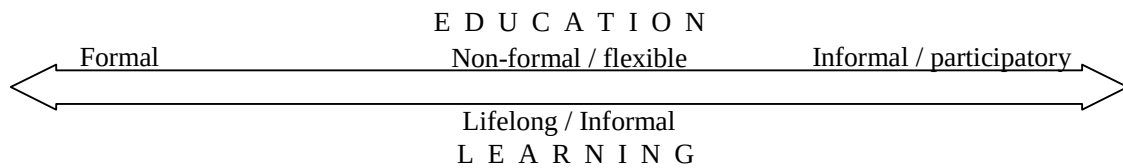


Figure 2.5: Diagrammatic representation of the total learning experience as a continuum.

2.4.2 Types of learning associated with food growing

In the sub-sections that follow, learning perspectives associated with food growing are examined, including ‘experiential learning’, ‘situated learning’ and ‘active learning’. It should be noted that although many practitioners have given credence to these learning approaches, their efficacy may not have been ascertained before implementation (Dillon *et al* 2003: 10-11). The need for a closer scrutiny of learning theory, in EE in particular, has been reiterated by a number of researchers (Dillon 2003: 222).

2.4.2.1 Experiential learning

Dewey (1906: 92) found that direct or spontaneous attention arises from intrinsic interest. This is considered to be the basis for experiential education – which is commonly associated with GBL (Desmond *et al* 2002: 21; Fang 1995/1997: np). An integral part of informal learning processes, experiential learning is also referred to as ‘hands-on’ or ‘real life’ learning, or ‘learning by doing’, and may be associated with ‘apprenticeship learning’ (Owens 2004: 73; Rogers 2004: np).

Real learning is not only didactic (instructional) but also participatory and experiential (Orr 1992: 91). Experiential learning is “a process through which a learner constructs knowledge, skill, and value from *direct experiences*” (Association for Experiential Education quoted in Desmond *et al* 2002: 22). The scholar becomes more active in her/his thinking, doing and solving problems, while the teacher acts as a facilitator. Observation and reflection on concrete experiences forms

the basis for developing abstract concepts, making generalisations, and testing their implications in different contexts (Desmond *et al* 2002: 21; Kolb quoted in Smith 2001-a: np).

There is a growing body of research pointing to the value of experiential learning in formal learning processes (Anderson, Reder & Simon 1996: 8; Jarvis quoted in Fang 1995/1997: np). For example, Mabie and Backer (quoted in Dillon *et al* 2003: 28) found that experiential GBL supported successful school-based science learning. However, according to a recent report on GBL in southern Africa, schools generally do not make “educational use of the real-life environment” (Sherman 2007: 16). In the 1930s, ‘school farms’ in South Africa made use of experiential learning, with an emphasis on developing citizenship, humanity, cooperation and creativity (Malherbe 1977: 230-231). Their child-centred approach to education was based on the premise that everything at the school farm was the joint property of the scholars. Because they farmed the land in their own interests (generating funds to cover their study costs), their school subjects were brought into relationship with real life (*ibid*: 231).

Experiential learning may also be misrepresented. For example, in Malawi, teachers found it difficult to translate “pupils learn by doing in the garden” into Chichewa; it was expressed instead as “pupils work in the garden” (Sherman 2007: 13). Focussing only on the mundane activities associated with real-world tasks tends to occur at the expense of more deeply engaged cognitive processes (Anderson *et al* 1996: 9). Anderson *et al* recommended focussing on engagement with complex cognitive tasks to enable transfer of skills between different kinds of activities and prepare scholars for a diverse and ever-changing real world.

2.4.2.2 Situated learning

The case for situated learning is based on the assumption that all activity – including activity of the mind – takes place in a context, or ‘situation’ – such as food growing (Anderson *et al* 1996: 5; Dewey 1906: 46; Fang 1995/1997: np). It may also relate to ‘situated cognition’, where education is a process of ‘cultural negotiation’ or “culture-in-the-making” (Stairs 1994: 156). Pennington (in Fang *ibid*) believed that the school garden supports learning because it provides subject matter that is immediate and familiar, thus helping demystify abstract concepts. This view is based on the assumption that all scholars come from a background where there is a garden, which is not necessarily true.

Jarvis and Sizer (quoted in Fang *ibid*; Smith 2003: np) saw the school garden as a ‘community of practice’ where scholars may engage in a complex social setting and develop personal and vocational skills. By contrast, Anderson *et al* (1996: 5) argued that situated learning, as engagement in a community of practice, stands in juxtaposition to more individualised engagement such as ‘ap-

prenticeship learning'. Unpublished research suggested that transfer of knowledge and skills to new situations is facilitated by abstract, rather than concrete, instruction (Singley quoted in *ibid*: 8). Individual cognitive engagement is essential for thinking critically about the limitations of different socio-cultural perspectives.

Proponents of situated learning might pay more attention to the relationship between what is learned in the classroom and what takes place in the real world. Anderson *et al* (1996: 8) recommended research to enhance the educator's ability to recognise when it is most appropriate to make use of narrower or broader social contexts for learning, and when to focus on teaching narrower, concrete skills or broader, abstract cognitive skills (*ibid*: 10).

2.4.2.3 Active learning

A scholar's understanding is developed not only through language but also as a result of her/his actions on the environment (Desmond *et al* 2002: 21; Findlay, in Dewey 1906: 6). The form of active learning most commonly cited in southern African EE research circles is the Active Learning Framework developed by O'Donoghue (2001) (see Figure 2.6). His line of reasoning was that environmental learning is optimised when there is a focus on some kind of issue or risk in the local environment. An 'active learning environment' was thus envisaged as one in which scholars will respond to an issue by getting in touch with their surroundings (tuning in) and talking and thinking their way through to solutions through an open-ended process that could take place repeatedly, in any order, in any number of learning areas. This process entails seeking information (i), conducting enquiries (E) about issues, taking action (A), and reporting (R) ideas.

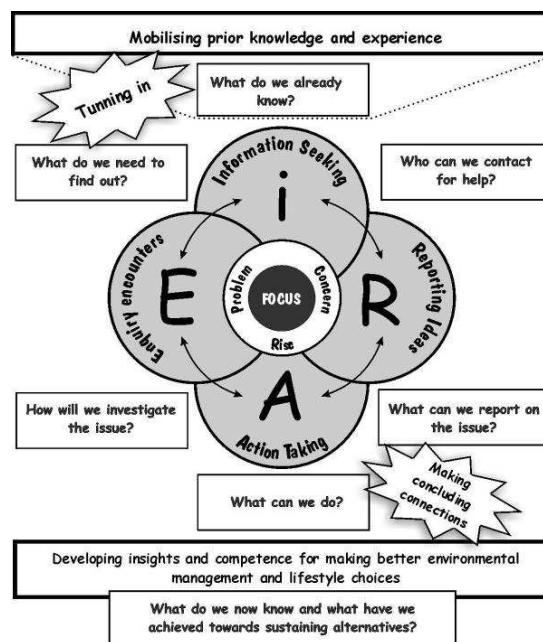


Figure 2.6: Active Learning Framework (from O'Donoghue 2001).

In the context of the UN decade of education for sustainable development, research conducted by Atiti (in Vandebosch *et al* 2004: 76) identified the educational potential of school gardens for engaging scholars and their parents in active learning, as well as social critique in order to promote social change. O'Donoghue argued that the active learning framework has the potential to enable scholars to progress from prior knowledge to better environmental management and lifestyle choices. To mobilise prior knowledge and experiences and facilitate meaningful transfer of knowledge and skills to new situations, abstract instruction is also necessary (see also 2.4.2.2).

2.4.2.4 Closing remarks relating to learning associated with food growing

One of the recommendations made by Vandebosch and Nanok (in Sambili, Tombo & Whitehead 2004: 20) was to adopt an integrated, multidisciplinary educational approach, supported by active and experiential learning. Based on the foregoing discussions of types of learning associated with gardens, it is apparent that there are congruencies between 'experiential learning', 'situated learning' and 'active learning', and that the depth and complexity of learning experiences in garden settings cannot be limited to one pedagogic strategy alone. It may also be noted that other pedagogic strategies could equally well be applied to garden settings, for example, Owens (2004: 64) found that both structured – or didactic – instruction and participatory learning processes supported first-hand experiences in outdoor settings such as gardens, in tandem with a whole-school approach, in developing environmental understanding and sustainable behaviour.

In the following section, the garden setting is discussed in terms of a 'place' for food growing and learning, and its potential in supporting a sense of connection with the wider socio-ecological system.

2.4.3 The role of 'place' in education

As noted in 2.2.7, food growing in urban settings can play a valuable role in 'place-making'. Various interpretations of a 'sense of place' have been reported by Pruneau, Chouinard, Arsenault and Breau (1999: 27), including 'ecological identity', 'topophilia', 'environmental sensitivity'²²; 'community identity', 'insideness', 'place identity' and 'place attachment'. Orr (1992: 104) maintained without a connection to place, people become indifferent to their local ecology and human ecology, and lose the 'art of living responsibly'. In Poland, Lewicka (2005: 383-392) found that people were less inclined towards sustainable thinking or civic engagement if they lacked cultural and socio-emotional capital. The researcher suggests that this is undermined if people are required to relinquish ownership of property, designations or associations – for exam-

²² Environmental sensitivity is defined as "a feeling of empathy towards the environment which is manifested by habits and attitudes of openness, interest and attention for the components of a milieu and by abilities to perceive and to experience these components" (Pruneau *et al* 1999: 27).

ple, through affirmative action policies – further diminishing community cohesion and sustainable thinking and practices.

Orr (1992: 104) argued that if scholars do not have to solve problems that have consequences outside of the abstract classroom context and their academic performance, they learn that practical incompetence and lack of accountability are acceptable. Place-based education is seen as a way of compensating for overspecialisation, combining intellect with experience, re-educating people in the art of living responsibly, and instilling an ‘applied ethical sense’²³ toward habitat, and promoting connections between people and with the biosphere (Orr 1992: 128-131; Sobel 2004: 63). In rural Alaska, Emekauwa (2004: 9) found place-based education could “re-awaken... Native people to the importance of assuming responsibility for the education of their children”.

Critical theorists assert that education is not neutral; it is either ‘overtly coercive’ or covertly coercive (Boyce 1996: 2; Gramsci quoted in Burke 1999/2005: np). The mainstream environmental movement has been criticised for paying insufficient attention to the role of social inequality and power imbalances in bringing about environmental degradation and depletion of natural resources (Bullard quoted in Gruenewald 2003-a: 6). Similarly, the critical social movement has been criticised for its excessive focus on human relationships at the expense of ecological concerns (Bowers quoted in *ibid*). This led to the proposal for a ‘critical pedagogy of place’, an alternative educational approach that grounds place-based education in a pedagogy that is “socially and ecologically critical” (Gruenewald 2003-a: 9).

Krasny and Tidball (2006-b: 8), in their discussion of civic action and traditional ecological knowledge, drew attention to Bowers’ warning that critical pedagogy could stifle community-based knowledge and experience. However, participatory processes such as the ‘food sovereignty’ movement (see 2.3.3.1) have adopted a critical approach to ‘accepted’ social practices (such as planting genetically modified maize), interrogating ecological consequences and taking into account alternative practices and community-based knowledge (Pimbert 2008: 39). There may be potential for such programmes in southern Africa, especially in food gardens, where community-based knowledge may be drawn in through school-community links.

2.4.4 School-community links

It is widely believed that communities have an important role to play in supporting educational development. Discussion below includes the meaning of ‘community’, the role it plays in schools, and vice versa. Garden-based learning is considered in terms of its role in linking schools and communities and hence creating a connection with the wider socio-ecological sys-

²³ Orr (1992: 131) quoted Leopold: “a thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise”.

tem. In this regard, the implications of school-community links are considered in terms of educational practice, environmental sustainability and food security.

2.4.4.1 Defining communities and their links to schools

To engage meaningfully with the concept of school-community links, it would be useful to identify an adequate definition of ‘community’. In 1887, Tönnies’ (quoted in Smith 1999/2007: np) *Gemeinschaft and Gessellschaft* [Community and Society] viewed community as “the permanent and real form of living together”, while society was seen as “transitory and apparent”. Community was thus “a living organism”, while society was a “mechanical aggregate and artefact” (*ibid*).

In heterogeneous societies in various parts of southern Africa and the USA, diverse social groupings do not necessarily share traditions or economic interests, but are nevertheless situated in one geographic area. The researcher thus proposes the following working definition of community:

A community is a dynamic human social grouping situated in a recognisable land area in which members share – to a greater or lesser extent – aspects of social, cultural, traditional, historical and economic activities, and in which diverse socioeconomic, political and environmental concerns inform the way in which members conduct their lives and relate to each other.

Numerous conduits have the potential to foster links between schools and communities (Jacquet de Haveskercke 2004: 60-61) – see Appendix J. At an advanced stage of reporting in this project, the researcher uncovered additional sources which revealed that many studies have in fact focused on the role of school-community links. For example, Schofield (2005: 9-12) listed nearly eighty different references (Appendix K) in his *School-Society Relations* course outline, and drew attention to the influence of socio-cultural and economic diversity on these links.

School-community relations involve collaboration, negotiation and debate among diverse groups with direct, and sometimes indirect, interests in the nature and quality of local schools. These relationships are shaped by global policy and economic trends, and by local cultural and social contexts. (Schofield 2006: np)

2.4.4.2 The role of schools in communities

Jacquet de Haveskercke (2004: 63) inferred from preliminary findings in Zimbabwe that schools contributed much less to the community than vice versa. She indicated most community members were influenced not by schools, but largely by organisations working in their community, by friends and neighbours, and by their own school experiences (*ibid*: 62). With regard to the latter, Jacquet de Haveskercke inferred that, “equipping pupils with better NRM skills will have an impact in the future” (*ibid*) – in other words, they are the farmers and decision-makers of the future.

Vaughan, Gack, Solorazano and Ray (2003), in their study of intergenerational and intercommunity learning in Costa Rica, theorised that as children learn and retain conservation principles,

they pass them on to their parents and the community. They recognised the key role of collaborative learning employed in the month-long school-based EE course (*ibid*: 16). In addition to the weekly two-hour sessions with the teachers at school, the children were required to complete homework with their parents' help, reading illustrated information booklets, colouring in pictures and answering questions on a worksheet (*ibid*: 14). However, De Keyser (2005: ii) noted that the incorporation of new agricultural technologies into the school curriculum was based largely on the assumption that beneficial knowledge and skills will automatically proliferate in the surrounding community. She suggested that school children might transfer new ideas and innovations to their parents through their homework assignments or direct messages from the school (De Keyser 2005: 34; Sherman 2007: 12). Drawing on De Keyser's findings, Jacquet de Haveskercke (2004: 64-86) put forward fifteen recommendations for strengthening the impact of schools on communities (see Appendix J).

The FoF initiative (see 2.3.4.1) targets children and young people on the premise that they will influence their parents – the present generation of farmers – and will also adopt sustainable practices as future agroforestry farmers, promoters and community leaders (Jacquet de Haveskercke *et al* 2004: 2; Akinnifesi pers comm March 17, 2006). However, studies in southern Africa have found that children do not influence 'parents' or decision-makers in their homes to any significant degree (Kruger 1992: 111; Parkin *et al* 2006: 179). Where children had engaged in practical EE projects in the school environment, there was some evidence of their influence on parents (Kruger 1992: 111). It was speculated that where a project addressed concerns raised by community members, there was an increased likelihood of children influencing their parents (*ibid*: 112). However, Kruger (*ibid*: 112) inferred that where socio-cultural norms place children in subordination to adults, their multiplier effect is minimal. She concluded that a community approach to EE may be more effective in such societies.

Improvements in agricultural production have been associated with the expansion of production possibilities and improved incentives, with the key change agents being individual farmers and private agribusinesses, supported by research institutions, governmental organisations, parastatal agencies, and donors (FARM-Africa 2004: 14; Gabre-Madhin & Haggblade 2003: 34). As noted in section 2.2.1, there appeared to be little evidence to link the quality or relevance of education with improved agricultural production (Vandenbosch *et al* 2004: 25). Nevertheless, it seems there was reason to believe that there is potential for agroforestry technologies introduced in school settings to be transferred by children to parents and families, and hence to the wider community.

2.4.4.3 The role of communities in schools

De Keyser (2005: ii) observed that in most cases, communities in southern Africa contributed more to school learning than vice versa. Wheeler *et al* (quoted in *ibid*: 23) suggested that parental and community involvement in children's schooling, coupled with an experiential approach to education, could enhance scholars' potential to become change agents. "Community ownership is crucial for relevant and effective basic education" – a view expressed by Vandenbosch, Nanok and Tollens (2005: 3) in their southern African-based policy brief. They recommended that the knowledge and expertise of locals should be incorporated in agricultural and environmental learning in schools (*ibid*: 6). To ensure ongoing community support for education, Watt (2001: 36) recommended (i) fostering partnerships between community, teachers and government – with common objectives, clearly defined responsibilities and effective accountability mechanisms; (ii) community-driven change projects, (iii) using resources transparently to address community needs; and (iv) receptiveness to dialogues with community support stakeholders.

Research in the USA found children's learning and development to be supported through their involvement with community-based organisations (McLaughlin 2001: 14; McLaughlin 2000: 3). Community-based learning resources, such as a community garden, were reported to provide a safe, informal setting in which children could draw on tutoring and other support (McLaughlin 2001: 18). A key recommendation was that schools should work in partnership with community-based organisations on "mutual goals for youth development", encouraging scholars to engage in community projects and integrate their community work into class projects, and support teachers' involvement, rather than leaving the CBO to merely make use of school facilities (*ibid*: 16). Youth empowerment may also be strengthened if local structures engage and collaborate with scholars and make them feel that their input is respected and relevant (Jensen 2007: np).

It may be argued that a peaceful neighbourhood – one without high levels of tension or crime – will be more supportive of children's educational activities. As Dewey (1906: 83) noted, customs and habits tend to be unconscious and mechanical. This draws attention to the need for good governance and functional communities in which people are employed in meaningful activities, rather than locked in a cycle of unconscious or destructive customs that undermine wellbeing and sustainability. These are concerns that cannot be mitigated easily or instantaneously.

A community 'garden support group' is one way in which resources, knowledge, skills and practical assistance may be mobilised, while at the same time strengthening community learning through its link with the school (Sherman 2007: 13). However, several southern African reports indicate that community integration into garden-based activities is limited (*ibid*: 16). In Zambia, where Community Schools lack the capacity to 'mobilise resources', Tembo (2005: 2) suggested

they may draw on support from outside organisations. He believed that communities would follow Community Schools' examples as they became empowered to generate income through their agriculture-based programmes (*ibid*: 5). At the time of this review, Kalubi (pers comm July 9, 2008) noted that Project Concern International Zambia had not yet monitored the effects of their programme in the broader community.

2.4.4.4 The role of garden-based learning in linking school and community

In their cross-cutting research on GBL, Desmond *et al* (2002: 71) identified a trend towards increased parental and community involvement in schools that followed GBL best practice, and speculated that this new sense of community was encouraged by the nurturing, uncompetitive gardening environment. De Keyser (2005: 35) suggested that the establishment of school gardens would enable scholars to experiment with new technologies and model good agricultural practices to the community, as well as providing opportunities for intergenerational learning – through parents helping their children in the school garden, or discussing ideas while tending their own plots within the school garden. There is also potential for agricultural extension officers to facilitate demonstration activities in school gardens, and foster links between agricultural institutions and schools (Hegge quoted in De Keyser 2005: 37). The sale of produce from a school garden, while serving as a fresh, local source of nutrition, can also serve to pique community interest in new agricultural technologies.

As noted by Desmond *et al* (2002: 71), staff, parents and community volunteers may find the garden burdensome. It is acknowledged that schools and communities in economically advantaged settings are in a better financial position to fund and support food gardening activities. As noted in 2.3.3.2, GBL projects in economically challenged contexts nevertheless have the potential to tap into the social and cultural capital (where intact) of traditional communities.

2.4.4.5 Implications for educational practice relating to food growing

Conventional schooling tends to create “artificial practice and environment, isolated from real life experiences where people of different ages and expertise are interacting and solving problems” (Tal 2004: 541). In the socio-cultural context of southern Africa, greater parental and community participation in school children's education is considered essential for promoting sustainable agriculture, as it allows the integration of formal and informal knowledge in education (Pruneau *et al* 1999: 27; Vandenbosch *et al* 2005: 6). In the USA, charter schools appear to promote participation in managing community concerns (Gruenewald 2003-b: 621). The Africa Education Initiative aims to increase accountability and responsiveness to community needs by promoting parental and community involvement in sponsored reading programmes, parent associations and parental involvement in school finances (AEI nd: np). Community involvement may

also be facilitated through the study of gender issues or society and environment interactions (Environmental Learning Forum nd: np). Allan *et al* (quoted in De Keyser 2005: 36) noted agricultural or environmental school clubs provide settings where individual initiatives could inspire new practices in the community. Potential limitations of communities should not be forgotten when considering their contribution to school-based learning. Educational quality, efficiency and equity should not be compromised.

Communities require a minimum level of skills, cohesion, and confidence to be able to contribute to education. This capacity often needs to be created, and can require considerable time and resources, particularly in poor communities where unmet educational needs are greatest. (Watt 2001: 36)

2.4.4.6 Implications for environmental sustainability and food security

Education that enhances relationship to the social fabric will improve a community's 'relationship to the environment', which in turn promotes sustainability (Pruneau *et al* 1999: 27). Similarly, where there is a weakened sense of identity and attachment to place, there is little connection between individuals and their communities (Malmberg 1992; Pyle 1992; quoted in *ibid*). Education that expands learning beyond the school to involve all generations and the broader community may empower individuals and communities to find sustainable solutions to environmental concerns (Ballantyne; Ben-Peretz; Fien & Packer; quoted in Tal 2004: 540). It may be suggested that a poor relationship between schools and communities would both reflect and exacerbate a general breakdown in society and associated unsustainable practices. Food growing activities may help to strengthen these links, while also supporting teaching and learning for environmental sustainability.

2.4.4.7 Strengthening school-community links

Vandenbosch and Nanok (in Vandenbosch *et al* 2004: 25) identified three learning environments: the school, the home and the community. This seems to mirror Marburger's notion of three learning arenas: "educating community of the household... the national and uniform school... [and] free self-education of adults of all social backgrounds" (Natorp quoted in Smith 1999/2007: np). Natorp asserted that education that strengthened community (*Gemeinschaft*) would reduce the gap between wealthy and poor (*ibid*). Vandenbosch *et al* (2004: 11, 25) recognised that a project's success is dependent on the "will and support of the people" and that school-community links are most effective where there are mutual benefits. These links may be strengthened through a participatory approach with teachers, parents and community members (Vandenbosch *et al* 2004: 37; de Keyser 2005: 85). The Eco-Schools programme (see 2.3.4.2), which promotes a whole-school approach to addressing local issues, may be seen as an attempt to strengthen school-community links. Parent Teachers Associations (PTAs) were found to be an effective

link, especially where steps are taken to involve the community (de Keyser 2005: 31). In education for sustainable development, school-community linkages are supported by:

▪ Capacity-building	▪ Relevant curriculum
▪ Appropriate learning / extension resources	▪ Enabling policy and working environment
▪ Schools as resource and outreach centres	▪ Continuous dialogue between community and schools
▪ School-community needs assessment	▪ Resource mobilisation
▪ Monitoring and evaluation	▪ Equity in benefits and resource sharing
▪ Appropriate approaches & methodologies	
▪ Awareness creation and mobilisation	(Vandenbosch <i>et al</i> 2004: 117)

It is important to remain critically aware of stakeholder agendas. State, NGO or international aid groups may have a hegemonic influence on community-based education projects. This may apply equally to the interventions of tertiary education and research institutions (Smith 1998/2001: np).

In closing, the school may be viewed as a subset of the broader community, and the school-community relationship is thus one aspect of a diverse array of interactive processes, which has the potential to promote social change. Drawing on insights gleaned from the foregoing discussion, the researcher proposes the following working definition of school-community links:

The school-community relationship has the potential to serve as an interactive and mutually educative process between a dynamic human social grouping and a subset thereof, a formal educational institution, that are situated in a recognisable land area in which members share – to a greater or lesser extent – aspects of social, cultural, traditional, historical and economic activities, and in which diverse socio-economic, political and environmental concerns inform the way in which they conduct their lives and relate to each other.

2.5 Synthesis of contextual factors

Education development in Africa cannot be achieved without the active support of communities, but for this support to be forthcoming, the limits of what communities can do need to be recognized, and certain conditions must be in place (Patrick Watt 2001: 36).

The contextual structure presented in this chapter has provided a review of features relevant to this research. There appears to be widespread concern regarding the poor understanding of ecosystem processes and their links to food growing, health and nutrition in various parts of southern Africa. This was introduced in discussing the history and impacts of agricultural education (2.3.1) and concepts linking food growing and education (2.3.3), where it was reported that emphasis is placed mainly on income generation and food production in southern Africa

There appears to be a renewed interest in promoting garden-based learning (GBL) (2.3.3.2) to strengthen nutritional knowledge and skills and promote integrated learning, environmental un-

derstanding, community-building, and learning for sustainability. This is apparent in a number of educational initiatives linked to food growing (2.3.4). However, there appears to be limited evidence of schools contributing to communities, of community involvement in school garden-based activities, or of links between education and improved agricultural production (2.4.4.2). It is possible that an overemphasis on academic achievement may hinder education for sustainability, as noted in discussing agricultural education (2.3.1), GBL (2.3.3.2) and the role of 'place' (2.4.3). Learning for sustainability is further undermined by poor community cohesion and lack of civic engagement, as noted in 2.4.3 and 2.4.4.

Educational responses considered to have the potential to address environmental degradation, promote responsible and sustainable approaches to food growing, and help address poverty and food security concerns entail an integrated, multidisciplinary approach to education, coupled with active, experiential and situated learning. This may further be strengthened by harnessing traditional ecological knowledge and practices, as well as innovative research in sustainable agriculture, agroforestry and urban agriculture (see 2.2.4 and 2.2.5). In the context of food gardens, agricultural and/or agroforestry activities – referred to generically as food growing – the potential for school-community links to support environmental learning and more sustainable approaches to food growing is highlighted. However, community involvement may compromise educational quality and efficiency, or introduce an element of prejudice (2.4.4.5). This reaffirms the notion that food security concerns cannot be addressed independently of socio-cultural factors, bearing in mind their complex interrelationship with agricultural practices, demographic trends and environmental degradation.

A number of existing educational initiatives with links to food growing, such as the Farmers of the Future, Health Promoting Schools and Umthathi Project in southern Africa, and global programmes such as Eco-Schools and Garden Mosaics, are identified. There appears to be potential in drawing on and adapting such initiatives in a bid to address environmental sustainability and food security concerns. In the same way that socio-cultural and structural contexts are taken into consideration in valid and trustworthy qualitative research (see section 3.6), so these need to be factored into the design and implementation of any valid and trustworthy educational programme if they are to be relevant and effective in promoting food security and sustainability.



3. RESEARCH PROCESS

The best of science doesn't consist of mathematical models and experiments, as textbooks make it seem. Those come later. It springs fresh from a more primitive mode of thought, wherein the hunter's mind weaves ideas from old facts and fresh metaphors and the scrambled crazy images of things recently seen. To move forward is to concoct new patterns of thought, which in turn dictate the design of the models and experiments. Easy to say, difficult to achieve (Edward O Wilson 1992: 5).

In this chapter we examine the research orientation, methodology, study sites, methods of data generation, analysis, and concerns relating to research ethics, trustworthiness of the findings, and limitations of the research process. Finally, a flow diagram (Figure 3.3) illustrates a synthesis of the research process.

3.1 Research orientation and methodology

Paradoxical as it may seem, the abstraction of science to methodology (which is largely what scientific 'paradigms' do) tends to turn the scientific project itself into a problem of method... a problem of instrumental strategies. The confusion between science as knowledge, or Wissenschaft, and as 'scientific method' has never been adequately unscrambled (Murray Bookchin 2005: 402).

This research is empirical – not experimental or quantitative. It investigates observations and experiences. At a metatheoretical level, it falls within the phenomenological / interpretivist tradition (Babbie & Mouton 2001: 28, 48). At a theoretical level, it is an exploratory study that uses the symbolic interactionist approach to better understand a particular aspect of society (Blumer 1969/1998: 76).

Research decisions are informed by assumptions about the nature of reality – a worldview or 'ontological position'. Mixed philosophical assumptions may be encountered in education research – especially where mixed methods are used (Greene, Kreider & Mayer 2005: 275). Researchers may respond in a number of ways. An 'a-paradigmatic' stance could be adopted, in which research design decisions are contextually informed (Patton quoted in *ibid*). Alternatively, a 'dialectic' approach (see section 3.3) may be adopted, in which conflicting paradigmatic perspectives and methods are valued for their generation of new perspectives and innovative approaches (Green & Caracelli quoted in *ibid*). Creswell (in *ibid*) and Tashakkori and Teddlie (in *ibid*) promoted a 'pragmatic' approach, in which a variety of perspectives are accommodated and minimal attention is focussed on the differences, as is the case in American pragmatism – which played a role in the emergence of symbolic interactionism – and in current thinking around realism (*ibid*).

By assuming a reflexive orientation the researcher is better able to make explicit her/his ontological perspective, so that it is congruent with the chosen theoretical framework and hence with

the design of the research (Blumer 1969/1998: 24-25). Lincoln and Guba (1985: 82-87) identified a number of different ontological positions, including ‘perceived reality’. The researcher adopts this perspective, recognising that reality exists (the empirical world) but is only known in part – through perceptions – and is interpreted according to social definitions (Blumer 1969/1998: 21; Charon 2001: 42; Lincoln & Guba 1985: 178; Mertens 2005: 7; Project Gold 2000). Because the ‘epistemic interest’ of this research was congruent with the assumptions of symbolic interactionism, it is germane to examine the theoretical underpinnings of this perspective.

3.1.1 Theoretical underpinnings: symbolic interactionism

In this section, consideration is given to the concept of symbolic interactionism, its principles and applications. Herbert Blumer, a key figure in this theoretical approach, is cited extensively. Other historic figures associated with symbolic interactionism include Dewey, Hughes, James, Peirce and Thomas. Current theorists include Becker, Cahill, Charon, Couch, Denzin, Fine, Lindesmith, Lofland, Maines, Shibutani, Strauss and Stryker (Charon 2001: 29; Fine 1993: 62).

3.1.1.1 The concept of symbolic interactionism

Symbolic interactionism has developed largely from pragmatism, a “theory of knowing, truth, science, and meaning” – and human being’s relationship with the environment (Denzin 1992: 5). The past is drawn in only because humans think about it and define it in the context of the present. In order to understand society, the researcher needs to focus primarily on the actions of ‘human subjects’ in concrete situations, in the present (Charon 2001: 30-31, 39).

According to Blumer (1969/1998: 21, 47) the symbolic interactionist perspective informs empirical studies of human group life and behaviour. His premises may be traced to Charles Darwin’s ideas and to behaviourist thinking (Charon 2001: 29). In studying the ‘human subject’ in ‘naturalistic’ terms, Mead drew on Darwin’s approach to studying the world – in terms of natural laws, rather than by appealing to supernatural explanations (*ibid*: 31). He recognised that the development of language, and thence the ability to use symbols and reason, sets humans apart and enables them to both learn about nature and act on it – both self and society are in an ongoing and dynamic process, in which truth, symbols and rules are changed through thinking and social interactions (*ibid*: 32). Similarly, Blumer (1969/1998: 41-42) encouraged researchers to follow Darwin’s example – constantly posing questions of the study, remaining sensitive to alternative perspectives, keeping a record of and reflecting further on observations that challenge working conceptions or appear unusual – in order to generate fruitful new research directions. Drawing on Charon’s (2001: 33) reference to behaviouristic thinking, we understand ‘human subjects’ in terms of what they *do*, rather than who they are. As Blumer (1969/1998: 55) stated, “social *action* is the primary subject matter of social science”. It should be noted that in addition to overt

physical behaviour, Mead also took into consideration the behaviour of the mind – thinking – in recognition of the role of interpretation, definition and meaning in understanding humans’ overt actions; this gave rise to the concept of “social behaviourism” (Charon 2001: 33).

3.1.1.2 Principles of symbolic interactionism

Blumer (1969/1998: 6, 49) held that symbolic interactionism is rooted in a specific view of society, the six components of which are briefly reviewed here.

- Society consists of humans engaging in *action*, a process in which there is (i) a social interaction between actors who (ii) cooperate over time and (iii) develop culture²⁴ – and hence is dynamic and constantly being shaped by actors in interaction (Charon 2001: 24-25).
- Individual conduct is formed through the process of social interaction (Blumer 1969/1998: 7-10). Steering away from the deterministic focus of psychology or sociology, symbolic interactionism presents the human as an active agent in which humans are able to ‘take on the role of the other’ during social interactions, which influences how they act (Charon 2001: 25). To some extent then, humans may be viewed as ‘free’, with society is held together by ‘voluntary commitment’ rather than by force (*ibid*: 27-28). It could also be argued that in ‘not doing anything’, a person is nevertheless *acting* on society.
- The world consists of objects – physical (such as buildings, cars or tree), social (any category of person, such as a political leader, father, or colleague), and abstract (such as concepts, codes of conduct, or ideologies) (Blumer 1969/1998: 10-12; Charon 2001: 44, 46). The way humans act towards objects is informed by how they define or interpret these objects – the meaning objects have, what they *symbolise*. Mead distinguished between “non-symbolic interaction” – in which one’s response is a reflex reaction, lacking interpretation of the other’s action – and “symbolic interaction” – in which one *acts* on the basis of *symbols*. In other words, one’s own response is informed by one’s interpretation²⁵ of each gesture made by the other, one’s understanding of the *meaning* of the other’s action, what it symbolises (Blumer 1969/1998: 7-10).
- The concept of the symbol is central to symbolic interactionism; society is comprised of humans in association with each other, who interact primarily on the symbolic level (Blumer; 1969/1998: 9; Charon 2001: 42). All humans use language and symbols to communicate; the symbolic communications between individual humans shape society. Likewise, the symbols

²⁴ According to Charon (2001: 18), society is not only an exterior phenomenon, but through a process of socialisation, also becomes part of a human being. He defines culture as “the consensus developed by people over a long history”, reflecting their shared view of reality. ‘Truth’ emerges from the basic ideas of a culture, ‘morals’ are formed by its rules, and personal values are shaped by cultural values (*ibid*).

²⁵ Interpretation of another person’s action entails pointing out that the action has a particular character or meaning to oneself (Blumer 1969/1998: 80).

provided by society – people, with language, moral codes and other human qualities – are essential for a functional individual (Charon 2001: 42). Objects are thus seen as ‘social objects’ – *social creations* or symbols which have been formed through a *social process of indication* – their status is only as stable as the indications and interpretations/definitions that sustain their meaning (Blumer 1969/1998: 10-12; Charon 2001: 53).

- Humans have selves, and so can be an object of their own action (Blumer 1969/1998: 12-15). The development of self-identity emerges in a number of layers, explicated by Denzin (1992: 26) as phenomenological, interactional, linguistic, material, ideological, and desire. In recognising themselves as social objects, humans can engage in self-interaction; this ‘mind action’ / thinking / internal dialogue is central to human action (Charon 2001: 24, 27).
- Humans form their actions based on what they note, interpret and assess (Blumer 1969/1998: 15-16). By making indications to themselves, people can construct and direct their action; action is not a simple release of a response to an outside signal or stimulus that plays on them. Human action is a continuous process in which decisions are refined on an ongoing basis (Charon 2001: 25).
- Organisations, institutions and networks of relations are comprised of interlinking human actions (Blumer 1969/1998: 16-20). Joint action has a unique identity, independent of its constituent acts, as does the collective that is responsible for the joint action (*ibid*).

3.1.1.3 Applications of symbolic interactionism

The symbolic interactions between people – reflected in the study’s findings (Chapter 4) and considered in theoretical terms (Chapter 5) – may be elucidated by drawing on Mead’s “triadic nature of meaning” (Blumer 1969/1998: 9). This is (i) an indication of what the respondent should do, (ii) an indication of what the actor intends to do, and (iii) an indication of the joint action being formed by the acts of both. Blumer (*ibid*: 9) added a fourth dimension, mutual role-taking – which is key to communication and effective symbolic interaction – where both parties need to put themselves in the other’s position in order to understand the intention and impending action of the other. It may be summarised as follows:

Symbolic interactionism is a paradigm in social psychology which proposes that the self is constructed through communication and role-taking. Interactionists such as Mead (1934) believe that our behaviour stems from our interactions with others, and present a view of social reality as being dynamic, unfinished and pluralistic (Sandstrom, Martin & Fine 2004, p.2). Interactionism aims to uncover the subjective meaning of human behaviour, and places a particular emphasis on the role that language and thought play in our interactions with others... (O’Connor & Scanlon 2005: 3)

According to Denzin (1992: 157), interactionism has been through a number of phases, beginning with the ‘oral tradition’, and moving into the ‘age of inquiry’. At the University of Iowa,

where symbolic interactionism took on a stronger empirical focus under Manford Kuhn, it has been described as ‘positivist’, ‘social realist’ or ‘structural functionalist’ (Denzin 1992: 68; Fine 1993: 62; Warshay & Warshay quoted in Fine 1993: 71). The subjective, interpretive symbolic interactionist methodology of the Chicago school – of which Blumer was the “supposed founder” – has been referred to as ‘consensualist pragmatism’ (Denzin 1992: 18, 149) or ‘humanist’ (Warshay & Warshay quoted in Fine 1993: 71). Denzin (1992: 158-159) stated that the proponents of the ‘age of inquiry’ – Kuhn, Blumer, Hughes, and others – promoted a modernist agenda and an “ideological control over inquiry” that undermined their “grand narrative myth” of a cumulative and empirical science of a real social world and simply kept the ‘oral tradition’ alive. In this classic interactionist-ecology-conflict model, communication is the structure of society, and the state its mouthpiece.

In the post-Blumerian era,²⁶ the pragmatic approach to symbolic interactionism has incorporated perspectives gained from critical theory and cultural studies, and has likewise been adopted by other sociological research endeavours such as chaos theory and social ecology – according to Fine (1993: 65). Social ecology has been referred to as a ‘dissident’ ecological tradition that focuses on the relationship between racial and economic oppression, as does critical pedagogy (Gruenewald 2003-a: 6). Scholars like Denzin (1992: 123) and Fine (1993: 80) drew attention to the valuable contributions that symbolic interactionism can make to cultural criticism and research that addresses the realities faced by those who do not have food, shelter or health care. In particular, Denzin (1992: 80-84) offered an interpretive and post-structural perspective of interactionism that examines three interrelated conditions. Denzin (*ibid*: 81-84; pers comm March 9, 2008) referred to these as “the three prongs of cultural studies”: (i) the production of cultural objects and their meanings, (ii) the textual analysis of these objects and their meanings and practices, and (iii) the study of lived cultures and lived experiences in everyday life.

In summary, the accepted basis of symbolic interactionism is Blumer’s (1969/1998: 2-5) premise that (i) humans act towards things (physical objects, categories of humans, institutions, guiding principles, human actions, and life experiences) according to the *meaning* these hold for them,²⁷ (ii) the meaning of such things arises in the process of social interactions – *meaning* is a social product – as exemplified in Wenger’s (1998) ‘communities of practice’, and (iii) *meaning* is engaged with, and modified, through a process of interpretation – an “internalised social process” of “self-interaction” / self-reflection – which guides action. Interactionists thus assume that human beings create the worlds of experience they live in by acting on things in terms of the *mean-*

²⁶ Blumer died in 1986; his 1969 publication referred to in this text was renewed by his estate in 1998.

²⁷ “To interpret the actions of another is to point out to oneself that the action has this or that meaning or character” – it symbolises something (Blumer 1969/1998: 80) or “makes sense” (Charon 2001: 100).

ings things have for them (Blumer 1969/1998: 2). Denzin (1992: 164) argued against Blumer's stance that consciousness determines existence, suggesting instead that communication and culture mediate the link between consciousness and existence.

Drawing on the pragmatic tradition, Denzin (1992: 150) proposed an oppositional cultural aesthetic. He identified three potential positions – or codes – in any cultural text. The 'dominant' (or hegemonic) code has 'cultural legitimacy' because of its inevitability. The 'negotiated' code concedes to the dominant code at an abstract level, which stands in contradiction to its own fundamental stance. The 'oppositional' code subverts meanings in texts in order to expose alternative meanings, demonstrate how the dominant and negotiated meanings may be opposed, and provide spaces for public engagement in political liberation (*ibid*: 151). In so doing, it is possible to demonstrate how 'mythologies of culture' are adopted and expressed in popular vernacular by members of society. Denzin (1992: 167) concluded that interactionists should adopt a more critical perspective, deliberately provoking controversy in their research and theories. He held that an oppositional cultural aesthetic is congruent with the aims of early interactionists, who sought to address challenges facing democratic society (*ibid*: 151).

3.1.2 Methodological application: qualitative / naturalistic research

In this section, consideration is given to the methodological implications of symbolic interactionism, with an emphasis on meaning-making and the need for a holistic approach to social research. In order to remain close to the empirical world that both represents and shapes the nature of social reality, a naturalistic enquiry process is considered an appropriate methodological approach for symbolic interactionist studies.

3.1.2.1 Methodological implications of symbolic interactionism

Methodology is "a way of thinking about and studying social reality" (Strauss & Corbin 1998: 3). A research methodology that attempted to provide a rational and orderly representation would be dissonant with the irrationality and disorder of the human social world (Lincoln & Guba 1985: 182-183). Various aspects of the symbolic interactionist perspective have implications for the methodological approach in this study.

Firstly, a central conception of symbolic interactionism is that "people act on the basis of the **meaning** of their objects" (Blumer 1969/1998: 50-52). In order to understand research subjects' intentions and actions and how they 'construct reality', the researcher should study the social world in terms of their own interpretation of the social world (subjective meaning) and the meanings attributed to social practices, phenomena and events (Lincoln & Guba 1985: 37; Mertens 2005: 14; Taylor & Bogdan 1998: 7). This requires putting oneself in their position – taking on

their role – and drawing on relevant observations and descriptive accounts, as well as critical examination of one’s own pre-established images. In essence, the interpretivist researcher’s understanding of knowledge (epistemology) recognises the interactive relationship between knower and known, and the value of mutual role-taking (see 3.1.1.3). Subjective meaning is inextricably linked to the notion of human consciousness.

Secondly, social interaction is seen as a formative process in which “people associate by making indications (designation and interpretation) to one another” (Blumer 1969/1998: 52-54). In order to understand human group life, the researcher must take into account the dynamic and variable nature of **social interaction**, and uncover the different forms of social interaction.

Thirdly, “social action is conducted through social interaction – a process of actors noting, assessing and interpreting situations” (Blumer 1969/1998: 56). In order to identify and analyse the “career of the act” – or “trace the process of the formation of social action” – the researcher should view **social action** as a **construct** of the actor(s) in the process of interaction (*ibid*: 54-55, 57). Participants’ perspectives of reality could differ from the researcher’s ‘outsider’ perspective (van der Mescht 2002: 47). It is important for the researcher to view phenomena from the point of view of the ‘subject’ – an ‘insider’ or ‘**emic**’ perspective on social action (Babbie & Mouton 2001: 53, 273). Jamison (2001: 13) asserted that the tacit aspects of collective action may be further unpacked by adopting the qualities of a psychoanalyst.

Fourthly, symbolic interactionism views organisations as “arrangements of people interlinked by their respective actions – dynamic networks of actions” – which requires us to represent the “**multiple realities**” of the social world (Blumer 1969/1998: 58; Lincoln & Guba 1985: 72). The researcher should thus focus on explaining the way in which participants define, interpret and respond to situations, and integrate these perspectives in order to throw light on the nature and functioning of the social group as a whole.

3.1.2.2 The need for a holistic approach

The study of multiple realities or diverse perspectives highlights the need for a holistic approach – “meaning cannot be attained for a whole simply by looking at its parts” (Lincoln & Guba 1985: 37). A holistic research approach enables the integration of observable phenomena, behaviour and social structures, with intentionality and cultural contexts, and identification of the relationships between the different phenomena (Cohen, Manion & Morrison 2000: 11). It takes into account not only the subjective (interior) aspects, at both an individual and collective level of human-centred research, but also the so-called objective (exterior) aspects, and thus lends itself to mixed-method inquiry, in which qualitative and quantitative data may be reviewed in an iterative

process (Greene, Kreider & Mayer 2005: 277; Wilber 1997: 5). For example, Fischer (2000: 254) promoted a complementarity between interpretive research and critical analysis that can be integrated into a meta-narrative – developed by the analyst-as-counsellor. Similarly, Wilber (1995; 1997) recognised the interactive relationship between physical, biological, social, political, legal, economic, psychological and cultural factors. He drew on the holistic or ‘integral’ orientation to analyse various fields of human knowledge and endeavours, including the “integration of science and spirituality” (Wilber 1997: xvii) – see figure 3.1 (section 3.3.5). The call for integration and synthesis, to steer academic culture away from its increasingly entrepreneurial and competitive trend, would help make sense of the “co-evolution” of social and ecological practices.

... we need theories that are somewhat less grandiose and exclusive in their ambitions, and more open to the flow and dynamic of (eco)social development. Reality is simply too complicated and the processes of greening are too all-encompassing – they represent too much of a moving target, we might say – to be able to be explained by any one form of academic research. (Jamison 2001: 27)

Scott supported this broader perspective, arguing for

... a more inclusive and pragmatic approach to both environmental education and to environmental education research. It seems... possible to use positivist, post-positivist, interpretivist, and critical paradigms, drawing on feminist, ethnic, cultural and other perspectives. This is consistent... with a commitment to respect conflicting perspectives under conditions of uncertainty... (Scott 2001 quoted in Scott 2007: 3)

An example of a holistic or systems perspective that enables a broader understanding of phenomena is Catton and Dunlap’s (1980: 17-18) ‘new ecological paradigm’. They recognised the interdependence of human activities and ecosystems and the limitations of technology, regardless of the extent of human innovation. A holistic approach to researching learning processes relating to agricultural activities has the potential to provide some understanding (*Verstehen*) of human society and how it experiences meaning (Lincoln & Guba 1985: 216). The interpretive researcher is in a position to bring together an eclectic blend of historical perspectives, ‘pluralistic sensibility’, ‘cultural complexity’ and most importantly the knowledge-making or knowledge interests, referred to as ‘cognitive praxis’²⁸ (Jamison 2001: 39).

The positivist scientist, following Wilber, seeks detail and specialised knowledge, and attempts to explain society and human behaviour in terms of universal laws which allow prediction and control, or at least a reasonable expectation of what might happen (Babbie & Mouton 2001: 28; Lincoln & Guba 1985: 37, 216). By contrast, the “[interpretive] scientist seeks a general, or critical, understanding of a wide range of disparate phenomena. ... [and] wants to know a little about

²⁸ Praxis, per se, might be considered to be “informed, committed action” (Smith 2001-a) – engaging in “a cycle of theory, application, evaluation, reflection, and then back to theory”. The term goes back to Marx (1844) who used it as a “materialist account of consciousness and making of history” (Wenger 1998: 281).

many things” (Jamison 2001: 35). While both specialist and generalist views are important, the latter provides a broader view that helps to “comprehend the totality” (*ibid*: 36).

3.1.2.3 The naturalistic enquiry process

Within the symbolic interactionist framework, the methodological approach of this study may be described as ‘naturalistic’ in the sense that it respects and remains close to the empirical world that both represents and shapes the nature of the social sphere under study (Blumer 1969/1998: 46). The naturalistic research paradigm may also be referred to as ‘constructivist’, ‘hermeneutic’, ‘interpretive’ or ‘qualitative’ (Babbie & Mouton 2001: 53; Mertens 2005: 9; Taylor & Bogdan 1998: 7). Lincoln and Guba (1985: 188) explicated various features of naturalistic inquiry, in addition to concerns relating to ethics and trustworthiness of findings.

Natural setting: Naturalistic research is often associated with ethnographic and field research (Babbie & Mouton 2001: 53). It takes place in the natural setting, meaning that investigation is directed at “a given empirical world in its natural, ongoing character” rather than a “simulation of such a world, or... an abstraction from it... or... a substitute... [or] preset image of it” (Blumer 1969/1998: 46). Research in the participants’ natural setting enables an in-depth understanding and “a rich, detailed description of specifics... [dubbed] thick description” of their attitudes and behaviours (Babbie & Mouton 2001: 270, 272). This is aligned to the aim of qualitative research, namely, to focus on particular cases in order to understand how individuals construct their own reality within a specific context and timeframe – an idiographic approach (Cohen *et al* 2000: 138; Lincoln & Guba 1985: 216; Project Gold 2000). This is the opposite of a ‘nomothetic’ approach, which focuses on causal factors and attempts to explain phenomena in terms of universal laws, or ‘nomic’ generalisations (Babbie & Mouton 2001: 33, 272; Lincoln & Guba 1985: 110). Lincoln and Guba (1985: 189) stated that “phenomena... take their meaning as much from their contexts as they do from themselves. ... reality constructions cannot be separated from the world in which they are experienced”. Some scholars thus use the term ‘contextualist’ or ‘holistic’ research (Babbie & Mouton 2001: 272). This was discussed in the previous sub-section (3.1.2.2).

Human instrument: To be ‘objective’ in naturalistic research, one should associate closely with research subjects. The qualitative researcher – as observer and interpreter – is seen as the primary research ‘instrument’ (Babbie & Mouton 2001: 270, 273) – see also section 3.3. The internal and subjective ‘researcher-as-instrument’ is in a position to adopt an intuitive and creative approach, and hence may also be progressively refined (Ely, Anzul, Friedman, Garner & McCormack Steinmetz 1991: 107; Lincoln & Guba 1985: 224-225; Taylor & Bogdan 1998: 40). By interacting directly with ‘human subjects’, the researcher is able to tap their authentic, basic knowledge – or ‘indigenous knowledge’ – with as little disturbance or contrivance as possible (Lincoln &

Guba 1985: 192). By engendering trust and engaging with empathy, it is possible to explore their 'lived experience' through 'inter-subjective understanding' (Babbie & Mouton 2001: 33, 273; Van der Mescht 2002: 47). The implications of 'mutual shaping' by inquirer and the 'object' of inquiry are considered in section 3.6.

Tacit knowledge: In naturalistic research, the researcher's set of understandings based on experience has an influential role regardless of whether or not it is consciously taken into account (Lincoln & Guba 1985: 195). Tacit knowledge "is all that is remembered somehow, minus that which is remembered in the form of words, symbols, or other rhetorical forms" (Stake quoted in *ibid*: 196).²⁹ Lincoln and Guba (1985: 40) recognised the role of tacit or intuitive knowledge³⁰ in interactions between researcher and respondent, and in appreciating the nuances of multiple realities. In emergent research design, the researcher's tacit knowledge is invaluable in detecting and responding to significant elements, and in designating units of data (*ibid*: 107, 208).

Qualitative methods: Qualitative methods are integral to naturalistic research, supporting the emergence of multiple perspectives in the interpretations of meanings (hermeneutics). A detailed discussion of qualitative methods of data generation is undertaken in 3.3. From the symbolic interactionist's perspective, there is little point in following conventional pre-established scientific protocol for its own sake, or slavishly testing hypotheses, replicating research studies, or using regularised procedures (Blumer 1969/1998: 28, 48).

... reality exists in the empirical world and not in the methods used to study that world; it is to be discovered in the examination of that world and not in the analysis or elaboration of the methods used to study that world. Methods are mere instruments designed to identify and analyse the obdurate character of the empirical world, and as such their value exists only in their suitability in enabling this task to be done. (Blumer 1969/1998: 27)

Inductive data analysis: In becoming immersed in the natural setting, the researcher generates new hypotheses or theories ('second-order constructs') based on observations – an inductive research process (Babbie & Mouton 2001: 272). This differs from 'deductive analysis' – in which prior categories of empirical data are sought to confirm, or disprove, what is deduced from a relevant theory (Lincoln & Guba 1985: 202). Inductive analysis supports a 'grounded theory' ap-

²⁹ Tacit knowledge, according to a popular source, is embedded in culture, or intangible and intuitive, and is thus difficult to make explicit through a process of 'codification' or 'articulation'. Because it cannot be recorded, tacit knowledge is usually only transmissible through extended internships and training (over long periods with face-to-face contact and trust-building) or is gained through personal experience (retrieved August 13, 2008, from www.nvcc.edu/home/lfeist/Class%2011/Chap%208%20-%20Key%20Terms.doc). Drawing on Wenger (1998: 67), tacit and explicit knowledge are recognised not as dichotomous opposites but as an 'interacting duality'.

³⁰ Intuitive knowledge is seen as a form of tacit knowledge; it does not have a rational basis or make use of analytical thinking. Combining empirical data with a heightened ability to observe and interpret reality, intuition may be defined as "direct, non-inferential awareness of abstract objects or concrete truths" or "the irresistible and indubitable perception of the agreement of any two ideas without the mediation of any other" (retrieved August 13, 2008, from <http://www.philosophypages.com/locke/g04.htm>).

proach to research (Babbie & Mouton 2001: 498; Dey 1993: 103; Strauss & Corbin 1998:12-14, 136-137; Zembylas 2002: 501). This is described in section 3.4.

Emergent design: Lincoln and Guba (1985: 208, 224-225) stated that naturalistic research prevents the researcher from finalising the design of the study before it is undertaken. While it is possible to provide a problem statement, there is a strong likelihood that the focus of the study will change, and hence also the procedures. The qualitative researcher thus sets out to study a “relatively unknown social phenomenon” – rather than to test a hypothesis – in order to discover what it is that s/he does not know, and gradually build theory as the data emerge (Babbie & Mouton 2001: 499).

Grounded theory: The researcher develops and sharpens her/his inquiry, and the research question, direction of inquiry, data, links between the data, and interpretations remain grounded in the empirical sphere under study (Blumer 1969/1998: 40). Because it may represent a summation of local understandings, a grounded theory approach is in some cases referred to as ‘local theory’ (Lincoln & Guba 1985: 205). Babbie and Mouton (2001: 33, 499) asserted that a grounded theory approach requires an idealist perspective, recognising that data describe research participants’ intentions, values, beliefs and reasons. Because theory emerges from the data, instead of being imposed onto the data, facts are seen as ‘theory-laden’ (Lincoln & Guba 1985: 207).

Grounded theory [is]... theory that was derived from data, systematically gathered and analysed through the research process. In this method, data collection, analysis, and eventual theory stand in close relationship to one another. A researcher does not begin a project with a preconceived theory in mind (unless his or her purpose is to elaborate and extend existing theory). Rather, the researcher begins with an area of study and allows the theory to emerge from the data. (Strauss & Corbin 1998: 12)

A grounded theory approach should be easily applicable – it ‘fits’ the situation being studied – and should be relevant to and explain social behaviour – it ‘works’ when applied (Lincoln & Guba 1985: 204-205). It is based primarily on theoretical sensitivity, coding (open, axial or selective), process, a conditional matrix, theoretical sampling, and the use of memos and diagrams (Babbie & Mouton 2001: 515). Some scholars lack confidence in grounded theory because it is open-ended or ‘under-determined’ – “there is always more than one way to account for any set of data” (Lincoln & Guba 1985: 207, 216). However, its proponents argue that it is consistent with *all* theory development, in that it has an element of creativity (*ibid*).

3.2 Research sampling

... social action is the primary subject matter of social science (Herbert Blumer 1969/1998: 55).

The sampling frame for this study was particularly broad, involving groups and individuals closely and loosely affiliated to gardening activities with an educational component. Babbie and

Mouton (2001: 288) drew on Spradley (1979) in listing three key criteria for selecting participants in qualitative research. The first criterion, *thorough enculturation*, requires the respondent to be well acquainted with the issues being researched; this was met in some cases, while in other situations the participants were less familiar with the concern under study – see 3.2.1, 3.2.2, section 3.5, and observations in Grahamstown, Malawi and New York (4.1.2, 4.2.2 and 4.3.2). The second criterion, *current involvement*, requires the participant to be currently involved in the activities being studied – this was addressed in most cases. The third criterion, *adequate time*, requires the participant to have sufficient time to spend with the researcher – this was generally met, although in some cases, follow-up verifications of transcripts of research conversations were not forthcoming.

3.2.1 Sampling approach

The sampling approach used in this research was primarily ‘purposive’ – or judgemental – in the sense that specific organisations and individuals were selected by the researcher, in line with the research aims (Babbie & Mouton 2001: 166; Cohen *et al* 2000: 103). Purposive sampling may entail selecting typical cases or a highly diverse group, or extreme and critical cases, or the sample may be selected on convenience criteria such as minimal effort and cost (Lincoln & Guba 1985: 200-201). Purposive sampling is thus not representative of the population, but contingent and built upon other elements of the study (Lincoln & Guba 1985: 224-225). While participants were not necessarily representative of the broader population, this non-probability approach to sampling is considered appropriate for exploratory research, in that it can help identify future research potential or test the feasibility of an in-depth follow-up study (*ibid*: 80). It is also particularly suitable for an emergent sampling design (Lincoln & Guba 1985: 201). Purposive sampling and emergent research design are, of necessity, linked to an interactive element in the research design (Lincoln & Guba 1985: 101-107).

Included in the study were members of youth groups and adult members of community groups involved in food growing (or production) activities, as well as the educators and/or educational project coordinators involved in some way in these activities. The constant in the research was thus the element of being involved in food growing/production. Variables included age-group (adult or school-going age) and the nature of their involvement.

3.2.2 Research sites and participants

Qualitative research is suited to the selection of a small number of cases (Babbie & Mouton 2001: 279). In this research, exploratory studies were undertaken in South Africa, Malawi and the USA, a decision that was influenced in part by the fact that the researcher was supported by a Borlaug LEAP grant which included an internship at an international agriculture research centre

(CGIAR) – in this case, the World Agroforestry Centre in Malawi. It also included mentorship through a USA-based research institution – in this case, Cornell University in New York State. It made sense to initiate investigations in Grahamstown, South Africa, where the researcher is based, and then to expand outwards in exploring different scenarios in Malawi and the USA. In all cases, the specific characteristics of the research sites included food growing activities with an educational component.

3.2.2.1 Grahamstown, South Africa

The researcher is resident in Grahamstown, and had formerly been employed in the Rhodes University Environmental Education and Sustainability Unit (RUEESU) which has collaborative links with a number of organisations that conduct educational activities of relevance to the study. The researcher was thus able to make direct contact with a number of individuals involved in activities relating to school-community gardens, health and nutrition.

Study participants included only adults because the findings in Grahamstown were used to inform subsequent investigations in Malawi and the USA. Contact was made with past and present members of the Umthathi Project, a non-governmental organisation (NGO), and with facilitators involved in the government-initiated Health Promoting Schools (HPS), operating under the auspices of the Departments of Health, of Agriculture, and of Education. The researcher also had informal discussions with local community members, with school teachers involved in the Eco-Schools project or associated with school-community gardens, and with the executive director of the Food Gardens Foundation. The researcher recognises in retrospect that a youthful perspective of learning activities in Grahamstown may have provided better guidance in terms of conducting interviews with school-going youth elsewhere.

3.2.2.2 Malawi

The researcher visited Malawi between 22 May and 22 June 2006, and sourced participants with the assistance of the CGIAR mentor, Dr Festus Akinnifesi, at the World Agroforestry Centre. Assistance was also provided by the regional leader of ICRAF's Farmers of the Future and senior education fellow of the African Network for Agriculture, Agroforestry and Natural Resources Education (ANAFE), Dr Sebastian Chakeredza, and an extension educator, Mr Jacob Nyirongo. With their knowledge of the FoF initiative and ongoing extension work with pilot schools, farmer learning centres and community-based organisations (CBOs), they were an important 'gateway' for making contact with the appropriate people to participate in the study – see Appendix L.

3.2.2.3 New York, USA

The researcher was based in the USA as a Borlaug LEAP fellow between 2 August and 15 December 2006, and sourced research participants through the USA mentor, Dr Marianne Krasny, and her colleagues associated with the Cornell Cooperative Extension (CCE) offices. Their work with groups and individuals linked to community gardening and garden-based educational programmes in ‘relatively economically disadvantaged urban settings’, in New York City and elsewhere, provided access to a diverse range of study participants – see Appendix L.

3.3 Qualitative methods of data generation

Data come to us only in answer to questions, and it is we who decide not only whether to ask but also how the question is to be put. ... How we put the question reflects our values ... [but also] helps to determine the answer we get. ... Data are the product of a process of interpretation, and though there is some sense in which the materials for this process are ‘given’ it is only the product which has scientific status and function (Abraham Kaplan quoted in Yvonna S Lincoln & Egon G Guba 1985: 198).

In this study the researcher – as observer and interpreter – was the primary research instrument (Lincoln & Guba 1985: 39). This is in keeping with the symbolic interactionist approach because it allows the researcher to draw on language and thought – symbolic interaction – in uncovering the subjective meaning of human behaviour. Due to the ‘partial’ nature of any one method, a number of methods should be used to provide a more complete data set. Research methods that enable close interaction between the researcher and participants, commonly associated with the ‘human-as-instrument’ in qualitative research, include interviewing, observation, document reviews, and unobtrusive measures (Lincoln & Guba 1985: 198, 267; Mertens 2005: 14). The human research instrument has the capacity to accommodate knowledge that is propositional – reasoned and consensual – as well as tacit – experienced and thought about (Lincoln & Guba 1985: 194). It also has the advantage of ‘processual immediacy’ – being able to immediately reflect on phenomena and postulate ideas – and the capacity to clarify and outline the main points of phenomena. The well-adjusted and experienced researcher with appropriate social skills, empathy and compassion is in a position to gain trust and associate closely with participants, detect subtle cues and respond appropriately (*ibid*: 193) – this supports the development of ‘inter-subjective’ understanding, which in turn has implications for the trustworthiness of research findings (see section 3.6). S/he also has the adaptability to synchronise the gathering of diverse kinds of information, and the capacity to relate this to a holistic view (*ibid*). Lincoln and Guba (1985: 194) concluded that the human instrument is a position to respond to unusual or unexpected phenomena, and subject them to closer scrutiny. Refer also to 3.1.2.3.

Because the primary aim was to achieve ‘inter-subjective’ understanding – as noted by Babbie and Mouton (2001: 33, 273) – the most important data generation method used in this study was the interview. The researcher generated primary data – as opposed to drawing on ‘secondary data’ from other research studies (Babbie & Mouton 2001: 76). For practical reasons – such as limited time periods in different geographic locations – several different data generation methods were implemented in parallel, as noted by Greene, Kreider and Mayer (2005: 276). All data were ‘textual’ (interview transcripts, field notes and documents) rather than ‘numeric’ (scores and statistics) (Babbie & Mouton 2001: 76).

Lincoln and Guba (1985: 101-107) argued that ongoing interaction with others is integral to an inherently ‘dialectical’ research process (introduced in section 3.1). It draws attention to conflicting perspectives and calls for the amendment of ideas, thus emphasising the “social construction of reality” (Mertens 2005: 14). The researcher synthesises these conflicts and contradictions, which in turn generates another cycle of conflicts and contradictions, in an ongoing and dynamic process that keeps the data ‘alive’. Electronic data were stored in three separate data logs, one for South Africa (totalling 44,267 words), one for Malawi (totalling 93,213 words), and one for the USA (totalling 140,960 words). The researcher avoided unnecessary printing of materials, in order to minimise the environmental impacts associated with excessive paper usage.

3.3.1 Interviews

As noted by Dexter (in Lincoln & Guba 1985: 268), an interview is “a conversation with purpose”. The aim is to obtain social constructions of current phenomena, reconstructions of past phenomena, and projections of future phenomena. The researcher attempted to source participants who were able to communicate in English, and was sensitive to social and cultural differences, as well as the potential risk of misunderstanding or misinterpreting interviewees, especially if English was not a first language. In some situations, the assistance of an interpreter was required. Interview styles varied, including semi-structured individual and paired interviews, focus-group interviews and workshops.

3.3.1.1 Semi-structured interviews

Interviews may be broadly classified as ‘structured’ (focussed) – where the interviewer knows what it is that s/he doesn’t know – or unstructured (depth/clinical/elite/specialised/exploratory) – where the interviewer does not know what it is that s/he doesn’t know (Lincoln & Guba 1985: 268-269). In reality, however, the degree of structure of an interview ranges along a continuum (*ibid*). In this research, interviews followed a semi-structured format, with reference being made to a previously prepared but flexible plan of inquiry – the ‘interview guide’ (Arksey & Knight 1999: 99). The main concepts to be explored initially were compiled for the Grahamstown con-

text (Appendix M), and refined further for use in Malawi (Appendix N) and then the USA (Appendix O). The degree of variation in questions was minimal, indicating a relatively high level of standardisation.

In most cases, the researcher was accompanied to the initial meeting with potential participants by a person known to them – a ‘gatekeeper’ (see also 3.2.2.2). Thereafter, the researcher made appointments to conduct interviews, either individually (in most cases) or in pairs, as was the case with some children. Interviews or discussions took place at the site where the participants were involved in gardening and/or educational activities, or in their offices or at a site that was familiar to them. At the outset of an interview, the researcher recapped the nature of the study and the main reasons for conducting an interview. The length of interviews ranged from 25 minutes to an hour and 45 minutes, after which the interviewer thanked the interviewee and gave the assurance of an opportunity to verify the transcript before any of the information would be used.

The researcher adopted an exploratory approach, guiding the general direction of the conversation but allowing interviewees to do most of the talking. Babbie and Mouton (2001: 289) advocated the cultivation of good listening skills, adopting an impartial but interested attitude, and the use of simple ‘probes’ in response to short answers, to yield more detailed information or elicit deeper insights. The researcher used a range of probes – nodding, or remaining silent to allow the interviewee to elaborate, or asking for examples or clarification. Cognisance was taken of the manner in which questions were posed – bearing in mind interviewees’ biases might be encouraged, leading to a collective bias in the findings – and the avoidance of leading questions or engaging in a simple opinion-seeking process. Most questions were open-ended, as was the case in Volk and Cheak’s (2003: 14) investigation of the effects of an environmental education programme on scholars, parents and community members. Where interviewees were able to relate their own experiences and raise issues of concern, unexpected information could emerge, providing deeper insight into their perspectives and social world (Arksey & Knight 1999: 3).

The relationship between interviewer and interviewee varied. In the case of minors or subordinates (see also section 3.5), especially in underprivileged communities,³¹ this tended to take the form of ‘asymmetrical-trust’ – the interviewer was seen as a form of authority, or the interviewee adopted the role of a ‘petitioner’ (Massarik quoted in Lincoln & Guba 1985: 269). In such cases, interviewees were sometimes ill at ease, and the data provided limited insights into their perspectives. At other times, the interviewer was a ‘human-being-in-a-role’ – conducting a ‘rapport interview’ with a knowledgeable other (Massarik quoted in Lincoln & Guba 1985: 269). It was

³¹ The relationship between generations and genders varies across societies. Subordination of women and children appears to be common both in traditional leadership systems and in lower socio-economic strata.

possible in some cases to hold ‘depth interviews’ with peers and occasionally, where an interviewee was a ‘caring companion’ who was equally committed to ‘empathic search’, a ‘phenomenal’ interview would unfold (*ibid*). In such cases, the conversation tends to ‘roam’ freely, similar to the approach of a ‘traveller’, enabling the researcher to engage in and explore diverse aspects of the participants’ lived experiences, and thus to accommodate fresh perspectives and a growing understanding of the setting (Taylor & Bogdan 1998: 40).

To capture the depth and subtle nuances of conversations, the intention was to make notes throughout the interview process, but this appeared to distract interviewees in some cases. The researcher audio-recorded the majority of the interviews, without technical failure, and then transcribed them, as recommended by Arksey and Knight (1999: 144). Lincoln and Guba (1985: 272) asserted that the use of recording equipment could generate a sense of distrust. However, this appeared to be a transient concern, possibly because the researcher used a small and inconspicuous machine. The interview data were collated into the three data logs, excerpts of which may be found in Appendix I.

3.3.1.2 Focus group interviews and workshops

The first interview in South Africa was conducted with a small group. This stimulated discussion and generated information that may have otherwise been inaccessible to the researcher (Babbie & Mouton 2001: 292). The researcher was committed to presenting findings at the 4th World Environmental Education Congress (WEEC) in Durban in July 2007. As the study was not sufficiently advanced to provide the basis for a paper of any substance, the researcher opted to run a workshop that may draw on the expertise and insights of educators and researchers. However, the focus group discussions of preliminary findings, structured around a number of themes, did little to clarify concepts emerging from the data (Appendix P). This may have been due to the one hour limit, participants’ lack of prior preparation, or subconsciously limiting mental exertion – as workshops may be used as ‘participatory window-dressing’ for predetermined decisions.

3.3.2 Observations

Various observable data were noted, including human activities and physical features in the setting. Maxwell (1996: 17) and Taylor and Bogdan (1998: 8-9) noted the importance of comparing what research participants actually do with what they report, in addition to probing their understandings of events and the reasons for particular perspectives, and motivations behind particular choices and actions. Meaning is conveyed through language behaviour and expressive movements (nonverbal cues), as well as the duration of such phenomena (Babbie & Mouton 2001: 293). Lincoln and Guba (1985: 273) argued that observation

... maximises the inquirer's ability to grasp motives, beliefs, concerns, interests, unconscious behaviours, customs, and... allows the inquirer to see the world as his[/her] subjects see it, to live in their time frames, to capture the phenomenon in and on its own terms, and to grasp the culture in its own natural, ongoing environment... [and] access the emotional reactions of the group introspectively... the observer [serves] as a data source; ... observation... allows the observer to build on tacit knowledge, both his[/her] own and that of members of the group. (Guba & Lincoln 1981 quoted in Lincoln & Guba 1985: 273)

In order to clarify what activities or educational programmes were being implemented in Malawi and in the USA, the researcher aimed to conduct observations as a participant. 'Participant observation' is a well-established research approach in the social sciences, which allows for interaction with participants as a 'semi-insider' (Arksey & Knight 1999: 11; Taylor & Bogdan 1998: 39). It requires a strong sense of curiosity, sustained attention to detail, and well developed observational and listening skills (Ely *et al* 1991: 42). The researcher found it difficult to shrug off her 'outsider' status and interact unobtrusively with participants in their natural and authentic settings (Cohen *et al* 2000: 138). As an international visitor, the researcher's presence in the social milieu generated curiosity and reactions that led to different behaviours. Although efforts were made to take notes unobtrusively, it was evident at times that this activity may have influenced the way in which participants behaved (Babbie & Mouton 2001: 294). However, the researcher felt it was appropriate to conduct observations overtly, as a sign of respect for research participants – bearing in mind that covert methods of gaining knowledge may be interpreted as an attempt to gain power over 'subjects' (see section 3.5). The 'observer effect' – or 'mutual shaping' – of the observer on the 'observee' and vice versa is discussed in section 3.6.

The observation process was unstructured and open-ended, without an observation schedule with predetermined categories or themes. The researcher was familiar with the kinds of phenomena to look for, having previously read around the topic, engaged in ongoing thinking, conversations and communications, as well as drawing on prior experience – a form of 'synthesised intuitiveness'³² (Irwin pers comm April 24, 2007). Observational data were entered in a field notebook, and further details and reflections recorded in a research journal served to augment these running notes (Lincoln & Guba 1985: 274-275; Taylor & Bogdan 1998: 46). An excerpt of observational notes is provided in Appendix Q.

3.3.3 Material data

The researcher collected materials where available, or noted their details and/or took photographs. Material data comprised transcripts of interviews and field notes, printed documents, teaching and learning resources, and photographs – all of which provide an account of events and

³² The researcher understands 'synthesised intuitiveness' to be based on non-inferential ontological awareness and collective experiential learning.

phenomena. Lincoln and Guba (1985: 277) stated that ‘material’ data provide irrefutable evidence and are contextually relevant – reflecting the ‘natural language’ of the setting – and thus provide a rich source of information. Material data are also readily available in any context, and complement the insights gained from observations and interviews (Arksey & Knight 1999: 88). Field notes were transferred with minimum delay to an electronic data log, and augmented with missing details and reflections on what had been seen and experienced. This was consistent with Babbie and Mouton’s (2001: 294) view that the researcher records both what s/he ‘knows’ has taken place and what s/he ‘thinks’ had happened. In cases where there was a longer time lag between a site visit and the transcription of observations into electronic format, it was apparent that recollections were no longer as vivid, and observation notes were therefore less meaningful. There was value in making copious notes, even though in most cases only a small fraction could be incorporated into the research report. Several hundred photographs of phenomena, participants, activities and materials, assisted recollection and provided illustrative examples. These were downloaded as electronic JPG files onto the researcher’s laptop and transferred into sets of labelled folders, each with a date and place name.

3.3.4 Research journal

As part of the data set, the research journal served as a useful medium for recalling issues that warranted further attention. Journal entries serve as a method of recording, to some extent, “unobtrusive informational residue” – physical traces that indicate activities or phenomena, such as frequency of use or level of care or interest in a particular topic (Lincoln & Guba 1985: 279-281). While this tends to be somewhat haphazard, collection of unobtrusive residues generally circumvents the need to intervene or elicit reactions, thus diminishing ‘role-selection’ or the ‘guinea-pig effect’ (*ibid*).

Personal comments and reflections on observations were recorded on an almost daily basis in an electronic journal. Journal entries were stored in separate electronic files, two for South Africa (2006 totalling 2,054 words, and 2007 totalling 7,270 words), one for Malawi (totalling 19,702 words), and one for the USA (totalling 31,128 words). Content pertaining to methodological decisions also formed part of what may be referred to as an ‘audit trail’ (Lincoln & Guba 1985: 210). An excerpt of a journal entry is provided in Appendix R.

3.3.5 Pulling together data generation methods

In this study the researcher visited foreign countries for limited periods, and was not able to carry out further cycles of data generation. The research process may nevertheless be described as an iterative process in that there was an ongoing and developing understanding of theoretical perspectives and practical applications. The researcher continued to source new references and re-

turn to previous readings with ‘fresh eyes’, which helped deepen an understanding of theoretical and practical concepts.

The researcher adopted a holistic approach to data generation (illustrated in Figure 3.1), taking all four aspects of reality into consideration (Wilber 1997: 12-18). At the individual level, the **subjective** aspect addresses psychological and intentional qualities, and hence reflects ‘truth’ in terms of sincerity, integrity, truthfulness or trustworthiness (*ibid*).

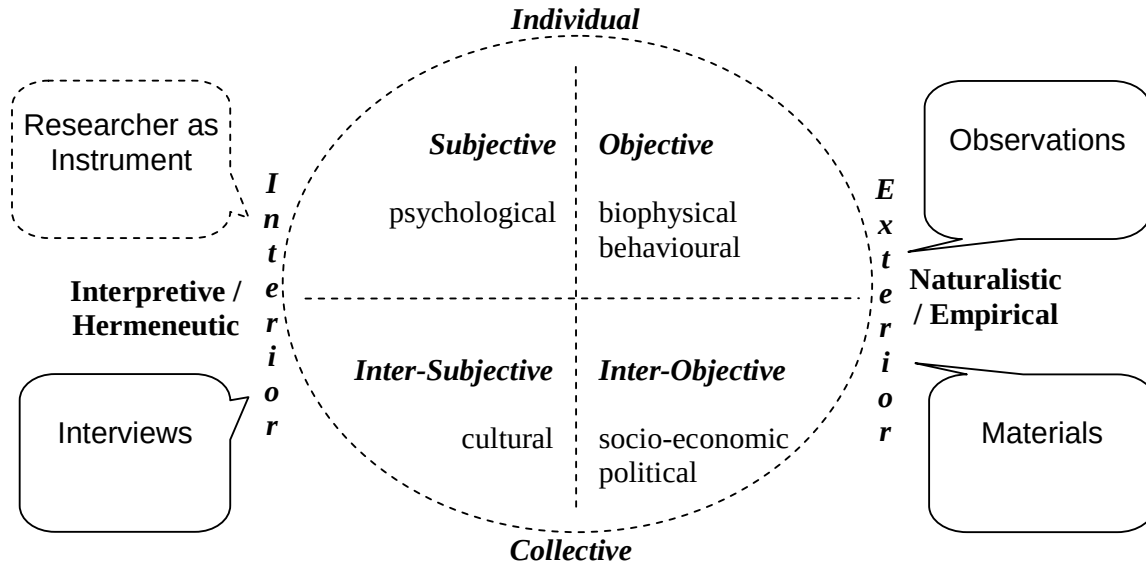


Figure 3.1: Diagrammatic representation of a holistic approach to data generation, integrating methods that take into account observable phenomena, behaviour and social structures with methods that take into account qualitative phenomena such as intentionality and cultural context (adapted from Wilber 1997: 10, 13).

The **objective** aspect addresses behavioural and biophysical factors that can be observed and measured; ‘truth’ may thus be viewed in terms of correspondence or representation. At a collective level, the **inter-subjective** aspect considers cultural factors such as values and beliefs, and reports ‘truth’ in terms of mutual understanding, culturally constructed meaning, and appropriateness. The **inter-objective** aspect focuses on socio-economic and political factors, in which ‘truth’ may be understood in terms of systems or functional fit and structural functionalism (*ibid*).

Further inspection of Figure 3.1 reveals synergies with the major ‘truth domains’ of ‘I’ (subjective), ‘we’ (inter-subjective) and ‘it’ (objective). Wilber (1997: 19-20) drew on Habermas’ structural-functionalism to illustrate how the upper left hand side of the diagram reflects ‘subjective sincerity’ (of self, consciousness, self-expression and truthfulness). The lower left aspect reflects ‘inter-subjective justness’ (ethics, morals, worldviews, culture, shared context and inter-

subjective meaning). The right hand side of the diagram represents both ‘objective truth’ and ‘inter-objective truth’ (science and technology, objective nature, empirical forms – including brain and social systems – and propositional truth – both reasoned/singular, and consensual/functional fit) (*ibid*). In this study, the depth of engagement with each of these truth domains tended to be limited due to the broad scope of this research.

3.4 Data analysis

Qualitative data tend to overload the researcher badly at almost every point... the most serious and central difficulty in the use of qualitative data is that methods of analysis are not well formulated... the analyst faced with a bank of qualitative data has very few guidelines for protection against self-delusion, let alone the presentation of ‘unreliable’ or ‘invalid’ conclusions to scientific or policy-making audiences. How can we be sure that an ‘earthy’, ‘undeniable’, ‘serendipitous’ finding is not, in fact, wrong? (Matthew B Miles quoted in Lincoln & Guba 1985: 332)

If data are presented in a ‘non-interpreted way’, they may serve as useful reference material and provide a high degree of ‘transparency’ (Vandenbosch, Sambili, Tombo & Whitehead 2004: 2) or may even serve as a form of secondary data for subsequent research. The aim of this study, however, was to use the data collected to provide a deeper understanding of the social world under study at a given time, and hence a greater degree of meaningfulness – in keeping with symbolic interactionist research (Taylor & Bogdan 1998: 9; Arksey & Knight 1999: 25).

Within the naturalistic paradigm, data are ‘constructions’ that have been shaped by the interaction between the researcher and sources of data – human or nonhuman (Lincoln & Guba 1985: 332). Blumer (1969/1998: 42, 46) held that symbolic interactionism enables two fundamental modes of inquiry: *exploration* (depiction) and *inspection* (analysis). Having depicted what is going on through a comprehensive descriptive account, the researcher should then engage in analysis. This entails “casting [the] problem in a theoretical form... unearthing generic relations... sharpening the connotative reference of... objects, and... formulating theoretical propositions” (*ibid*: 42-43). Inspection may be described as a process of “close shifting scrutiny” that is “flexible, imaginative, creative” and unconstrained (*ibid*). According to Lincoln and Guba (1985: 202-204, 334-335), the Glaser and Strauss ‘constant comparative method’ is a form of naturalistic data processing – which is characteristically generative, constructive, subjective and inductive. Analysis of data may be seen as a synthetic process in which

The constructions that have emerged... [from] inquirer-source interactions are reconstructed into meaningful wholes. Data analysis is thus not a matter of data reduction... but of induction. (Lincoln & Guba 1985: 333)

Initially, as a novice researcher, the intention was to generate all the data first and then process them afterwards under the guidance of the supervisor. However, it became apparent that it was

not practically feasible to print and work manually with three lengthy electronic data logs (with word counts of 44,267 + 93,213 + 140,960). Due to the active promotion of technological capacity at Cornell University, where the researcher was based for a semester, a Computer-Aided Qualitative Data Analysis Software (CAQDAS) programme was thus employed (see 3.4.1). In retrospect, the researcher believes that the project would have been more manageable if data analysis had been conducted in parallel with data collection.

... the one thing I really regret is not analysing data as I went along. If I could do things again, I would definitely transcribe and analyse as soon as possible. This struck me more recently, especially at times when I feel quite bored; I am slowing down, losing momentum. If I had known HOW to analyse my data, it would have made sense to do it as I went along. Then every time I did another interview, I would have felt inspired afresh by the new insights and would have felt more motivated to get the data analysed. (Köhly, research journal, September 10, 2007)

The researcher recognises that analysis was embarked upon without knowledge of ‘how to’ do it – it was an iterative learning process. This is evidenced by an early version of a thematic typology (see Appendix S). The novice researcher’s lack of confidence in taking those first steps in data analysis was in all likelihood part of the learning curve.

3.4.1 Computer-Aided Qualitative Data Analysis Software (CAQDAS)

Qualitative data analysis is essentially an intuitive process of meaning-making, and some scholars believe that the use of computers is a contradiction in terms (Babbie & Mouton 2001: 504). Others recognise the potential for computers to improve the reliability and validity of data analysis (*ibid*). Some software packages are simple and easy to use, but their capabilities are limited, while others – such as ATLAS.ti – are highly complex and powerful; this may present challenges to the novice computer-user (*ibid*: 503). The researcher learned the basic operations using the accompanying manual. It should be noted that no qualitative data analysis software package is capable of analysing the data for the researcher; it simply facilitates the process (*ibid*).

ATLAS.ti 5.2.0, a ‘knowledge workbench’ developed and supported by Scientific Software Development in Berlin, Germany, was purchased in the course of this research project. This “code-based theory builder” package has many capabilities and allows the researcher to focus on analysed materials in an intuitive environment (Babbie & Mouton 2001: 509). It provides tools to “manage, extract, compare, explore and reassemble meaningful pieces from large amounts of data in creative, flexible yet systematic ways”, involving one researcher or a group of researchers, each working from a different location (Muhr 2004: 2). The programme allows the researcher to analyse multi-media texts, create visual images or mind maps using networked data, and count frequencies of words or phrases if so desired. Babbie and Mouton (2001: 504-510) considered ATLAS.ti to be the best package in the world with the most user-friendly interface of

all the CAQDAS programmes available, suitable for the novice researcher. In this study, three ‘primary documents’ (for South Africa, Malawi and the USA) were housed within one *hermeneutic unit* as textual documents (*.txt or *.rtf) – to use the ATLAS.ti terminology.

3.4.2 Qualitative data analysis

A helpful framework for making decisions regarding the choice of data analysis approach was provided by Tesch (quoted in Babbie & Mouton 2001: 491), who is often referred to as the ‘mother of CAQDAS’. She maintained that qualitative research may delve into the characteristics of language, discover regularities, understand the meaning of actions or text, and reflect on data (Babbie & Mouton 2001: 491). While the symbolic interactionist framework provides little guidance in terms of particular data analysis methods, O’Connor and Scanlon (2005: 3) advise the researcher to focus on the role of language and thought in uncovering the subjective meaning of human behaviour.

Analysis of data in ‘parallel tracks’ entails separate but concurrent analysis of discrete packages of data (Greene, Kreider & Mayer 2005: 276). Analysis of ‘cross-over tracks’ is an iterative process in which data from one track are analysed and then transformed to a separate track for comparative purposes, or a typology (a set of substantive categories) is generated from one track in order to interrogate the other track (Greene, Kreider & Mayer 2005: 276). ‘Single track’ analysis entails streamlining of different types of data into one single analytical process, such as coding and categorising (Greene, Kreider & Mayer 2005: 276). In this study, the researcher set out to analyse a ‘single track’ of data, but at a later stage, generated several iterations of a typology in order to interrogate the main track of data and revise the codes, to create more useful categories (Zembylas 2002: 502). This form of ‘cross-over track’ analysis is also considered to be useful in mixed method studies.

The first step in analysis entails *unitising* and *coding* data, which is informed by asking what the data represent, and making comparisons between elements of the data (Babbie & Mouton 2001: 499). Coding is a prerequisite for generating different ‘categories’ or themes (Arksey & Knight 1999: 161; Ely *et al* 1991: 151). Holsti (quoted in Lincoln & Guba 1985: 203) described unitising as a process in which “raw data are systematically transformed and aggregated into units which permit precise description of relevant content characteristics”. A unit consists of one or two sentences or a paragraph, which can only be interpreted effectively in its entirety. Each unit was allocated a code as it was identified. According to Strauss and Corbin (1998: 13), coding enables (i) building – rather than testing – theory, (ii) providing an analytic tool for dealing with large amounts of ‘raw data’, (iii) exposing various different meanings of phenomena, (iv) allowing both systematic and creative approaches, and (v) identifying and linking concepts. In most cases,

‘open coding’ was used (rather than ‘axial’ or ‘selective’), in which the main idea conveyed in the unit was identified as having particular dimensions, properties or consequences, for example, ‘dependency’, ‘economic focus’, ‘volunteerism’, and so on. There were also aspects of ‘selective coding’, in that particular categories were intentionally related to contextual elements of the research, such as ‘food growing’, ‘greening’ or ‘environmental focus’. While the researcher is sympathetic to Denzin’s (1992: 150-151) oppositional cultural aesthetic approach (discussed in 3.1.1.3), allocation of ‘dominant’ (or hegemonic), ‘negotiated’ and ‘oppositional’ codes did not occur, mainly because of the complexity of the task and lack of experience or guidance in this regard.

The second step in data analysis entails clustering the units of data, based on their similarities, into *categories/themes* – or *families*, to use ATLAS.ti terminology. According to Babbie and Mouton (2001: 272), the aim of qualitative research is to draw on concepts used by research participants, rather than on abstract theoretical constructs, in order to remain true to the meanings of the participants. In discovering regularities – or patterns – in their comments and reflections, it becomes possible to develop categories and linkages between these elements, in order to generate theory (*ibid*: 498). This is in keeping with an inductive and ‘grounded theory’ approach to data analysis (described in 3.1.2.3).

Marshall (in Lincoln & Guba 1985: 345) declared that if the researcher was able to tolerate the uncertainty and misgivings associated with delaying designation of categories, and instead allowed these to build up over time, then data analysis would be most successful. Allocation of categories in this research was a tentative process, in which ‘look-alike’ or ‘feel-alike’ units were provisionally grouped together. As analysis progressed, it became increasingly clear which codes could be most appropriately grouped. Six categories/themes/families – with any number of coded units fitting within and across themes – were identified on the basis of their relevance to the emerging research focus. These are identified and discussed in Chapter 5 (emergent concepts).

Electronic analytic memos were used to record research ideas and engage in self-critique and reflection on an ongoing basis (Maxwell 1996: 11-12; Ely *et al* 1991: 80-82). These could either be ‘attached’ to a ‘quote’ (a section of coded data) or left ‘free’ within the ATLAS.ti hermeneutic unit. As noted by Muhr (2004: 128), the ideas recorded in memos are often associated with theory-building. The project management process using ATLAS.ti is illustrated in Figure 3.2.

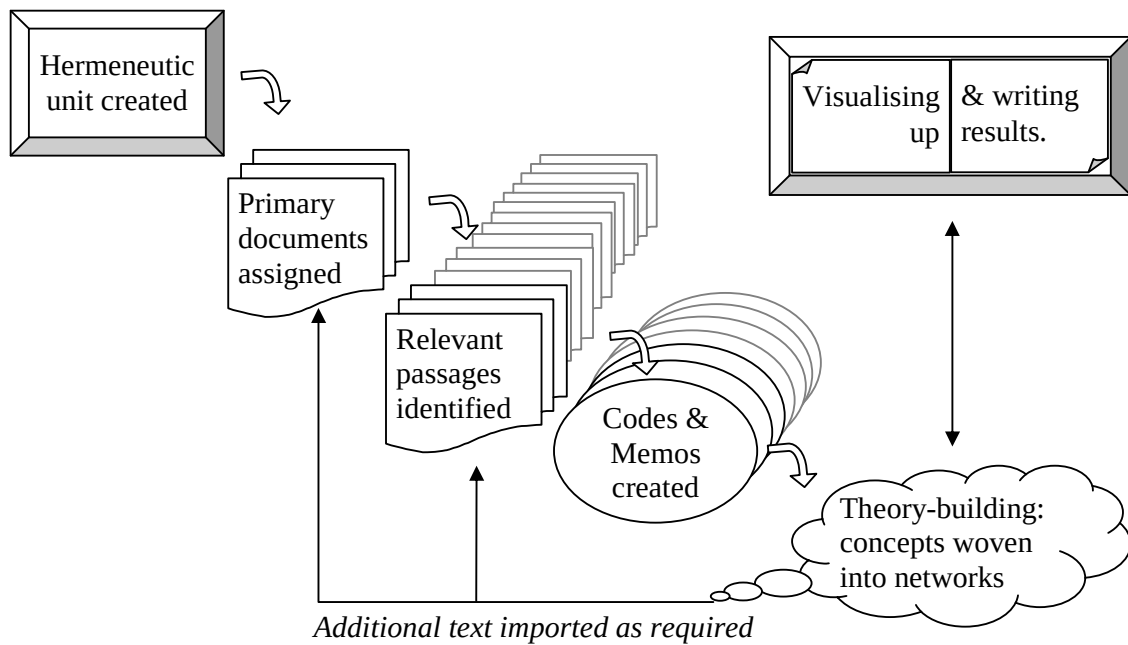


Figure 3.2: Diagrammatic representation of the ATLAS.ti data management process (adapted from Muhr 2004: 28).

3.5 Ethical considerations

We must... turn our searching eye inward upon our own consciences. We may then see how our reflective gazes have contributed to this surveillance society (Norman K Denzin 1992: 169).

Social research should not harm participants in any way; it is important to consider ethical issues (Babbie & Mouton 2001: 522; Cohen *et al* 2000: 49). While qualitative and feminist research in particular may champion a non-exploitative and non-hierarchical approach, as noted by Arksey and Knight (1999: 13), it is not always possible to recognise the impact – at the time or subsequent to the study – of a social researcher’s seemingly harmless questions or suggestions. For example, Hepburn (1999: 52, 54) observed that when an “educated person came and told [a traditional community]... how to run their lives”, they felt inferior and “deprived of their culture”.

The researcher was sensitive to these concerns and made every effort to avoid disrupting participants’ sense of wellbeing or self worth. An interpretive approach is considered to promote a more respectful engagement with study participants because it views them as sources of valid insights and experiences, rather than as mere research ‘subjects’. Every effort was made to steer clear of inaccessible or ‘obscurantist language’ in conversations with participants, in order to avoid alienating, intimidating or fostering a sense of disempowerment (Taylor & Bogdan 1998: 23; Hepburn 1999: 80). This is also relevant to the validity and trustworthiness of research (see section 3.6).

In terms of moral or political influence, Lincoln and Guba (1985: 212-213) drew attention to the way in which the researcher's knowledge of participants' social worlds may open them up to exploitation, and argued for *negotiated outcomes* by working with them. The 'observer effect', and 'mutual shaping' (discussed in section 3.6), also have potential benefits, as illustrated in the closing comments during an interview in Malawi.

CW: I think mine is just a word of appreciation. You know, learning is a process... so learning being a process, you even learn from your fellow friends. I've learned from you, you're showing a heart of learning something. So, I've learned something from you, so I just want to thank you, you've been patient, you are very free, so we like such kinds of people.

AM: And also your ways of encouragement.

CW: It's... a good thing, because we feel like ah, we are doing better things here, what if we do better, more than this... so it's another way of developing... so I would like to thank you.

NK: Thank you.

AM: And the door is open, any time you visit Malawi, you are free to pop in...

NK: I'd love to! Thank you... I will certainly keep in touch. I am so encouraged by what I've seen here today and yesterday. (Thondwe Village Polytechnic interview, June 13, 2006)

According to Lincoln and Guba (1985: 269), if the researcher needs to be covert in obtaining 'honest' or 'nonreactive' responses from 'human subjects' then s/he might consider another way of finding the information, or abandon the project altogether. Babbie and Mouton (2001: 521) recognised the dilemmas posed by this, advising the researcher to give careful thought to the pros and cons of studying sensitive topics, and suggesting that the research community may serve as an ethical yardstick. In this study, the researcher chose to seek information in an overt manner. The purpose of all research-related visits was made as clear as possible, and no attempts were made to coerce them into participating in the study. However, it was apparent that in certain settings where particular members of the community had subordinate roles – such as women or children – they would in some cases be instructed to speak to the researcher by those in positions of authority in the community. Consequently, it was clear in some cases that interviewees approached the researcher with apprehension. This undermined their spontaneity or insightfulness and hence the value of such conversations to the study.

In southern Africa, verbal consent was negotiated with all groups and individuals who participated in the study. The researcher remained mindful of the potentially "unconstructive and bureaucratic route of obtaining all permission in writing" (Taylor & Bogdan 1998: 38). This was considered to be inappropriate in rural African situations, because of the high levels of illiteracy, as well as the fact that English is a second language for many people. In the USA, the researcher was required to complete an online UCHS (University of Cornell Human Subjects) education and training programme, in order to be in a position to interview 'human subjects' (see Appendices T and U). Consent forms were sent to participants or, in the case of minors, to their parents. In the latter case, a simple assent form was provided for the child. Study participants in New York ex-

pressed the view that the Human Subjects form gave a sense of being ‘contractual’ and wanting to ‘extract’ information from them. It was agreed that the academically oriented HS protocol was inappropriate in a non-academic community setting. In keeping with mutually beneficial research or extension work, it was suggested that Cornell University modify its HS protocol and develop a more appropriate working relationship with informal non-academic communities.

Another ethical concern is the protection of participants’ identities. The researcher recognised that while anonymity may be preferable when researching sensitive topics, in other cases participants may prefer to be acknowledged by name, especially where their knowledge, skills and attitudes have made a beneficial contribution. In this study, the latter option was made explicit, and in all cases, interviewees indicated a preference to be quoted by name in the report, rather than being anonymous. Similarly, the researcher sought permission from individuals or relevant authorities before taking photographs of people and activities/facilities, or gathering material data which provided evidence of garden-based learning processes. However, the researcher realised that in some cases, the publication of some viewpoints or actions may have placed them in a compromising position. It was therefore considered ethically appropriate in such cases to replace real names with pseudonyms in this report. Removal of names and contact details from interview transcripts would have provided additional protection. Had this system been followed, participants’ identities could still have been traced via code numbers kept in a master identification file for auditing purposes. All such documents should be stored securely.

In this study, it was not practicable to work closely with participants to negotiate the inferences drawn from this study, or give them an opportunity to critique a semi-final draft of this report. However, the researcher was cognisant of these concerns and attempted to clarify knowledge claims by submitting all interview transcripts to interviewees for verification.

It is acknowledged that research is more likely to be beneficial to a community where it is linked to their activities and priorities. However, it should be borne in mind that ‘power elites’ within a community may marginalise other voices and steer research in a direction that serves their own interests. Furthermore, researchers should guard against distorting or misrepresenting findings to support ideologies that perpetuate domination (Babbie & Mouton 2001: 544). In reality, it is impossible to produce totally unbiased research. For example, support received from academic institutions and funders with particular foci or agendas – such as addressing poverty, food security and health issues – may have introduced a certain degree of bias in this research. Intervention by one or another agency is simply another aspect of the social milieu in which ‘mutual shaping’ – a feature of the naturalistic enquiry process (as noted in 3.1.2.3) – is in constant evidence. This is discussed further in the next section.

3.6 Validity and trustworthiness considerations

Data have meaning, and this word ‘meaning’, like its cognates ‘significance’ and ‘import’, includes a reference to values (Abraham Kaplan quoted in Yvonna S Lincoln & Egon G Guba 1985: 224).

The validity and trustworthiness of the research methodology – its level of reliability – is considered in this section. Further evaluation of the appropriateness of the methodology and methods, from a retrospective standpoint, is discussed in section 6.3 together with the limitations of the research findings.

The Münchhausen perspective of objectivity and validity in qualitative research stresses the importance of “doing justice to the object of study” (Babbie & Mouton 2001: 274). Other terms commonly used to convey objectivity in qualitative research include credibility, transferability, dependability and confirmability (Babbie & Mouton 2001: 276; Lincoln & Guba 1985: 296-300, 316-319). The ‘Lincoln and Guba (1985: 218-219, 290) perspective’ of objectivity stresses trustworthiness, such that peers would be inclined to take the findings of the research seriously. This is supported by detailed field notes, ‘triangulation’ of data, guarding against distortions that arise as a result of the researcher’s presence or involvement in the study, reflections and introspections in a personal research journal, and keeping a ‘methodological log’ in which emergent research design decisions are recorded (*ibid*: 281-282). The researcher’s personal belief system would also contribute to producing trustworthy research (Ely *et al* 1991: 93). For pragmatic purposes, this research is discussed in terms of its *credibility*.

Babbie and Mouton (2001: 277) maintained that ‘credible’ research must be ‘dependable’ in order to allow ‘transferability’ – meaning the extent to which the findings might apply to other cases. However, because qualitative research findings are idiographically interpreted – in the context of its natural setting – its transferability will vary (Cohen *et al* 2000: 138; Lincoln & Guba 1985: 216). This was noted in 3.1.2.3. Six credibility criteria applicable to this study are briefly outlined here.

In the first place, the researcher should make use of *triangulation* – the use of multiple sources of data and diverse methods – in order to transcend personal bias and generate believable data (Babbie & Mouton 2001: 275, 277; Lincoln & Guba 1985: 283, 305-306). Triangulation helps develop a more complete picture and hence a deeper understanding of the social realities in a research site (Arksey & Knight 1999: 24). In this study, triangulation also includes other theoretical perspectives (*ibid*: 23; van der Mescht 2002: 48). Scott (2007: 3) asserted that environmental education research needs to be more inclusive and pragmatic, drawing on diverse theoretical perspectives, as noted in discussing a holistic approach to research (see 3.1.2.2). This resonates with

the approach of post-Blumerian symbolic interactionism, which draws on critical theory and cultural studies (Fine 1993: 65; Denzin 1992: 151). Drawing on the notion of critical reflexivity, it is considered appropriate to question the *status quo* of declared research practice, as did Denzin (1992: 20) in his critical analysis of symbolic interactionism. He warned against an “ideological control over inquiry”, using the example of ‘consensualist pragmatism’ which he reasoned had been undermined by its positivist and post-positivist terminology while attempting to adhere to an interpretive sociology.

A weakness of this study is that the researcher did not consistently use triangulation, for example, by observing all reported activities, or by interviewing other children, parents or educators that had been mentioned by an interviewee. In cases where triangulation did take place, and observations contradicted interviews or other sources, it served as a valuable method for uncovering conflicting perspectives or dissonance between intentions, speech and actions – an empirical finding.

The second feature of credible research of the kind undertaken in this study is *persistent observation*, in which the researcher continuously seeks out both salient and atypical phenomena and different ways of interpreting them, together with ongoing tentative analyses of the emerging findings (Babbie & Mouton 2001: 277; Lincoln & Guba 1985: 307). In this study, the researcher constantly sought new perspectives to throw new light on findings, drawing on conversations with critical friends and pertinent research literature.

The third aspect considered is *prolonged engagement* – in which the researcher remains in the field until ‘data saturation’ occurs, which also helps to minimise reactivity (Babbie & Mouton 2001: 277; Lincoln & Guba 1985: 282, 301). This was not achieved to any great extent as the fieldwork periods in Malawi and the USA were restricted by available funding. In most instances, observations were conducted once at each site after a preliminary visit had served to ascertain the suitability of the site. This limited the researcher’s ability to engage at length and progressively sharpen the research focus with any one participant. There was, however, some evidence of ‘data saturation’ where similar phenomena emerged from different sites.

In the fourth instance, *member-checking* is considered useful in generating credible research findings (Babbie & Mouton 2001: 277; Lincoln & Guba 1985: 314). In this study, all transcripts of research conversations were sent to interviewees to verify whether the interviews were a truthful reflection of their perspectives – to get their “phenomenological nod” (Goodridge pers comm March 12, 2007). Participants were presented with an opportunity to augment their initial responses with further insights, or to edit text to reflect their perspectives more accurately. Some participants did not verify their interview transcripts, and the researcher did not wish to prevail

on them to verify the emerging analysis of data – which would have supported some degree of ‘face validity’ (Lather 1986: 78).

A fifth feature of credible research is *peer debriefing* – in which the researcher engages in critical review of insights, analyses and ideas with a peer of similar standing (Babbie & Mouton 2001: 277; Lincoln & Guba 1985: 283, 308). In this study, the researcher engaged with a diversity of peers not involved in the study, through personal conversations (recorded in the research journal) and email correspondence. This helped develop a critical stance to towards the research.

Finally, a researcher should be able to provide some kind of additional material evidence of the findings – *referential adequacy* (Babbie & Mouton 2001: 277; Lincoln & Guba 1985: 283, 313). While Lincoln and Guba suggested that ‘referential adequacy materials’ should be purposely set aside for use only after completion of the study, the researcher did not consciously do this. However, a record of all data and sources, such as audio recordings of interviews and a large collection of digital photographs, provide some level of referential adequacy. This allows ‘auditors’ and peers to locate the materials and review the findings (Mertens 2005: 14; Lincoln & Guba 1985: 283). The nature of the *audit trail* is discussed further below.

Lincoln and Guba (1985: 318-320) reasoned that the ‘confirmability audit trail’ should enable a peer or ‘auditor’ to trace the data sources and check the trustworthiness of the findings. According to Halpern (1983 in *ibid*; Babbie & Mouton 2001: 278), six factors need to be addressed. In keeping with these requirements, the researcher stored all raw data from this study, including audiotapes, digital photos, documents, and field notes. Second, working summaries and products of data analysis have been electronically filed and backed up. Third, a synthesis of the findings has been presented in this dissertation. Fourth, a research journal has been maintained which, together with the project proposal submitted to the Rhodes University Higher Degrees Committee, provides a record of the researcher’s intentions and standpoint in the study. Fifth, draft interview schedules provide an understanding of how data collection tools were fine-tuned. Finally, although the researcher did not create an exhaustive collection of written ‘process notes’ outlining the audit trail, it should be noted that insights into methodology and findings, as well as the location of data, were discussed in detail with and demonstrated to the supervisor of this study.

One might also consider the two aspects of ‘transferable’ research identified by Babbie and Mouton (2001: 277). In qualitative research, it is the reader who demonstrates the relevance of the findings to a different context or subject. The use of ‘thick description’ – the “rich, detailed description of specifics” – of phenomena creates an authentic sense of the complexity and depth of the study, and provides sufficient detail for the reader to make judgements regarding transferabil-

ity (Arksey & Knight 1999: 49; Babbie & Mouton 2001: 272, 277; Lincoln & Guba 1985: 214-215). This is demonstrated in the following chapter, where findings are reported. Secondly, through ‘purposive sampling’ – in this case, purposely selecting vastly differing locations and research participants – the researcher accessed as wide a range of data as possible, accounting for local conditions, values and cultural influences, increasing the amount of specific information available to the reader (Lincoln & Guba 1985: 40).

In discussing the objectivity criteria of validity and trustworthiness, it should be born in mind that no research is entirely ‘value-free’. It should be borne in mind that ‘final resolution’ is impossible when an argument relies on value positions (Lincoln & Guba 1985: 176). A researcher may not have firsthand familiarity with the sphere of social life to be studied, and so will bring other beliefs and understandings (pre-established images) to this world; this reflects what people do in everyday life (Blumer 1969/1998: 37). In keeping with a qualitative research approach, the researcher recognised the need to identify assumptions, perspectives, social and cultural norms, to critically examine both personal values and those in the context being studied, and adopt a reflexive orientation to interpreting data (Taylor & Bogdan 1998: 28; Lincoln & Guba 1985: 161, 177; Lather quoted in *ibid*: 78, 175; Mertens 2005: 14).

Another requirement for ‘objective’ research in the qualitative paradigm is ‘inter-subjective’ understanding (Babbie & Mouton 2001: 273). As Lincoln and Guba (1985: 71) pointed out, “the construction of realities must depend on some form of consensual language”. If a researcher uses ‘obscurantist language’ (noted in section 3.5), ‘verbifying’ nouns or commandeering foreign terminology, research subjects will give up trying to understand her/his ‘self-created’ or constructed reality (Lincoln & Guba 1985: 73). The use of specialist terminology (or ‘jargon’) has the potential to support institutional hegemony and ‘fundamentalism’, bearing in mind that the social process creates and upholds the rules, rather than the rules creating and upholding group life (Blumer 1969/1998: 18-19). Every effort was made to avoid using jargon, or ‘ideological hegemony’ (Maxwell 1996: 34), a phenomenon sometimes described as the ‘chattering class’.³³

Cognisance should be taken of the interaction between ‘inquirer’ and the ‘object of inquiry’ in naturalist research, and their reciprocal influence (Lincoln & Guba 1985: 94). ‘Mutual shaping’, or the ‘observer effect’ – introduced in the naturalistic enquiry process (3.1.2.3) – has five aspects (*ibid*: 37, 155). Firstly, all elements in any situation are in mutual and continual interaction. Secondly, a particular configuration of all elements – as ‘potential shapers’ – activates each indi-

³³ An amusing term brought to the researcher’s attention by a colleague, the term ‘chattering class’ is used to describe academics who use impressive, intellectual-sounding jargon (‘theoretical hot air’) in everyday contexts. Excessive emphasis on theory/jargon contributes little to practical and sustainable solutions for real-life problems.

vidual element in a different way. Thirdly, both the setting and the researcher's purpose play a role in judging which elements have played a shaping role. These points do, however, support the qualitative researcher's understanding of multiple constructed realities, of the influence of the researcher's values in the study process, and of the interactive relationship between knower and known (*ibid*). Fourth, each explanation of a 'shaper' is unique because each situation is unique, and fifth, any explanation is a 'here-and-now' account that represents but a snapshot of one moment in a dynamic process. This is underlined by the qualitative researcher's recognition of limited generalisability (Lincoln & Guba 1985: 155-156). In acknowledging the role of 'mutual shaping', our view of the social world cannot be deterministic – linking a particular 'cause' to a particular 'effect'. In conducting research with human 'subjects', the researcher's intentions may become manifest to some extent in the subjects, a phenomenon explained in *Ecological Intelligence* as "pushing the envelope of human consciousness". Einstein's General Theory of Relativity offers a deeper insight into the 'observer effect':

$E = mc^2$ was in fact a multiple pregnancy, incubating the exciting field of quantum theory, a system of mechanics based on the wave-particle duality of matter and radiation. The duality phenomenon is also known as the *observer effect*. In other words, light can be seen to travel in waves or particles, depending on the intention of the observer ['indication' – the symbolic interactionist term]. The theory introduces us to the concept of an invisible 'field' to explain the astonishing, non-classical behaviour of sub-atomic particles. As if connected or supported in a 'field' of interaction, the behaviour of these particles is such that there seems to be no usual cause and effect relationship between them. In other words, their influence, one upon the other, is instantaneous. ... The act of observation creates the space-time event, telling us that every sub-atomic particle exists firstly in a virtual state, the actual state manifesting itself in accordance with the intention of the observer. (McCallum 2005: 76).

This resonates with the symbolic interactionist perspective of the social sphere: humans indicate to each other what should be done and interpret each other's indications in order to align their actions and form the objects that constitute their world (Blumer 1969/1998: 49).

It is not considered possible to generalise findings from this study to other sites and populations with any degree of confidence because of the contextual and geographic differences between cases. However, the reader can make judgements regarding the 'transferability' of the findings to her/his particular context (Mertens 2005: 5).

There will be further critical reflection on the methodology and methods employed in this study in the context of the research findings (see 6.3).

3.7 Synthesis of research process

Symbolic interactionism is a perspective in... empirical social science... a down-to-earth approach to the scientific study of human group life and human conduct (Herbert Blumer 1969/1998: 21).

The manner in which this naturalistic research methodology unfolded is summarised in Figure 3.3 – which was adapted from Lincoln and Guba (1985: 188).

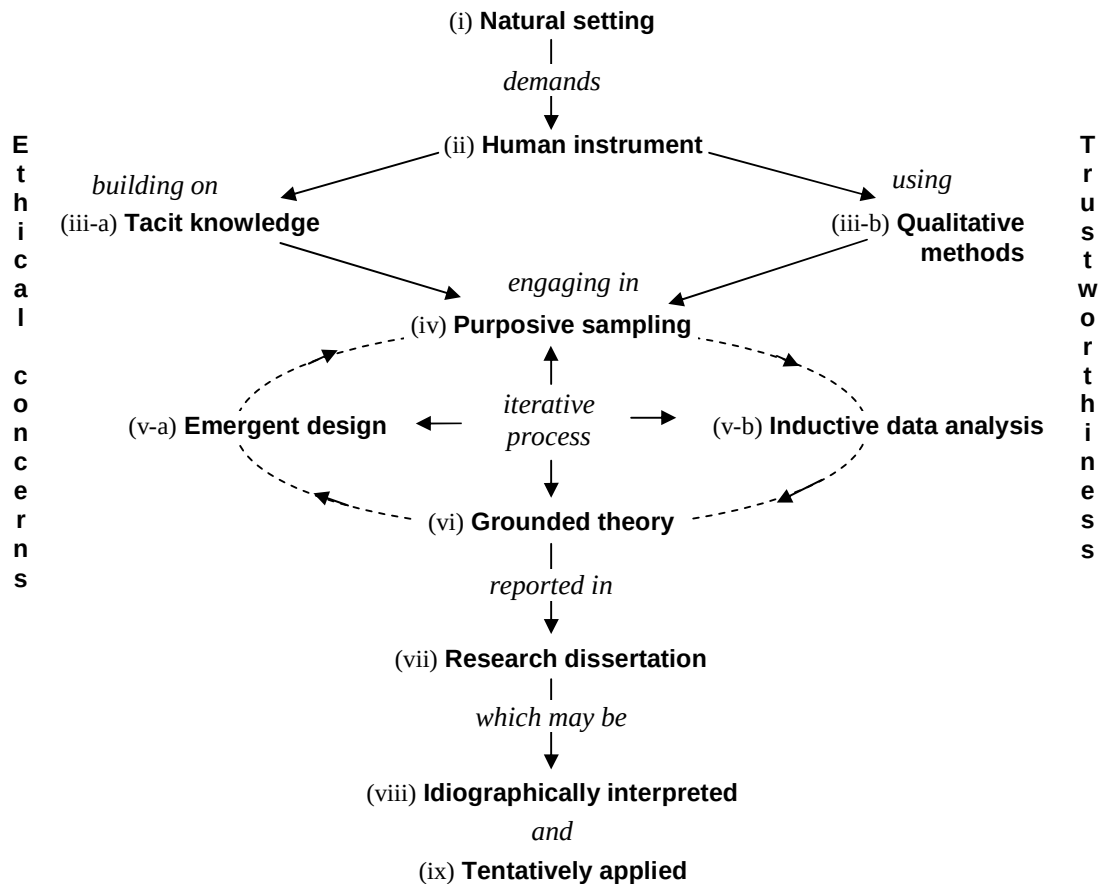


Figure 3.3: Flow diagram representing a synthesis of the naturalistic inquiry process (adapted from Lincoln & Guba 1985: 188).

This flow diagram illustrates how the research took place in (i) the *natural setting*, with (ii) the *human* as primary research *instrument*, (iii-a) building on *tacit knowledge* and using (iii-b) *qualitative methods*. The researcher was engaged in an *iterative process* in which (iv) *purposive sampling* and (v-a) *inductive data analysis* informed an (v-b) *emergent design* and the generation of (vi) *grounded theory*. It is noted that at best, the (vii) *research report* and recommendations can be (viii) *interpreted idiographically* and (ix) *applied tentatively*. Key considerations included

ethical concerns and the *trustworthiness* of this qualitative research process. The role of values – both in the research subjects and in the researcher in making meaning of data – is also recognised (Lincoln & Guba 1985: 333).

The findings of the study, as a result of this research process, will be discussed in the following chapter.



4. EMERGING ISSUES from SITE and PLACE

In pursuing a sociology which unmasks the dramaturgical society, the interactionists have made a hero of the ethnographer-voyeur who comes back from the field with moving tales of the powerless. They have made gazing on others a legitimate interactionist preoccupation. ... But now these myths are under assault (Norman K Denzin 1992: 168).

In this chapter, research findings are presented. They are reported in terms of the questions guiding this study (see section 1.2). These were: what motivates schools to grow and/or harvest food plants; which is linked to the feasibility of incorporating food growing activities into learning programmes; conditions promoting intergenerational learning; integration of community-based knowledge and food growing practices, and of scientific knowledge and research into environmental learning; the role of formal learning in school children's futures; use of learning support materials; and the key ingredients for sustained, effective and relevant food growing projects.

While there is modest engagement with theory in this chapter, theoretical considerations will be dealt with primarily in Chapter 5 where key observations are assembled and discussed further. Contextual factors such as social and economic history and cultural and structural features vary between research sites. South Africa (section 4.1) and Malawi (section 4.2) are situated in the southern hemisphere, and the USA (section 4.3) is in the northern hemisphere. Noteworthy observations and emerging conceptual issues at each site are outlined, based on the researcher's inspection of the data. These findings may be seen as 'snapshots' of particular moments within diverse, dynamic and developing social realities. Quotations are provided where appropriate, with additional examples in Appendix I to back up the inferred findings of this study. It should be noted that more space is given to findings in Malawi and the USA, as Grahamstown was used as a 'pilot' site to guide subsequent investigations (see 3.2.2.1).

4.1 Grahamstown, South Africa

A breakfast table looks different to someone who has milked cows, churned butter... and dug potatoes (Gary Paul Nabhan and Stephen Trimble quoted in Wei Fang 1995/1997: np).

4.1.1 Contextual factors – Grahamstown, South Africa

Grahamstown is situated in the Makana Municipal area in the Eastern Cape – one of the poorest of the eleven provinces – on the south eastern seaboard of South Africa (Figure 4.1). The town was established as a British military outpost in 1812 by Colonel John Graham, from whom the town takes its name (McI Daniel, Holleman & Jacot Guillarmod 1985: 2).

Food growing activities in the Grahamstown area face challenges such as poor soil quality, erratic rainfall and a polluted river catchment. The dominant soil type is relatively infertile clay, shifting into acid soils in the surrounding hills – home of the grassy sourveld (McI Daniel *et al*

1985: 7). Most of the more fertile ground – the alluvial deposits alongside the streams running through Grahamstown – has been covered by buildings and paving. The annual rainfall is approximately 580 mm, and periodic droughts present challenges to a growing population.

Grahamstown faces socio-economic and related sustainability challenges. Of the estimated 124,758³⁴ local inhabitants in Grahamstown, fewer than 50% have formal or permanent employment, according to a survey conducted at the end of 2007 by the Institute for Social and Economic Research. Many households survive on informal entrepreneurial activities, including vending of fruit and vegetables at semi-formal market localities, on a door-to-door basis, or on pavements outside shopping centres.

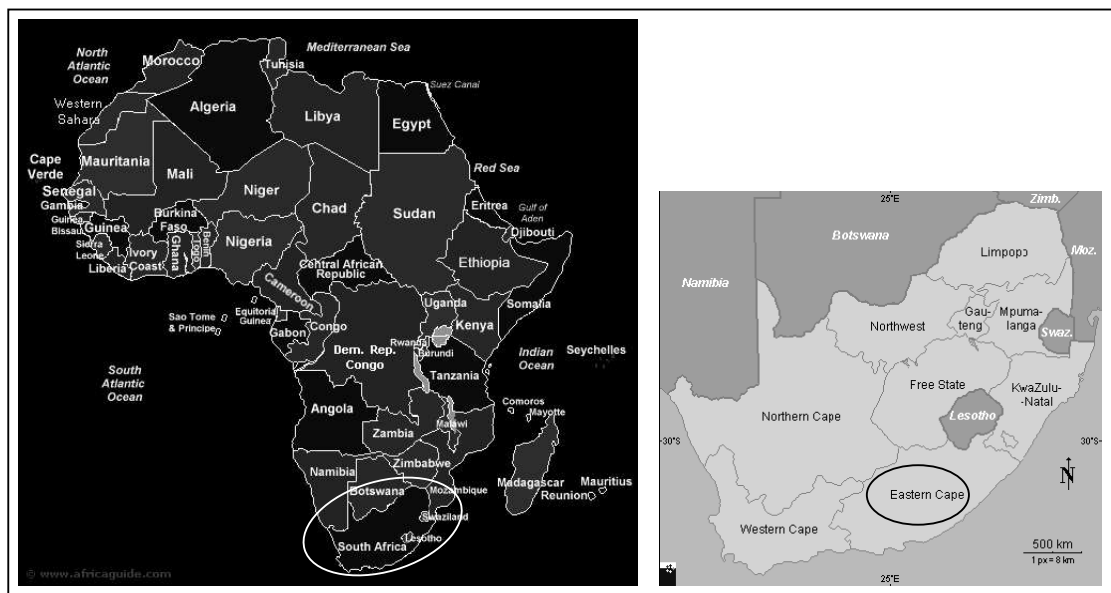


Figure 4.1: Maps showing continent of Africa (from www.africaguide.com) and provinces of South Africa (from Philander 2006: 8), including the Eastern Cape.

Rhodes University was established in Grahamstown just over 100 years ago, and is a focal point of educational activities in Grahamstown. The city is home to several prestigious private schools, as well as a large number of ‘government’ schools, and hosts the annual National Arts Festival and Scifest Africa. The researcher has resided in Grahamstown for approximately 20 years, during which time there has been a significant increase in indigent population numbers. Three languages are commonly spoken: Xhosa, English and Afrikaans. Although English is the official

³⁴ This figure comes from the draft Waste Implementation Plan for the Makana Municipality, August 2008, page 20.

language for teaching and learning, mother tongue communication is common in ‘previously disadvantaged’³⁵ schools.

Grahamstown schools participating in food growing activities appear to have a variety of associations with support organisations. Some schools mentored by the Umthathi Project (see 2.3.4.5) had subsequently joined the Health Promoting Schools (see 2.3.4.4) and/or Eco-Schools (see 2.3.4.2) programmes. One of the three HPS pilot schools in Makana initiated a partnership with the Food Gardens Foundation (see also 4.1.2.5). The Rhodes University Environmental Education and Sustainability Unit (RUEESU) is aligned to the Eco-Schools Eastern Cape region, and a staff member has taken on the role of facilitating local activities. Observations pertaining to food growing, school-community links and aspects of learning are collated in a number of sub-sections below.

4.1.2 Grahamstown: food growing, school-community links, aspects of learning

Various factors, discussed in the sub-sections below, appear to play a role in food growing and school-community links. A number of challenges were also identified.

4.1.2.1 Food production focus

Food growing: All participating food gardens aligned to the HPS programme and Umthathi Project focus on food growing. In addition, the latter places emphasis on helping unemployed people acquire practical skills such as cooking and business skills (Walker pers comm April 22, 2006).

Food security: Food gardening was reported to assist in promoting food security (Mhlana pers comm April 12, 2006). It was noted that the productivity of food gardens appears to be variable.

Nutritional supplementation: Produce from food gardens was reported to augment dietary intake and in some cases contributes to school health and nutrition programmes (Mvula-Jamela pers comm April 18, 2006). However, it was reported that school gardens tend to be neglected during holiday periods, and produce is left unharvested.

We have a problem, strangely enough, of the gardens not being harvested in December. So there are actual vegetables that can be sold and eaten [but] they [are left to] die. (Cockcroft pers comm May 9, 2006)

³⁵ The term ‘previously disadvantaged’ is commonly applied to schools that are located in African ‘townships’ – areas that were assigned to ‘non-Whites’ during the apartheid era. However, even under the post-apartheid government (installed in 1994), children in such schools continue to face disadvantageous circumstances, such as dysfunctional school management, teachers who are under-qualified or demonstrate a lack of professionalism or work ethic, and limited materials and resources. The former Model C schools (government schools intended for Whites only during the apartheid era), by comparison, are generally better resourced and functional. Private schools are generally well resourced, and are usually only attended by children from relatively privileged backgrounds and a few promising scholars who have been subsidised by bursaries.

Programme requirements: In some schools, food gardens are established in order to meet the requirements of a particular programme. “All schools that are in the HPS programme ... are [expected to have] food gardens” and a Health Centre, in line with its key focus areas (Mtimkulu pers comm April 12, 2006; Mothlabane pers comm April 12, 2006) (see 2.3.4.4). However, it was not established how links between food growing and health were made known to scholars.

4.1.2.2 Income generation focus

Produce from school/community food gardens is reportedly sold to generate income. During the researcher’s first visit to the Umthathi Project, there were plans to accentuate the socio-economic benefits of food gardening while retaining an educational focus. To this end, links had been initiated with a Cape Town-based NGO, the South African Institute for Entrepreneurship (SAIE) which focuses on creating entrepreneurs (Cockcroft pers comm May 16, 2006). This seems to be associated with a self-help approach³⁶ (see also 4.1.2.5). A representative of the Umthathi Project indicated their intention to strengthen parental commitment to school income generation projects, including food gardens.

... we want to train them to basically use that garden as an income tool, an income-generating resource. Because that’s what the School Governing Bodies need to do: they need to generate income for the school. (Cockcroft pers comm May 9, 2006)

4.1.2.3 Teaching and learning practices

Short quotations illustrate a number of teaching and learning practices noted in Grahamstown, with additional excerpts provided in Appendix I. Discussion around this aspect is limited as it is beyond the scope of this thesis.

Experiential learning: Umthathi Project’s *Maths in the Garden* programme entailed practical, hands-on learning activities with school children using mathematics on garden-related topics such as “modelling, measurement, capacity” (Jantjie pers comm May 3, 2006).

... it helped the children at the schools enormously to know how to make scale models of the school and the relationship to scale models of the school grounds, and helped the whole parent-teacher association to plan the infrastructure and expansion of the school garden. (Walker pers comm April 22, 2006)

Record-keeping: A retired school garden facilitator reported how children could learn accountability by keeping records of their food gardening activities (Jantjie pers comm May 3, 2006). Sherman (2007: 15) made a similar observation regarding a number of southern African schools,

³⁶ “The self-help approach is a successful instrument for combating poverty in a sustainable way. It empowers the very poor, the majority being women, socially, economically and politically empowering them to live a life of dignity with their children in the community. The work with and in the group sets off a number of amazing processes... (which) are carried out by the very poor themselves. As a result of capacity building and mutual support the members receive in the group, the very poor are empowered to take control of their own lives” (Kindernothilfe 2006: 2).

but suggested that the educational aspect could be better coordinated with the practical aspects of financial record-keeping for the school.

Demonstrations: During an Eco-Schools workshop, the researcher observed a demonstration to a group of teachers on how to germinate ‘imifino’ (Xhosa for wild spinach) in soil inside an old car tyre. It was not established whether this stimulated wider practice or not.

Contextualisation: It was apparent that in some Grahamstown schools, teachers lack the confidence to contextualise teaching and learning. For example, a teacher expressed concerns regarding how community knowledge relating to food gardening might be incorporated into the formal school curriculum (Mvula-Jamela pers comm April 18, 2006).

Mainstream curriculum concerns: A retired school garden facilitator asserted that “if [the garden] can be inside the curriculum it will be successful. Outside the curriculum there will be too many problems” (Jantjie pers comm May 3, 2006). However, lack of teacher capacity presents a major challenge (Mvula-Jamela pers comm April 18, 2006). It was reported that only those teachers working within the Eco-Schools programme make links between environmental concerns and the formal school curriculum (Tyatya pers comm March 27, 2006). The researcher observed an Eco-Schools workshop (May 16, 2006), to which HPS teachers were also invited, in which guidance was provided in developing learning activities with imifino (see Figure 4.2).



Figure 4.2: Eco-Schools learning activity with imifino, Grahamstown.

In the past, the Umthathi Project provided the early foundations for mathematics, for example, by encouraging scholars to be creative with the shapes of their food garden plots (Jantjie pers comm May 3, 2006). The NGO now uses SAIE training materials (see 4.1.2.2) which are SAQA (South African Qualifications Authority) accredited through the ETDP (Education, Training and Development Practices) SETA (Sector Education and Training Authority), thus linking their activities with the national qualifications framework (Cockcroft pers comm May 16, 2006). Use of SAIE materials may potentially help prepare school children for their futures, bearing in mind the recommendation made by the FAO (2007: 5) that learning objectives in southern African schools need to be better aligned with food production and income generation (see 2.3.3.2).

In-service training: For several years, professional development has been promoted by the Eco-Schools Makana cluster, as is the case in other South African nodes (WESSA/WWF-SA 2008: 38). The aim of holding regular cluster meetings is to develop skills, for example, in integrating community-based knowledge and food growing practices into environmental learning. The researcher has also observed teachers attending various training and development courses at Rhodes University over the years.

4.1.2.4 Teaching and learning resources

A range of teaching and learning resources were noted. Examples are provided here, with additional excerpts in Appendix I.

Conventional schools: Food growing is commonly promoted in underprivileged schools. The quality of education in Grahamstown varies dramatically between so-called ‘township schools’, the former ‘Model C’ schools and private schools (see Footnote 35 in section 4.1.1).

Teachers: Management of a school garden appears to be the domain of one or a few teachers. It does not appear to follow any consistent format, and use of the garden as a teaching tool varies. Staff shortages were reported in some cases to be a reason for not implementing garden-based programmes such as 4-H (see 2.3.3.2) (Mhlana pers comm April 12, 2006).

Agricultural extensionists: Department of Agriculture extensionists provide resources to community groups and schools with the aim of promoting food growing and food security (Mhlana pers comm April 12, 2006). However, they but do not provide any related training.

Equipment: Extensionists provide seeds and tools for food growing, but these are reportedly lost through theft or misappropriation (Mhlana pers comm April 12, 2006). By way of comparison, Malherbe (1977: 228) drew attention to large amounts of public money spent on “costly agricultural equipment which was... supplied to schools and which could not be used because there were no qualified teachers to handle it”.

Experts: Staff at Rhodes University organise workshops, materials and assignments for Eco-Schools and HPS teachers. It should be noted that Sherman (2007: 12) found little evidence in southern Africa of the involvement of nutritionists, health workers or school cooks in managing school gardens or participating in related educational activities.

Written/visual materials: Programmes such as Eco-Schools appear to promote guided use of learning support materials. For example, at an Eco-Schools workshop on May 16, 2006, the researcher observed materials provided by the convenor. These included a lesson plan on imifino and healthy eating for a grade 4 Life Skills class, and six resources (‘teacher notes’ on a balanced

diet; worksheet on a balanced meal; schedule for interviewing community members about imifino use; poster template for summarizing information gathered by community; rubric for assessing poster; additional imifino information). A variety of educational packs and booklets are also published by Share-Net, under the auspices of the Wildlife and Environment Society of South Africa (WESSA). The RUEESU shares such materials with teachers on request. However, it was not established to what extent materials are used independently, or how these are used in teaching and learning.

Websites: While a number of South African websites have been developed for environmentally related learning, anecdotal evidence suggests that less than 10 percent of the population has internet access – either in their own homes, or through affiliation to a school or organisation with internet access. Connection speeds are sometimes slow, with the result that it can take a very long time to download websites or open attached materials. Web-based learning is further discouraged amongst the general public by high costs, as access to the internet is mostly through commercial service-providers rather than libraries and other public facilities.

Institutions with agroforestry links: It appeared that the Umthathi Project had a student internship arrangement with the Fort Cox College of Agriculture and Forestry, which is situated 20 km from the University of Fort Hare (Jantjie pers comm May 3, 2006; Murray pers comm March 31, 2006). The researcher learned that Fort Cox was a member of ANAFE and hence had access to agroforestry technologies (Chakeredza pers comm May 25, 2006). Further enquiries revealed that relevant project outcomes could not yet be reported (Tshidzumba pers comm April 25, 2006).

Visiting students: A partnership with Baltimore College in the USA contributed to the establishment of the Umthathi Project and *Maths in the Garden* programme. International Studies students travelled to Grahamstown annually, or every two years, to work with school children for a month (Jantjie pers comm May 3, 2006).

Community members: Various interviewees reported community involvement in school food gardens, mainly in establishing food gardens, watering and caring for them during school holidays, and monitoring and dealing with security or theft. Parental involvement was reportedly also channelled through school Parents Teachers Associations. This was considered to be a valuable way to improve food growing activities in schools.

So what we're looking at is involving the parents and the teachers, and the School Governing Body (SGB), and... what we're trying to push is... that School Governing Bodies take the garden seriously as an income generating tool, or directly into the soup kitchen. So, the garden stops producing, somebody will notice and say why? (Cockcroft pers comm May 9, 2006)

The Eco-Schools programme promotes community involvement. For example, parents gathered imifino and prepared traditional food in the school kitchen for a teacher workshop on May 16, 2006. It was not established to what extent they participated in workshop activities.

4.1.2.5 Physical and financial support and resources

Support for food growing and educational activities in Grahamstown is reported in terms of land and natural resources, government and private support, NPOs and NGOs. Consideration is also given to the impact of dependency, rivalry and crime, as compared with a self-help approach. A few examples are provided below, with additional quotations in Appendix I.

Land and natural resources: In most cases, school grounds appear to be large enough to set aside an area for food growing. In the case of community food gardens, land is made available to them by the local municipality.

Government-funding: HPS organisers saw themselves as an umbrella organisation with links to a range of government departments, NGOs and Rhodes University. The HPS programme was regarded by RUEESU academics as an important governmental initiative in the community.

Private partners/donors/volunteers: Funding for food growing was reported to be leveraged from various sources. For example, the Old Mutual Group Scheme donated money to the HPS project (Mtimkulu pers comm April 12, 2006), and the Wilde Gansen in the Netherlands and the International School Garden Project in Germany supported the Umthathi Project (Jantjie pers comm May 3, 2006; Walker pers comm April 22, 2006). As noted in 2.3.4.5, USA-based students also brought new perspectives to the Umthathi Project every two years.

NPOs/NGOs: Food growing or related activities were reported to receive support from various NGOs, such as the SAIE (as noted in 4.1.2.2) and the Food Gardens Foundation (as noted in 2.3.4.4). In some cases, this appeared to be through the fund-raising efforts of a governmental group such as Department of Health (Mothlabane & Mtimkulu pers comm April 12, 2006).

Dependency syndrome: Findings in this study seem to differ slightly from Gasperini and Maguire's (2001: np) suggestion that complacency in Africa may have emerged as a result of the Green Revolution and a belief that education has addressed food production concerns. Interviews indicated that a sense of dependency undermines the potential of food growing projects to become self-sustaining. This was associated with a lack of individual responsibility or accountability, or a sense of complacency, entitlement or apathy (Jantjie pers comm May 3, 2006; Walker pers comm April 22, 2006). Some parts of Grahamstown were considered to be 'over-serviced' and stuck in the 'welfare mode' (Walker pers comm April 22, 2006). Similarly, school gardens

receiving support from a number of programmes, such as the Umthathi Project, Food Gardens Foundation (FGF), and Health Promoting Schools were described as ‘resource-heavy’:

To put it in a strange way, I think the schools in [Grahams]town are over-resourced. The rural schools are under-resourced... they have to... really use that resource... (Cockcroft pers comm May 9, 2006)

After ‘graduating’ from one organisation’s food growing programme, such a school would approach another ‘service-provider’ and embark on a new programme (Andile pers comm April 12, 2006). Similarly, a teacher who championed a school health and nutrition programme believed that if she left, no other teacher would assume responsibility for overseeing their school garden (Avril pers comm April 18, 2006). It was suggested that Grahamstown is atypical of the broader South African scenario (Walker pers comm April 22, 2006). The reciprocal relationship between aid and dependency is discussed further on in 5.1.1.2.

Rivalry: The researcher inferred that there was some professional jealousy amongst members of different support organisations. While members of one support programme reported a collaborative working relationship with members of another group, an interview with the latter indicated that this was not happening in practice (Cockcroft pers comm May 9, 2006). Shifts in food growing strategies or organisational allegiance, or ‘intrusions’ on another organisation’s ‘territory’ may be viewed as political or opportunistic attempts to maximise access to support and resources (Cockcroft pers comm May 9, 2006; Jantjie pers comm May 3, 2006). The researcher speculates that in some cases, it may also be linked to a subconscious attempt to demonstrate independence.

Crime: Various cases were reported of tools being stolen from schools, and gardens and infrastructure being vandalised. Some schools responded by employing the services of a local security company (Mothlabane pers comm April 12, 2006). Other interviewees reported that the issue is quickly resolved if parents are enlisted to help solve the problem (Jantjie pers comm May 3, 2006; Cockcroft pers comm May 9, 2006) – see also 4.1.2.4.

Self-help approach: A ‘resource-light’, self-help approach was considered to be a more effective way to help food growing initiatives to become self-sustaining (Cockcroft pers comm May 9, 2006). This would promote self-reliance rather than dependency on constant intervention.

4.1.2.6 Intergenerational factors

The researcher learned that a number of gardens in the eastern part of Grahamstown were established by schools or community members or both. Various intergenerational factors seem to play a role in food gardening and learning. Examples are provided below, with additional excerpts in Appendix I.

School drawing from community: As noted in 4.1.2.4, parents are involved in various ways in school garden activities and feeding programmes. However, a number of respondents reported poor community support for school gardens (Cockcroft pers comm March 30, 2006; Mothlabane pers comm April 12, 2006). The Umthathi Project hoped to remedy this by placing the SGB at the helm of the income generating role of food gardens. This was expected to provide continuity to gardening activities from one school year to the next (Cockcroft pers comm March 30, 2006).

Community drawing from school: It was reported that productive school gardens reduced food costs for local community members.

She was stopped in Joza... by a parent that she didn't know who said, 'thank you very much for starting the school garden at CM Vellem. I now don't have to catch a taxi into town to buy my cabbages and vegetables. I can go and buy locally from the school'. (Walker pers comm April 22, 2006)

Some parents reportedly sell produce from school gardens to cover the costs of school fees, but others make a living by selling snacks (mainly 'junk food') to scholars at the school gates (Mtimkulu pers comm April 12, 2006). The observation by Jacquet de Haveskercke (2004: 63) that communities contribute more to schools than vice versa was neither verified nor challenged.

Conflicts: Interactions between schools and communities also have negative aspects. For example, vandalism and theft of items from the school garden reflects lack of concern for the functionality of the school and its stakeholders. This is linked to discussions in 5.1.1.2.

Limited intergenerational transfer: It appeared that by and large, intergenerational learning and mentoring of children by adults is not prevalent. A common concern is the impact of HIV/AIDS on orphans who are deprived of the mentoring input of parents (Walker pers comm April 22, 2006). Another significant factor is the absence of parents who live and work elsewhere. The previous director of Umthathi speculated that socio-economic and infrastructural factors undermine the transfer of knowledge from schools to communities, and that the 'generational gap' is associated with various learning problems at school (*ibid*).

4.1.2.7 Aspects of environmental learning

It was difficult to establish the extent to which meaningful environmental learning was taking place in the sites that were briefly explored. It may be inferred from observations of widespread littering and neglect that environmental considerations are not prioritised.

4.2 Malawi

A society grows great when old men plant trees whose shade they know they shall never sit in
(Greek Proverb).

4.2.1 Contextual factors – Malawi

Malawi is a small country with a large lake, sandwiched between Tanzania in the north, Zambia in the west, and Mozambique to the south and east – in the Southern African Development Community (SADC) region (Figure 4.3). The climate and soils are moderately favourable for growing food crops. There is a long dry period every year with rains falling mainly between November and March (Chakeredza pers comm June 1, 2006). In the southern part of the country, this may be more than 1,000 mm (*ibid*). Land is traditionally handed down from parents to children, but as population numbers have grown, the size of plots has become progressively smaller, and many young adults find themselves without land or capital, and are thus pressed to find employment. The pressure on arable land has created an ongoing cycle of deforestation to make way for fields, and resultant soil erosion and environmental degradation.

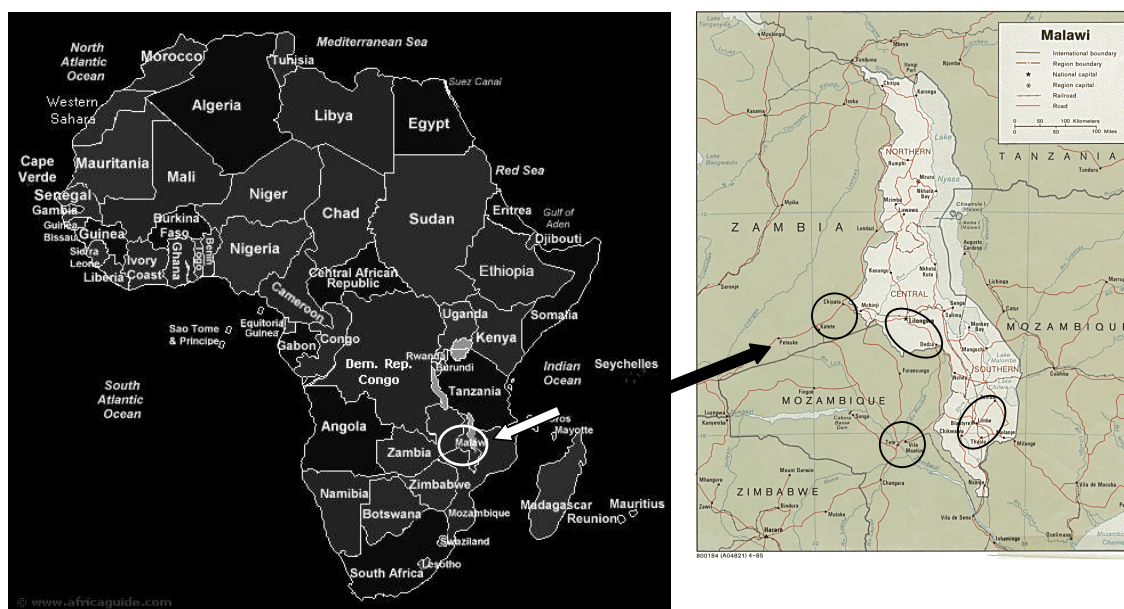


Figure 4.3: Maps showing continent of Africa (from www.africaguide.com and www.jacanaent.com/Maps.htm) and research sites in Malawi and adjoining areas in Mozambique and the eastern part of Zambia.

Most people in Malawi walk or cycle some distance to gather natural resources or to tend their plots where they grow maize (the main source of starch), impilo,³⁷ cabbage, tomato, potatoes,

³⁷ This was the term used by Matha Lufeyo (pers comm June 6, 2006); English word unknown.

cassava and beans, as well as mangoes, avocados, pawpaws, granadillas and oranges. People commonly eat the leaves of vegetables such as pumpkins, peas, rape and cassava. They sell their produce in local markets to generate some income. On the roadsides, people sell wood and charcoal, as well as take-away foods such as grilled wild birds. The author wrote in her journal:

Not a spot of untouched ground to be seen anywhere. ... My overall impression of Malawi was of people living lives of quiet desperation. (Köhly, research journal, May 29, 2006)

In 2006, Malawi was considered to be one of the poorest countries in the world, with widespread infrastructural decay. It was operating largely on handouts of essential food items and fertiliser from aid organisations, distributed via traditional village heads. The population was about 12 million, compared with 3 million about 30 years ago. Large numbers of young children, many orphaned by HIV/AIDS, were present in schools visited to the south and west of Lilongwe. There was no evidence of family planning or efforts to address population growth. The researcher observed that the Catholic Church has a strong presence in the country. At the time of the researcher's visit, the value of a Malawi Kwacha was equivalent to about 4 cents in South Africa (1 ZAR = 22.7985 MWK); one South African Rand equated to about 16 cents in the United States (1 USD = 6.04660 ZAR).³⁸

In 2006, the Malawian government under Dr Bingu wa Mutharika had introduced a 'Food for Work' programme in which recipients of food aid are required to contribute a certain number of hours of labour – often agriculturally-related. This initiative was born out of the concept of God being represented by work and food (Swaminathan 2006). The potential of agricultural skills to improve rural livelihoods was reported, but the school system and parental pressure reportedly discouraged scholars from pursuing agricultural careers. Educational policy in Malawi had been modified to reflect agroforestry in the school curriculum (Nyirongo pers comm May 23, 2006). However, school gardens have only recently been included in the curriculum (Sherman 2007: 9).

The Malawi office of the World Agroforestry Centre (ICRAF) had moved to Chitedze Agricultural Research Station at Lilongwe. The previous office site near Blantyre, Makoka Agricultural Research Station (MARS), served as host to the SADC-ICRAF Agroforestry Project (Chakeredza pers comm June 1, 2006). Farmer Learning Resource Centres – constituting the Farmers of the Future (FoF) concept – had been initiated by the African Network for Agroforestry Education (ANAFE) fellow at two primary schools and a village polytechnic at the end of 2005 (Chakeredza pers comm June 1, 2006). At Thondwe Primary School, near Makoka, the teachers were conducting after-school agroforestry-related activities with 20 school children in a wildlife club. St Anthony Girls' Primary School – run under the auspices of the Catholic church – had a limited

³⁸ An online currency converter was used: <http://www.xe.com/ucc/convert.cgi> (accessed 10 May 2006).

budget but nevertheless neatly maintained grounds, dedicated staff and, according to the principal, a good academic record. Their agroforestry-related activities were conducted through the school's wildlife club and juice-making committee. The Thondwe Village Polytechnic (TVP), launched in 1999, brought a vocational education component to complement their support institution's other projects – health centres and orphan nurseries – which all aimed to improve the living standards of rural people (Benda & Lucio pers comm June 13, 2006). From 2003 agricultural courses were offered for 20 students – selected on the basis of their education grades. The Malawi College of Forestry, near Dedza, had 50 students on a two-year certificate course on forestry technologies and indigenous forest management, and became affiliated to ANAFE in 1992. Mapanga community-based organisation (CBO), an independent community initiative established in 2001, embraced 19 villages in the Thyolo district. Their motto stated: “We can help ourselves”.

For comparative purposes, the researcher visited ICRAF Zambia – situated at the Msekera Research Station, near Chipata – which was operating on a Canadian International Development Agency (CIDA) ‘no-cost extension’ in 2006. Since then, the ICRAF offices at both Makoka Agriculture Research Station in Malawi and Msekera in Zambia have been closed down.

4.2.2 Malawi: food growing, school-community links, aspects of learning

4.2.2.1 Food production focus

Various interviewees reported that children are unable to learn effectively because they do not have breakfast. The need to supplement diets and promote food security appeared to be a strong incentive for adopting agroforestry in Malawi.

Food security: Agroforestry was seen as a way of promoting food security (Chibwana pers comm June 5, 2006; Chikole pers comm June 13, 2006; Jacquet de Haveskercke pers comm June 14, 2006; Katanga pers comm June 17, 2006; Mawonga pers comm June 13, 2006; Zulu pers comm June 16, 2006). It was reported that the TVP was self-sufficient, producing about 300 kilograms of maize per student per annum (Walasi pers comm June 12, 2006). This should equate to about 10,000 kg for 33 students in 2006.

The most attractive aspect of agroforestry appeared to be fruit production, which was introduced to school children through juice-making. A school teacher was impressed that ICRAF's grafted fruit tree seedlings could produce fruit after two years (Ngaiyaye pers comm June 7, 2006). The cultivation of indigenous fruit trees such as ‘wild sweet apple’ (*Uapaca kirkiana*) was also being promoted in schools (Walasi pers comm June 12, 2006). This appeared to stimulate scholars' appreciation of the nutritional and economic potential of wild fruits (Mussa & Bamusi pers comm June 7, 2006).

Food preservation: A respondent reported that in-season fruits should be dried or used to make juice for consumption during less abundant periods, rather than left to decay (Walasi pers comm June 12, 2006). Two juice-making processes, using locally purchased fruit (pawpaws, guavas, naartjies or mandarins, and lemons) were observed at two schools. The procedure recommended by ICRAF was followed to a greater or lesser extent: first washing, then peeling and chopping the fruit, and then boiling until soft. The pulp was then pressed through a coarse hand-sieve with a spoon into a large plastic bucket. Thereafter, it was strained through a fine sieve, and sugar and lemon juice added to taste (see Figure 4.4). It was then poured into plastic bottles for storage.



Figure 4.4: Juice-making activities in a rural school, southern Malawi.

Nutritional supplementation: Interviews with teachers and children established that fruit juice could augment dietary intake, and provide a suitable liquid supplement for people who were unable to eat solid food (Lindani pers comm June 9, 2006). However, the researcher believes that the boiling process will destroy most of the vitamins.

4.2.2.2 Income generation focus

Economic benefits appeared to be the strongest motivating factor for adopting agroforestry practices, especially juice-making. Various figures were quoted for selling juice, including K125 per litre [the equivalent of R5.48], K30 per cup [R1.30], or small cups at K5 [22 cents] for children and poorer people (Lindani pers comm June 8, June 9, 2006). Income generated was reportedly ploughed back into schools' agriculture club activities. Maize milling services to community members helped the TVP generate additional income, together with the sale of eggs and milk (Walasi pers comm June 12, 2006; Gomonda pers comm June 13, 2006). The stated aim of the Mapanga CBO was to introduce sustainable agricultural technologies, such as agroforestry and fish farming, in order to promote environmental conservation and improve socio-economic conditions in the rural community and its schools.

4.2.2.3 Agroforestry focus

As noted in 2.2.6, ICRAF promotes agroforestry with the aim of counteracting deforestation, natural resource depletion and poverty. According to an associate scientist at ICRAF-SA, the introduction of the Farmers of the Future concept aimed "to improve the quality and the relevance

of basic [primary] education using natural resource management or agroforestry” (Jacquet de Haveskercke pers comm June 14, 2006).

FoF activities are coordinated under the auspices of ANAFE, through a regional branch of the Southern Africa Regional Agricultural Forum and Training (SA-RAFT), in order to incorporate agroforestry into the school curriculum and at a tertiary level (see also 2.2.3.3). Their main focus was on primary and secondary schools because many children drop out and return to rural areas where they rely on subsistence farming (Akinnifesi pers comm May 23, 2006). The researcher visited the Makoka ICRAF plant nursery where germplasm (seeds) of desirable agroforestry plants is propagated and distributed free to local farmers and Farmer Learning Resource Centres. Staff reported that they also provide training in agroforestry technologies and nursery management. In eastern Zambia, by way of comparison, it appeared that agroforestry had been introduced to schools in 2004 (Phiri-c pers comm June 16, 2006). The researcher observed a variety of plants associated with agroforestry (see Appendix E).

Fruit trees: The domestication of indigenous fruit trees is being researched by ICRAF (see Appendix E), with a view to propagating the most productive strains and promoting their cultivation in home gardens. The researchers observed alternate rows of mango trees (*Mangifera indica*) and passion fruit (*Passiflora edulis*) at all the three FoF sites. One school had also planted domestic guava trees (*Psidium guajava*) and indigenous fruit trees such as baobab (*Adansonia digitata*) and wild loquat/Masuku (*Uapaca kirkiana*). Some teachers kept records of all the species they planted (see Figure 4.5).

Figure 4.5: List of agroforestry trees recorded at primary school, eastern Zambia.

Sl. No.	Species Name	Quantity	Spacing
1	2100m Mangifera (Mango)	180	5m x 5m
2	2100m Passiflora (Passion fruit)	63	5m x 5m
3	Adansonia digitata (Baobab)	10	5m x 5m
4	Sclerocarya birrea (Moringa)	30	5m x 5m
5	Uapaca kirkiana (Masuku)	60	5m x 5m
6	Passiflora (Passion fruit)	59	5m x 5m
7	Mexican apple	18	5m x 5m
8	Jack fruit	✓ 6	5m x 5m
9	Gliricidia	✓ 36	5m x 5m
10	Flacouratia indica (Garden)	20	5m x 5m
11	Acacia Senegalensis (Moringa)	10	5m x 5m

Fertiliser trees: While slow-growing indigenous species such as *Faidherbia albida* (apple-ring thorn tree / msangu) could be used to improve soil fertility, faster-growing ‘fertiliser trees’ were seen to increase immediate benefits and hence encourage farmers to move away from slash and burn practices. In experimental plots at Makoka, various strategies were being investigated to establish the optimal use of fertiliser trees. For example, *Tephrosia* is planted, after a year it is ploughed into the ground, and then maize is planted. In another experiment which has been running since 1992, *Gliricidia* is planted in every second furrow, pruned, and then the prunings are incorporated into the furrows. The plants are allowed to coppice and the maize is planted in the tops of the ridges (see Figure 4.6).

Figure 4.6: Fertility tree experiments at Makoka Agricultural Research Station, Malawi.



Gliricidia sepium inter-planted with maize was observed at all of the school sites visited. In rural eastern Zambia, an innovative ‘biomass pit’ – in which nitrogen-rich *Gliricidia* leaves and soil were mixed – had been in use. Some Multi-Purpose Leguminous Tree Species (MPLTS) were also employed. For example, the river bean tree (*Sesbania sesban*) is a fertiliser tree, and the non-indigenous lead tree (*Leucaena leucocephala*)³⁹ is used to feed cattle.⁴⁰ In Zambia, other MPLTS were also used:

RK: ... *Leucaena mycophylla* [a tall non-indigenous tree which coppices easily]. ... when you cut them, they regenerate... it produces nice long poles which they use for making the roofing and even for firewood. [and]... a good soil fertility tree. (Katanga pers comm June 17, 2006)

Some interviewees appeared to be more familiar with the ‘Sasakawa planting method’⁴¹ to improve maize yields (Mmambo pers comm June 9, 2006). It also seemed that chemical fertiliser application continued to receive support, even from organisations that actively promoted agroforestry technologies (Mawonga pers comm June 12, 2006). When the researcher asked teachers at a primary school if they had considered improving soil fertility with something other than chemical fertiliser, the response was negative, with the explanation that they could get fertiliser from ICRAF (Ndila pers comm June 8, 2006).

The regional FoF coordinator believed there was a gradual shift in agricultural practices as new and more sustainable technologies were introduced (Chakeredza pers comm May 25, 2006). A teacher expressed the desire to shift away from a reliance on chemical fertilisers because of expense and human health implications (Phiri-c pers comm June 16, 2006). The initial shift to agroforestry required some effort, as well as a change in practice.

... you have a fertiliser bank which you can harvest any time... a lot of work will come in the first year. ... In the second year you don’t weed, you just put a fire break, because the trees would have

³⁹ The researcher found out later that *Leucaena leucocephala* is denoted in South Africa as a CARA category II invasive alien plant. According to the Convention on Biodiversity and the Conservation of Agricultural Resources Act (CARA), there are three designated categories of invasive alien plants (the official UN terminology). Drawing on Murray and Powell (ca 2002: 1), it is illegal to grow category 1 plants (dangerous weeds), illegal to grow category 2 plants without a permit, and existing category 3 plants may be left in place but should not be replanted.

⁴⁰ If consumed in large quantities, *L. leucocephala* can be poisonous to livestock (Murray & Powell, ca 2002: 91).

⁴¹ According to Hesser (2006: 156-167), Sasakawa-Global 2000 is an initiative that was established to support increased food production in 15 Sub-Saharan African countries, and has already benefited several million farmers. Dr Norman E. Borlaug became the President of the Sasakawa Africa Association in 1986, and leader of the Sasakawa-Global 2000 agricultural program in sub-Saharan Africa together with former US President, Jimmy Carter (Borlaug LEAP nd).

grown already vigorously ... you don't need to worry about where you are going to get the money to get your fertiliser... it gives you peace of mind! (Katanga pers comm June 17, 2006)

4.2.2.4 Teaching and learning practices

Examples of teaching and learning practices in Malawi are provided below, as well as in Appendix I. As noted in 4.1.2.3, it is beyond the scope of this thesis to discuss in detail.

Collaborative learning: Some collaborative engagement between locals and international support agencies with regard to the introduction of new practices was apparent. Similarly, there were plans to adopt a stronger collaborative learning approach that involved students working together with farmers in the surrounding area.

... there will be a good communication with the surrounding farmers... [but] we have to be careful... we need to solve their problems *with* them. ... So there will be a good linkage between the community around and students. (Walasi pers comm June 13, 2006)

Community-based education: In some parts of eastern Zambia, agroforestry technologies were taught in communities and reinforced through the schools (Phiri-c pers comm June 16, 2006). This parallel approach increased the likelihood of parental support for children who wished to practice the new agroforestry technologies they had learned at school.

Field visits: A field day at Makoka, attended by 200 farmers, provided opportunities to compare agroforestry and non-agroforestry plots (Gomonda pers comm June 13, 2006). Such field visits aimed to show new technologies to 'laggers' who wait and see if 'early adopters' are successful before following suit (Walasi pers comm June 12, 2006). In the Thyolo district, scholars occasionally visit the Mapanga Training Centre and plant nursery (see Figure 4.7) where they observe and engage in hands-on agroforestry practices (Kachulu pers comm June 6, 2006).



Figure 4.7: Agroforestry nursery in the Thyolo district, southern Malawi.

Demonstrations: Field visits are often linked to demonstrations – an approach that was reported to be the most effective way of disseminating agroforestry technologies in the wider community. It was emphasised that role-modelling is essential to sensitise the community to the need for wise land use practices. Similarly, it could demonstrate the potential to become self-sufficient.

So first of all we had to show the people that we are doing agriculture... we stopped buying maize some time back. ... And last year we were even providing maize to... these orphan care nursery schools... (Mawonga pers comm June 13, 2006)

Experiential learning: The Malawi College of Forestry reported an intention to include a stronger practical focus in its curriculum, such as planting soil fertility trees and indigenous fruit-bearing trees (Serganimahanje pers comm May 24, 2006). In schools, children were actively involved in planting fruit trees, inter-planting maize with fertiliser trees, and making fruit juice. A practical, hands-on learning approach at a tertiary institution was reported to be of value:

... in Thyolo in the tea estates... they have got two of our students... and they are saying they are performing better. ... our [students] are very good because we stress very much in practical. (Mawonga pers comm June 12, 2006)

Questions and answers: It was reported that questions arise during demonstrations to the community (Chikole, pers. comm. June 13, 2006). It was not clarified to what extent participants contribute, or whether the demonstrator controls the nature of the discussion.

Project-based learning and reporting: A student research project is a valuable part of the TVP course (Mawonga pers comm June 12, 2006). For example, a recent graduate had researched the adoption of agroforestry in the surrounding community.

I had to do my research on my own. So I decided to study the adoption of agroforestry technologies. So I was emphasising much on mixed cropping of *Gliricidia* with maize. So I had to go to ICRAF and do my research. (Gomonda pers comm June 13, 2006)

Lectures: It was reported that during classes, the focus of learning was mainly theoretical at St Anthony Girls' Primary School, where classes were exceptionally large (Nagoli pers comm June 8, 2006). Two children at another primary school reported that they would sometimes have group discussions then report back to the teacher (Mothelo & Kafotokoza pers comm June 9, 2006).

After-school activities: It appeared that food growing and related activities at participating primary schools were taking place after school hours, mainly through agriculture clubs or wildlife clubs, covering topics such as food production or conservation of resources. Similarly, Malawi College of Forestry students reportedly conducted after-school 'awareness education' with teachers and scholars at five nearby schools (Serganimahanje pers comm May 24, 2006).

Mainstream curriculum concerns: Evidence of curriculum links to agroforestry-related activities is limited as it was not possible to observe any regular school lessons. Primary school teachers reported linking tree-planting and other agroforestry activities to school agriculture lessons, while juice-making activities could be linked to home economics lessons. Similarly, reference is made to practical activities while in class, mainly home economics, science, agriculture, and social studies (Lindani *et al* pers comm May 25, 2006). It was suggested that juice-making could be linked to English classes, in terms of communication about activities, and to religious education,

in terms of the ‘creation story’. Links to mathematics or science were also practicable, as suggested by one teacher (Ngaiyaye pers comm June 7, 2006).

By way of comparison, teachers in Zambia did not face the challenge of creating links between agriculture and various mainstream subjects at school. A practical agricultural studies component, called the Production Unit (PU), had been part of their curriculum for some time (Phiri-c pers comm June 16, 2006). The PU requires scholars to work in the garden one afternoon a week, between 14h00 and 16h30 (Zulu & Banda pers comm June 16, 2006). Two scholars reported that their garden-based activities are similar to their duties at home (Nkhuwa & Phiri-d pers comm June 16, 2006). There is no formal assessment of garden-based activities (Katanga pers comm June 17, 2006).

Contextualisation: As noted in 2.2.1, ICRAF aims to promote education that draws on contextually relevant learning support materials. For example, when learning how to calculate the height of an object, the use of local resources such as a leaning tree (instead of reference to the ‘leaning tower of Pisa’) provides examples that are familiar to local children (Chakeredza pers comm May 25, 2006; Jacquet de Haveskercke pers comm June 14, 2006). It was asserted that the principles of agroforestry should be introduced to a community in the context of what they had traditionally practiced, and then their understanding could be extended by drawing additional applications of agroforestry to their attention (Mawonga, pers. comm. June 13, 2006). For example, villagers had previously been using ‘dirigi’⁴² as a poison to catch fish, but had come to realise that because it is leguminous, the plant could also be used as a fertility tree.

In-service training/workshops: In the eastern part of Zambia, a “training workshop” for teachers and staff of an NGO, Plan⁴³ had been organised (Katanga pers comm June 17, 2006). It covered agroforestry technology, contextualised teaching and learning, and demonstration plots (Jacquet de Haveskercke pers comm June 14, 2006).

4.2.2.5 Teaching and learning resources

Resources for teaching and learning were limited by western standards, but in other respects reflected the potential of the community to strengthen educational processes. Examples are provided below, as well as in Appendix I.

⁴² Dirigi was identified by an agriculture instructor as *Tephrosia virgiliae* and *T.candida* (Walasi pers comm June 13, 2006). Various online plant databases appear to conflate *T.virgiliae* with *T.vogelli* or *T.purpurea* var. *sericea* (originally *Mundulea sericea*). It is assumed that the interviewee was referring to fish poison bean / Vogel's tephrosia. The researcher was unable to establish whether *T.virgiliae*, *T.vogelli* and *T.candida* have been merged.

⁴³ Plan International is a child-centred, community-based organisation, which aims to facilitate access to good education, health, water and sanitation for as many children as possible (Jacquet de Haveskercke & Mitti, pers. comm. June 14, 2006). It was stated at <http://www.fosterparentsplan.ca/AboutPlan/default.aspx> that, “We work in 45 developing countries where, worldwide, our long-term community programs benefit 1.3 million children and impact the lives of 13 million people. Plan is non-religious, non-political and has no government affiliations.”

Conventional schools: Schools visited in Malawi are relatively under-resourced government funded institutions. Some schools are privately run with additional foreign support.

Teachers: Teachers may qualify by studying for a Teacher's Certificate but, in some cases, they are permitted to start teaching in a school without any formal qualification (Ngaiyaye pers comm June 7, 2006). A rural primary school served as an example of how the projected teacher to scholar ratio of one to sixty is exceeded, often by double the number (Kachingwe pers comm June 6, 2006). A high turnover of teachers in rural areas was also reported, as they are reluctant to live without modern conveniences (Kachulu pers comm June 6, 2006). The ratio in tertiary training institutions is more manageable, for example, at the TVP there were 20 students to one lecturer (Walasi pers comm June 12, 2006).

Written/visual materials: In all cases observed, there were very few books or posters in the schools, and simple items such as paper and pencils were described as 'teaching and learning materials' (Mlelemba *et al* pers comm May 26, 2006). In some cases primary schools were reported to have no library, and only teachers have the use of table, chair and textbooks (Samona pers comm June 5, 2006). A scholar reported that he received eight exercise books per term, and paid for his own pen (*ibid*). The researcher was unable to visit a secondary school's 'improvised' library as the teacher with a key to its door was absent at the time.

The researcher noted that the *Action* magazine for environmental health education in schools is widely distributed in the region. One of its aims is to contextualise learning and teaching (Jacquet de Haveskercke pers comm June 14, 2006). ICRAF collaborated with *Action* to produce a magazine on agroforestry, *Farming with Trees* (Jacquet de Haveskercke 2006: 5). This issue draws attention to managing fruit trees, processing and marketing produce, animals and agroforestry (fodder and live fences), and soil fertility.

Study groups: A scholar described how he participated in an inter-school study group on weekends. In this way, he and his peers could glean additional support from each other (Masowa pers comm June 6, 2008).

Traditional leaders: An agriculture instructor believed that it was futile to impose solutions on the community without first consulting traditional community leaders (Walasi pers comm June 13, 2006). His former student confirmed the need to have traditional leaders onboard.

But with us, in terms of implementing farming technologies, we should go the chiefs because... they are telling the people, saying that we will come here and we will give you later this... the chief has to be convinced first... (Chikole pers comm June 13, 2006)

Community members: Community-based knowledge and practices did not appear to play a role in teaching and learning about agroforestry technologies. A teacher reported that volunteers from

the community used to come to their school to teach the children about local cultural practices, but this was no longer the case. He explained their thinking:

... they are calling us to teach this! ... [The teachers] are getting money [but] we [community members] don't get anything – why are they calling us? (Ngaiyaye pers comm June 7, 2006)

Vocational institutions: A vocational element was central to the courses at a tertiary institution, including agriculture. The TVP graduates were reported to be in demand because of their practical skills (Mawonga pers comm June 13, 2006; Walasi pers comm June 12, 2006).

Partner institutions: Educators from partner organisations are involved in teaching and learning at the TVP. For example, the Extension Planning Areas office, which provides community extension services, teaches the module on extension methods – also referred to as 'rural sociology' (Mawonga pers comm June 13, 2006; Chikole pers comm June 13, 2006).

... our curriculum was certified by Natural Resources College. And we have... ICRAF, Makoka Research Station. ... Thondwe Extension Planning Area... EPA. ... there's a very strong collaboration between Thondwe Village Polytechnic and these institutions. So sometimes people from Thondwe EPA come here to teach, as part-time lecturers... (Mawonga pers comm June 13, 2006)

The NGO, Plan, seemed to inspire communities in eastern Zambia to plant maize and vegetables (Njobvu & Thole pers comm June 16, 2006). It was unclear whether this was linked to agroforestry or not.

Farmer Learning Resource Centres: ANAFE began by "selling the concept" of agroforestry to three pilot schools – which were identified as 'Farmer Learning Resource Centres' (Chakeredza pers comm May 25, 2006). The school agriculture or wildlife clubs are engaged in (i) value addition and marketing (initially of mangoes), (ii) planting passion fruit and grafted mango trees and (iii) mixed intercropping (*Gliricidia* with maize) (Chakeredza pers comm June 1, 2006). Agroforestry technologies would be transferred to rural communities by youth returning to live and work in their villages (Chakeredza pers comm June 1, 2006).

Agroforestry demonstration plots: Demonstration plots were not yet fully established at the time of the researcher's visit because the Farmers of the Future initiative was in an early pilot phase in Malawi. It was hoped that schools and their 'demonstration plots' would serve as a channel for introducing agroforestry to the wider community. In Zimbabwe and Tanzania, demonstration plots were found to serve as a valuable conduit for establishing links with communities (Jacquet de Haveskercke pers comm June 14, 2006). However, if teachers lack the capacity to explain the principles of agroforestry, demonstration plots have little value (*ibid*). It was hoped that school-community links could remedy this:

...we did a lot of analysis of the different approaches in 2004, and found that the school-community links is one of the ways of scaling up agroforestry technologies. If we have these

demonstration plots in schools, with all this capacity building, we can actually use that to get the communities to adopt agroforestry. (Mitti pers comm June 14, 2006)

Agroforestry nurseries: A plant nursery at Makoka was well established with indigenous and introduced fruit tree and fertiliser tree species such as baobab, marula, mango, wild medlar, bus-sea, white hoary pea and Mexican lilac (see Appendix E). At the time of the researcher's visit, the TVP was developing a new agroforestry plant propagation site, with a potting shed and grafting chambers. The Mapanga CBO propagated a diversity of tree seedlings in addition to providing agricultural training at its training centre. Their policy was to provide each CBO member with 120 tree seedlings of her/his choice on an annual basis. The CBO had four community gardens and 11 tree nurseries which provided seedlings for free to local senior citizens and schools, and sold seedlings to other organisations.

Special events: Interviewees expressed the desire for school open days attended by the community, with activities like song, dance and theatre, to demonstrate technologies and teach nursery management skills (Chakeredza pers comm June 12, 2006). The TVP planned to invite village headmen – “the people who matter in the villages” – to an open day event. A rally organised by the Wildlife and Environment Society of Malawi took place during the researcher's visit. This event was attended by a large number of schools (Figure 4.8).

Figure 4.8: A Wildlife and Environment Society school rally on June 10, 2006.



Radio: Radio was perceived to be the best way to disseminate information or advertise field day events to the community (Lindani pers comm June 9, 2006; Chikole pers comm June 13, 2006). It was reportedly also used to support classroom-based learning (Kachulu pers comm June 6, 2006). Other respondents were sceptical, citing the lack of radios and the cost of batteries as limiting factors.

Equipment: Processing equipment supplied by support institutions was used in schools for practical lessons in fruit juice-making. Most Malawians cannot afford to buy such equipment (Walasi pers comm June 12, 2006). The researcher noted that fruit desiccation is not costly; it may be sliced into smaller pieces and placed in a hot, dry place.

TALULAR: A teacher listed everyday objects that can be used to support learning, for example, a practical demonstration on evaporation made use of firewood, water and a pot (Lindani pers comm June 9, 2006). This was referred to as TALULAR: Teaching And Learning Using Locally Available Resources (Jacquet de Haveskercke pers comm June 14, 2006).

Expert researchers: According to Chakeredza (pers comm May 25; June 1, 2006), most of the agroforestry information used in training is sourced from research conducted by ICRAF-SA, ANAFE and agricultural research stations. All schools visited cited ICRAF as the primary source of information for agroforestry teaching and learning. A graduate believed that the incorporation of agroforestry into the TVP agriculture curriculum in 2003 was influenced by ICRAF (Gomonda pers comm June 13, 2006).

Agricultural ‘extensionists’: Several interviewees asserted that a key challenge in Malawi is the lack of extension workers to disseminate agricultural and agroforestry technologies (Walasi pers comm June 12, 2006; Wembere pers comm June 22, 2006). Government extension workers apparently provide initial input but stop visiting once an agricultural project is ‘on track’ (Mwala pers comm June 5, 2006). Interviewees commented on the need for more agricultural training institutions in Malawi.

Agriculture is serving a lot of important roles – serving as foreign exchange, it’s a source of money, a source of food – essential things. But look where you can get trained! We have got few [two or three] institutions. (Walasi pers comm June 13, 2006)

Primary school children were considered to be future ‘extensionists’ – as well as ‘farmers of the future’ – a point that will be discussed further in 4.2.2.7.

Student researchers: Student researchers at the TVP may serve as a source of information for other organisations:

So sometimes these institutions come here to read whatever the students have prepared, and whenever they see something much important, they... try and photocopy, get the information. So ... we are also providing them with [research] information. (Mawonga pers comm June 13, 2006)

Foreign workers: With the presence of many different NGOs and foreign aid-funded projects in Malawi, foreigners with various forms of knowledge and skills were in evidence. For example, one of the TVP agriculture lecturers came from Italy. However, it was reported that some community members are reluctant to visit centres where foreigners work, as they see it as a place “only for *azungu*... meaning Europeans” (Mawonga pers comm June 12, 2006). During a discussion regarding the role of trust, collaboration and sharing of knowledge in social change, *fear* was identified as a limiting factor in community development:

... the communities... they’ve got access to come here, to have some technologies... [but] if they are fearing us, they cannot develop themselves. So, we need to... eliminate this kind of fearing environment, whereby there will be some collaboration. (Walasi pers comm June 13, 2006)

In pointing out the infrastructural decay in many countries on the continent, a community leader with a well developed sense of self-efficacy asserted, “Malawi needs white people” (Andile pers comm June 6, 2006). This comment did not appear to reflect a sense of dependency on foreign aid, but rather an appreciation of the complementarity of diverse aptitudes and skills.

4.2.2.6 Physical and financial support and resources

Resources and support that enable food growing and educational activities varied in sites in Malawi. These and the impact of dependency are discussed briefly here, with additional examples provided in Appendix I.

Land and natural resources: Diminishing natural resources in the south eastern region of Malawi was evident. The researcher observed how large areas of indigenous vegetation had been cleared, presumably as a result of ongoing firewood collection or to make way for conventional agriculture. The Farmers of the Future intended to respond to the country’s increasing reliance on farming by placing an emphasis on agroforestry, which is considered to be a form of agricultural intensification. However, as noted in 2.2.1.1, technological improvements will not necessarily lead to agricultural intensification, and it is not clear whether there is sufficient arable land to accommodate the food growing activities of a growing population.

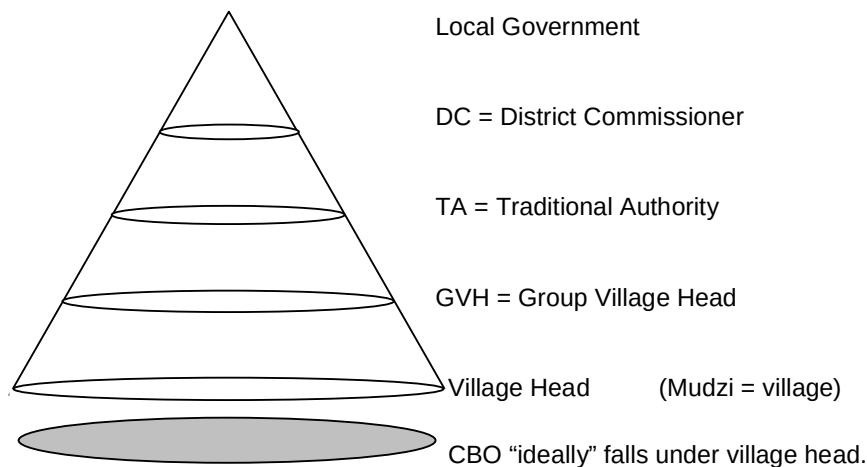


Figure 4.9: Diagrammatic representation of authority structures in the southern part of Malawi.

Traditional structures: It was reported that corrupt village heads accept government-issued agricultural coupons on behalf of villagers or non-existent people and pass these on to family and friends (Mwala pers comm June 5, 2006). By contrast, the researcher observed a community-based organisation managing the distribution of aid and gathering evidence (photograph and sig-

nature of each recipient) for the donor. A diagrammatic representation of the authority structure system in the southern part of Malawi is presented in Figure 4.9.

Government-funded education institutions: The Malawi College of Forestry was committed to conducting a survey, together with Bunda College, on “teachers’ training needs, opportunities and constraints faced when establishing a school garden, and links schools have with neighbouring communities” (Jacquet de Haveskercke 2006: 8). The Farmers of the Future contact person at the college was unaware of this SA-RAFT project, presumably as he had recently taken over this responsibility from a colleague who died in 2005 (Mtambo pers comm June 26, 2006). At the time of the researcher’s visit (May 24, 2006) students reported that they had not yet begun working with local communities.

Private partners/donors/volunteers: A CBO in the rural Thyolo district was reported to have a good working relationship with the owner of the neighbouring tea estate, who served as a trustee (Zuze pers comm June 5, 2006). It was asserted that active promotion of partnerships stimulated the exchange of innovative ideas and practices (*ibid*). An example is provided in Appendix V.

‘Foster parents’ in the USA provide sponsorship for African children through Plan International. The funds are pooled to fund infrastructural development that will be of benefit not only to the children but also the community in which they live, for example, hospitals and schools (Jacquet de Haveskercke & Mitti pers comm June 14, 2006).

NPOs/NGOs/CBOs: Principal donors whose funding for the Farmers of the Future programme was channelled through ICRAF-SA, had expectations that placed demands on its rollout. For example, the Canadian CIDA told FoF coordinators in Zimbabwe that “by 2006 you will reach 400,000 farmers” (Jacquet de Haveskercke pers comm June 14, 2006). This may have reduced the quality of interactions with participants and follow-up support. A similar programme in Mozambique, called Junior Farmer Field Schools, was reported to receive support from the Food and Agriculture Organization of the United Nations (FAO) (Chakeredza, pers. comm. May 25, 2006). The Mapanga CBO obtained most of its funding from the Malawian Government, Malawi Environmental Endowment Trust (MEET) and Masaf III, but had a number of other partners such as the EU-managed Africare and Oxfam, and efforts were being made to initiate a relationship with World Vision. The CBO had also received prize money in 2005 for the Stanbic Best CBO Award. Their relationship with ICRAF reportedly developed as a result of a visit from COMPASS, a USAID community participatory group, in 2003. There was some evidence of professional jealousy and discontent amongst community members who expected to receive payment for their contributions to the CBO.

Plan Zambia was reported to assist schools by buying and distributing text books and teachers' guides from publishers approved by the Ministry of Education (Phiri-c pers comm June 16, 2006). The researcher observed that contributions from international donors are not always appropriate. For example, a well-intended delivery of books without first establishing the school's requirements caused some tension. Most of the books were not suited to the course content or local context.

Dependency syndrome: Evidence of dependency in Malawi may be associated with large amounts of aid for so-called 'development' initiatives.

Of course we know, considering our mentality, our Malawian mentality, whenever we'll be embarking on that programme, people will be thinking that we will even be assisting them with [handouts]. (Mawonga pers comm June 13, 2006)

This was also apparent to some extent in the Chadiza district in eastern Zambia where scholars (interpreted by a teacher) described a school feeding programme. HEPS, a porridge-like blend of ground maize and soya donated by Denmark,⁴⁴ is cooked by parents at the school (Njobvu & Thole pers comm June 16, 2006). The children noted how hunger prevented them from concentrating on their schoolwork prior to feeding programme, because they only had breakfast (*ibid*). When the researcher suggested they bring lunch from home, they said it was not needed because donors provided their lunch at school (Njobvu & Thole pers comm June 16, 2006).

This appears to be linked to a sense of disempowerment. A child's comment, "I want poverty to stop in Malawi" (Kafotokoza pers comm June 9, 2006), reflects the need for educational interventions that empower youth to take charge of their lives and embrace new social and cultural practices that promote food security and environmental sustainability.

Similarly, Akinnifesi *et al* (2004: 2) asserted: "in the long term, farmers need a way to break out of the cycle of dependence on food aid and fertilizer subsidies". The notion that Africa can take responsibility for itself was explored with two primary school teachers:

... and then I put my equally genuine question to them: 'can Africa realise its potential without Europeans – and that includes without their funding and expertise'... I could see them blink with surprise [at the directness of the question], but once they had digested the challenge, Mmambo said he thought it was possible. And why not, I ask myself. Why should all of Africa crumble and decay and cease to function? Why should Africa wait for handouts every time something breaks and has to be fixed? If Africa can simply get used to the idea of the buck stopping HERE, then Africa should get off its butt and deal with its problems before they snowball into yet another disaster in need of western aid. And Africa should also stop allowing itself to be exploited, so that it

⁴⁴ "World Food Programme (WFP)-assisted programmes offer the option of using fortified blended foods such as corn-soy blend or wheat-soy blend that provide at least two-thirds of the daily micronutrient requirements of young children. Locally manufactured blended foods with similar quantities of micronutrients are available in many countries, for example, FAMIX in Ethiopia, HEPS in Zambia..." (retrieved August 26, 2006, from <http://www.unesco.org/education/>).

doesn't end up being a permanent underdog, belly-crawling and selling its natural resources dirt cheap to the west (or north, if you prefer). (Köhly, research journal, June 9, 2006)

4.2.2.7 Intergenerational factors

It was not possible to assess the extent to which new agroforestry technologies had spread into communities as a result of schools in Malawi. Findings discussed here point to some of the intergenerational factors that may play a role. Additional examples are supplied in Appendix I. Generally, it seems that educational institutions linked to ICRAF were optimistic that agroforestry technologies would be disseminated more widely through children and youth.

... we were training farmers directly ourselves, training NGOs, who then train their farmers, we were working with the national extension services, working with tertiary education institutions... and by doing all of that, we then realised we could also work with schools, work through schools to reach communities... And that's how we then really picked up the idea of Farmers of the Future in the region. (Jacquet de Haveskercke pers comm June 14, 2006)

School drawing from community: No community members were involved in mentoring agriculture students at the TVP (Walasi pers comm June 12, 2006). Likewise, no learning interactions between students and casual labour during harvesting periods were reported (Gomonda pers comm June 13, 2006). There was little or no parental involvement in establishing and maintaining school gardens or in related learning activities in primary schools (Nagoli pers comm June 8, 2006; Mothelo & Kafotokoza pers comm June 9, 2006; Lindani & Mmambo pers comm June 9, 2006). As noted in 4.2.2.5, resistance among community members to contribute to school learning was linked to their expectation of payment (Ngaiyaye pers comm June 7, 2006).

Community drawing from school: If community members approached a school to find out how to make juice or propagate fruit plants, a teacher reported that he would "just send them to ICRAF people", explaining that "those are the ones who do the propagation... we just receive the seedlings" (Obami pers comm June 9, 2006). The researcher noted that teachers and local farmers were growing and drying paprika in the grounds of a primary school to generate extra income. This project did not involve or benefit the school children in any way (Ndila & Obami pers comm June 9, 2006).

Conflicts: Interactions between schools and communities appear to be discordant or antagonistic at times. For example, "people... like to pick other people's produce without permission" (Ngaiyaye pers comm June 7, 2006). In another case, a school planted a woodlot on communal land and the affected community complained that the school had taken too much land (Katanga pers comm May 23, 2006). In other cases, roaming livestock cause damage to school gardens.

Children drawing from adults: In a rural area, most of the intergenerational interactions appeared to be adult-initiated. In the Mapanga CBO, adult members were involved on a voluntary

basis in teaching orphans in a community-based Child Care Centre (Chibwana pers comm June 5, 2006). The researcher noted that the ‘youth coordinator’ of the CBO was an older man. A 20-year old scholar in eastern Zambia described how parents warn children that the “ground will be made bare” if they cut down or burn trees and do not plant more (Phiri-d pers comm June 16, 2006).

Adults drawing from children: It was apparent that teachers accepted the idea that agroforestry knowledge learned by children at school would be transferred to parents or carers. For example:

... [parents] can’t go there to the ICRAF to attend the workshops, but they can learn more from their children. Because the ICRAF people came here [to school], and teach us... and also teach our pupils... and the children once they go in their homes, they teach their parents. (Nagoli pers comm June 8, 2006)

However, it seemed that in the Malawian socio-cultural context, a child’s opinion is generally not valued; “maybe at only 20 years of age... the parents would take them seriously” (Lufeyo pers comm June 6, 2006). A teacher confirmed that children’s contributions at home followed patterns established by parents, such as watering flower gardens or weeding in the fields (Nagoli pers comm June 8, 2006). While children were viewed as subordinate to adults, a teacher suggested that links could still be established between school and community when children approached parents for permission to engage in school-based agroforestry activities.

When we ask the pupils to do something, they have to consult their parents. So, when they consult their parents, it means we are together. It goes round and round. Because the pupils come from the community. (Lindani pers comm June 9, 2006)

A similar finding was reported by De Keyser (2005: 44), who suggested that although children may not be able to change their parents’ mentality, there is a chance that regular contact with the children’s teachers or head teacher can have a positive influence on parents’ practices, especially through primary schools where there tends to be closer parental involvement.

Adults drawing from young adults: While educational efforts in primary schools target ‘future farmers’, efforts in tertiary institutions – where young adults⁴⁵ are in attendance – may speed up the ‘multiplier effect’. Agriculture graduates from a village polytechnic were reported to perform well at work and had the capacity to disseminate agroforestry skills (Mawonga pers comm June 13, 2006). Their efficacy may be influenced in part by the fact that young adults’ opinions are more acceptable. Furthermore, they learn extension methods in the TVP ‘rural sociology’ course (Gomonda pers comm June 13, 2006).

⁴⁵ In Malawi, it seems that mature adults are not encouraged to pursue further study. The principal of a forestry college explained that they wanted to reduce the student admission age, as they wanted to invest in students who would be productive in the field for a longer period of time (Serganimahanje pers comm May 24, 2006).

Summing up: It is not clear to what extent new agroforestry knowledge and skills in the community are acquired via school-going children, or learned directly from agroforestry experts and agricultural extension workers, or as a result of observing practices on demonstration plots. The condition most likely to promote intergenerational knowledge exchange seems to be the serving of mutual interests. This was confirmed by an agroforestry development facilitator in eastern Zambia, who chose to focus on school-community links in a forthcoming workshop with teachers (Katanga pers comm June 17, 2006). In light of the findings, more direct engagement with mature adults, using holistic educational approaches that integrate communities with schools, may require closer attention. This will be explored further in Chapter 5.

4.2.2.8 Aspects of environmental learning

The overall impact of school-community links, or the FoF initiative, on environmental learning in Malawi was not established with any certainty. Some responses in Malawi indicate that understanding of links between sustainable agricultural practices, food, nutrition and health is tenuous. It was asserted that older people are resistant to the idea of planting trees to restore soil fertility because they lack education and agroforestry does not produce instant results (Katanga pers comm June 17, 2006; Phiri-c pers comm June 16, 2006). However, it is apparent that many older people have been implementing aspects of agroforestry – for example, growing the leguminous Pigeon pea (*Cajanus cajan*) – but without knowledge of its principles. It was suggested that school children are in a better position to learn and understand complex principles such as nitrogen-fixing (Phiri-b pers comm June 16, 2006). However, some teachers also showed limited understanding of agroforestry trees and their role in soil fertility.

Generally it seems that environmental learning is supported by outside expertise and mediation. A young scholar in a rural, under-serviced community in Malawi reported via a translator that most of what they learned about the environment and agroforestry took place outside school (Lamoson & Zuze pers comm June 5, 2006). The explanation given for this was that they were obliged to follow the government-designed syllabus at primary school (*ibid*). He reported that he learned about planting trees on deforested mountainsides through the CBO.

... people are now aware that they should plant more trees for the environment, income-generating, firewood, and rain harvest... because no trees, no rain... so, trees are life... And if you have got many trees in this country, the rain... will fall... and the people get more crops. (Lamoson & Zuze pers comm June 5, 2006)

Similarly, teachers reported that ICRAF taught them to replant trees in order to “get enough rain” and increase their harvest (Lindani & Mmambo pers comm June 9, 2006). The researcher noted the choice of Australian silky oaks (*Grevillia robusta*) for a tree-planting ceremony in a rural area. According to the CGIAR (1995: np), inter-cropping with this species can increase the ab-

sorption of rainfall from 30% to 76%. Sensitivity to water conservation concerns was evident in various cases. For example, at a tertiary agricultural training institution, sunken seed beds retain moisture for a longer period and thus require less watering. The TVP also recognised that *Eucalyptus* trees take up excessive amounts of ground water and reduce soil fertility, and resolved to remove all specimens on their property.

By contrast, a rural community group propagated and distributed seedlings of *Eucalyptus* sp,⁴⁶ in addition to various indigenous trees. The researcher also observed their release of soiled water from a dam into a river, instead of onto agricultural fields. They appeared to be ignorant of the catastrophic impact of high nutrient loads and particulate matter on water quality, aquatic life forms and ecosystem functions. They also appeared to lack the ability to recognise its potential to improve soil fertility and hence crop yields. This is discussed further in 5.1.1.1.

In a remote district in eastern Zambia, a young school girl appeared to have a deep concern for the quality of the environment and how it would affect her community. She had observed how cutting trees and burning has resulted in bare ground, and expressed concern that soil fertility had been reduced, resulting in poor crop yields (Nkhuwa pers comm June 16, 2006). A peer added that their parents “know these things” because “they know what happens in other areas; so people are teaching each other” (Phiri-d pers comm June 16, 2006). He also asserted that “even with money, things are expensive. It’s better to use own products to develop own country”, explaining that “trees from other countries cost more money”. He quoted his grandmother: “you will suffer if you don’t care for these trees” (*ibid*).

4.3 New York, USA

Perhaps the hope, then, lies in a fuller understanding of what we are reacting to, and a healthier, more humane sense of what we’d rather embrace, including seemingly antiquated notions of honesty, humility, collectivism, ethical conduct and moderation in material possessions. Essential to this process, as psychologists like Levine suggest, is also developing a more finely tuned awareness of the role narcissism plays in society. When complete extraction is not possible, then boundary setting is a necessary practice for preserving a healthy, socially and politically-engaged life (Silja J A Talvi 2006: np).

4.3.1 Contextual factors – New York, USA

New York State on the eastern seaboard of the USA has large areas of moist temperate forest. The forest economy includes products like maple syrup from the sugar maple tree (*Acer saccharum*). In upstate (northern) New York, soil is very acidic (lower than pH 5.6). Extreme droughts are rare and rainfall throughout the year supports crop and vegetable growing, although there is

⁴⁶ *Eucalyptus* sp originates in Australia, and is a popular woodlot tree throughout southern Africa. It is known to diminish groundwater significantly (the DWAF Working for Water programme estimates that one tree will on average take up and transpire about 40-50 litres of water per day).

generally less rain during winter (New York State Climate Office nd: np). Agricultural land is used for growing maize (USA: corn), lucerne (alfalfa), fruit trees, grapes and vegetables, as well as livestock (meat and dairy). Many ‘farms’ in NY State appear to be relatively small, and land-owners may commute large distances to work in urban centres such as Ithaca, where Cornell University is located. As a result of this ‘country-living’ trend, demand for land is creating a subtle pressure on the countryside. As in Malawi, population growth in the USA does not appear to be a concern. American society tends to excel in “technological innovations [and] political strategies of compromise” (West quoted in Denzin 1992: 151-152).



Figure 4.10: Map of the United States of America – including New York State in the north east.

There are about 400 farmers’ markets in the state, of which 40 to 50 are situated in greater New York City (Ameroso pers comm August 2, 2006).⁴⁷ East New York (ENY) – which is now completely built up – was considered in the past to be the ‘bread basket’ of the USA, growing more vegetables than any other area (*ibid*). In such urbanised areas, the soil is covered by impervious surfaces such as concrete or tar so there is an increased tendency to flooding even after moderate rainfalls (New York State Climate Office nd: np). Drug-related crime in the 1960s triggered the so-called ‘white flight’, when many homes in ENY were abandoned (Ameroso pers comm August 2, 2006). Many people apparently “burnt down their buildings to collect the insurance money”, resulting in large numbers of vacant lots which subsequently became “the largest concentration of community gardens throughout New York City” (Braverman pers comm September 21, 2006). Urban agriculture is the main focus of East New York Farms! a project of the United

⁴⁷ At the same time, there were concerns that the number of farmers countrywide had decreased to 1% of the population (Borlaug, October 18, 2006).

Community Centre (UCC), which also provides support to senior gardeners in the community through its after-school youth internship programme (*ibid*).

In the neighbouring area of South Brooklyn, Added Value was established in 2001 under the leadership of two former youth counsellors whose vision was to “build a sustainable future through youth empowerment and urban agriculture” (Added Value 2006). In 2003, the non-profit organisation developed the Red Hook Community Farm on top of three quarters of an acre of bituminised (tarred) public recreation area.⁴⁸ The project works with local schools that are at times under-served and dysfunctional, creating opportunities for youth to engage with their community through a socially responsible urban farming enterprise, and gain new knowledge and skills. The programme is so popular that up to 50 school children may be seen at one time working on the urban farm (Loomis pers comm December 13, 2006). Other activities include farmers’ markets and computer-based work.

In the Bronx, fresh produce is distributed throughout NYC from the Hunt’s Point wholesale market. The south Bronx and east Harlem are also major transportation hubs, and the asthma hot-spots of the USA (Figueroa pers comm August 4, 2006). ‘Garden 8’, a community garden in Harlem, was developed following the bulldozing of an urban subsistence farm to make way for development and ‘gentrification’.⁴⁹ One street away, the ‘Five Star garden’ was protected from a similar fate after the Trust for Public Land declared it a permanent public garden in 1999. The garden had a diversity of organically grown vegetables and herbs, a wooden birdhouse, and a gazebo where community members may socialise. At 219-225 West 122nd Street the Worley’s community garden grew out an initiative to secure and clean up a dirty empty lot. It was fenced and filled with trees and bushes, with a winding path leading to table and chairs and a pond populated by fish, turtles and frogs. Similarly, a part-time Special Needs teacher was asked by the school principal to develop a garden on an empty lot across the street. He and the children, parents and community cleaned up the lot with the help of ‘the City’ (municipal services), and transformed it into their ‘Garden of Love’ (Goodridge pers comm December 12, 2006).

In 2006, one US Dollar equated to approximately six South African Rands.⁵⁰ Despite the country’s perceived material wealth, it was apparent that diet-related health issues are a concern. The Cornell Cooperative Extension (CCE) works with formal and non-formal educators, focussing on (i) urban environment, (ii) family and youth, and (iii) nutrition and health (Ferenz pers comm

⁴⁸ A short walk away, there is an excellent view of the Statue of Liberty from The Pier.

⁴⁹ Gentrification is a phenomenon that occurs in previously low-cost neighbourhoods when increasing numbers of wealthy people move in, resulting in a trend towards upmarket living, higher rentals and living costs. In ‘gentrified’ areas in New York City, this has forced low-income renters to move away because they are no longer able to afford the higher costs of living (see http://www.pbs.org/pov/pov2003/flagwars/special_gentrification.html).

⁵⁰ An online currency converter was used: <http://www.xe.com/ucc/convert.cgi> (accessed 10 May 2006).

September 18, 2006). The CCE had received congressman funding to conduct Garden Mosaics and urban agriculture projects in the south Bronx, hence their work with Abraham House and St Raymond Community Outreach (Babcock pers comm September 18, 2006). The GM programme (see 2.3.4.3) had established links with existing community gardens, and in 2006 it was noted that GM materials were being used by various organisations and individuals – on the continent and in other countries. Abraham House is a Catholic-run organisation that provides after-school care for 72 children (from five to 17 years old) whose parents are incarcerated (Gomez pers comm August 2, 2006). Instead of languishing in jail, the parents are ‘employed’ by the organisation (*ibid*). Approximately 15 staff members, some part-time, were involved in the after-school programme in 2006 (Alegre pers comm September 23, 2006). Garden-based activities took place in the nearby Bronx Community and Cultural Garden in Willis Avenue. St Raymond Community Outreach is a non-sectarian organisation with an after-school garden project at a senior centre, the Parkchester Enhancement Programme (PEP). This links in with the intergenerational aspect of the GM programme (Mattera pers comm August 3, 2006). Charter schools such as the Bronx Leadership Academy II (BLA II) provide an alternative form of schooling. They promote local participation and control and improved school-community links (Gruenewald 2003-b: 621); this was a growing phenomenon in New York. The ‘nuclear unit’ (individual household) seemed to be the only ‘community’ that many people in the USA have.

... in this crazy, globalised and very impersonal United States... people are taught... do it yourself and there’s nothing anyone else can do for you. ... you have to teach kids to listen to each other, because by the time they hit first or second grade, they already have been taught that you elbow other people out of the way for what you can get. ... and that’s a challenge, teaching sharing and teaching respect. (Loomis pers comm December 13, 2006)

A groundswell of community engagement movements appears to be targeting such concerns. “It’s something that we have to teach each other in the United States: to work as a community...” (Loomis pers comm December 13, 2006).

4.3.2 New York: food growing, school-community links, aspects of learning

For the purposes of this study, attention was focused on community gardens in New York City. A number of factors appeared to motivate communities and schools to establish food gardens.

4.3.2.1 Personal and social wellbeing focus

Community gardens appeared to fulfil a number of interlinked social needs, supporting personal and social development, and showcasing community potential. Some examples are provided below, with additional excerpts provided in Appendix I.

Gardens as places of safety: The community garden in many cases is seen as a place of refuge in neighbourhoods battling with crime and social problems, and because of its visibility, serves as a

showcase of community potential – a better way of approaching community life (Figure 4.11). According to Kuo (2006: np), there is a higher incidence of violence in neighbourhoods that lack green spaces. Social, psychological and physical deterioration of neighbourhoods have been associated with ‘nature deficit disorder’. By cultivating ‘nature on their doorstep,’ for example, through community gardens, a youth and social responsibility consultant in Harlem asserted that they would help mitigate crime (Figueroa pers comm August 4, 2006).



Figure 4.11: A place of safety in the Bronx: a community garden.

The researcher inferred from comments made by a number of interviewees that garden-based after-school programmes also played a role in keeping children out of trouble.

They’re getting more interested in the programme and that keeps them off the street doing bad stuff. It’s better that they learn stuff that will help them, other than do other stuff that they should not be doing. (Cruz pers comm September 25, 2006)

Gardens as healthy spaces: Green issues were not given first priority in suburbs with socio-economic challenges. However, because of issues such as asthma, the CCE adopted a health focus in their educational programmes.

... community gardening is very important, but it’s not the most important for a lot of people. So I think that is one barrier, you know, environmental concerns are sometimes seen as something for white middle class college-educated people... However, the connection to health has made a big difference. ... I think that’s the best way to connect with communities that aren’t that interested in the environment. (Babcock pers comm September 19, 2006)

Gardens as places of wellbeing: A number of interviewees commented on the value of green areas in reducing stress and improving quality of life. A teacher described how “city children could be in the arms of nature” in their ‘Garden of Love’ in Harlem; this helped them handle “all the stresses” (Goodridge pers comm December 12, 2006). A community gardener observed how it benefited children in the Bronx: “ground has something that they need, that connects them” (Parker pers comm August 4, 2006). This in turn has a positive impact on other aspects of life, like physical health and social skills. An after-school group was involved in installing a gazebo in a community garden; both adults and children use it to socialise, play board games and relax. The need for an element of enjoyment or play in the garden was emphasised.

Well, some of the kids here are coming for some exercise also. Picking up garbage is not compulsory, it's [not much fun]. [Now] they are so happy, and they are at least moving; not sitting in front of TV. (Alegre pers comm September 23, 2006)

It was suggested that community gardens should 'earn their keep' to avoid being appropriated for development.

... [if] it's... underutilised. Somebody... will come back in and say... 'we're taking it over, I don't care... if it's Trust or public land; we need it for a such and such. ... look at it! It's just... somebody's little oasis with lots of crap all over it'... (Ameroso pers comm September 19, 2006).

Gardens as sites for personal and social skills development: A Special Needs teacher noted how activities in community gardens could spark a sense of social responsibility. Children who were dysfunctional in conventional classroom settings developed collaborative/interpersonal skills.

... in the classrooms... these kids are cat and dog at each others' throats. But in this [garden project] they sensed there was no right answer, no wrong answer, and... they just took off!... the things they said about cooperation... and what the plants need... about companion planting – like the 'three sisters' garden⁵¹... those kids worked together and they talked about their interdependence. (Goodridge pers comm December 12, 2006).

The most common strategies for developing social skills and empowering young people appeared to be the provision of a nurturing context, life skills experiences, stimulating creativity, and enabling participation in decision-making and community organising – all of which could be achieved in a community garden. This is discussed further in 4.3.2.5 and 4.3.2.6.

Gardens as sites of spiritual development: A teacher drew attention to the challenge of finding ways of "civilising us up and out from [our] hubris" and becoming 'repatriated' to the earth. In this regard, city gardens provide 'natural settings' where biological processes serve as metaphors to support healing and spiritual growth (Goodridge pers comm December 12, 2006). It was asserted that children "need that level of love, they need that level of engagement" provided by garden-based experiences (*ibid*). For example, an orphaned child, in observing how dead plant matter ultimately supported new life through the composting process, came to terms with his parents' death (*ibid*). The search for spiritual fulfilment and social solutions to 21st Century concerns was evident in many spheres of society in the USA (see also 5.2.2.2).

4.3.2.2 Food focus

Examples below indicate that urban agriculture and food growing in New York community gardens was common. Some examples are provided below, and also in Appendix I.

⁵¹ The 'three sisters' garden is a form of companion planting, using three food plants, practiced traditionally by native Americans. Climbing beans grow up the stalk of the corn (maize) plant, and creeping squash plants provide support around the base. Interestingly, all the essential amino acids – required for human growth and repair – are supplied by a combination of these three plants. The corn is also a good source of starch, and squash provides vitamin A (Marcellino nd: np).

Access to fresh produce: It was reported that fresh produce in stores is often more costly than ‘canned’ food (Mattera pers comm September 25, 2006). Initiatives like the African American ‘SOUL food’ – Sustainable Organic Uptown and Local – movement promote fresh and nutritious food rather than unhealthy ‘fast food’ (Figueroa pers comm August 4, 2006). While the USA appeared to be a ‘land of plenty’, some fresh items were not easily available in stores.

I have to go to Manhattan if I want to buy it. ... maybe I don’t have the time to go... just to buy basil. (Alegre pers comm September 23, 2006).

Growing food: The researcher observed a wide variety of vegetables and herbs growing in urban gardens (see Appendix W). However, a Bronx after-school gardening group was not permitted to grow food plants at a senior centre, to avoid attracting rodents⁵² (Mattera pers comm September 25, 2006). Basil, which they were allowed to plant, was barely used by the seniors; this may have undermined efforts to awaken their interest in food growing. Urban agriculture was nevertheless viewed in many cases as a way to promote food security, especially in economically disadvantaged urban areas (Ferenz pers comm September 18, 2006; Figueroa pers comm August 4, 2006; Parker pers comm August 4, 2006).

... a lot of our efforts and... garden stuff are more interested in food security than... education. ... people now want to know, how can I grow a lot of it? ... Production skills as compared to just general science education. That seems to be a... trend. (Ameroso pers comm September 19, 2006)

Nutrition education: Garden programmes were reported to help children understand the origin and value of fresh food (Alegre pers comm September 23, 2006). Children and parents became enthusiastic about eating healthy food as a result of the Added Value programme (Appendix X) linked to a community ‘farm’ (Chapman & Loomis pers comm December 13, 2006).

4.3.2.3 Income generation focus

Added Value uses agriculture as a tool for both education and economic development in Red Hook. Their training at Saturday farmers’ markets is linked to a Community Supported Agriculture (CSA) project (Ameroso pers comm August 2, 2006). Participating adults or youth – such as those at East New York Farms! – are required to sell their produce at farmers’ markets at least three times in a season (Braverman pers comm August 2, 2006). This ensures a regular supply of fresh produce at farmers’ markets, and thus ongoing public support. School children’s entrepreneurial potential is reportedly being stimulated by participation in a real-life school stock exchange in Ithaca – the first of its kind (Simon pers comm December 15, 2006).

In the case of a CCE ‘urban ag’ project with ‘special ed’ children, it was reported that produce is sold at a weekly ‘market’ at school where the main ‘customers’ are teachers and parents (Am-

⁵² However, other interviewees asserted that rats would not eat leafy green and sub-soil plants like potatoes.

erose pers comm September 19, 2006). During school holidays, the produce is harvested and sold by the CCE urban agriculture and markets coordinator (*ibid*).

4.3.2.4 Cultural focus

A cultural focus was observed in various food growing activities, examples of which are provided below. See also Appendix I.

Cultural food: Many New York community gardens seem to provide opportunities for cultural minority groups to grow produce that is not available in stores (Braverman pers comm August 2, 2006; Morgan pers comm September 20, 2006). Such gardens appear to be points of familiarity where minority groups gather and associate in their ‘own’ cultural space. It was noted that children are fascinated by the idea of cultural heritage being expressed through plants in a garden (Goodridge pers comm December 12, 2006). They feel secure in the presence of parents or elders who share similar cultural beliefs and practices, and so want to learn from them (*ibid*). However, it was noted that among immigrants from developing countries, eating produce from a garden is considered to be lowly; the ability to purchase fast food reflects a higher social status (Alegre pers comm September 23, 2006).

Multicultural dynamics: It was apparent that in economically disadvantaged neighbourhoods, interracial mixing is not common. This may be linked to personal safety concerns (Alegre pers comm September 23, 2006). Similarly, separation according to gender – occurring spontaneously when after-school children are required to work in groups – was viewed as beneficial.

In my experience, it has worked better: Their behaviour is less disruptive and it makes the task easy to achieve. ... it’s always the same. (Alegre pers comm September 23, 2006)

The absence of ‘multicultural’ interactions does not necessarily set the precedent for future interactions. A Special Needs teacher believed that the sustainability of their school-community garden required the support of a multicultural community advisory board, comprised of both parents and community gardeners (Goodridge pers comm December 12, 2006).

4.3.2.5 Youth empowerment focus

It was clear that youth empowerment was a priority in New York, as indicated below (additional excerpts in Appendix I). A Cornell University senior extension associate shifted the primary focus of her GBL programme from ‘building horticultural skills’ to ‘youth development’.

... developmental assets of youth. ... our programme is really about ‘what do young people need?’
... So it’s first about youth development, and gardening is an avenue through which the development happens. (Eames-Sheavly pers comm September 14, 2006)

Nurturing context: Urban agriculture settings were found to serve as nurturing spaces where young people may gain gardening experience and develop their potential.

... probably a very small percentage of youth that we work with... will actually go into agriculture... But it's important to engage them and create a safe space. (Braverman pers comm September 21, 2006)

Employment: It was reported that many community gardeners recognise teenagers' need for employment and are willing to provide garden-based jobs, if funds can be raised to cover their salaries (Braverman pers comm September 21, 2006). Physical work on 'urban farms' was reported to be beneficial for special needs children (Ameroso pers comm September 19, 2006). Further probing revealed that they were neither viewed as juvenile delinquents in need of rehabilitation, nor as cheap farm labour – which was a concern in pre-apartheid South Africa⁵³ (see 2.3.1). The researcher learned that any heavy agricultural work is carried out by adults using machinery. Furthermore, the children gain skills in marketing and communication (Ameroso pers comm September 19, 2006).

Life skills: It was apparent that constructive engagement in urban agriculture activities – whether paid or voluntary – could serve as a springboard for a successful and productive future, especially for children from challenged backgrounds (Rodriguez pers comm December 15, 2006; Simon pers comm December 15, 2006). A young adult described how he developed a variety of skills, including writing proposals for funding.

I was one of the teenagers who went through the process, so I was one of those kids who got into gardening, got into the construction phase and kept it going, and then became a counsellor, and then became a supervisor, and now, I'm the coordinator of the park and garden, and programme coordinator as well. (Rodriguez pers comm December 15, 2006)

Scholars demonstrated confidence during interviews with the researcher. They attributed this to their involvement in garden-based projects, recalling how they reported their findings to groups of adults (Barroso pers comm September 23, 2006; Velez pers comm September 23, 2006).

Decision-making: A senior extension associate reported that there was no correlation between 'interest in gardening' and 'involvement in gardening activities' in her research with school children; the key factor is 'involvement in decision-making' (Eames-Sheavly pers comm September 14, 2006). The *extent* to which their ideas shape planning, designing and planting will determine their level of engagement (*ibid*; Goodridge pers comm December 12, 2006). A teacher cited this reason for his decision to act as a facilitator rather than an agenda-setter (Goodridge pers comm December 12, 2006). Similarly, it was reported that teenagers on the East New York Farms! youth internship programme and pre-teens in an afterschool group shape the nature of their own programmes (Braverman, pers. comm. September 21, 2006; Simon pers comm December 15,

⁵³ In his research on the 'Poor White' problem in the pre-apartheid era (1910-1930), Malherbe (1977: 178) observed that vocational education – including agriculture – was associated with the destitute and delinquent, and thus bore a stigma of 'rehabilitation'.

2006). Furthermore, educators felt that factual information helps enable children to make rational decisions (*ibid*). The importance of engaging a young person's intellect and critical capacity was emphasised.

It's like that saying, "Give a man a fish, he eats for a day. Teach a man to fish, he eats for a life-time" You teach them how to critically examine problems and issues, and how to learn. Where to go and find the information. (Mattera pers comm September 25, 2006)

Creativity: It was apparent that garden-based and related education programmes make intentional use of processes that stimulate young people's creativity. The researcher observed a sense of ownership in a young woman bringing her child to see her teenage garden art (Worley's garden, New York, August 4, 2006). It may be inferred that this provides a foundation for building social capital – a factor that is interrogated further in discussions on diversity and sustainability (see 5.2.3.1) – as well as enabling intergenerational learning extension.

Children's creative efforts in a community garden may conflict with community members' interests or aesthetic values (Mattera pers comm September 25, 2006). It was noted that if children's creativity is stifled, they are less likely to have a sense of ownership or interest in the garden.

The vast majority of children's gardens in the US are planned, designed and constructed by adults, and when it's done, they invite the kids to come and do activities there. But we're finding we're missing the boat regarding their creativity... as well as their interest. (Eames-Sheavly pers comm September 14, 2006)

4.3.2.6 Community organising focus

Community organising was a strategy commonly referred to in New York – both in the Community Education and Development course at Cornell University and in a number of implementing agencies. Examples are provided here and in Appendix I.

Added Value reported establishing various partnerships using an 'organising approach' – building solid relationships over an extended period. "We're not just growing food, we're growing the next crop of community leaders" (Marvy quoted in Richardson 2006, December 8). Community members are not expected to leave familiar contexts to attend workshops in unfamiliar settings.

... people don't come to us in our midtown office very often, we go to them where they live and work. So in order to do that, you've got to go into the community and form partnerships and relationships (Babcock pers comm September 19, 2006).

A conscious effort to foster community development at primary school and teenage level was also evident. The community garden was considered to provide a space where respect and care can be promoted.

... some of the teens too... we start the summer with... reading through this list of agreements and saying... ok why do we ask that there not be put-downs, and that there not be fighting? Even if you're joking, why do we ask that you not throw things? ... the impact of their behaviour on one another. And try to create a safe space... One of the teens who... was with us the summer before,

he came back for a little while, and was in the midst of some actually really tough personal stuff, but was really just so happy to be here. His first day here, there were a couple of other girls starting the same day, and... he just like basically said to them, Added Value is different, it's special here, and you can be yourself, and nobody's gonna hurt you... you can be yourself here. (Loomis pers comm December 13, 2006)

Outside agencies may also initiate the community development process (Babcock pers comm September 19, 2006). New perspectives on citizens' power and control in society were offered by the 'transformative action' approach (CTA nd: np). Predicated on the notion that "social change agents are more successful in achieving their goals when they approach conflict with compassion rather than anger", it seeks to transform problems into opportunities, antagonism into cooperation, victims into leaders, and "adversaries into allies [and] co-creators of positive futures" (Wessels pers comm June 7, October 24, 2006). The impact of community organising in promoting community development and empowerment will be probed further in 5.1.1.1 and 5.2.3.2.

4.3.2.7 Teaching and learning practices

Teaching and learning practices in New York had both differences and commonalities with those in southern Africa. This is not discussed in detail as it is beyond the scope of this thesis (as noted in 4.1.2.3 and 4.2.2.4). Excerpts are provided below, with additional examples in Appendix I.

Outdoor education: In urban contexts in the USA, a garden may be a child's only exposure to 'nature' or the outdoors. "As far as education [is concerned]... I think largely it is just getting into the garden" (Babcock pers comm September 19, 2006). By way of comparison, teaching outdoors in some southern African sites may occur only because of limited classroom space.

Community-based education: Programmes such as Garden Mosaics promote community-based education and development (Krasny pers comm November 15, 2006). It was emphasised that underprivileged groups should engage with environmental concerns because their communities tend to be more impacted than relatively privileged groups (Babcock pers comm September 19, 2006). Programmes thus appeared to have an issues-based component, though not at the expense of other learning approaches. However, where leadership had imposed a particular approach on its educators, this appeared to create organisational tensions (Bernard, pers comm September 19, 2006). It is suggested that an issues-based approach alone may neglect ecological understanding and hence limit the development of knowledge and skills that promote sustainability.

Garden-based learning: As was noted in 2.3.3.2, there was a campaign in the 1970s to develop gardens in every school in the USA. This was borne out by the urban agriculture and markets coordinator who had worked at the CCE since 1978 (Ameroso pers comm September 19, 2006). The principles of GBL (see 2.3.3.2) seemed to be applied in most food gardens, for example, by providing authentic learning experiences and real-life examples (Chapman pers comm December

13, 2006). It was reported that children were inspired by ‘farming’ experiences on the Red Hook Community Farm; because they wanted to find out more, they developed an interest in reading (Loomis pers comm December 13, 2006).

Place-based learning: A teacher expressed the view that the garden is “a meeting place, a mediated place, for the children from the school to meet their larger community” (Goodridge pers comm December 12, 2006). The use of foreign examples – such as equatorial rain forests – was considered inappropriate for introducing urban children to environmental concerns. The value of grounding learning experiences in a local context was drawn from Sobel’s *Beyond Ecophobia*.

... as we formed that individual self and culture, if we were attentive to the whole habit, those immediate localities... the child should know what’s in their backyard first – that’s when there is the first opportunity for the child to bond with the natural world. ... As they grow, they’ll see that their world is nested into a larger world. (Goodridge pers comm December 12, 2006)

The cultural emphasis of garden-based activities seems to be influenced by the community in which they take place. For example, Antiguan parents believe that no garden is complete without vegetables, and an African parent introduced a favourite plant (manioc/cassava) to a Harlem school garden (Goodridge pers comm December 12, 2006). In the latter case, the plants died. This draws attention to the need to consider limitations of local environmental conditions; plants from the tropics do not grow well in New York’s icy winter temperatures.

Affirming experiences: Connection with natural processes in urban settings tends to be limited.

I remember a teacher... who went to their garden and the biggest surprise... was that the kids had no idea where tomatoes came from. Some thought they grew on a tree. So for them, to actually see a tomato growing was mind-blowing... (Babcock pers comm September 19, 2006)

Various interviewees expressed the need for educational interventions that stimulate children’s interest in finding out more. The need for affirming experiences was emphasised.

So we lay down a framework where they can be involved and be successful, and then ultimately be proud of what... they’ve done. So that they want to come back and do more. They’re never sitting in a classroom with a board, and writing down on it and making them read text books. It’s all hands on and group work. (Mattera pers comm September 25, 2006)

Experiential learning: Although it had no links to the mainstream school curriculum, it was apparent that experiential learning complements school schedules and provide experiences that are transferrable to other learning settings. Various examples indicated that garden-based activities or informal learning could bring school-based or formal learning to life. The outcomes of children’s experiential learning processes were further affirmed by formal research findings (Simon pers comm December 15, 2006). The organisational philosophy of East News York Farms! was based on an understanding of reality that took societal needs into account: community food security is “experience-based, not curriculum-based” (Braverman pers comm September 21, 2006).

Community mapping: A youth and social responsibility consultant engaged “junior policy makers” in mapping local resources and assets such as food stores and green spaces, and exploring the potential for food gardens in their communities (Figueroa pers comm August 4, 2006). He aimed to draw them into investigating the role of structural and institutional racism and oppression, while also establishing links with the community.

Exploratory learning: The researcher observed the use of Garden Mosaics ‘Neighbourhood Exploration’ materials in community mapping activities (see Figure 4.12). Scholars were given guiding questions, diagrammatic and aerial maps of the area, and guidelines for assigning responsibilities (leader, photographer, spotters, note-taker, navigator). A community education coordinator confirmed that exploration-based learning was more successful with smaller groups.

... definitely with smaller groups – even if it was public school-based, it was much smaller groups at a time – and therefore a lot less structured, and a lot more exploration-based. (Loomis pers comm December 13, 2006)



Figure 4.12: Neighbourhood exploration with scholars in the South Bronx.

Interviewing: Interviewing was reported to help scholars learn about parents’ and community gardeners’ traditional practices (Goodridge pers comm December 12, 2006). However, it seemed that directing questions boldly to adults did not come naturally for children of all cultures (see also 4.3.2.10). Patient facilitation was found to help scholars and community members gain confidence in this new way of interacting (*ibid*). It was noted that complementary forms of knowledge, including folklore, and personal stories, stimulated learning. The children developed cultural sensitivity that helped them ask appropriate questions of different gardeners and adapt their questions according to the kind of expertise offered by different interviewees. The teacher found that they did not simply ask “dry and abstracted” questions; they began to develop “profound social skills” and became “pretty sharp researchers” (*ibid*).

Reporting: Providing opportunities for children to share their findings with the wider community was reported to create a sense of ownership and ‘systematise’ their knowledge (Goodridge pers comm December 12, 2006). A pre-teen group was found to have the ability to educate not only younger peers but also their educators through reporting on their interviews (Simon pers comm December 15, 2006). An educator explained that her after-school group was required to report on a monthly basis to their parents on “their findings within their own nutrition classes” and simi-

larly, the parents were required to present to the youth (*ibid*). The Added Value *Digital Horizons* ‘new media’ project was found to bring a new dimension to reporting – including slides and photo essays of activities – that developed both computer technology and communication skills.

Each programme has different components and is based on the concept of sustainability... environmental, social and economic. ... So part of working as a social project is learning about communication... how to explain our work to other people. ... being our own media is part of that. (Loomis pers comm December 13, 2006).

Field visits: It was reported that elementary schools visited the Red Hook community farm on a weekly basis as they worked through curriculum-linked programmes with Added Value (Loomis pers comm December 13, 2006). In other cases, schools appeared to visit local community gardens on an *ad hoc* basis.

Demonstrations: Traditional cooking demonstrations, using produce from community gardens, were reportedly a regular feature at farmers’ markets (Braverman pers comm September 21, 2006; Ottey pers comm September 21, 2006; Willins pers comm September 21, 2006). This seemed to help create awareness not only of healthy recipes and eating, but also generated an interest in growing food plants (Chapman pers comm December 13, 2006).

Mainstream curriculum concerns: One of the greatest challenges in the USA was considered to be the impact of the formal education system and its top-down imposition of curriculum on teachers (Goodridge pers comm December 12, 2006). In some cases, learning associated with gardens may intentionally incorporate arts, culture, science, food, and other school-based subjects, but for the most part, garden-based activities are not formally linked to the school curriculum (*ibid*). This was “maybe the right thing” because a teacher felt their garden could remain independent of the Board of Education, and children could spend their time in the ‘Garden of Love’ as they wished (*ibid*). A sentiment regarding the New York Board of Education’s attempts to standardise the public school curriculum was that it undermines creative teaching.

There’s a part of me that doesn’t... want the Board of Education to take [the school garden] on... I think... maybe [it] can even kill nature education, because... it [will] have that same regimented structure. (Goodridge pers comm December 12, 2006)

However, it was noted that some city teachers are accustomed to working with a pre-packaged curriculum and feel intimidated by the lack of structure when facilitating an experiential learning process in a garden (*ibid*). If children ask questions for which they have no ready answers and no recourse to answer books, they may feel at a loss. A final year schoolgirl expressed regrets that she could not link her school work to gardening activities:

NK: Have any of your school projects or homework or anything like that had anything linked to your garden activities?

AC: Ah no, I couldn't because I had already finished taking my biology class by the time I came to the garden, so I was unable to. But I would have, I would have done a project. (Cruz pers comm September 25, 2006)

Holistic learning: In her assessment of liberal arts education, an extension educator drew attention to the challenges of linking formal, non-formal and informal learning experiences. Based on her assertions, it seems that holistic learning processes require support at many levels so that knowledge from formal learning situations, after-school programmes and home or community life can be integrated in a meaningful way.

... so that these messages aren't just heard in after-school programmes, and that youth aren't always having to carry the burden to bring it back to their science teacher or their self-study teacher or whoever. So that these things are reinforced at home, and then they're reinforced in school. And so that that helps these outcomes to be more positive. (Simon pers comm December 15, 2006)

When the director of youth services was asked for her views on their educational approach, she highlighted the potential of after-school programmes to meet 'real learning needs'. Her examples of holistic approaches to teaching and learning through extra-curricular programmes and garden-related activities are noted in Appendix I (Mattera pers comm September 25, 2006).

In-service training: A CCE extension educator explained how two-day Garden Mosaics workshops are run for teachers in New York (Babcock pers comm September 19, 2006). It seemed that commitment to implementing the training was sometimes an issue, especially among community gardeners (Ameroso pers comm September 19, 2006). The CCE formulated a series of commitments to hold community gardeners accountable and make sure that gardens remained well tended and productive, as well as a signed agreement through employers (*ibid*; Babcock pers comm September 19, 2006).

Local curriculum: A farm educator at Added Value had spearheaded an intentional and carefully thought through collaborative process with a non-profit organisation and teachers from a public school to develop and pilot a *Farm to Classroom* curriculum. This had links with the mainstream school curriculum. At the time of the researcher's visit, the *Farm to Classroom* project was being piloted in conjunction with some 'wellness' work with administrators at a public school in order to inform their policy on physical and mental health (Chapman pers comm December 13, 2006).

After-school activities: Garden-based after-school activities, drawing on community-based knowledge and intergenerational learning, were found to have an impact on children's learning experiences that go beyond the scope of conventional educational models (Goodridge pers comm December 12, 2006). The social emphasis on learning interactions was also appreciated by scholars (Velez pers comm September 23, 2006). The Garden Mosaics programme was seen to add

“some structure to informal education” (Babcock pers comm September 19, 2006). For example, children at Abraham House did a ‘Weed Watch’ project in a community garden as part of their after-school activities (Barroso pers comm September 23, 2006). The need for an “informal approach to education, with an emphasis on the affective dimensions of learning, relationship-building, and culture” was underlined (Figueroa pers comm September 20, 2006).

Community service and service-learning:⁵⁴ A teacher reported that scholars’ participation in Garden Mosaics activities counted towards their ‘community service hours’ (Ullery pers comm September 18, 2006). The researcher learned that offenders who are not incarcerated in jail may also be ordered to do community service (Alegre pers comm September 23, 2006). In a follow-up discussion, the merit of formalising the children’s contribution to the community through their garden-based activities was considered:

Until now it did not count as Community Service hours, because it is only for children in High School or applying for High School. But in a sense, we have been doing Community Service. Taking care of a garden is a serious business, so probably this year we will implement something that really count for that matter. (Alegre pers comm May 15, 2007)

4.3.2.8 Teaching and learning resources

A diversity of resources was drawn into teaching and learning processes in New York, a number of which are discussed below. Additional excerpts may be found in Appendix I.

After-school programmes: Most GBL activities in New York appeared to take the form of after-school programmes. For example, Abraham House provided an after-school facility that also served as a ‘prevention programme’ in the South Bronx – providing a better alternative to crime, drugs, unwanted pregnancies, or violence in a neighbourhood that did not provide any healthy activities (Gomez pers comm August 2, 2006). Their after-school programme, including garden-based activities and neighbourhood explorations and clean-ups, artwork and games, was believed to be most successful with younger children (*ibid*). It may be inferred that after-school programmes embrace aspects of both informal and non-formal education. The use of a structured programme, such as Garden Mosaics, within this framework would influence learning activities.

Youth internship programmes: At East New York Farms! teenagers are employed in an after-school youth internship programme which includes garden-based and civic activities, as well as workshops that help foster intergenerational relationships and draw in expertise from various local organisations (Braverman pers comm September 21, 2006). The aim is to retain some interns as employees in the second year, and provide them with further challenging opportunities.

⁵⁴ Service-learning is an intentional integration of service with learning, in which students or scholars provide a meaningful service to the community while engaged in experiential learning through action and reflection on complex local problems, and develop civic responsibility (http://www.servicelearning.org/what_is_service-learning/service-learning_is/index.php, retrieved January 14, 2009).

Holiday programmes: Various programmes are offered by Added Value. For example, teenagers may work for about 17 hours a week under the supervision of staff, college interns and senior youth leaders during the 8-week summer holiday training programme (Ameroso September 19, 2006). In some cases a monthly stipend increases household income by thirty percent (*ibid*).

Special education programmes: An interviewee found that by working with ‘CY7’ scholars from ‘special education’ schools, he was able to use their help on an urban farm throughout the year (Ameroso pers comm September 19, 2006). Because of learning difficulties and emotional problems, they require “kinetic training, where they can use their hands”, so do not follow the mainstream school curriculum. This was also found to be effective with autistic school children (*ibid*).

Farmers’ markets: Farmers’ markets are a regular feature in New York from the end of June until mid-November. They serve as a platform for social interactions, cooking demonstrations, and the sale of fresh produce. The markets also provide opportunities for teenagers to work with adult volunteers and staff – “It’s their moment... to step up and start applying that new knowledge that they have, and new ownership of the space” (Chapman pers comm December 13, 2006).

Special events: Special events held at the culmination of a school term or growing season appeared to be a popular way of celebrating what children have learned (Chapman pers comm December 13, 2006; Cruz pers comm September 25, 2006; Goodridge pers comm December 12, 2006). The whole school may be invited, as well as parents and community gardeners (Goodridge pers comm December 12, 2006). It seems that events involving parents increase their interest in children’s food gardening activities.

Youth conferences: Events organised for teenagers were reported to help them engage in the community and take responsibility (Loomis pers comm December 13, 2006). A community education coordinator noted how these events create opportunities for teens to meet role-models who inspire them to realise their own potential (*ibid*).

Communities and community-based organisations: It appeared that garden-based activities are common in smaller community-based organisations such as the United Community Centre (UCC), a ‘parent’ organisation of East New York Farms! (Babcock pers comm September 19, 2006). An extension educator spoke of ‘community’ in terms of its social assets – the greater its diversity, the richer its educational potential (Simon pers comm December 15, 2006).

Community schools: It was reported that the face of formal education in the USA had been changing over the last 15 years, with a trend towards ‘alternative’ charter schools – small public schools focusing on individual shared learning and teaching, drawing on local resources (Ferenz pers comm September 18, 2006). Charter Schools involve parents in decision-making and volun-

teer work, in collaboration with the educators. Some are vocational, preparing scholars for further technical training. Other charter schools focus on a particular theme – such as science at the Bronx Leadership Academy II – while maintaining a broad approach to learning (*ibid*).

Community gardens: It was apparent from site visits that school groups make use of existing community gardens for outdoor and garden-base learning, or work together with community members and other organisations to develop a vacant lot into a community garden.

Community gardeners: It was reported that some educators intentionally draw community members into their teaching and learning programmes at school. This provides an opportunity for scholars to experience the complementarity of formal/expert knowledge and informal/ community-based or ‘revered knowledge’ (Babcock pers comm September 19, 2006). Community gardeners who participate in the Community Supported Agriculture (CSA) programme sell their fresh produce at farmers’ markets in the city.

Role-models: A teacher found that his scholars were impressed by role models such as a CSA “commercial gardener that is feeding a couple of hundred people in the neighbourhood” (Goodridge pers comm December 12, 2006). Children participating in garden-based project were inspired to find out more about the work done by a researcher when they found out that he was an immigrant, like their own families (Velez pers comm September 23, 2006). Similarly, Added Value educators serve as role-models to teachers working in challenging public school environments; they showed care, kindness and respect, set boundaries fairly, and viewed challenges as important learning moments (Loomis pers comm December 13, 2006).

Self-worth: Added Value educators demonstrated a sense of self-worth and wisdom beyond their years, resisting the urge to over-extend their organisation for the sake of prestige. They focussed their energy primarily at a local level, facilitating school-community activities and providing meaningful support for sustainability at a local level (Chapman pers comm December 13, 2006).

... knowing our limits and our capacities, and being able to say... great idea... not yet... or, not so much... to be able to say NO, and say it well... (Chapman pers comm December 13, 2006).

Similarly, a senior extension associate focused her research primarily on local sustainability concerns by working with educators in New York State. This supported an approach of ‘thinking globally, acting locally’ (Eames-Sheavly pers comm September 14, 2006).

Committed educators and facilitators: A dedicated garden programme coordinator was considered essential for the sustainability of garden-based learning activities (Goodridge pers comm December 12, 2006). It was asserted that “70% of teaching is about getting the kids to *want* to learn” (Chapman pers comm December 13, 2006). The influence of teachers’ attitudes and be-

haviour was evident in a public school where the “relationship that [children] have with the teacher... is the only relationship... of consequence” (Chapman pers comm December 13, 2006). The hierarchical power relationship seemed to have taught the children little respect for their peers; this would presumably have a ripple effect in the wider community.

The importance of commitment in creating more holistic learning experiences within relatively limited organisational structures was also highlighted (Simon pers comm December 15, 2006). It appears that some teachers implement programmes like Garden Mosaics because they believe “it’s the best way for [children] to learn. There’s something other than money that motivates their efforts” (Babcock pers comm September 19, 2006). Such teachers are valuable role models at CCE workshops, presenting case stories of how they implemented the Garden Mosaics programme (*ibid*). Ongoing sharing of expertise and extension support appeared to be essential.

... I had a lot of guidance by the manager of the garden, and they were showing me what were weeds, and what were not. Because when we planted seeds, I didn’t know what was growing!
(Alegre pers comm September 23, 2006)

University research and extension: Some of the expert knowledge used in the Garden Mosaics programme drew on university researchers. Collaboration between research and extension staff helped translate this into meaningful educational material (Babcock pers comm September 19, 2006). Researchers guide extension staff in evaluating their educational efforts (Babcock pers comm September 19, 2006). Likewise, extension educators provide input that helps university researchers select research topics that can be meaningfully applied in communities.

... we count on county educators to help us by providing us with that reality check and that feedback. (Eames-Sheavly pers comm September 14, 2006)

Management styles, funding priorities and strategies may undermine urban agriculture projects. Tensions were evident with regard to an emphasis on ‘human ecology’ and ‘nutrition and health’, rather than on ‘food systems’ and ‘agriculture’ (Bernard pers comm September 19, 2006).

Public libraries: A number of educators and community workers reported on the value of public libraries. For example, a teacher sent his scholars to the Library of Black Research to find out more about the cultural aspects of gardening (Goodridge pers comm December 12, 2006).

Written/visual materials: A variety of educational materials appear to be in use. For example, Added Value uses the *Cook Shop* curriculum developed by Food Change, and East New York Farms! use materials from *Food Project* (Loomis pers comm December 13, 2006; Braverman pers comm September 21, 2006). The CCE uses and distributes materials developed by its own staff, such as *Garden in the City* (CCE 1987), as well as Garden Mosaics materials (see 2.3.4.3) – which specifically encourage school-community links.

Digital materials: The Garden Mosaics programme produced educational videos and digital materials that could be printed. The DVDs could be purchased online through Photosynthesis Productions⁵⁵ (Krasny pers comm November 15, 2006). A PhD researcher at Cornell University found that if users only have access to Garden Mosaics DVD, they are less likely to implement the programme than when they have ongoing face-to-face interactions with a facilitator (*ibid*).

Websites: Web pages are a valued source of information for garden-based learning, as well as raising the profile of gardening projects. For example, a Harlem-based community gardener gained publicity via the Garden Mosaics website, which resulted in her invitation to run organic gardening workshops and attend conferences (Parker pers comm August 4, 2006). Children in the south Bronx were observed using internet facilities to explore the Garden Mosaics web pages [www.gardenmosaics.org] and Google Earth [http://earth.google.com/].

4.3.2.9 Physical and financial support and resources

Support and resources in New York varied, as demonstrated in examples below and Appendix I.

Land and natural resources: In an urban context vacant lots are commonly used for community gardens and urban agriculture. Because land and natural resources are limited and “trees don’t pay taxes”, unprotected community gardens often end up being appropriated for housing developments (Goodridge pers comm December 12, 2006).

Government-funding: Public schooling in New York was reported to be free (Ottey pers comm September 21, 2006). Registered community gardens are eligible for support from the city, while private land was reported to be the sole responsibility of the landowner (Mattera pers comm September 25, 2006). However, community gardens are usually required to pay a membership fee of \$200 per season to sell their vegetables through farmers’ markets.

Various universities are involved in community and youth projects related to greening, gardening, health and nutrition (Figueroa pers comm August 4, 2006; Parker pers comm August 2, 2006). The USA ‘land-grant’ system allows one university per state to have a piece of land, such as Cornell University in New York State. In exchange for the cost-free use of state land, the university has a commitment to provide ‘cooperative extension’ work – a form of community engagement – in each county.⁵⁶ The land-grant university serves both as a source of expertise and as a forum for pooling the experiential knowledge of farmers and agriculturalists in order to promote their ongoing success, state-wide (Babcock pers comm September 19, 2006).

⁵⁵ See Photosynthesis Productions web page at <http://www.photosynthesisproductions.com/gmstore/>

⁵⁶ The USA ‘county’ within the ‘state’ is similar to a municipal district within a province in South Africa, for example, the Makana District in the Eastern Cape.

Since it was established in the 1920s, the CCE has shifted its focus to the 4-H programme (see 2.3.3.2) with a family-oriented approach (Babcock pers comm September 19, 2006). It is involved in managing protected gardens, collaborating with farmers' markets and various NGOs and NPOs, and also manages a 'farm parcel' through a 'vendor agreement' within a State Park (Ameroso pers comm August 2, 2006; Babcock pers comm September 19, 2006). Their WIC⁵⁷ coupons help women, infants and children access fresh local foods at farmers' markets (*ibid*; Braverman pers comm September 21, 2006).

Extension programmes operate on 'soft funding', which has repercussions for the community they serve. NPOs like East New York Farms! are charged for CCE technical support services (Braverman pers comm September 21, 2006). While there is merit in placing a value on support services, this seems to defeat the point of land-grant universities.

Private partners/donors/volunteers: The business sector in New York was reported to be supportive of community and garden projects. Volunteerism appeared to be common, including charter schools where parental involvement is a requirement (Ferenz pers comm September 18, 2006).

NPOs/NGOs: Community gardens, elementary schools and after-school programmes in New York City receive funding and support from various groups.⁵⁸ The researcher interviewed a number of young adults who had already mastered fund-raising skills (see 4.3.2.5) required to cover costs of materials and youth employment programmes.

Collaboration: Collaboration between different organisations is a common theme in New York, and was cited as an essential ingredient in community gardens and urban farming projects (Ameroso pers comm September 19, 2006). A *Nature Network* had been created in New York City and New Jersey to combine the efforts of environmental science and education organizations to become "more collaborative, and have more impact" (Babcock pers comm September 19, 2006).

Community-based organisations: It was asserted that a community's use of a garden is "what keeps these places going" (Ameroso pers comm September 19, 2006). A community gardener reported that neighbours paid him to work in the garden (Morgan pers comm September 20, 2006). The researcher observed three people stopping to place orders for green tomatoes.⁵⁹

⁵⁷ According to <http://www.gannett.cornell.edu/search.html> (retrieved 9 August 2006), "Women, Infant and Children (WIC) Program: provides nutritious foods, nutrition education, and referrals to community services for low-income pregnant and post-partum women, and their children who are under five years of age."

⁵⁸ Numerous NGOs and NPOs operate in New York, for example, Added Value, the Astor Foundation, the Bronx River Alliance, City Farms, Council for the Environment, Food Change, Green Guerrillas, Just Foods, the New York Restoration Project, Operation Green Thumb, Trust for Public Land, the Urban Silviculture Project, and Wallerstein Collaborative.

⁵⁹ Fried green tomatoes is a popular dish in the USA: slice the green tomatoes, dip them in a 50:50 mixture of flour and corn/maize meal, and fry in olive oil (Morgan pers comm September 20, 2006).

Hierarchy: Community-building and collaborative efforts seemed to be compromised in some cases by the desire for personal gain or maximum profits (Hildegard pers comm September 25, 2006; Rodriguez pers comm December 15, 2006). Hierarchical authority patterns within organisations also have a demoralising and divisive effect (Bernard pers comm September 19, 2006).

4.3.2.10 Intergenerational factors

There was widespread evidence of mentoring and engagement with youth in gardening contexts. Examples below illustrate factors that promote intergenerational learning (see also Appendix I).

Children drawing from adults: In garden contexts, children appeared to benefit from the community in a variety of ways. For example, older people are often present when Abraham House after-school children visit the nearby community garden. Adults give advice willingly, assist the children and involve them socially (Velez pers comm September 23, 2006; Cruz pers comm September 25, 2006). The educational value of grandparents or community elders with farming backgrounds visiting a community farm and sharing memories with children was also reported (Chapman pers comm December 13, 2006). A scholar described a family practice and linked it to her garden-based educational programme in New York.

... my mom's got oregano. And she has – of course, everybody has – mint... [and] garlic... [And] where my grandfather lives, in Puerto Rico, he has a lot of stuff growing. And last year during the summer... I saw him pick garlic and onions from his back yard. And he uses them to cook.
... he didn't even need to go to the store. (Cruz pers comm September 25, 2006)

The intergenerational component of programmes like Garden Mosaics intentionally opens up opportunities for further after-school learning interactions (Babcock pers comm September 19, 2006). Interviewing elders was reported to be a successful way of facilitating knowledge transfer from adults to children. For example, youth interviewed seniors with the aim of putting their stories onto the Garden Mosaics website (Mattera pers comm August 3, 2006). Their enthusiasm about these interactions apparently inspired other teens to consider growing fresh produce (Cruz pers comm September 25, 2006).

Adults drawing from children: It was evident that seniors derive benefits from youth participating in their gardening activities. Seniors value their youthful energy and assistance in gardening activities (Ameroso pers comm September 19, 2006; Mattera pers comm August 3, 2006).

It was reported that children bring their parents to the Red Hook community farm during summer vacations to share their newfound understanding of food and nutrition (Chapman pers comm December 13, 2006). Even if parents are not interested, they do not prevent their children from working on the urban farm or eating healthful foods (Chapman pers comm December 13, 2006). Some parents were reportedly so inspired that they offered to help raise funds: “whatever it takes,

we'll all go door to door asking for funds for this. We want our kids to do this programme. We want it more!" (Loomis pers comm December 13, 2006).

Other intergenerational dynamics: In some cultural contexts, interviewing of adults by children is not widely accepted.

... the African American culture – it's less 'childcentric'. When you come into a room, everything doesn't stop, or isn't centred on children. The adults are primary and the children learn from them. (Goodridge pers comm December 12, 2006)

As noted in 4.3.2.7, this style of interaction became educationally successful when the teacher facilitated the process. An interviewee drew attention to the benefits of adults and scholars learning in parallel, as well as Harvard-based research which found that parental involvement enhanced out-of-school learning (Simon pers comm December 15, 2006). These could be explored further in the southern African context (see 5.2.3.1). In the South Bronx, inappropriate adult behaviour presents challenges at times (Alegre pers comm September 23, 2006). Nevertheless, a teenager was optimistic that her after-school group could have a positive influence, noting how community participation in the area had already improved.

I think because at first, in the garden, it didn't have that many plants. ... and so we changed it – we put in some grass, and we brought in some different plants to plant so it would look nicer and greener. So that Paco starts planting some other plants of food or vegetables or fruit. So I think it has changed because before, it didn't have that much, and now the people come and help us... Maybe we're showing the people, when we're picking up garbage, not to throw it down, but to put it in a container. We learn at school that we're supposed to throw our garbage in one place, because it's bad for plants, but it's also bad for us, for our health. (Barroso pers comm September 23, 2006)

In another case, an after-school group had little freedom to make decisions in a garden where seniors own the land and stipulate what the youth may do (Mattera pers comm September 25, 2006). As noted in 4.3.2.2, edible food plants were disallowed (Mattera pers comm September 25, 2006). By contrast, it was reported that parents were eager to buy vegetables grown by their 'special ed' teenagers, which also contributed to the school's finances (Ameroso pers comm September 19, 2006).

Intragenerational learning: Teaching and learning at an intragenerational level was also evident. It was primarily the responsibility of senior youth interns to prepare and facilitate workshops for new interns, with some assistance from the youth and agriculture programme coordinator (Braverman pers comm September 21, 2006).

4.3.2.11 Aspects of environmental learning

In a dense urban environment such as New York City, connection with and understanding of broader environmental concerns appears to be limited. For example, the researcher observed misuse of water resources in a community garden

... I was struck by the irony of the fact that while there was an illustrated sign declaring 'this garden harvests rainwater', right beside it, there was a leaky hosepipe connection to a fire hydrant which lead to a sprinkler in the garden which was going full tilt in the mid-afternoon heat. (Köhly, research journal, August 2, 2006)

The first step towards any kind of environmental learning was perceived to be connection with an outdoor space such as a garden (Babcock pers comm September 19, 2006). It was asserted that the role of the community in influencing environmental learning and understanding begins with the mother and father – they create the first unique culture in a child's life (Goodridge pers comm December 12, 2006). This is in turn nested within the larger context of community, which is in turn is nested within the global context (*ibid*). However, this can only occur where parents have the necessary environmental understanding and are appropriate role-models.

An interviewee revealed that ongoing exposure to garden-based activities was beginning to have a positive impact on children's attitude to their environment (Alegre pers comm September 23, 2006). It seemed that absence of environmental knowledge and skills in the wider community was being compensated for by programmes that intentionally include environmental concerns and scientific concepts.

... workshops... about agriculture... because it seems like that's what they're going to be doing, so it is important. ... basic soil and basic plant physiology and stuff like that... (Braverman pers comm September 21, 2006)

They learn about, like, you need to test the soil before you start to see what you've got, and what sort of problems may occur later on. So I think that the whole land that they were testing was contaminated with petroleum oils – it used to be a bus depot there before, so the bus depot basically ruined the whole ecological balance. (Rodriguez pers comm December 15, 2006)

The researcher did not enquire about their understanding of the health of the ecosystem in which they grow their produce, but a number of interviewees volunteered their insights on human and environmental health. For example, a respondent who was conscious of the health implications of using growth media containing processed human waste and affected by industrial activities in a high density urban environment reported that tests are always done on the soil and compost used in food gardens – especially for the presence of heavy metals (Braverman pers comm August 2, 2006). Another described how educational activities could also be strengthened by making connections between culture and science learning (Simon pers comm December 15, 2006). A scholar expressed her concern for her health, and the impacts of human activities on the health of the environment, as a result of the mentoring she received during after-school gardening activities.

... I'm taking care of myself better. Certain plants are healthy to eat...
... the first day that we went to do gardening, they gave us Styrofoam cups, and she said, 'Styrofoam is very bad for the environment... it doesn't ever decompose or anything', and so I was like, 'oh my gosh!' And after a while I didn't want my mom to buy Styrofoam cups because I was thinking about that. (Cruz pers comm September 25, 2006)

4.4 Synthesis of emerging issues

It is the social process in group life that creates and upholds the rules, not the rules that create and uphold group life (Herbert Blumer 1969/1998: 18-19).

In the foregoing sub-sections it is evident that issues emerging from findings in the three research sites were diverse and, in some cases, site-specific. It is also clear that environmental conditions vary between the southern African and North American sites – for example, soil fertility, rainfall patterns and seasonal changes – as well as demographic, socio-cultural, economic and political factors. The main issues emerging from this research are recapped below. Those that appear to be of particular significance to the role of school-community links in environmental learning are discussed further in Chapter 5.

Commonalities:

Garden-based activities were found to be associated mainly with after-school activities and food growing programmes, as well as community-building. Two main concepts appear to emerge in all sites: the practical or tangible benefits of gardens, and considerations of environmental learning associated with food growing.

Tangible benefits

The incentives for establishing a garden or growing food vary from one socio-economic and cultural setting to another. Some factors appear to be common in all sites.

Income generation: The income generation potential of food growing appears to attract the most interest in all cases. This is in turn influenced by cultural factors. This is discussed further in section 5.1.

Health and nutrition: In most cases, food growing and related learning activities had a focus on nutrition or food security, or on ways of promoting better health in the community. This is discussed mainly in section 5.1.

Education: It was apparent that attempts were being made to link food growing activities to education or training. Findings indicate that the success of such efforts were variable. Where food growing activities expand in the community, this is attributed to a number of factors, including the role of school-community links and intergenerational learning, demonstrations, distribution of seedlings, extension work, volunteer activities and role-modelling. This is considered in all sections of Chapter 5.

Environmental learning

Environmental focus: While there may have been an ‘environmental’ agenda associated with programmes considered in this research, it does not necessarily lead to a better understanding of the environment and ecological processes. Findings indicate that the socio-political and economic spheres are not in harmony with the life-sustaining capacities of the biophysical sphere (see Figure 2.3). In general, it would seem that consideration is not given to the consequences of actions on elements that fall outside an individual or community’s immediate interests. This is discussed mainly in sections 5.2 and 5.3.

Contextual factors: Garden-based activities and related learning appear to be influenced by the nature and extent of support and resources, and the incentives for growing food. The provision of expertise, equipment and funding is generally beneficial, although the focus of activities may be influenced by partnerships or links with support groups and organizations. Aspects of food growing and related learning activities appear to be strongly linked to cultural values or traditions. This is discussed further in section 5.1.

Pedagogic strategy: The way in which teaching and learning takes place in the context of food gardens has a reciprocal influence on school-community links and associated cultural factors – a theme that is discussed further in section 5.2.

Subject matter: The formal curriculum content influences the nature of school-community links. At the same time, findings indicate that efforts are being made to take contextual factors such as socio-economic needs, cultural practices, and community interests into account. This is discussed further in section 5.3.

Mainstream curriculum concerns

Grahamstown: Where garden-based activities are linked to the formal school curriculum, there appears to be a lower likelihood of community involvement in children’s learning processes.

Malawi: Attempts are being made to address the challenges of working with the mainstream curriculum by developing local curricula and providing in-service training and workshops on contextualised teaching and learning. This is discussed in section 5.2.

New York: The requirements of a standardised ‘top-down’ curriculum appear to weaken school-community links and associated informal learning and community-building processes. Excessive emphasis on standards and tests relating to the formal school curriculum undermines the sustainability of food growing projects and associated environmental learning and action. This appears to be because community food security concerns are seen as experience-based, rather than cur-

riculum-based (see 4.3.2.7). Significant environmental learning experiences that take place outside of the formal school curriculum – through community building and after-school programmes – are considered to be readily transferrable to formal learning programmes. The use of structured materials through informal learning processes is also considered to be a constructive response. This is discussed further in sections 5.2 and 5.3.

The complex interplay between the factors outlined above presents conflicting perspectives of the role of school-community links in supporting environmental learning in the context of food gardens. It also highlights a number of potential threats associated with working with a formal school curriculum.

Specific issues:

Some emerging issues from this research are site-specific, although certain factors may be shared with other cases.

Southern Africa

Sustainable agricultural technologies: Food growing in parts of southern Africa is linked to sustainable technologies or ‘traditional ecological’ practices such as agroforestry. Permaculture may also be placed in this category. It was not possible to establish the influence of these practices on learning, food security or environmental sustainability. This is discussed mainly in section 5.3.

Parallel learning: In socially hierarchical societies, learning associated with good growing appeared to be more effective where schools and communities engage in separate programmes. In this way, school-based learning and informal community-based learning have a mutually reinforcing influence. The role of parallel educational programmes with schools and communities is discussed in section 5.2.

Outside expertise: Where there is limited teacher capacity or an absence of learning support materials, garden-based learning benefits from the support of agricultural extensionists, researchers, foreign workers and other outside experts. This is discussed in section 5.2.

Dependency: Outside intervention in initiating food growing and related learning activities appears to undermine a community’s ability to make decisions, initiate development projects or take responsibility for the consequences. This may be linked to a sense of entitlement and a ‘cycle of dependency’ in which communities become accustomed to receiving development aid, and donor agencies become dependent on needy communities in order to carry out their contracts. This undermines the potential of impoverished communities to achieve self-empowerment and dignity, or create sustainable solutions. This is discussed in section 5.1.

Rivalry: Professional jealousy or competition for resources, instead of collaboration, were found to undermine food growing and related learning activities. This may be associated with authoritarian leadership structures, conflicts of interest or struggles for supremacy between different funders or support agencies. It is also associated with issues of insecurity, lack of confidence or self-efficacy, and avoidance of accountability. This is discussed in section 5.1.

New York

Findings indicate that personal and social health, safety, wellbeing, spiritual development and nutrition education are valued, together with community organising – growing fresh and healthy foods and “the next crop of community leaders”. This presents opportunities for intergenerational and environmental learning.

Personal and social wellbeing: Food growing and related learning activities seemed to play a role in promoting personal development or psychological well-being. This was linked to gardens serving as safe places for cultural connections, community engagement and direct experiences with natural processes. The role of gardens in providing both a natural and socio-cultural setting for learning is considered mainly in section 5.1.

Empowerment: In communities where children’s opinions are respected, their involvement in decision-making promotes a sense of ownership in food gardening programmes and stimulates creative and critical thinking. They are able to build social capital and engage in collaborative learning, a necessary ingredient of inter- and intragenerational learning (see 4.3.2.8). Children are more likely to demonstrate resourcefulness and take initiative in gardening projects where individual achievement is held in high regard. This is discussed in sections 5.1 and 5.2.

Community organising: A community-building or organising approach is in strong evidence. Adults and youth with a shared interest in finding solutions build relationships, create alliances to solve problems, and take action. This is discussed in sections 5.2.

Complementarity and asset-based learning: Where scholars are exposed to rich content – such as horticultural skills, science and community-based knowledge – more opportunities are opened up for environmental learning. This enables a holistic approach, integrating scientific and community-based knowledge, ecological literacy, spirituality and diverse learning styles. Where community-based knowledge complements formal knowledge, attention is drawn to the role of citizens-as-experts and experts-as-citizens. The greater the diversity of the community, the more ‘social assets’ it is seen to have, and hence the richer its educational potential. This is discussed in sections 5.2 and 5.3.

Informal and experiential learning: School-based learning is reinforced by informal learning experiences with community members in food growing contexts, for example, through internships, after-school and holiday programmes. Community food gardens supplying fresh produce to urban markets are commonly used as real-life contexts for teaching and learning. Pedagogic tools such as demonstrations, interviews, reporting, community mapping and exploratory learning (see 4.3.2.7) provide opportunities for experiential, community-based and garden-based learning. This is discussed mainly in section 5.2.

Programmes in which garden-based learning combines the teaching of horticultural skills with youth development appear to have the most potential for supporting sustained, effective and relevant food growing projects.

Closing remarks

Consideration of the emerging issues highlights the complexity and variability of findings as regards school-community links and food growing in relation to environmental learning. In light of the educational focus of this research, the role of school-community links may be seen as the hub around which interpretations of place, pedagogy and subject matter converge and diverge in a dialectical process – a concept introduced in sections 3.1 and 3.3. In Chapter 5, the key concepts that have emerged from issues identified, will be synthesised and discussed.



5. EMERGENT CONCEPTS

Schools are repositories of spaces and materials to support learning. Communities, on the other hand, offer fertile resources that can extend the classroom into the non-school lives of youth (Milbrey W McLaughlin 2000: 25).

In this chapter, the theoretical considerations and developing concepts emerging from this research are interrogated. A symbolic interactionist perspective helps foster an understanding of the subjective meaning of social actions (see 3.1.1) such as food growing activities and educational processes. The concepts draw on data that were coded and clustered (as noted in 3.4.2) into six main themes or ‘families’, using a grounded theory approach to data analysis (see 3.1.2.3). The themes may be broadly described as (i) cultural factors, (ii) organisational structure, (iii) reasons (incentives) for food gardens, (iv) place of/for learning, (v) pedagogic approach, and (vi) school-community links. As noted at the end of Chapter 4, school-community links – as the central theme of this research – may be seen as the fulcrum around which the dynamics of pedagogy, place and subject matter are both at variance and in harmony. Meaningful synthesis requires a dialectical process of reconciliation between propositions (thesis) and contradictions (antithesis).

Bearing in mind the questions that have guided this project (see section 1.2), the researcher attempts to interpret and make meaning of the findings in terms of their implications for environmental learning through food growing, in the context of school-community links. After considering various formats, the themes were reframed in terms of a broader understanding of curriculum, in order to sharpen the educational focus of the dissertation. The ‘emergent concepts’ are thus assembled and discussed under three major headings in this chapter, namely, (section 5.1) contextual factors, (section 5.2) pedagogic approach, and (section 5.3) curriculum content. The reader may notice some overlaps, but this is considered to be necessary repetition to accommodate similar factors in different contexts. The chapter culminates in (section 5.4) a conceptual framework for environmental learning that may be supported by school-community links and food growing activities.

5.1 Contextual factors influence school-community links, food growing activities and environmental learning

... establish a well-grounded shared concept of school gardening, giving priority to children’s learning and health; ... sharpen the focus of food security and applied nutrition education in this concept; ... draw up procedural guidelines for school garden development; ... turn around the image of school gardening and enhance its status in the curriculum; ... convince family and community of the garden’s value and involve them more closely (Jane Sherman 2007: 3).

In keeping with the qualitative approach to this research, findings are interpreted and reported within their specific contexts and timeframes, and social action is understood in terms of its idio-graphic motive (see in 3.1.2.3). The nature of school-community links, food growing activities, and teaching and learning vary according to contextual factors such as culture, social and economic history, and natural elements. The researcher identified a number of sub-themes which appeared to be predominant, although not exclusive, to different regions. In this section, we discuss the role of socio-cultural (5.1.1) and structural factors (5.1.2) and of place (5.1.3) in the context of school-community links, food growing and environmental learning and action.

5.1.1 Socio-cultural factors

In this research, social and economic history, cultural practices, values and beliefs were found to vary between study sites. The socio-cultural milieu and other contextual factors are also considered to be elements of the ‘hidden curriculum’ – to be discussed further in 5.2.3.3.

5.1.1.1 Incentives for food growing

Income generation: In many cases, food growing and related learning activities are linked to economic incentives, arising out of the need for income, or linked to the sale of produce in the form of value-added items and nutritional supplements. Where individuals and private farming businesses have greater incentives and possibilities for production, this seems to lead to improvements in agricultural production, as suggested in 2.4.4.2.

Food security: In settings where socio-economic issues are prevalent and basic needs are not always satisfied, food growing is commonly associated with addressing dietary and food security needs (see 4.2.2.1). In some cases, food growing is culturally informed, for example, plants that cannot be found readily in stores are grown for favourite cultural dishes, or it may be seen as a way of improving the quality or relevance of learning programmes (see 4.2.2.3). The food production agenda appears to take precedence over educational efforts in most southern African school settings, as found by Sherman (2007: 2).

Political agendas, lack of capacity and staff shortages tend to undermine the success of food growing in school settings (see 4.1.2.4). A culture of entitlement or dependency, associated with over-resourced communities and provision of food aid, tends to undermine food growing activities, self-reliance and collaborative action for sustainability (see 4.1.2.5, 4.2.2.6) – discussed further in 5.1.1.2.

Empowerment and well being: Food growing may be associated with community organising and youth empowerment programmes in some settings (see 4.3.2.6). In such cases, stakeholders with a shared interest in finding solutions will build relationships, create alliances to solve problems,

and take action. Other incentives for establishing food garden include personal and social health, safety, wellbeing, spiritual development and nutrition education (4.3.2.1). Where food growing and related learning activities include an element of choice or decision-making, this appears to promote buy-in as well as independent thinking, resourcefulness and self-sufficiency. Decision-making and agency at the individual level play a role in civic engagement and participatory decision-making in the context of food growing and related educational activities (see also 5.1.1.2 and 5.2.3.1). This has implications for the types of pedagogic strategies used (see 5.2.3.3).

Ethical perspectives: Ethical perspectives are formed according to the ‘object of moral concern’ – shaped by interests and socio-cultural factors – as discussed in 2.3.2 and 2.4.3. In the case of theft of produce from school food gardens (see 4.2.2.7), release of polluted water into a river (see 4.2.2.8) or wastage of water resources (see 4.3.2.11), it appears that the object of moral concern is limited to that which serves the immediate interests of the individual. Little consideration is given to the consequences of actions on the ‘other’ – people outside of the individual’s immediate interests, other living creatures and plants, or the abiotic environment (see 5.2.3.3). The quest for food security and income generation or employment may help promote sustainable food growing practices. However, the findings indicate that a third criterion of ‘sustainable agriculture’ which receives insufficient attention is the conservation of natural resources (see 2.2.2.2). A closer scrutiny of ethical perspectives is required, bearing in mind that a holistic ethic would recognise the indisputable connection between society’s ethical stance and the integrity of the biophysical environment on which human livelihoods, food security, nutrition and health depend (see 2.3.2). Challenges associated with ethical learning may perhaps be addressed through the development of ‘consequential thinking’ – expanded on in 5.2.3.3.

5.1.1.2 Organisational structure

The nature and extent of support and resources plays an important role in the success of food growing activities and related learning.

Community support: As noted in 4.3.2.9, the sustainability of a food garden relies on community support. In New York, the Community Supported Agriculture (CSA) programme served as a reliable adherent of the weekly farmers’ markets – a regular feature from the end of June until mid-November. The farmers’ markets provide not only fresh produce to the community, but also opportunities for social interactions, including intergenerational, and demonstrations in cooking and food growing (see 4.3.2.8). Hung (2004: 65) described how the CSA programme in New York allows community members to buy ‘shares’ so they can receive fresh produce from their local farmers’ market throughout the growing season. Sustained collective commitment to a community project is based on the agency and support of individuals.

Agency and structure: The structure of the school – as a learning organisation – influences the nature of its relationship with the community, which in turn has implications for food growing activities and associated learning. The findings of this study suggest that formalised structures sometimes have less positive impact on food growing activities than informal structures. For example, a loosely constituted group of parents or community members have greater agency in making decisions with regard to food growing activities, and hence have a greater sense of ownership; this will contribute to the sustainability of the project (see 5.1.3). This has some bearing on Rogers’ (2004: np) assertions regarding the limitations of formal educational systems (see 2.4.1). This is taken up further in 6.3.3 and 6.3.8.

The relationship between the school and the community is embodied in interactions between one or more individuals/agents within the school and within the community. Agency may be associated with individualism – interpreted as “liberation from social chains” (Stirner quoted in Fromm 1976: 77) and “self-ownership, the right – and the duty – to invest one’s energy in the success of one’s own person”. It is thus associated with self-reliance, decision-making skills and action-taking; in its extreme form it may lead to the transformation of people into ‘things’ and shape their relationships in terms of ownership (*ibid*). A structure or system of readily available goods and services, promoting convenience and consumerism and ownership can wield power over and undermine the agency of the individual and create dependency on the system – this is discussed further below.

Drawing on symbolic interactionism, which is “interpretive and analytic, structural and interactional” (see 3.1.1.2), Denzin (1992: 3) and Fine (1993: 70) argued that it serves as “both a theory of experience and a theory of social structure”, and so can overcome the dichotomy between agency and structure. It has been postulated that a ‘meso’ level could be introduced to mediate between these ‘micro’ and ‘macro’ levels of interaction. However, according to Fine (1993: 69) modern symbolic interactionists assert that a fixed distinction between agency and structure is meaningless, and argue instead for a “seamless sociology”. Variations between settings are noted in a journal entry:

... what strikes me is that by focusing on individual progress and development, the broader social structures are strengthened enormously. I think it is more frequent in Africa that... individuals... will take any gap they can find in order to escape the hegemonic obligations imposed upon them by the ‘group structure’, because they want to make good for themselves first. I sense that it is more common here [New York] for individuals who have ‘risen up’ from the slums to voluntarily immerse themselves back in the very communities from which they came, ploughing capacity back. (Köhly, research journal, September 23, 2006)

Partnerships: Links with support groups or organizations influence the focus of food growing and related learning activities. Where a funder develops a collaborative relationship with the re-

cipient community, accountability is enhanced. Similarly, if links between school and community are actively promoted, a broader ‘learning community’ will be engaged in food growing and associated educational activities (see 5.2.3.3). This echoes a recent paper on the role of family and community:

... they are the child’s learning base, provide role-models, can support or negate the school’s messages, are a secondary learning target, and are the locus of improvements in practices. They are also sources of information, expertise and advocacy for school and students and a natural audience and public for the school’s activities. (Sherman 2007: 13)

Rivalry and hierarchy: At times, rivalry and hierarchy (alluded to in 4.1.2.5, 4.1.2.6, 4.2.2.6 and 4.3.2.9) may be associated with clashes of interests and individual ‘empire-building’, which undermine social cohesion and commitment to community-based projects. Individual inputs may be integrated if sufficient capacity exists to organise participatory processes. Where this is strengthened by a capacity for adaptive learning, greater resilience may be cultivated – a feature of sustainable socio-ecological systems (see 2.3.3.1). This is discussed further in 5.2.3.

Institutionalisation: The nature of support organisations and their level of institutionalisation will influence the way in which community members are involved and how food growing and associated learning activities take place. Highly stylised and structured organisations have power and influence but their individual members have less agency, as noted by Rogers (2004: np). It would seem that institutionalisation and bureaucracy undermines diversity, creativity, and critical engagement with issues. This inhibits adaptive learning and resilience in the face of change.

Dependency: This factor appears to be common to all contexts. In a community where dependency on, and of, the collective predominates, there tends to be less diversity in terms of ideas, knowledge and skills. Dependence on food aid, genetically modified seeds or chemical fertilisers (see 2.1.2, 2.2.1.2, 4.1.2.5 and 4.2.2.6) or on the availability of consumable goods (see 2.3.3.1 and 4.3.1) undermines the resilience of a society in the face of unexpected events, threats or environmental change.

Where formalised structures manage processes such as providing handouts of food or aid, or an ‘underprivileged’ community is ‘resource-heavy’ or ‘over-serviced’ by a number of NGOs or development aid organisations, a culture of entitlement, complacency or apathy seems to be promoted (see 4.1.2.5 and 4.2.2.6). This closed-loop feedback effect between aid and dependency traps recipients into a ‘welfare mode’ and donors into a paternalistic mode of service provision.

In societies where children are not permitted to participate in decision-making, there is a sense of collective reliance or dependency on social structures. Lack of agency and self-esteem may further undermine ownership in food growing programmes. This may in turn shape perceptions of

agriculture and agricultural education (see 2.2.1) and subvert adaptive learning and the ability to participate in making decisions and taking responsibility or action for promoting sustainable practices.

If communities become accustomed to receiving assistance or support, and donors become accustomed to targeting needy communities, a ‘cycle of dependency’ may be established. The inability of a community to initiate a development process may be linked to the agenda of donors who are dependent on needy communities in order to fulfil their mandate of providing development aid. This weakens the ability of communities to engage meaningfully with socio-economic and environmental concerns and determine sustainable solutions.

5.1.2 Structural factors

Objective realities such as the availability of arable land, economic resources and infrastructure, as well as climatic conditions, soil, water and ecosystem functionality cannot be ignored. These factors will have a significant influence on the nature of food growing activities, school-community links, and associated teaching and learning.

Biophysical environment: Food growing cannot succeed in a damaged ecosystem with exhausted soil fertility and scarce or non-existent water resources. This may account, in part, for Vandembosch *et al*’s (2004: 25) view that the quality or relevance of education was not linked to improved agricultural production (see 2.3.1). It is possible that over an extended period, appropriate education will promote active rehabilitation of damaged systems which will in turn lead to more productive food growing activities. Where land is limited, school-community links may be strengthened through collaborative food growing efforts; this may apply in both rural and urban settings. In some cases, rivalry and competition for limited resources undermine the relationship between school and community (see 4.1.2.5, 4.2.2.6, 4.3.2.9; see also 5.1.1).

Infrastructure and economic resources: Where societal infrastructure and economy are limited or crumbling, small-scale or localised food growing activities appear to be more common. In such cases, the contribution of formal school-based education to a child’s future may only be of value where food growing and environmental knowledge and skills feature strongly.

5.1.3 Place

The setting in which food gardening and learning activities take place has physical, spiritual and socio-cultural attributes. These aspects tend to be associated with perceived reality, and may be referred to as assets or capital (see 2.1.2). This perspective is expanded on in 5.2.3.3.

Physical capital: Biotic and abiotic aspects of the natural world may be perceived as a form of physical capital, as alluded to by Narayan (2000: 39). In some settings, young adults have little or no physical capital and thus seek employment or charity in order to live (see 4.2.1).

Spiritual capital: In some settings (4.3.2.1) it is apparent that food growing is influenced by a sense of purpose and values – or spirituality – as identified in 2.2.2.2 (see also Appendices B and Y). The role of spiritual capital been associated with a more holistic – and sustainable – approach to learning and natural resource management, as noted in section 2.4 (see also 5.2.4).

Socio-cultural capital: As noted in 2.4.3 and 2.4.4.4, cultural capital stimulates civic engagement. Furthermore, neighbourhood ties – “a locally based social network” – are common to both place attachment and civic engagement, and hence play a significant role in mobilising a community to take meaningful action (Lewicka 2005: 392). The findings in food growing settings suggest that there may be a reciprocal influence between the levels of social capital and incentive to participate in food growing activities. Social capital also appears to be promoted where creativity and decision-making are encouraged, as this leads to a greater sense of ownership – evident in commitment to community health and levels of trust and empathy (see 2.3.4.3 and 2.4.3, 2.4.4.4 and 4.3.2.5). However, in southern African settings, children are not generally drawn into decision-making processes relating to food growing activities (see 4.1.2.6 and 4.2.2.7), an observation that was also made by Sherman (2007: 16).

Furthermore, in culturally diverse settings such as southern Africa and parts of the USA, a community’s diversity may be seen as a social asset which has enormous educational potential, although evidence of this being implemented is limited (see 4.3.2.4, 4.3.2.7 and 4.3.2.8). This has implications for the way in which place attachment and civic engagement may be promoted. Engaging with cultural, gender and generational differences, if not sensitively mediated, has the potential to be divisive. This is discussed further under 5.2.3.1.

Sense of place: A food garden or agricultural plot is a relatively neutral ‘natural’ social context where learning can take place (see 4.3.2.7). This in turn has the potential to promote school-community links – a form of social capital – through participatory adaptive environmental learning processes – as discussed in 2.4.4.4 and 5.2.3. School-community links and community organisations influence the extent and nature of social networks such as kin, neighbours, and associations. The role of ‘place-based learning’ will be discussed further in 5.2.1.

5.2 Pedagogic approach influences school-community links, food growing activities and environmental learning

... school is a cultural phenomenon, not a free-floating universal agency unbound from history and present situation. ... schools are critical sites for and agents of negotiation among cultures in contact, not merely transmitters of the means for success in a dominant culture (Arlene Stairs 1994: 155).

Pedagogic approach may be described as the methods used to bring ideas across, how teaching and learning takes place. There is a reciprocal influence between pedagogy and school-community links, although the former appears to play a more significant role. Teaching techniques will be influenced by teachers' values, resources available, curriculum content and other contextual factors.

As noted in section 4.4, garden-based activities were most commonly associated with after-school activities and food growing programmes, as well as community-building. The pedagogic approaches that foster and support school-community links and food growing activities are discussed in terms of (5.2.1) experiential learning, (5.2.2) vocational learning, (5.2.3) participatory adaptive learning, and (5.2.4) holistic learning.

5.2.1 Experiential learning

Experiential learning – associated with 'learning by doing', 'hands-on' or 'real life' learning – is considered to be integral to food growing and garden-based learning (see 2.3.3.2 and 2.4.2). As noted in 2.4.4.3, experiential learning plays a role in supporting school-community links. Although it is associated with apprenticeship learning, the two should not be conflated (see 5.2.2).

Experiential learning is evident in all sites (see 4.1.2.3, 4.2.2.4, 4.3.2.7). It is an approach advocated by Farmers of the Future in southern Africa (see 2.3.4.1), and by the Garden Mosaics programme (see 2.3.4.3). In the context of this study, experiential learning is discussed in terms of garden-based, place-based and informal learning.

5.2.1.1 Garden-based learning

GBL is not a formally accepted 'pedagogy' per se, but enables a broader learning experience (see 2.3.3.2). It is evident in all study sites in terms of food growing, working with soil and water, caring for living things, harvesting and making constructive use of produce. It is also associated with demonstrations, interviews, reporting, community mapping and exploratory learning (see 4.3.2.7). Some teachers feel intimidated by the lack of structure when facilitating garden-based learning activities that are not formally linked to the mainstream school curriculum (see 4.3.2.7).

Schools have become sensitive to issues surrounding use of child-labour, and the misconstruing of ‘working in the garden’ as experiential learning (see 2.3.2.1). As noted in 2.3.3.2, short periods of non-intensive work in a garden are considered acceptable, provided that it does not harm health or prevent school attendance (FAO 2007: 12). In some respects, this appears to undermine opportunities for longer periods of hands-on learning in a garden setting.

In New York, GBL appears to foster intergenerational learning, and to a lesser extent intercultural learning. In southern African settings, this does not generally appear to be the case. This is discussed further in 5.2.3.1. As noted in 2.3.3, GBL and civic ecology offer a vehicle for drawing together food growing and education for sustainability. GBL appears to draw on different kinds of intelligence and engage scholars with social or learning problems. Various examples indicate that GBL provides experiences that are transferrable to other learning settings and help bring school-based or formal learning to life. It also has the potential to provide useful working examples of agricultural intensification for rural settings, and help children learn about food production (FAO 2007: 5). In southern Africa, however, the links between food, nutrition and health are not well understood, community and institutional support is limited, and monitoring and evaluation of school gardens is inadequate (*ibid*: 23).

Desmond *et al* (2002: 30, 71) and the FAO (2007: 7) noted how many schools invest efforts in establishing infrastructural support and strategies to sustain their sporting facilities, but ignore school gardens, presumably because they are a burden to “the creative energies of staff, parents, and community volunteers”. To overcome this issue, it was suggested that the school garden be treated as one of the educational resources of the school system, which is budgeted for as part of the school operating costs. However, findings indicate that teachers who manage school gardens do not necessarily have the skills and knowledge required. Furthermore, poor management of the garden, or treating it as an educational resource only, could serve as negative role-modelling (see also 5.2.3.3). Based on findings in New York, there is merit in exploring the educational value of learning linked to existing community-based food growing activities in southern Africa, rather than artificially created school gardens (see 2.4.4.5). This is raised again in 6.3.1.

5.2.1.2 Place-based learning

In densely urbanised settings in New York, gardens also offer a natural outdoor setting for environmental learning (see 4.3.2.7). This can support the development of a ‘sense of place’ in the form of an ‘ecological identity’ (see 2.4.3). By contrast, in some southern African settings, ‘outdoor learning’ may be necessitated by limited indoor space for large school classes, and thus have negative connotations.

The quality of a setting, or place, will influence the quality of learning in that place. As noted in 2.2.7 and 2.2.4, food growing and urban agriculture play a valuable role in ‘place-making’, and hence in creating safe neighbourhoods, as well as community development and ecological restoration. Findings in New York suggest that the garden is a neutral socio-cultural setting that provides a safe and nurturing place for community engagement, youth empowerment, and spiritual development and healing (see 4.3.2.1, 4.3.2.5 and 4.3.2.6). It also provides an informal setting where scholars may draw on the knowledge and skills of gardeners and other community members (see 2.4.4.3). As noted in 2.2.2.1, community-based or local knowledge and culture is linked to a particular place.

It has been proposed that learning for sustainability is limited by lack of community cohesion, and that education that enhances relationship to the social fabric will improve a community’s ‘relationship to the environment’ (sense of place), thus promoting sustainability (see 2.4.3 and 2.4.4.6). It may be assumed that where there is evidence of indifference to the local ecology and human ecology – for example, littering, indiscriminate use of water, or disposal of waste substances into a river (see 4.2.2.8 and 4.3.2.11) – there is a need for community-building to enhance a sense of connection to place. This is discussed further in 5.2.3.3.

It is acknowledged that transfer of educational theory and practice from one context to another is limited by socio-cultural and structural differences. An educational programme can provide core values, principles and learning resources from which educators can choose and adapt according to the school or community’s needs (see 2.4.4.4). On the other hand, there is potential for a food growing context to stimulate fresh consideration of biophysical, social, political and economic factors. In New York there is some evidence of an emerging ‘socially and ecologically critical’ place-based education. Scholars are encouraged to ‘re-inhabit’ place, by reconnecting with nature and ecological processes; this resonates with an asset-based approach to learning (discussed in 5.2.3.3), which may have merit in the southern African context (see 6.3.3 and 6.3.5). In some settings, scholars are encouraged to rise above colonial influences that have created systems of human oppression and led to cultural and ecological alienation, as described in 2.3.3.2 – a form of ‘decolonisation’. However, overemphasis on the impacts of oppression might foster a sense of blame, divisiveness, powerlessness and inaction, drawing attention to social deficits rather than assets.

5.2.1.3 Informal learning

Community food security concerns are seen to be experience-based, rather than curriculum-based (see 4.3.2.7). The findings indicate that in many cases, preference is shown for an informal approach to education, with an emphasis on the affective dimensions of learning, relationship-

building, and culture. Where garden-based activities are linked to the formal school curriculum, there appears to be a lower likelihood of community involvement in children's learning processes, and hence weakened school-community links. Significant environmental learning experiences that take place outside of the formal school curriculum are considered to be readily transferable to formal learning programmes (see 4.4). The Garden Mosaics programme is seen to provide structure for informal education activities in New York (see 4.3.2.7). As noted in 2.4.1, the distinction between informal *education* and informal *learning* draws attention to the intentionality of education compared with incidental learning that occurs during any education process, as well as in participatory activities (see 5.2.3).

5.2.2 Vocational learning

Findings in New York indicate that youth empowerment and employment form significant components of GBL, often in the form of youth internship programmes (see 4.3.2.5 and 4.3.2.8). This supports the development of technical and vocational skills – which is associated with ‘apprenticeship learning’. Vocational schools – considered to be a type of ‘community school’ or ‘charter school’ – are seen as a way of preparing scholars for further technical training at a tertiary level (see 4.3.2.8). Findings in southern Africa indicate that vocational learning – in the form of food growing and business skills – is in some evidence (see 4.2.1 and 4.1.1). However, a recent study highlighted the poor integration of food production and learning, and the need to improve practical nutrition, environmental practices, business skills, and life skills (Sherman 2007: 2). Vocational learning is taken up again in 6.3.2.

As noted in 2.4.1, vocational learning has been associated with ‘curriculum as product’, and an economic system of division of labour. While this may equip scholars with technical and vocational knowledge and skills, it would seem that a holistic approach would promote a broader understanding of the complexity of social and ecological processes, and support informed and committed action (see 3.1.2.2, 5.2.4 and 5.3.4.2). This is associated with ‘curriculum as praxis’, which would include consideration of theoretical constructs, implementing and evaluating their relevance, and adjusting them in accordance with considerations of empirical reality (see 2.4.1).

5.2.3 Participatory adaptive learning

Consideration is now given to factors that foster socio-ecological resilience and learning for sustainability. These include (5.2.3.1) diversity, (5.2.3.2) the role of participation and civic engagement, and (5.2.3.3) adaptive learning and transformative action.

5.2.3.1 Diversity

Diversity is considered to be a key ingredient of resilience, which in turn underpins sustainability, as noted in 2.3.3.1. The more diverse a community, the more ‘social assets’ it is considered to

have, and hence the richer its educational potential (see also 5.2.3.3). In this section, discussions focus on diversity in terms of drawing on complementary forms of knowledge, learning between generations, and the potential and pitfalls of the multicultural project, parallel learning and assimilative learning. In closing, consideration is given to ontological and normative thinking, cultural negotiation and cultural criticism.

Complementary forms of knowledge: Findings indicate that there is integration, to varying degrees, of complementary forms of knowledge (also discussed in section 5.3) in educational practice (see 4.3.2.7). This has the potential to foster resilience, as noted in discussions of ‘citizen science’ (see 2.3.3.1). However, the process of debate, discussion and persuasion as a means of integrating empirical approaches (informed by science) and normative thinking (informed by cultural values) referred to in 2.3.3.1, is not generally evident in southern African contexts. This suggests that the relationship between experts and others – community members / citizens and children – is fairly new and that ‘civil society’ requires further development (see 5.2.3.2). This is raised again in 6.3.7 and 6.5.3.

Intergenerational learning: In New York, ‘youth empowerment’ projects enable young people to build social capital and engage in collaborative or participatory learning – a necessary ingredient of inter- and intragenerational learning (see 4.3.2.8). Examples include interviewing community gardeners, engaging in garden-related projects, and creating inventories of local resources through neighbourhood explorations (see 4.3.2.7 and 4.3.2.10). Garden-based school projects, shared gardens, and adult gardeners sharing their knowledge with and mentoring children in garden activities are all examples of how community gardening may be ‘extended’ into schools and school-community links strengthened. While this has potential in southern African settings, the authoritarian nature of traditional leadership and subordinate position of children tend to undermine intergenerational teaching and learning. Possible pedagogic responses include parallel learning, multicultural learning and assimilative learning, amongst others. These are discussed further below.

Multicultural learning: In pluralistic societies, different cultural perspectives are an unavoidable aspect of learning processes (see 5.1.3). It is apparent that food security concerns cannot be addressed independently of socio-cultural factors because of their complex interrelationship with agricultural practices, demographic trends and environmental degradation (see 2.4.4). Findings indicate that the Garden Mosaics programme promotes multicultural interactions in community gardens, but that social groupings involved in food growing tend to be relatively homogenous or ‘monocultural’. While emphasis is increasingly being placed on multiculturalism in learning for sustainability, its implementation presents both challenges and opportunities to the educator (see

4.3.2.4). In diverse and complex socio-cultural settings a wide diversity of vested interests, ideological agendas and values may generate social conflicts. An advantage of social and cultural diversity is that it serves as a larger ‘meme’⁶⁰ pool – to use Dawkins’ (2006) term – thus acting as a form of ‘insurance’ to help human society deal with diverse challenges. In the same way that genetic biodiversity increases an ecosystem’s ability to tolerate unexpected setbacks or perturbations, socio-cultural diversity increases human society’s ability to adapt to environmental changes, economic fluctuations and other disruptions. It is thus an essential feature of resilience (see 2.3.3.1).

Findings in New York suggest that the introduction of the multicultural project has emerged from the conscious decision of the individual who views different social and cultural perspectives not as threats but as opportunities for deeper and more challenging learning (see 4.2.2.5 and 4.3.2.4). In other words, it has emerged as a result of individual agency (see 5.1.1.2).

Parallel learning: In some settings, adults and scholars learn similar concepts in parallel (see 4.2.2.4 and 4.3.2.10). This may take the form of informal learning experiences where similar concepts are taught and reinforced through separate programmes for adults and children. For example, after-school programmes and youth internships, or community-based education and school-based adult programmes. This approach seems to be of particular value in socio-cultural settings where children and adults are hierarchically separated. However, it does not address the gaps or differences between cultures and generations. This is taken up again in 6.5.6.

Assimilative learning: As noted in 3.1.1.3, the ‘dominant’ (or hegemonic) cultural perspective in a society is seen to have ‘legitimacy’ and inevitably tends to have precedence over any other perspective (Denzin 1992: 150). Among cultural minority groups, assimilative learning processes may generate a sense of cultural loss, assimilation, cultural isolation, antagonism or ‘indigenisation’. This appears to be the case for various minority groups in New York who have found a cultural space of their own in community gardens (see 4.3.2.4). While the researcher is not conscious of this in other food growing study sites, there is merit in remaining critically conscious of the implications of cultural assimilation and the potential for a community garden to serve not only as culturally familiar setting but also to play a role in the ‘multicultural project’ discussed above.

Ontological and normative thinking: The findings of this research suggest that there is a gap between the theory and practice of multiculturalism, but that there is growing support for it in teaching and learning for sustainability. It appears that where the demographics of a school popu-

⁶⁰ The ‘meme’ refers to the cultural unit of human evolution. Although this concept is not well accepted among scientists, it is nevertheless a useful tool for engaging with the qualitative aspect of human evolution.

lation reflect cultural diversity, the school-community relationship has the potential to play a role in transforming multicultural theory into practice. This is taken up in 6.3.5

It was noted in 4.3.2.4 that the absence of multicultural interaction in a particular setting does not have to be treated as a precedent for future dynamics. It is not logically coherent to base a normative statement – such as, ‘multicultural interactions *should* not exist’ – on a statement of perceived reality (an ontological view), such as, ‘multicultural interactions *do* not exist’. The success of the multicultural project depends, in large part, on whether or not it is perceived to meet societal needs, and if a society is ‘ready’ for it. Visionary thinking and idealism have played an important role in facilitating constructive social change. An often-quoted example is the role of gender activism in the 19th century, one of the earlier social justice movements. This example indicates how a paradigm shift among a few thoughtful individuals can lead to an ontological shift in society.

Cultural negotiation: In some southern African settings agroforestry technologies are promoted to older people who do not understand the principles but who have nevertheless been practicing aspects of it for many years (see 4.2.2.5). It would appear that a certain amount of cultural negotiation takes place in order to ‘sell’ the concept of agroforestry to such communities. It is not clear whether there is a ‘dominant’ cultural perspective to which other views cede – as suggested in 3.1.1.3.

In educational settings, cultural negotiation is premised on the view that school is a cultural phenomenon and a place where different cultures meet, negotiate and generate new cultural identities. From this perspective, cultural change or evolution is a form of narrative, and education serves as a process for “culture-in-the-making” – a form of cultural constructivism (Stairs 1994: 156), as noted in 2.4.2.2 and 2.4.4.4. The focus is on developing human potential to negotiate and create a shared culture, which is more affirming and inclusive than ‘assimilative learning’. This concurs with findings in food growing settings in New York, where a focus on creativity promotes empowerment and the development of social capital (see 4.3.2.1 and 4.3.2.5). Planting, caring for living things and harvesting produce provide opportunities to develop skills in communicating and resolving differences through participatory activities. While it is not certain how effective this is in pluralistic societies, it may be that community-building and participatory activities help build *shared* cultural capital and stimulate civic engagement and learning for sustainability. Following the principles of symbolic interactionism (see 3.1.1.2 and 3.1.1.2), society may be seen a dynamic process in which actors engaged in social interactions are constantly shaping culture – “the consensus developed by people” over time (Charon 2001: 18, 24-25). This social transformative action is discussed further in 5.2.3.3.

Cultural criticism: It is possible that ‘multicultural education’ may represent a ‘mythology of culture’ in that it is subtly dominated by hegemonic cultural norms (see 3.1.1.3). Denzin’s (1992: 129-130) interactionist cultural criticism – presaged by Cornel West’s ‘prophetic pragmatism’ – is based on a “*creative democracy ... [of] critical intelligence and social action*” and an *optimistic* outlook for the socially ‘downtrodden’ (*ibid*: 131). There appears to be widespread social and political engagement in dealing with the realities of those who do not have food, shelter or health care, as well as with environmental concerns. However, findings in some settings indicate limited evidence of ‘mediated knowledge’ through a ‘culture of participation’. Generally, there seems to be a growing awareness of the need for participatory processes that take socio-cultural diversity and different forms of knowledge into account in learning to adapt in the face of change and uncertainty (see 2.3.3.1). This is discussed further in 5.2.3.2 and 5.2.3.3, and also in 5.3.1, 5.3.2 and 5.3.3.

It is difficult to ascertain the levels of critical consciousness in society or to what extent cultural, economic and political hegemony are challenged. Shor (quoted in Boyce, 1996: 4) asserted that critical consciousness is characterised by “power awareness, critical literacy, permanent desocialization, and self-education / organisation”, and aims to nurture a passion not only for the community and public life, but also for “justice and a concern for the environment”. As such, it would be a facet of both critical pedagogy of place (see 2.4.3) and of community organising which is discussed in 5.2.3.2.

5.2.3.2 Participation and civic engagement

In this section, discussion focuses on participatory approaches to learning, civic engagement, learning communities, and community organising. The role of contextualised curriculum is briefly discussed.

Participatory learning: Findings indicate that the food garden offers a nurturing and uncompetitive learning environment where school and community can engage in participatory learning, drawing on concrete examples and direct experience, as well as abstract instruction (see 2.4.4.4). Where there is community participation – by citizens or experts – formal school-based learning may be enriched by their food growing knowledge and skills (see 4.3.2.8 and 4.3.2.10). Where attempts to draw communities into school-based learning activities are unsuccessful (see 4.1.2.6 and 4.2.2.5), scholars are unlikely to benefit from community-based knowledge or resources. In both cases, this appears to be influenced by the presence/absence and functionality of social networks (see 5.1.3) and cultural and socio-emotional capital (see 2.4.3 and 5.2.3.3).

Formal, structured school-based learning is unlikely to be participatory, although it is possible to find examples of ‘participatory window-dressing’ with predetermined learning outcomes. As noted in 2.4.1, participatory educational activities are, by their very nature, informal, unstructured and contextualised. The use of contextualised curriculum in the school setting is discussed below in this section. The topic is raised again in 6.3.8.

Civic engagement: It was noted in 2.4.3 and 2.4.4 that learning for sustainability is undermined by poor community cohesion. It was suggested in 2.3.3.1 that civic engagement, also referred to as participation,⁶¹ offers a meaningful educational approach to promoting democracy and resilience – qualities considered essential for a sustainable society. Tools that appear to facilitate participatory learning and civic engagement in the USA include interviewing and community mapping, especially where adults are willing to advise and assist children in the garden (see 4.3.2.7 and 4.3.2.10). The Eco-Schools programme is cited as an example of civic engagement, although in southern African settings where democracy is still young, this is uncommon. There is reason to believe that sustainable solutions to poverty, discrimination and exclusion lie in civic engagement, as noted in 2.3.3.1.

Voluntary associations (‘associational life’, for example, between parents, food growers and volunteers) foster values such as tolerance and cooperation which underpin democratic life. Institutional collaboration (the ‘good society’, for example, schools, NGOs and research institutions) supports collaborative efforts between diverse stakeholders working towards shared goals. Unmediated associational life faces the risk of spiralling into oppression or conflict because both ‘despots’ and ‘democrats’ are equally free to express their diverse values and beliefs – based on different ideologies, cultural backgrounds, political affiliations, religious persuasions, race, gender or age. Edwards (2005: np) asserted that argument and deliberation in the public sphere would work across associational life and institutional collaboration, to mediate between different perspectives, help develop shared interests and find consensus in terms of actions to be taken. In settings with fledgling democracies, ‘civil society’ requires development in unthreatening, politically neutral examples of the ‘public sphere’. A food growing setting has the potential to serve as an example of a healthy associational ecosystem where mediation between voluntary associations and institutional collaboration can take place, focusing on shared concerns of food security, nutrition and health.

Learning communities: As noted in 5.1.1.2, school-community links promote a broader learning community. Drawing on the notion of a learning organisation, the capacity for team learning may

⁶¹ Krasny and Tidball (2006-b: 1) asserted that, “participation refers to self-organization in social-ecological systems, and to civic action on the part of youth and other community members”.

be described “the process of aligning and developing the capacities of a team to create the results its members truly desire” (Senge quoted in Smith 2001-b: np). This resonates with civic engagement, where individual and collective action is based on the ability to both identify and address community concerns, for the common good. In order to bring to light stakeholders’ perceptions of a better future, there is also a need for real dialogue, or “thinking together” – being “open to the flow of a larger intelligence” to generate what the physicist Bohm termed “collective thought” (in *ibid*). Team learning also requires an ability to recognise the factors that prevent this process (*ibid*). While traditional leadership uses authoritarian control and standardisation, a learning community would opt for “*partnership and choice*” (Koehler quoted in Smith 2001-b: np). In this context, it may be noted that those “who see themselves as stewards will choose *responsibility* over entitlement and hold themselves *accountable* to those over whom they exercise power” (*ibid*).

Community organising approach: Findings in Malawi suggest that principles of community organising were applied in terms of consultation with acknowledged community representatives – in this case, traditional leaders (see 4.2.2.5). In New York, food growing and related learning activities appear to involve community organising, including youth empowerment programmes (see 4.3.2.6 and 5.1.1.1). Key to promoting empowerment is the ‘iron rule’ of community organising, “Never, ever, do for people what they can do for themselves” (Rogers 1990: 15). Conscious efforts to build relationships, create alliances in solving problems, and taking action appear to have much in common with civic engagement (discussed above), in promoting participatory learning in food growing settings.

Contextualised curriculum: If the socio-cultural milieu (see 5.1.1.5) and other contextual factors – considered to be elements of the ‘hidden curriculum’ – can be made explicit and drawn into classroom practice, it will no longer be part of a ‘hidden curriculum’, according to Smith (1996/2000: np). Implementation of a ‘contextualised curriculum’ will thus enable a ‘contextualised social process’ (*ibid*). Contextualised learning – as an unstructured or informal form of education – tends to be participatory (as noted in 2.4.1) and hence social by nature. It is possible that in the process of laying cultural diversity open to scrutiny, the aims of the multicultural project may be undermined. However, as noted above, mediation between diverse perspectives to create a shared culture of environmental learning has the potential to provide sustainable solutions for food security, nutrition and health. This is taken up in 6.3.8.

5.2.3.3 Adaptive learning and transformative action

Adaptive learning is essential in developing adaptive capacity. It draws on socio-cultural diversity and different forms of knowledge (see 5.2.3.1) and participatory processes (see 5.2.3.2). In

this section, discussion focuses on the role of asset-based learning, self-help approaches, empowerment through choice and decision-making, critical thinking and reflection, and consequential thinking. Discussions conclude with a brief consideration of transformative action.

Asset-based learning: Findings indicate that responsibility and empowerment are promoted by drawing assets from diverse sources and integrating them with a participatory approach to adaptive learning. Narayan (2000: 40) observed how assets function at the individual, household, and community levels, which depends on “the nature of the asset, the social context in which it is embedded, and the urgency of need”.

Poor people rarely speak about income, but they do speak extensively about assets that are important to them. ... Power relations among individuals and groups shape how such assets are controlled and used. The extent to which different resources can be mobilized depends directly on how power is shared within households, communities and other social institutions.

The four primary classifications of assets are *physical capital*, which includes land and material belongings; *human capital*, which includes health, education, training, and labour power; *social capital*, which refers to the extent and nature of social networks such as kin, neighbours, and associations; and *environmental assets* such as trees, forests, water, and non-timber products. (Narayan 2000: 39-40)

Expanding on earlier discussions (see 2.1.2 and 5.1.3), the plot or garden may be seen as a *physical asset*, the soil, harvested rainwater and plants in the garden are *environmental assets*, and human health, education and ability to work are *human assets*. The community members – those in the neighbourhood who make decisions, participate in food growing, teaching and learning activities, or act as mentors – constitute the *social assets*. This would include children, as the decision-makers of the future. Zohar’s (2005: 45) interpretation of capital – as material, social and spiritual⁶² (see 2.2.2.2 and Appendix Y) – has some merit in the educational context, especially where a holistic approach is adopted (see 5.2.4).

As observed in 4.3.2.8, the greater the diversity of a community’s social assets, the richer its educational potential. In the context of food gardening projects, diversity in terms of socio-cultural factors, community-based and scientific knowledge (see also 5.3.1 and 5.3.2), and educational processes may be drawn into adaptive learning and co-management processes that allow stakeholders to shape their own outcomes in seeking livelihood resilience. However, this asset-based perspective requires consequential thinking skills and the ability to recognise potentially sustainable practices. This is discussed further below.

Self-help approach: Findings indicate a growing focus on self-help approaches in food growing contexts (see 4.1.2.5). The rationale of this approach is as follows:

⁶² It should be noted that spiritual capital is reflected in the individual or organisation’s meaning, values and purpose, rather than in religious beliefs or practices.

The conventional entry point to a poor community is through the acknowledged leaders. Very often, the very poor within the community are left out in this development process. *Even in participatory approaches*, their voice is not heard. As a consequence, the needs of the very poor are ignored. On the contrary, in this approach, members of the community identify the very poor households in a community and the interventions start with them. (Kindernothilfe nd: np).

It appears to complement the community organising approach (see 5.2.3.2) and is an essential step in adaptive learning and developing socio-ecological resilience in poor communities. This is picked up again in 6.3.3 and 6.3.6.

Choice/decision-making and empowerment: Findings in this study indicate that decision-making and empowerment are critical ingredients in developing an interest in gardening, as well as a sense of self-esteem, and social skills (see 4.3.2.5). This has positive implications for strengthened school-community links, as noted by Gruenewald (2003-b: 621), who found that charter schools promote local participation and control. It also appears to be a central feature of a learning community (see 5.2.3.2). Of interest are similar findings in a recent study in southern Africa by the FAO (2007: 18), which reported that scholar decision-making relating to the implementation of GBL activities led to an increased sense of ownership in gardening projects. Similarly, at an adult level, “when farmers are involved in setting the research agenda, monitoring and evaluating different technologies or crop varieties”, there is an increased likelihood of accepting and implementing new agricultural technologies (FARM-Africa 2004: 15). This is also raised in 6.3.3 and 6.3.6.

Critical thinking and reflection: According to a garden-based study in the UK (see 2.4.2), scholars who are empowered make choices also develop critical thinking skills:

... the children at East School appeared to have a higher degree of involvement in the running of their school through the democratic and participative structures in place. The children appeared to be more confident and have more critical skills, i.e. they were more willing to question environmental practices in their school and suggest alternatives. Arguably, these critical thinking skills were better developed because of the responsibility they have been given to make creative choices concerning their own environment. (Owens 2004: 73)

A subtle difference between critical *thinking* (imaginative and creative, stimulated by art) and critical *reflection* (rational and scientific) emerged from discussions in New York (Eames-Sheavly pers comm September 14, 2006). This draws attention to the need for both rigour and creativity (see 4.3.2.5). Both critical reflection, which underpins rationality, and critical thinking, which underpins creativity, are required to imagine the potential socio-ecological consequences of various possible actions – hence the term, consequential thinking (see below). A transformation process that may help to bring this about will now be discussed.

Transformative action: This approach, evident in New York (see 4.3.2.6), draws on Martin Luther King Jr. and Mahatma Gandhi's principle of non-violent action, and shifts thinking away from the 'us versus them' approach (Wessels pers comm October 24, 2006). Embracing a vision for collective transformation through bold social change strategies, it focuses on equitable and sustainable communities which are "grounded in compassion and inclusive visions" and aims to (i) expose injustice, (ii) transform conflict into collaboration, and (iii) focus on what you are *for* – not what you are against (CTA nd: np). In educational terms, transformative action may be interpreted as a transformation of perspective, a paradigm shift:

... the process of becoming critically aware of how and why our assumptions have come to constrain the way we perceive, understand, and feel about our world; changing these structures of habitual expectation to make possible a more inclusive, discriminating, and integrating perspective; and finally, making choices or otherwise acting upon these new understandings. (Mezirow quoted in McGonigal 2005: 1)

It is possible that in southern African settings, a transformative action approach may stimulate critical consciousness of cultural, economic and political hegemony, and promote reconciliation and collaborative problem-solving to promote social and environmental justice. A challenge faced by educators is how to unlock tacit knowledge which is embedded in culture, mediate between and promote critical scrutiny of diverse socio-cultural perspectives, and foster a shared capacity for learning and adaptation.

Consequential thinking: As noted in 2.4.3, Orr (1992: 104) argued that if scholars learn about social injustice and ecological deterioration in an abstract context such as a classroom without doing anything about it, they will learn to accept practical incompetence as a part of their lives. In this study, it is not clear to what extent scholars are required to solve problems that have consequences outside of their academic performance, or whether garden-based learning activities explicitly stimulate consideration of the consequences of actions. However, findings suggest that hierarchical power relationships and outside intervention undermine the ability to take responsibility or build capacity for real and constructive action (see 4.3.2.8). This runs counter to the aims of ESD, to motivate and empower adults and youth to consider the environmental and social consequences of their actions, and make informed decisions for a more sustainable world (see 2.3.2).

Drawing the principles of symbolic interactionism (see 3.1.1.2), social action appears to be based on thinking or 'mind action' – symbols – to interpret the other's action (see 3.1.1.2). Mind action is prompted by discontinuity and problems; it enables problem-solving, in which the actor carefully considers what to do next, before embarking on a line of action (Charon 2001: 102-103). Mind action thus inhibits immediate action – in the sense of *postponement* – until the action has been planned (Meltzer quoted in Charon 2001: 103-104).

Consequential thinking⁶³ may thus be understood in terms of people who are ‘planners’ – they are ‘ethically motivated’ and plan their actions; they are in control of the ongoing act because they understand what they are doing and can rehearse what they are going to do before they do it (Charon 2001: 100-101). By contrast, ‘responders’ are ‘automaton-like beings’ who merely exhibit ‘behaviour’ (*ibid*; Dunne & Pendlebury 2003: 201). This brings to mind the German expression “konsequent”, meaning “logically consistent”, which implies that a logical connection is made between an action and its outcome. The ‘actor’ who applies rigour to his/her thinking will have a compellingly logical argument and exercise “choice and conscious control” (Troyer quoted in Charon 2001: 101). Dunne and Pendlebury (2003: 205) note the distinction made between ‘reasoning’ and ‘reasoner’ (p 205), and propose that (discerning) character and (sound practical) reasoning are mutually dependent in making judgments that prompt appropriate action (p 207-208). The German term “konsequent durchgreifen” – meaning “take rigorous action” – carries consequential thinking to its logical conclusion: *competent action*.

It may be concluded that education should include a focus on building good character and developing discernment, to build a citizenry that possesses practical wisdom. The ability to envision the logical outcome of a particular action on socio-ecological processes and hence whether it supports or undermines sustainability would be further supported by a holistic ethical perspective and approach to learning. This picked up in 6.3.10 and 6.5.5.

5.2.4 Holistic learning

Concepts emerging from this research indicate efforts in New York to promote holistic learning and provide committed facilitation (see 4.3.2.7 and 4.3.2.8). Holistic learning includes extra-curricular programmes and garden-related activities, integrating scientific and community-based knowledge, ecological literacy and spiritual growth (see 2.2.2.2, 2.4 and 5.1.3). This is congruent with Orr’s (1992: 100) vision of liberal education as a means of developing the ‘whole person’ – the development of the capacity for clear thought and compassion in recognising the interrelatedness of life. Furthermore, findings suggest that educational processes tend to be more successful when they cater for diverse learning styles (see Figure 2.5), including informal / contextualised / participatory learning and flexible non-formal education, as well as formal school-based education (see 4.3.2.1). It appears that complementary forms of learning enhance educational processes in food growing settings (see 2.3.1 and 2.4.2.4). For example, the structure of the Garden Mosaics programme complements informal, experiential learning processes, which often include a social component, as part of an after-school garden-based programme (see 4.3.2.7).

⁶³ The term consequential thinking was identified by Manning, in a discussion of emotional intelligence, as a proactive consideration of the consequences of ideas and actions, before action is taken (retrieved February 14, 2008, from http://www.successfactorynewsletter.co.za/Newsletter_11February2008.htm).

The different types of learning experiences in food growing settings seem to have links with various perspectives of ‘place’ (see 5.1.3). In this regard, Desmond *et al* (2002: 22) identified the (i) physiological-psychological (body/mind), (ii) sociological (interpersonal relations and cultural values), and (iii) physiographic (landscape of spaces, objects, persons, and natural and built elements). This in turn appears to have correlations with Wilber’s (1997: 19-20) holistic model of three major ‘truth domains’ (see 3.3.5). The psychological aspect coincides with the subjective truth and sincerity of ‘I’; the sociological coincides with the inter-subjective truth of ‘we’; and the physiological and physiographic coincide with the objective truth of ‘it’. This integration of subjective authenticity, socially constructed truth, and objective reality – which supports a holistic approach to teaching and learning – is referred to as a socio-ecological perspective (Miller 2000: np). A holistic understanding of socio-ecological processes and sustainability is supported not only by complementary forms of learning, but also by complementary forms of knowledge, including appropriate curriculum content. This will be discussed below.

5.3 Curriculum content influences school-community links, food growing activities and environmental learning

... knowledge and understanding of ecological processes provides us with the basis for a wiser, gentler and more rational relationship with the natural environment than is currently the case. Only the most ignorant, obtuse and short-sighted view would argue that we can afford to neglect the importance of healthy fully functioning ecological processes upon which we are so totally dependent for our existence (Patrick R Irwin 2001: 41).

Learning subject matter (curriculum content) will influence the nature of school-community links and garden-based learning. Similarly, the content of teaching and learning is informed by the resources drawn on by the educator, socio-economic needs, resources available, teachers’ and scholars’ interests and values, cultural practices and other contextual factors. As was noted in section 4.4, scholars are exposed to greater opportunities for environmental learning where they are actively engaged in garden-based learning programmes, as well as being exposed to rich content such as science and community-based knowledge and food growing skills. Curriculum content associated with school-community links and food growing activities is discussed in this section in terms of (5.3.1) formal knowledge, (5.3.2) community-based knowledge, (5.3.3) mediated knowledge, and (5.3.4) empirical grounding.

5.3.1 Formal knowledge

Garden-based learning is associated primarily with extra-curricular activities, both in southern Africa, and New York, and so is not generally associated with formal qualifications. This was also the finding of Sherman (2007: 9) and the FAO (2007: 25-26). In the USA, various after-school and garden-based learning programmes explicitly engage with scientific concepts such as

basic soil and plant physiology, the impacts of chemicals on ecosystems, and relevant practical responses required in the context of food growing (see 4.3.2.11).

The introduction of learning resources, such as the Garden Mosaics materials in New York and the Action magazine and various Share-Net educational packs and booklets in southern Africa, appears to provide some structure for learning associated with food growing (see 4.1.2.4, 4.2.2.5 and 4.3.2.8). These appear to follow the convention of the westernised schooling system, in that formal knowledge has been integrated into the curriculum using materials developed by experts. By contrast, use of locally available resources (TALULAR) in some southern African settings relies on teachers' interests and creativity (see 4.2.2.5). This may also be linked to the promotion of social capital and community empowerment (see 5.2.3.1 and 5.2.3.3). This is also taken up in 6.3.4, 6.3.6 and 6.3.9.

Formal knowledge contained in materials may be contextually relevant, and thus affirm experiential learning processes (see 4.3.2.7). However, educational intervention by outside agencies, if not sensitively managed, may result in the provision of books and other materials that are neither contextually nor culturally relevant (see 4.2.2.6). In this study, it is not clear whether any printed materials are developed as a result of a community-driven process.

In the USA, websites and digital materials such as DVDs are a popular 'formal' source of information for garden-based learning, as well as helping raise the profile of food growing projects (see 4.3.2.8). In southern Africa, use of websites and digital materials in the majority of school and community settings is undermined by limited skills or access to computers and the internet.

5.3.2 Community-based knowledge

Various food growing activities explored in this study include environmental technologies that may be based on local or community-based knowledge, such as composting, recycling and agroforestry. In some southern African settings, older people had been implementing agroforestry all their lives, for example, by intercropping with the leguminous Pigeon pea, *Cajanus cajan*, but without explicit knowledge of its principles (see 4.2.2.5). However, there is little evidence of older people mentoring younger people in this regard, in some cases, because they are unwilling to assist unless they are paid. This limits opportunities for scholars to draw on community-based knowledge through experiential and participatory adaptive environmental learning processes. It also appears to be a missed opportunity for strengthening school-community links.

Findings in New York indicate that community-based knowledge is drawn into learning processes in a variety of ways (see 4.3.2.7, 4.3.2.8 and 4.3.2.10). Some educators intentionally draw community members into their teaching and learning programmes at school, while others task

scholars with interviewing or assisting elders or gardeners through after-school programmes. This not only supports intergenerational and experiential learning, but also provides opportunities for scholars to learn folklore and personal stories, and thus experience the complementarity of formal/expert knowledge and informal/community-based knowledge (see 2.2.2.1). The latter is also referred to as ‘revered knowledge’ in New York (see 4.3.2.8), a term used to include the knowledge of those who have come to live in the area for a few generations, for example, ‘African Americans’ and ‘Latinos’. The term ‘revered’ seems to be appropriate where indigenous knowledge (IK) is viewed with uncritical acclaim.

Returning to the brief synopsis of IK in 2.2.2.1, the definition of IK as “a body of knowledge built up by a group of people through generations of living in close contact with nature” appears to exclude people living in urban areas. However, in the context of this research, evidence suggests that regular contact with living things in an urban or community garden enables an associated body of knowledge to develop. It is thus considered appropriate to favour the term ‘community-based knowledge’. It is also apparent that the boundary is somewhat blurred between so-called ‘formal’ or expert knowledge and ‘informal’ community-based knowledge (see 4.4). Each individual in a community has varying levels of formal and informal expertise, based on their experience and training, both of which are applied in formal settings and informal participatory settings such as a community gardens. The terms ‘experts-as-citizens’ and ‘citizens-as-experts’ seem to provide an apt reflection of this overlap.

Findings suggest that efforts to draw on community-based knowledge in food growing and associated learning in school-based learning are driven primarily by mainstream curriculum policy, materials developers, and teachers who use or adapt materials for this purpose. It is mostly implemented by teachers with sufficient interest, knowledge and skills in mainstream New York schools. In southern African settings, knowledge transfer between schools and communities is limited by the ‘generational gap’ and other socio-cultural factors (see 4.1.2.6), and some teachers lack confidence in their ability to incorporate community knowledge into formal classroom-based learning (see 4.1.2.3). In this regard, Eco-Schools members are supported through regular cluster meetings and a variety of materials developed by university-based experts (see 4.1.2.3 and 4.1.2.4). The material development initiatives appear to follow the same conventional procedures noted in 5.3.1.

In New York, opportunities are also provided for children to share their findings with the wider community through electronic media, such as the Added Value *Digital Horizons* project and ‘blogging’ on the Garden Mosaics website – uploading text, photos or videos onto the ‘web log’ (see 4.3.2.7). This provides opportunities to develop both computer technology skills and com-

munication skills, promote interactive learning, and creates a sense of ownership by ‘systematising’ scholars’ knowledge. In southern African settings, however, web-based learning is uncommon (see 4.1.2.4) and adults generally do not accept the notion of learning from the younger generation (see 4.2.2.7). At present, ‘blogging’ thus does not appear to be a culturally appropriate means of promoting environmental learning or school-community links in southern Africa.

The educational challenge is to find appropriate pedagogic techniques that unlock tacit knowledge embedded in culture, mediate between and promote critical scrutiny of diverse socio-cultural perspectives, and develop a shared capacity for learning and adaptation (see 5.1.1.2).

5.3.3 Mediated knowledge

As noted in 2.2.2.1, 2.3.3.1, community-based / local / traditional / ‘indigenous’ knowledge and formal / expert / science knowledge pertaining to food growing and related learning activities are, in many cases, complementary. However, in the context of school-community links associated with food growing, evidence of mediation between different cultural perspectives of knowledge is equivocal. It is not clear to what extent there may be debate, discussion and persuasion – or cultural criticism (see 5.2.3.1) – or integration of empirical and normative thinking to develop a ‘culture of participation’ (see 2.3.3.1 and 5.2.3.2). It also appears that the generational gaps referred to in 5.3.2 undermine efforts to mediate learning between older and younger generations. Skilled facilitation is probably required to integrate formal and community-based knowledge (of both adults and children), to promote effective environmental learning (see 4.3.2.7). This is raised in 6.3.5, and also in a suggestion for further research (see 6.5.3).

Examples in New York offer some possible strategies for other settings. The development of a local curriculum that is linked to the mainstream school curriculum, through intentional and carefully thought through collaborative processes, appears to stimulate community engagement and learning pertaining to local food plants, food growing and nutrition (see 4.3.2.7). Garden-based learning experiences in many cases inspire scholars to find out more about subject matter, thus engaging them in reading or conducting research on the World Wide Web (see 4.3.2.7). This is further strengthened where scholars are affirmed by teachers.

The land-grant university system in the USA serves both a source of expertise and a forum for pooling the experiential knowledge of farmers and agriculturalists in rural and urban settings (see 4.3.2.9). In some southern African settings, the knowledge and skills of locals and foreigners is drawn into food growing programmes (see 4.2.2.5). However, such collaborative processes risk being undermined by affirmative action policies and radical emphasis on ‘decolonisation’ (see 5.2.1.2) – as described in discussions of a critical pedagogy of place (see 2.4.3).

5.3.4 Empirical grounding

Community food security, nutrition and health are viewed primarily “experience-based”, as opposed to curriculum-based (see 4.3.2.7). This is also in line with the empirical approach of this study (see 3.1). It is considered educationally sound to ground learning experiences in the local context (see 4.3.2.7). An experiential approach to learning is embraced by the Farmers of the Future (see 2.3.4.1) and the Garden Mosaics programme (see 2.3.4.3), primarily through after-school activities (see 4.3.2.7). In the context of this research, garden-based learning allows the integration of direct experience and concrete examples, as well as abstract instruction (see 2.4.4.4).

Based on the symbolic interactionist approach, which is predicated on experience and social structure, the link between ontological reality and consciousness may be forged by communication and culture – to cite Denzin’s (1992: 164) emphasis (see 3.1.1.3). Similarly, the dichotomy between expert and community-based knowledge might be overcome through cultural negotiation or criticism (see 5.2.3.1) to enable the integration of empirical and normative thinking for more effective engagement with issues of food security, nutrition and health.

5.3.4.1 Biophysical processes

Findings suggest that insufficient attention is paid to principles of ecology and associated socio-ecological resilience in learning for sustainability. In most cases ecological illiteracy or indifference to the local socio-ecological system is evident (see 4.2.2.8 and 4.3.2.11), although a degree of ecological literacy is expressed in some study sites (see 4.3.2.11). It is unclear to what extent ecological literacy is fostered through food growing technologies that are ecologically based (see 2.2.3.1).

Food growing and related learning with an environmental agenda in and of itself does not necessarily result in a better understanding of the environment and/or ecological processes. Content relating to environmental concerns in curriculum-based learning is brought to life through first hand and real-life experiences of living processes (see 2.3.3.2 and 4.3.2.11). In this study, garden-based learning (GBL) (see 2.3.3.1) and agroforestry practices enable direct experience of real-life biophysical processes, which may be complementary to school-based learning and transferable to other learning settings (see 4.3.2.7). However, it does not seem that there is much engagement with the principles of ecology or recognition of the interdependence of human activities and ecosystems (see 3.1.2.2).

5.3.4.2 Consequential action

Projection of the consequences of human activities and how these may compromise ecological processes – termed consequential thinking (see 5.2.3.3) – requires a holistic understanding of systems and processes. It has been suggested that civic ecology education and GBL would draw together education for sustainability and food growing. For example, it may entail participatory GBL processes, drawing on socio-cultural and knowledge diversity, and creating opportunities for self-organisation, to build socio-ecological resilience (see 2.3.3).

It is clear that skilled and committed facilitation is required to link the nature of learning subject matter with the outcomes of human actions in terms of ecological principles. Similarly, it is important to cater for diverse interests and provide support at many levels in order to integrate formal, non-formal and informal knowledge systems (see 4.3.2.7).

5.4 Emergent concepts: a synopsis

The central theory [of curriculum] is simple. Human life, however varied, consists in the performance of specific activities. Education that prepares for life is one that prepares definitely and adequately for these specific activities. However numerous and diverse they may be for any social class they can be discovered. This requires only that one go out into the world of affairs and discover the particulars of which their affairs consist. These will show the abilities, attitudes, habits, appreciations and forms of knowledge that men need. These will be the objectives of the curriculum. They will be numerous, definite and particularized. The curriculum will then be that series of experiences which children and youth must have by way of obtaining those objectives (Franklin Bobbitt quoted in Mark K Smith 1996/2000: np).

The emerging themes have been considered in this chapter in terms of place, pedagogy and content and their reciprocal influence with school-community links.

Place, or **contextual factors**, influence school-community links, food growing activities, and environmental learning. This includes the place in which food growing occurs, the incentives for growing and/or harvesting food plants, and the impact of formal learning on scholar's futures. Income generation and food security provide strong incentives for food growing in all three study sites.

The **pedagogic approach** adopted influences school-community links, food growing activities and environmental learning. The nature of teaching and learning, whether formal or informal, plays an important role, as do learning support materials and intergenerational learning and mentoring. Experiential learning – including garden-based, place-based and informal approaches – is integral to learning associated with food growing. It is also a cornerstone of vocational learning. In the context of participatory adaptive learning, diverse worldviews evident in multicultural societies present challenges to the educator.

Curriculum content influences school-community links, food growing activities and environmental learning. There is evidence of complementarity between scientific knowledge and community-based knowledge, mediated knowledge and empirical grounding.

These strands will be considered in more detail in the next chapter, together with a conceptual framework, and tentative suggestions regarding the implications of the findings.



6. CONCLUSIONS

Environmental education should 'illuminate the essential idea that all cultures have a relationship with the natural world which they and all others can draw upon for understanding and inspiration' (Running-Grass quoted in Wei Fang 1995/1997: np).

In this final chapter, general conclusions (6.1) are presented as a synthesis of theoretical concepts emerging from this study in terms of pedagogy, place and subject matter. This is followed by a diagrammatic portrayal of the emergent concepts in the form of a conceptual framework (6.2) for teaching and learning for sustainability supported by school-community links and food growing activities. A number of tentative propositions regarding the implications of the emergent concepts are put forward in section 6.3, with a focus on particular aspects that may possibly be applicable to the southern African contexts. In section 6.4, personal reflections on the limitations of this research are considered in terms of the research results and methodology. This leads into section 6.5, in which a number of future research directions are considered.

6.1 General conclusions: a synthesis

Genuine power can only be grown, it will slip from every arbitrary hand that grasps it; for genuine power is not coercive control, but coactive control. Coercive power is the curse of the universe; coactive power, the enrichment and advancement of every human soul
 (Mary Parker Follett 1924: xiii).

Help a man when he is in trouble and he will remember you when he is in trouble again (Anon).⁶⁴

The 'iron rule' of community organising:
Never, ever, do for people what they can do for themselves (Mary Beth Rogers 1990: 15).

Findings of this research confirm that contextual factors (section 5.1) influence the nature of school-community links, food growing activities and environmental learning. Socio-cultural factors (5.1.1) – which are an element of the 'hidden curriculum' – play a role in determining what motivates food growing, for example, income generation, food security, empowerment and well-being. Of particular significance are ethical perspectives, which are linked to levels of understanding regarding how human and environmental health and wellbeing are interrelated. Food growing and related learning activities are influenced by the nature of organisational structure. This includes consideration of the levels of community support, and the dynamics of partnerships as well as rivalry and hierarchy. Of particular significance are considerations of agency and structure, especially with regard to the potential impact of institutionalisation and its role in creating a culture of dependency. School-community links and related food growing and learning activities rely on a functional biophysical environment, as well as infrastructure and economic re-

⁶⁴ Retrieved August 29, 2008, from <http://www.unixgirl.com/quotes2.html>

sources. These were discussed in terms of structural factors (5.1.2). Consideration of contextual factors also includes the role of place (5.1.3) in terms of physical, spiritual and socio-cultural capital and the sense of 'place' that is engendered. Evidence suggests that a food garden offers a relatively neutral setting in which a sense of place may be fostered through school-community links. This draws attention to the role of place-based learning in food growing settings.

A number of insights emerged with regard to pedagogic strategies (section 5.2) and their influence on school-community links, food growing activities and environmental learning. The case for garden-based learning (GBL) is considered within the framework of experiential learning (5.2.1), a formally accepted pedagogy. There are various benefits associated with GBL, including the potential to link learning to existing community gardens, as is the case in various New York study sites. This offers potential solutions to issues associated with managing gardens in southern African sites where gardens are established in school grounds under somewhat contrived circumstances. It offers a tangible, real-life setting in which place-based learning might adopt a more socially and ecologically critical approach. It also provides opportunities for informal learning bearing in mind that food security concerns are grounded – not in formal school curricula but – in real life experience.

Consideration of vocational learning (5.2.2) reveals that it has potential in preparing scholars for adult life, but also has certain limitations. For example, theoretical understanding of concepts relating to nutrition, economics and environmental considerations may be overlooked where the focus is primarily on the development of technical skills.

Discussions pertaining to participatory adaptive learning (5.2.3) reveal a number of complex threads. Participatory practices, by their very nature, engage with issues surrounding diversity (5.2.3.1) – a factor that is also viewed as an essential ingredient of socio-ecological resilience. Diversity presents challenges such as the integration of 'expert' and community-based knowledge (which in many cases may be complementary), intergenerational learning, and multicultural learning. In hierarchically structured societies, 'parallel' learning programmes for different groups may promote a separatist agenda, while an 'assimilative' approach may absorb minority groups into the dominant cultural group. Gaps between the theory and practice of multiculturalism raise some issues, including the logical limitations of grounding normative thinking in existing ontological states. The relative merits of cultural negotiation and cultural criticism are considered with a view to building shared cultural capital, stimulating civic engagement and learning for sustainability.

A second thread that emerged in relation to participatory adaptive learning is the role of participation and civic engagement (5.2.3.2). This draws attention to the potential contradictions inherent in masquerading learning processes as ‘participatory’ in formal education settings. Consideration is given to the role of civic engagement in developing ‘civil society’, especially in the context of a young democracy. This brings to mind the notion of a ‘learning community’, and the potential of the ‘community organising’ approach in food growing settings in promoting individual and community empowerment. The brief consideration given to the role of curriculum in ‘contextualised social processes’ leaves unanswered questions, including its potential conflict of interests with the multicultural agenda.

A third thread emerging from discussions of participatory adaptive learning is the role of adaptive learning and transformative action (5.2.3.3). This opens with a consideration of asset-based learning, which is linked to the concept of consequential thinking. The food garden is identified as a form of physical capital where school and community – as diverse social assets – may draw on human capital and environmental assets. An adaptive learning process appears to be especially significant for a self-help approach, together with empowerment. It would appear that the extent to which scholars – or community members – are drawn into decision-making will determine their level of buy-in and commitment to food growing activities. Empowerment also appears to enhance critical thinking and reflection, which may serve as a necessary springboard for transformative social action and critical engagement with hegemonic cultural, economic and political structures. Socio-cultural transformation may enable consequential thinking, and thus promote sustainable practices.

Holistic learning (5.2.4) emerged as a final factor in the context of pedagogic strategies pertaining to school-community links, food growing activities and environmental learning. It is apparent that learning which embraces subjective, social and objective truths (see 3.3.5) will promote the development of the whole person in line with a socio-ecological perspective.

In the final strand of discussion, attention is given to the role of curriculum content (section 5.3) in school-community links, food growing activities and environmental learning. Formal knowledge (5.3.1) – generally associated with the input of experts and a westernised schooling system – is apparent in all settings. It is also instrumental in the incorporation of community-based knowledge (5.3.2) into ‘contextualised’ learning support materials. This should alert the reader to a blurring of boundaries between ‘expert’ and ‘informal’ or community-based knowledge, exemplified in the terms ‘experts-as-citizens’ and ‘citizens-as-experts’. The complementarity of formal or expert knowledge and informal or community-based knowledge is apparent, but there is little evidence of ‘mediated knowledge’ (5.3.3). This may be due to generational gaps, an emphasis on

exorcizing knowledge associated with a previous oppressive political system, or lack of skilled facilitation. In the final analysis, evidence draws the focus back to the importance of empirical grounding (5.3.4), including the principles of ecology and the consequences of human activities in terms of functional ecosystems.

The framing of emergent concepts in terms of place, pedagogy and curriculum content is illustrated in the conceptual framework in the next section.

6.2 Conceptual framework

... conventional notions of accountability are problematic because they fail to recognise the mediating role that schools play in the production of space (or social context) through the education of place makers (or citizens) (David A Gruenewald 2003-b: 620).

The conceptual framework represented in Figure 6.1 emerged partly through discussion with colleagues but mainly through ongoing engagement with the findings. It is represented as an **Ecological Learning Community** (ELC) that is nested within the broader context of the biophysical sphere, upon which the socio-cultural and economic spheres are dependent – as indicated in the lower figure, which refers back to the model of ‘strong sustainability’ in which the economic and socio-political are aligned with the biophysical sphere (see Figure 2.3). An *Ecological Learning Community* may be seen as the manifestation of school-community links – the central theme of this research – around which the dynamics of *pedagogy*, *place* and *content* intersect in a dialectical process of reconciliation and contradiction in learning for sustainability.

The **PLACE** of learning has physical, socio-cultural and spiritual attributes which, in the context of this research, are articulated through **community**, **school** and **food garden**. Interconnected with *place*, **PEDAGOGY** makes use of **participatory** processes, drawing on social and cultural **diversity** as well as community-based knowledge and scientific expertise, engaging in **adaptive learning** for resilience, as well as **experiential**, **vocational** and **holistic** learning to support the development of shared socio-cultural capital. A serendipitous outcome of this emergent conceptual framework is that the intersecting lenses of *pedagogy* and *place* have sharpened the focus on *content*.

The five-pointed star at the heart of this process represents the essential core **CONTENT** of teaching and learning for sustainability – the basic principles of ecology. This includes consideration of the type of dietary intake (**trophic levels**), the transfer of energy between these trophic levels (**energy flows**), cycling of elements and molecules throughout the system (**recycling**), the presence or absence of chemical and physical factors that provide appropriate conditions for life (**limits**), and the impacts of dynamic processes and events (**change**).

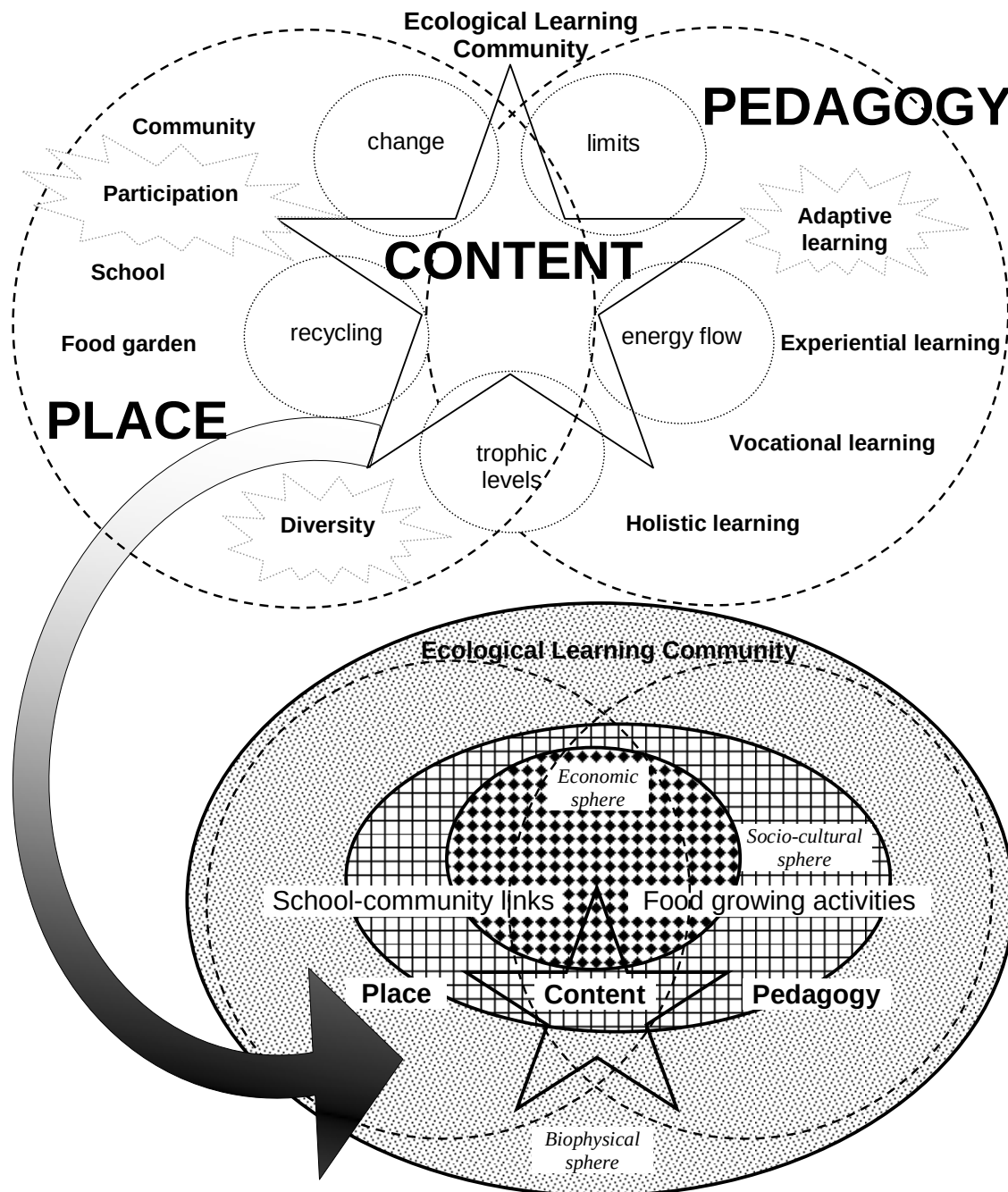


Figure 6.1: Diagrammatic representation of an Ecological Learning Community (ELC): a conceptual framework for teaching and learning for sustainability supported by school-community links and food growing activities.

The theoretical considerations that have emerged cannot be separated from practical considerations such as the need to address food security, health and poverty alleviation. This is congruent

with the symbolic interactionist framework, which recognises the theory of both social structure and experience, and the interpretive process through which meaning may be modified.

6.3 Applied conclusions

Learning cannot be designed. Ultimately, it belongs to the realm of experience and practice. It follows the negotiation of meaning; it moves on its own terms. It slips through the cracks; it creates its own cracks. Learning happens, design or no design. And yet there are few more urgent tasks than to design social infrastructures that foster learning. ... Those who can understand the informal yet structured, experiential yet social, character of learning – and can translate their insight into designs in the service of learning – will be the architects of our tomorrow (Etienne Wenger 1998: 225).

In this section, attention is focused on the implications of themes which appear to be of significance to the role of school-community links in supporting environmental learning through food growing. It should be borne in mind that findings in different sites cannot be generalised to all other situations, but that it is possible to draw on these cases and interpret them through different lenses and draw on aspects that resonate with a different context. Tentative propositions are made with regard to real-life learning in community food gardens (6.3.1), vocational learning (6.3.2), empowerment and self-help approaches (6.3.3), social capital, civic engagement and sense of place (6.3.4), multiculturalism and mediated knowledge (6.3.5), community organising (6.3.6), civil society (6.3.7), participatory contextualised learning (6.3.8), learning support materials (6.3.9), ethical perspectives (6.3.10), ecological learning (6.3.11), and in light of this, a refinement of an early definition of community (6.3.12).

6.3.1 Real-life learning in community food gardens

It was proposed in 2.2.2.2 that sustainable agriculture should address three key concerns: (i) food security, (ii) employment and income generation, and (iii) natural resource conservation and environmental protection. It is proposed that these considerations are applicable to food growing activities in general, as well as to garden-based learning – which aims to improve nutritional knowledge and skills, integrate learning, environmental understanding, community-building, and learning for sustainability (see 2.3.3.2). However, it is not clear to what extent schools promote sustainable food growing in communities, or whether education has had a significant impact on productivity and food security (2.4.4.2).

It has been suggested that learning is enhanced by engaging with concerns that have consequences outside of abstract classroom settings (see 2.4.3) and linking schoolwork to real-life issues that serve community interests (see 2.4.2.1). Research findings in New York support this assertion (see 4.3.2.3, 4.3.2.7 and 5.2.1.1). There is merit in exploring the educational value of

linking school-based learning to existing community-based food growing activities in southern Africa, instead of artificially created school gardens. See also 6.5.1.

6.3.2 Vocational learning

The potential of the food garden to serve as a ‘learning community’ that provides a complex social setting in which members may develop personal and vocational skills, is recognised (see 2.4.2.2). Although this research found some evidence of vocational learning – in the form of food growing and promotion of business skills (see 4.1.1, 4.2.1 and 5.2.2), there seems to be poor integration of food production and learning pertaining to practical nutrition, environmental practices, business skills and life skills, according to a recent study in southern Africa (Sherman 2007: 2). Bearing in mind the assertion that practical competence is “an indispensable source of good thinking” which grows out of the friction between reflective thought (the abstract realm) and real-life problems (the concrete realm) (Orr 1992: 93), it would seem that a vocational and technical thread in the school curriculum may promote critical thinking skills.

6.3.3 Empowerment and self-help approaches

Empowerment and decision-making appear to be essential for developing and maintaining individual and community buy-in with regard to food growing projects (see 4.3.2.5). It offers a realistic channel for fostering adaptive learning and developing socio-ecological resilience in poor communities. In contexts where a culture of entitlement or cycle of dependency is evident (see 5.1.1.2), it would strengthen self-help approaches to community education and development (see 5.2.3.3), as well as complementing a community organising approach (see 5.2.3.2). Where a community is able to shape its own outcomes, with all stakeholders engaged in an asset-based approach to ‘adaptive co-management’, this offers the potential to foster environmental learning and consequential thinking (see 6.3.11).

Income generation appears to be a common incentive for food growing activities in all study sites (5.1.1.1) that may facilitate empowerment. However, findings in southern African settings suggest that children are not generally drawn into decision-making processes (see 4.1.2.6, 4.2.2.7 and 5.1.3). This concern is addressed in 6.3.5.

6.3.4 Social capital, civic engagement and sense of place

It was asserted in 2.3.3.1 that civic engagement is essential to finding sustainable solutions to poverty and social inequity. Evidence suggests that poor community cohesion and lack of civic engagement undermine learning for sustainability (see 2.4.3, 2.4.4 and 5.2.1.2). Literature surveyed suggested that neighbourhood ties (a form of social capital) promote a sense of attachment to place and stimulate civic engagement, as does cultural capital (see 2.4.3 and 2.4.4.4). The findings of this study suggest that participation in food growing activities and social capital are mu-

tually supportive. Social capital also seems to be promoted where creativity and decision-making are encouraged (see 2.3.4.3 and 2.4.3, 2.4.4.4 and 4.3.2.5).

It is proposed that education that enhances relationships to the social fabric will improve a community's 'relationship to the environment' (sense of place), thus promoting sustainability (see 2.4.3 and 2.4.4.6). Drawing on Edwards (2005: np) view of civil society, a community food garden (the 'public sphere') may play a mediating role between the 'good society' (schools, NGOs and research institutions) and 'associational life' (parents, food growers and volunteers). See also 6.3.7.

6.3.5 Multiculturalism and mediated knowledge

There appears to be a gap between the theory and practice of multiculturalism, despite evidence of its promotion in teaching and learning for sustainability (see 5.2.3.1). It was suggested in 5.2.3.1 that cultural negotiation, or criticism, may overcome the dichotomy between expert and community-based knowledge and enable an integration of empirical and normative thinking (see 3.1.1.3). Similarly, it may address the dichotomy referred to in 6.3.3 which is evident not only between generations but also between gender and cultural groups – primarily but not exclusively in southern African settings (see 3.2.2.5, 3.5, 4.3.1, 4.1.2.6, 4.2.2.7, 4.3.2.1, 4.3.2.10, 5.1.3 and Appendix I).

It is proposed that where the demographics of school and community reflect cultural diversity, the school-community relationship has the potential to play a role in transforming multicultural theory into practice. Where diversity in terms of knowledge, cultural perspectives and educational processes is viewed as an asset, stakeholders are in a position to collaborate and engage in adaptive learning processes that promote empowerment and responsibility (see 5.2.3.3, 5.3.1 and 5.3.2). However, there is limited evidence of this in practice (see 4.3.2.4, 4.3.2.7 and 4.3.2.8).

Critical scrutiny of cultural norms in the context of food growing activities may be stimulated through a critical pedagogy of place (see 2.4.3). However, critical pedagogical approaches require skilled mediation in order to avoid a deficit-based focus on oppression and blame, resulting in divisiveness, powerlessness and inaction. It is more likely that a community organising approach will help build shared cultural capital and stimulate civic engagement and learning for sustainability (see 6.3.6 and 6.3.8 and also 6.5.3).

6.3.6 Community organising

The findings of this study suggest that formalised organisational structures do not necessarily have a positive impact on food growing activities (see 4.3.2.6 and 5.1.1.2). Institutionalisation and bureaucracy can undermine diversity, creativity, and critical engagement with issues, which

in turn inhibits adaptive learning and resilience in the face of change. This is of particular concern in southern African settings where authoritarian control and standardisation is in evidence (5.2.3.2).

It is proposed that in general, an informal social grouping has more options in terms of making empowering choices, consciously building relationships, creating alliances, solving problems, and taking action in its best interests – a ‘community organising’ approach (see 5.2.3.2). As a ‘learning community’, it will be in a position to participate in learning pertaining to local food plants, food growing and nutrition, mediate knowledge and collaborate in the development of ‘local curricula’ that are linked to the mainstream school curriculum (see 4.3.2.7 and 5.3.3). See also 6.3.9.

6.3.7 Civil society

As noted in 2.3.3.1, diversity is a key ingredient in fostering resilience. Findings indicate that debate, discussion and persuasion, as a means of integrating diversity in terms of empirical approaches (informed by science) and normative thinking (informed by cultural values), are not generally evident in southern African contexts (see 4.3.2.7 and 5.2.3.1). Complementary approaches to learning and diverse forms of knowledge in educational practice thus tend to be limited.

It is strongly suggested that intentional and carefully planned programmes focussing on community education and development would strengthen the relationship between citizens and experts, adults and children, masculine and feminine, and different cultural groups. This would not only enhance the role of school-community links in food growing activities in environmental learning, but also strengthen ‘civil society’.

6.3.8 Participatory contextualised learning

In the context of civic ecology education, it was noted that participation, also referred to as civic engagement, is a form of self-organisation and civic action in a socio-ecological system (see 5.2.3.2). Participatory educational activities are, by their very nature, informal, unstructured and contextualised, as noted in 2.4.1. It may be inferred that formal, structured school-based learning is thus unlikely to be participatory in nature, although examples of ‘participatory window-dressing’ with predetermined learning outcomes may often be found. This has implications for the interpretation of ‘contextualised curriculum’.

Contextualised learning – as an unstructured or informal form of education – tends to be participatory (as noted in 2.4.1). It was stated that if contextual factors such as the socio-cultural milieu – elements of the ‘hidden curriculum’ (see 5.1.1.5) – are made explicit and drawn into classroom

practice, a ‘contextualised social process’ is enabled. This raises questions regarding the impact on multicultural processes.

Following the principles of symbolic interactionism (see 3.1.1.2 and 3.1.1.2), participation in dynamic social processes leads to the development of consensus and a subtle shaping of culture. As proposed in 6.3.5, cultural negotiation through community-building and participatory activities may help build shared cultural capital and stimulate civic engagement and learning for sustainability (see 5.2.3.1).

6.3.9 Learning support materials

It is apparent that learning resources in various study sites provide some structure for learning associated with food growing (see 4.1.2.4, 4.2.2.5, 4.3.2.8 and 5.3.1). Such materials draw on the knowledge and skills of experts in formal educational institutions, in keeping with a westernised approach to learning. By contrast, use of locally available resources in some southern African settings (see 4.2.2.5) draws on individual educators’ interests and creativity.

It is proposed that the development of a local curriculum (see 5.2.3.2 and above in 6.3.6) would be enhanced by a ‘community organising’ approach that draws on intentional and consciously created alliances and efforts to mediate knowledge and address community concerns.

6.3.10 Ethical perspectives

As noted in 2.3.2, the connection between society’s ethical stance and the biophysical environment on which human livelihoods, food security, nutrition and health depend will determine the integrity of that system (see 2.3.2). A resilient and sustainable agricultural system that prevails in the face of climate change, wars, economic instability and other disturbances (see 2.3.3.1) is essential to the future of human society (see 5.1.2).

In most cases in this study, food growing and related learning activities focus primarily on economic and human health issues – an ‘anthropocentric’ perspective (see Figure 2.2). Explicit reference to science or environmental and natural sciences is also prevalent (see 4.2.2.4, 4.3.2.2, 4.3.2.7, 4.3.2.8 and 4.3.2.9, 4.3.2.11) – this may be interpreted as a ‘biocentric’ perspective. Where moral concern embraces all that exists, this may be interpreted as a holistic perspective (see Figure 2.2). A holistic ethic understands the total dependence of human livelihoods on a healthy and functional biophysical environment. This is informed by ecological literacy and consequential thinking (see 6.3.11).

6.3.11 Ecological learning

In general, it appears that there is limited understanding of the interdependence of human activities and ecosystems and the limitations of technology, regardless of the extent of human innova-

tion (see 3.1.2.2 and 5.3.4.1). Findings suggest a prevalence of ecological illiteracy or indifference to local socio-ecological systems (see 4.2.2.8 and 4.3.2.11), although there is evidence of ecological understanding in some cases (see 4.3.2.11). It is unclear to what extent ecological literacy is fostered through food growing or technologies such as agroforestry that are purported to be ecologically-based (see 2.2.3.1).

It is proposed that learning programmes associated with food growing activities would benefit from a strengthened focus on the capacity of the biophysical environment to support human society. An *Ecological Learning Community* (see 6.3.12) would support the development of a ‘socio-ecological identity’ and ecological literacy. A multi-disciplinary and holistic approach to teaching and learning enables a programme to draw on strengths and compensate for weaknesses in a diverse civil society – the principle of complementarity. Place-based learning, combining abstract instruction with specific concrete examples, appears to support the development of a shared cultural capital in what may be termed a ‘socio-ecological identity’. This would enable consequential thinking and appropriate and competent action in any particular situation, which has the potential to promote a realignment of the economic sphere and the socio-cultural and political sphere with the life-sustaining capacities of the biophysical sphere. See also 6.5.5.

6.3.12 Ecological learning community

Returning to the notion of ‘community’ introduced in 2.3.4 and the proposed definition of school-community links in 2.4.4.7, and drawing on considerations in this chapter, it may be appropriate to redefine these in terms of an Ecological Learning Community (ELC):

An ecological learning community is a diverse and dynamic human social grouping situated in a recognisable land area in which members share – to a greater or lesser extent – aspects of social, cultural, traditional, historical and economic activities, and in which diverse socioeconomic, political and environmental concerns inform the way in which members conduct their lives and relate to each other. As a manifestation of school-community links, it has the potential to make use of participatory processes, drawing on social and cultural diversity as well as community-based knowledge and scientific expertise, engaging in adaptive learning for resilience, as well as experiential, vocational and holistic learning to support the development of shared socio-cultural capital and ecological literacy in learning for sustainability.

6.4 Limitations of research findings: personal reflections

If you can't be a good example, then you'll just have to be a horrible warning (Catherine Aird).⁶⁵

Ethical aspects of the research were considered in section 3.5 and the research methodology was evaluated to some extent in section 3.6. In this section, consideration is given to the limitations of the study in terms of research results as well as the methodology and methods employed.

The intention of this research was not to provide exhaustive evidence for the occurrence of a set of phenomena, but rather to reflect the meaning and implications of such phenomena for study participants. In this regard, the aims and objectives of the study have been achieved. The role of the school-community relationship in enabling environmental learning and action in the context of food growing was explored. This provided some understanding of the influence of **contextual factors** such as the place in which food growing occurs, incentives for growing and/or harvesting food plants, and the impact of formal learning on scholars' futures in particular settings. It also gave some idea of how **pedagogic approach** may influence school-community links, food growing activities and environmental learning, including consideration of formal and informal learning, use of learning support materials and conditions that promote intergenerational learning. It also provided insights into the role of **curriculum content**, including consideration of expert and community-based knowledge, food growing techniques and environmental understanding. These insights provided an idea of some of the factors required for sustained, effective and relevant food growing projects that promote food security, nutrition and health, as well as learning for sustainability.

Upon reflection and with hindsight, the naturalistic methodology adopted in this study is considered to have been appropriate for exploring a broad range of issues. It was congruent with the irrationality and disorder of the human social world, as was noted in 3.1.2.1. In qualitative research, the researcher does not know what exactly is not known. It is for this reason that unexpected outcomes have emerged rather than definitive answers to specific *a priori* questions. As a generalist, the researcher did not develop a deeper understanding of one particular study site, but learned a little bit about a wide range of unrelated phenomena in order to "comprehend the totality" (Jamison 2001: 36) – in keeping with the aims of a qualitative study (see 3.1.2.2). By contrast, a positivist study would aim to provide detailed and specialised knowledge, and attempt to explain society and human behaviour in terms of universal laws which allow prediction and possibly even some degree of control.

⁶⁵ Retrieved January 30, 2009 from <http://www.fbcuk.co.uk/catherineaird/>

The symbolic interactionist approach, which attaches symbolic meaning to social action, helped the researcher to perceive situations through the eyes of research participants and recognise how particular actions may be shaped by the way in which others interpret it. Following this approach, the researcher aimed to select participants who were insightful and knowledgeable, and involved in food growing activities associated with school and community.

The research methods employed in this study suited the nature of the research. By conducting interviews and observations, the researcher was able to interact closely with participants, although this was less effective in cases where participants struggled to communicate in their second or third language, or felt uncomfortable in the presence of a foreign researcher.

The limited time spent in the field at each site necessitated a retrospective approach to studying social processes in most cases. The number of scholars and community members interviewed was relatively low compared to that of programme facilitators and/or educators. This was in some cases due to the researcher being steered towards more fluent or confident individuals who were known to the ‘gatekeeper’ who managed access to participants (see 3.2.2.2 and 3.3.1.1). In other cases, interviews were conducted with English second-language speakers who experienced difficulties in expressing themselves, resulting in data that did not adequately express the way in which participants define, interpret and respond to situations as members of the broader social group. The level of probing of participants’ perspectives and experiences was too superficial in some cases to allow any significant depth of interpretation or insights. This was due, in some cases, to communication difficulties with English second language speakers.

The researcher’s ability to engage with material data and reflect on observable phenomena and postulate ideas in a research journal was perhaps weakened by a lack of experience. With hindsight, it may have been helpful to draw on a more structured observation process, using an observation schedule with a few guiding categories.

The findings were descriptive of and specific to the contexts in which the garden-based activities were based: South Africa, Malawi, Zambia and New York. The research thus recognised human action as meaningful, complex, unique to particular contexts, and responsive to variable and changing situations. This was an essential aspect of investigating food growing activities in socially, economically, political culturally and biophysically diverse settings. However, generation of excessive interview data disallowed a focussed engagement with significant findings.

It is generally accepted that qualitative research does not allow findings to be generalised because the sample is generally not considered to be representative of the wider population. The provision of ‘thick description’ in the research report should provide the reader with the necessary informa-

tion required to make judgements regarding transferability of findings to her/his particular context (Lincoln & Guba 1985: 216-217). However, because this dissertation exceeded the standard length of a Masters thesis, it was necessary to drastically reduce the overall content, including the findings in Chapter 4. Most of the 'thick description' thus appears out of context, in Appendix I.

The broad sweep of this study – covering a number of countries on two continents – provided some useful insights into commonalities, as well as differences, between sites, but did not allow for deeper engagement in any one locality. While the depth of the findings was limited, and the researcher was unable to uncover all the complexities of each study site, the research has nevertheless provided some understanding of the role of school-community links in environmental learning. The tentative propositions emerging from this study should be applied with caution to educational processes linked to food growing activities. They may also have relevance to existing programmes that were explored in this study. A recommendation emerging from an overview of garden-based learning at the time of this study should be taken into account:

A unique opportunity exists to further investigate garden-based learning globally and to initiate an exchange of ideas and resources that can strengthen the practice in all settings. This is a role for an organization with a global perspective and connections. (Desmond, Grieshop & Subramaniam 2002: 75)

A collaborative effort amongst experienced researchers would perhaps have met this challenge, and at the same time, done greater justice to a holistic research approach.

6.5 Some suggestions for future research

The assumption of an educational laboratory is... that enough is known of the conditions and modes of growth to make intelligent enquiry possible; and that is only by acting upon what is already known that more can be found out (John Dewey 1906: 108).

The findings of this research are drawn from dissimilar sites, thus it may be that application will be mutually exclusive. Conclusions based on an idiographic interpretation of qualitative research findings – taking the specific context and timeframe into account (Lincoln & Guba 1985: 216) – are not readily transferable to other contexts. Solutions that are effective in a context such as the USA may not be applicable in a different context such as southern Africa. The socio-cultural and structural context of a country or region cannot be ignored when designing and implementing education programmes.

6.5.1 Community-based food growing as an educational tool

It is recommended that further research be conducted on the integration of school programmes into existing community-based food growing activities (as noted in 6.3.1). This may help address the concern that community integration into school garden-based activities is limited – as was

also found by Sherman (2007: 16). It would also provide a real-life context for learning about food security, nutrition and health.

Furthermore, there is scope for collaboration with local organisations. For example, CP Wild actively promotes the commercialisation of indigenous plants in southern Africa, and Working for Water is actively involved in clearing catchment areas of invasive alien plants – including nitrogen-fixing leguminous species (see Appendix Z). Such ‘fertiliser trees’ (see 2.2.3.2) would provide a free source of fixed nitrogen that could be used in community garden compost pits.

6.5.2 Community organising as an educational tool

A large body of evidence indicates that community organising processes contribute significantly to community empowerment and development, as does a self-help approach. These two approaches have the potential to facilitate adaptive learning and the development of socio-ecological resilience in poor communities. In light of this, closer attention may be paid to educational processes that enable direct engagement through community organising (see 6.3.6).

Aspects that require closer interrogation in the southern African context include the implementation of community organising and its role in promoting participatory food growing activities, relationship-building and problem-solving. This would provide insights into its role in developing social capital and stimulating civic engagement and learning for sustainability.

6.5.3 Complementary and mediated teaching and learning

There is a strong case for the complementarity of community-based / local / traditional / ‘indigenous’ knowledge and formal / expert / science knowledge pertaining to food growing and related learning activities (see 2.2.2.1, 2.3.3.1 and 5.3.3).

Research on the mediation between different cultural perspectives of knowledge would elucidate the levels of skill required to facilitate debate, discussion and persuasion (see 5.2.3.1) in developing a ‘culture of participation’ (see 2.3.3.1 and 5.2.3.2). This would inform the development of courses for facilitators who are knowledgeable and committed to providing sustained input and supporting community development.

6.5.4 The role of land grant institutions in supporting civil society

The land grant system in the USA commits participating universities to provide ‘cooperative extension’ work – a form of community engagement – in exchange for the cost-free use of state land (4.3.2.9). There is merit in exploring the commonalities and differences between the USA and southern African university systems, with a view to identifying factors that would best support community education and development in southern Africa.

6.5.5 The relationship between consequential thinking and ethical perspective

It has been suggested that by engaging with concerns that have consequences outside of abstract classroom settings, it is possible to develop a stronger ethical concern and sense of responsibility (see 2.4.3 and 6.3.10). As noted in 5.1.1.1, a closer scrutiny of ethical perspectives is required. Factors that promote a holistic ethic and an understanding of the indisputable connection between society's ethical stance and the integrity of the biophysical environment on which human livelihoods, food security, nutrition and health depend (see 2.3.2) need to be explored further.

6.5.6 The role of parallel learning programmes in southern African communities

There may be potential in exploring the role of parallel learning approaches in southern African socio-cultural contexts where hierarchical separation is common (see 4.2.2.4 and 4.3.2.10). While this does not appear to address the gaps or differences between cultures and generations (see 5.2.3.1), it has the potential to strengthen environmental learning. Where adults and children learn similar concepts in parallel, this may pave the way towards participatory after-school activities in food growing contexts that promote a shared culture of environmental learning.

6.6 A lasting harvest

... technology alone cannot satisfy all human needs and desires. If we listen to educational philosophers of the past and present such as Jose Martí, E.O. Wilson, David Orr, and Wendell Berry, we learn that there must be a link to nature and nurture in our everyday life. Can we take every child into the wilderness? Maybe, but only occasionally! Can we take every child into the garden? Most certainly and daily! (Daniel Desmond, James Grieshop and Aarti Subramaniam 2002: 45).

This study has afforded the researcher extensive opportunities to engage with diverse knowledge, expertise and experiences in different cultural contexts, which have stimulated both personal and professional growth. It has provided a number of insights into the dynamics of school-community links and how these may support or undermine environmental learning. It is difficult to judge the immediate benefits of this research, but it will hopefully contribute in some way to a growing body of knowledge pertaining to food growing and learning for sustainability. Bearing in mind the exploratory nature of this research, and in keeping with scientific thinking, recommendations and propositions should be applied tentatively.

The researcher has remained cognisant of the need for subjective truthfulness in terms of engaging with and reflecting on findings, inter-subjective justness in terms of representing the world-views and cultural contexts of research participants, and objective truth in terms of reporting empirical results and generating theory (see 3.3.5). Reality is a complex and moving target, as Jamison (2001: 27) observed, and full accommodation of these considerations is an unrealistic ambi-

tion. As such, this thesis is a realistic representation of an imperfect whole that is part of something far greater.

<i>Be the change you want to see in the world</i> (Mahatma K Gandhi, 1869-1948).



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**RHODES UNIVERSITY
DEPARTMENT OF EDUCATION**

**An exploration of school-community links
in enabling environmental learning
through food growing:
a cross-cultural study**

VOLUME 2 of 2

APPENDICES

by

Nicolette Köhly

Submitted in fulfilment of the requirements for the Degree by Thesis

of

**MASTER of EDUCATION
(Environmental Education)**



**Supervisor:
Professor P R Irwin**

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Appendix A: Borlaug LEAP Final Administrative / Technical Report

Referenced in Vol 1: page 2.

Submitted by: Marianne Krasny**Fellow:** Nicolette Köhly**Mentor:** Festus Akinnifesi

Wednesday 10 October 2007

a. Introduction

The student, Ms Nicolette (Nikki) Köhly, is a postgraduate student at Rhodes University, with a first degree in Science (Microbiology and Entomology - Rhodes University), a Graduate Diploma in Applied Science (University of South Australia) and a Post Graduate Certificate in Education (Natural Science, Biology, Arts & Culture - Rhodes University). The student is conducting research for a Master in Education, exploring the role of the school-community relationship as an enabling factor in environmental learning in the context of food gardening or agricultural activities. Field study sites included Grahamstown in South Africa, various localities in Malawi and Zambia, and New York State in the USA. Ms Köhly intends to complete her Master in Education degree in January, 2008.

The CGIAR mentor, Dr Festus Akinnifesi, based at the World Agroforestry Centre in Malawi, is coordinating and conducting research on upscaling integrated agroforestry technologies that provide sustainable solutions to soil fertility problems. His research provides a way of empowering farming communities to raise their income by undertaking on-farm and off-farm economic activities and by applying soil conservation and management practices in their agricultural enterprises, thus helping to address issues of food security and poverty. Dr Akinnifesi's research is linked to the Farmers of the Future initiative which aims to promote the use of sustainable agroforestry technologies in education and training, and improve the quality and relevance of education by making agroforestry and natural resource management a key element of the school curriculum. This enabled the student to tap into a network of agricultural expertise, explore the educational aspects of agricultural research, and establish valuable links with experts on the African continent.

The USA mentor, Dr Marianne E Krasny, at Cornell University, initiated the Garden Mosaics programme in the USA, which makes use of community gardens for youth and community education by combining science learning with intergenerational mentoring, multicultural understanding, and community action. Her expertise in this field, together with her ongoing research on the integration of civic action with science education, has been of great value to the student. Time spent at Cornell University also provided the student with an opportunity to attend courses, seminars and conferences on agriculture, education and research, and to establish links with experts in the USA.

b. Achievements During the Fellowship

Exploratory visits were conducted in Grahamstown, South Africa during April 2006. In my capacity as postgraduate student and Borlaug LEAP Fellow, I conducted a focus group interview with representatives of the Health Promoting Schools (HPS), from the Departments of Health, of Education and of Agriculture, to ascertain the status of agriculturally-based educational programmes and associated challenges. I conducted interviews with representatives of the Umthathi Training Project – a non-profit organisation that supports vulnerable communities in the Eastern Cape in improving health by increasing food and livelihood security – including with the past director, a retired school garden facilitator, and the present training manager. I also conducted an interview with a teacher at a local school, who is the health and nutrition programme coordinator. I transcribed all interviews for incorporation into my South African electronic data log, took ex

tensive field notes, dated and labelled all digital photographs, and entered reflections and ideas in my research journal.

In May, I visited two community gardens and two school gardens in Grahamstown. I attended an educational workshop focussing on imifino (wild spinach), for a combined group of Eco-Schools and HPS teachers, and co-presented a lesson on a 'mystery fruit' plant with the US mentor, Dr Krasny, at an Eco-School. I continued to incorporate field notes into my data log, and also established email communications with the Head of the Social Forestry Department at Fort Cox College of Agriculture and Forestry.

From 22 May to 22 June, I visited Malawi, under the mentorship of Dr Festus Akinnifesi at the World Agroforestry Centre (ICRAF) / CGIAR centre located at Chitedze Agricultural Research Station in Lilongwe. During the first week, I travelled with the US mentor, Dr Krasny, and the ICRAF agriculture extensionist, Mr Jacob Nyirongo, to various Farmers of the Future pilot sites in southern Malawi. Thereafter I returned alone to the following sites for in-depth follow-up visits:

- ICRAF, Makoka Agriculture Research Station, Zomba – liaising with the Regional Leader of Farmers of the Future, who is also Senior Education Fellow for the African Network for Agriculture, Agroforestry and Natural Resources Education (ANAFE);
- Mapanga community-based organisation, Thyolo district, Bvumbwe (near Blantyre) – a CBO that implements agroforestry in collaboration with ICRAF;
- St Anthony Girls' Primary School, Thondwe (near Zomba) – participants in piloting the Farmers of the Future initiative;
- Thondwe Primary School (near Zomba) – participants in piloting the Farmers of the Future initiative;
- Thondwe Village Polytechnic (near Zomba) - participants in piloting the Farmers of the Future initiative.

I also went to Mozambique to conduct an in-depth interview with an Associate Scientist and a Social Scientist from the ICRAF Southern Africa Regional Programme, to learn about their role in spearheading Farmers of the Future in the region. Thereafter I travelled to Zambia and visited ICRAF in Chipata, Zambia, and visited schools in the Chadiza district (Manje and Mwala) that are participating in the Farmers of the Future initiative. I conducted interviews with 5 teachers and 4 students, as well as with the Agroforestry Development Facilitator (who was the Farmers of the Future Training Manager for the SADC-ICRAF Agroforestry Programme at Msekera Research Station).

I transcribed all interviews for incorporation into my Malawi/Zambia electronic data log, together with field notes and records of informal discussions and materials seen; I dated and labelled all digital photographs, and entered reflections and ideas in my research journal. I also established email communications with a number of experts in the field, including the Global Coordinator of Farmers of the Future who is based at ICRAF in Kenya.

From 31 July until 18 December, I visited the USA, and conducted further research in the field between August and December 2006. Sites included Cornell University (Ithaca) and Cornell Cooperative Extension (New York City), Bronx Leadership Academy (South Bronx), East New York Farms!, Added Value (Brooklyn), and groups affiliated to the Garden Mosaics programme: Abraham House (Bronx), St Raymond Community Outreach (Bronx), and Harlem community gardens. I also visited Open Road and other NYC community gardens (New York City) and the Rognel Heights Cultural Center (Baltimore).

I conducted observations of youth/community garden-based learning activities and a 'Farm to School' plant science lesson, participated in two student neighbourhood exploration exercises, and held a series of in-depth interviews. Interviewees included the Principal Investigator of the Garden Mosaics project (my US mentor), a Senior Extension Associate, an Extension Associate, two Extension Educators, a programme leader for Urban Agriculture and Markets, a coordinator of a Youth and Agriculture Program, a Farm Educator, a Community Education Coordinator, a Counsellor/tutor, a Director of Youth Services, a Consultant for youth and social responsibility, a Part-time Special Needs teacher and garden coordinator, a park and garden coordinator, and four after-school programme participants. I also held informal discussions with several youth interns, as well as a number of community gardeners. In all cases, I transcribed interviews and incorporated them into my USA electronic data log, together with references, field notes and a record of informal discussions, dated and labelled all digital photographs, and entered reflections and ideas in my research journal.

I met with the Associate Director of CIIFAD (Cornell International Institute for Food, Agriculture and Development) in the College of Agriculture and Life Sciences at Cornell University, and the Director of Affiliate and Community Initiatives from the National Wildlife Federation in Reston, Virginia. I also established communications with the Founder and Co-Director of the Center for Democracy and Citizenship at the University of Minnesota, and a colleague at the Institute for Democracy in South Africa (IDASA).

I participated in a fall semester course, Community Education and Development, run by Prof Scott Peters, in the Department of Education at Cornell University [<http://education.cornell.edu/> / <http://instruct1.cit.cornell.edu/courses/practicestories/>]. This entailed extensive reading and submission of written reflections on a weekly basis – collated by the course coordinator – and participation in class discussions. I also attended weekly Agro-ecological Perspectives for Sustainable Development seminars organised by CIIFAD, as well as number of Introduction to Graduate Studies classes run by Dr Krasny.

March 2007: Submitted a draft thematic typology [see Appendix S] to my Rhodes University supervisor, Professor Pat Irwin.

April 2007: Finalised transcriptions of all interviews. Together with observations, journal, correspondence, etc, there are more than 1,000 pages to analyse.

May 2007: Began electronic data analysis.

30 May 2007: Submitted an early working draft of my dissertation to Professor Pat Irwin.

30 August 2007: Distributed the final draft of the proceedings of the WEEC 2007 workshop (see below) to participants.

Current: Various aspects of data analysis are still in process. Writing up is at an advanced stage. Note that the requirement for a full thesis MEd dissertation at Rhodes University is approx 220 pages.

Presentations

11 April 2006: Presentation (using MS PowerPoint) to the Education Faculty at Rhodes University on my research, 'A Context-based Study of the Integration of Agricultural Practices into Environmental Education.'

12 September 2006: Presentation (using MS PowerPoint) to the Department of Natural Resources at Cornell University, 'Exploring agriculturally-based environmental learning in southern Africa.'

9 October 2006: Presented a poster at the North American Association of Environmental Education Research Symposium in St Paul, MN, USA.

5 November 2006: Gave two presentations (using MS PowerPoint) for the second annual Fall Leadership Summit for the Collegiate Future Farmers of America (CFFA) students, "Mom, what's for lunch? Growing up & growing food in southern Africa." USA.

15 May 2007: Public presentation (using MS PowerPoint) on my visit to the USA, organised by the Diaz Cross Bird Club, Grahamstown, South Africa.

4 July: Ran a workshop, 'The role of school-community links in environmental learning and cultural transformation' attended by 35 participants from many different countries. Introduction included a MS PowerPoint presentation. World Environmental Education Congress, Durban, South Africa.

Conferences

9-14 October 2006: Attended the Research Symposium and 35th annual conference of the North American Association of Environmental Education at St Paul, MN, USA.

15-20 October: Attended the World Food Prize and Borlaug International Symposium in Des Moines, Iowa.

2-3 November 2006: Attended 56th Annual Cortland Recreation Conference at SUNY Cortland.

2-6 July 2007: Attended the World Environmental Education Congress (WEEC) in Durban, South Africa – hosted by the Environmental Education Association of Southern Africa (EEASA).

c. Perspective of US Mentor

The Borlaug LEAP Fellowship provided an opportunity for Ms Köhly to expand her research from South Africa to encompass Malawi, Zambia, and the US, and thus to gain a broader perspective on school-community partnerships. Ms Köhly is currently writing her MEd thesis at Rhodes University, which will include descriptions of models for school-community partnerships from different regions of the world, something that would not have been possible without the Fellowship.

The Fellowship allowed me, as the US mentor, to expand upon initial collaborations with Rhodes University Education Faculty, and the associated Environmental Education and Sustainability Unit; without the Fellowship it would have been difficult to maintain these collaborations. As part of our collaboration, we were able to present a workshop at the 4th World Environmental Education Congress held in Durban, South Africa, in July 2007, and thus to expand our international collaborations. In addition to the presentation with Ms Köhly at the World Environmental Education Conference, I was author or co-author on five other presentations, and expanded my pool of potential collaborators during the conference. I was also able to establish a collaborative relationship with the World Agroforestry Centre, which led to valuable new perspectives related to my own work in sustainability and environmental education.

I look forward to reading Ms Köhly's thesis and to working with her, Dr Akinnifesi, and Dr Pat Irwin on several publications related to her work. I also appreciate the opportunity to broaden my perspectives on school-community partnerships in multiple settings and cultures as a result of her work. Finally, the Fellowship allowed me to establish additional relationships with CGIAR staff, which led to funding for a second Borlaug Fellow, and potential additional fellowship applications in the future.

d. Perspective of the CGIAR Mentor

The Borlaug LEAP Fellowship has provided a unique opportunity to the fellow in building a strong network of communities of practice around an important area of 'community-school partnership' in southern Africa and the United States. Ms Köhly's rapid exposure to new innovations in Malawi and Zambia has broadened her experience and perspectives on ways of achieving synergistic partnership between schools and communities around them, and in achieving sustainable natural resources management. I am particularly impressed at her ability to interact and identify new opportunities. For instance, in her visit to Malawi, she was able to interact with social scientists of the World Agroforestry Centre based in Chipata, Zambia, who came for a different purpose. That has led to an innovative expansion of her work in order to capture new practices and knowledge in a neighbouring country. Her work was well applauded by a community known as 'Mapanga community-based organisation,' at Thyolo district in southern Malawi. They had wished that Ms. Köhly continues to mentor and collaborate with them. The fellow was very organized and was able to achieve substantial result within a short time frame. She was exposed to several academic and development perspectives during the fellowship period that have helped to sharpen her perspectives and further develop her emerging leadership capability.

As her CGIAR mentor the fellowship also provided an opportunity to forge a new collaboration with Cornell University, even beyond the scope of Ms Köhly's fellowship.

e. Perspective of the Fellow

As a result of my collaboration with my mentor and colleagues at the Malawi CGIAR, and with practitioners in the surrounding region, I have gained new perspectives regarding the integration of practical agricultural applications into educational initiatives. It has also opened my eyes to the potential for sustainable agricultural technologies such as agroforestry and permaculture to meaningfully address food security issues in the long term, in southern Africa. While I was struck by the dire poverty and food security concerns faced by a growing population in Malawi, I was also impressed by the ability of some to produce food with limited resources. However, I remain mindful of the challenges – including social, cultural, economic, and political – in addressing food security and poverty from an educational perspective.

By adopting a more holistic perspective which takes broader ecological concerns into consideration – together with social, cultural, economic, and political – agricultural research initiatives will have a better chance of finding realistic and sustainable solutions. A move towards more sustainable agricultural technologies will undoubtedly help avert ecological disasters world-wide. By adopting this broader perspective to the development of technological solutions to current and emerging food security issues, beneficiaries will have more realistic expectations. This approach would also promote consequential thinking, self-empowerment and responsible practices amongst beneficiaries. By approaching issues with the aim of finding long-term solutions, instead of a repetitive series of short- to medium-term crisis-management operations, there is a much better chance of reducing food insecurity *in the long term* in developing countries. This is in line with the aims of the Borlaug LEAP programme.

I am inspired by the way in which 'civic engagement' enables youth to identify opportunities for making a difference in their communities. In the process, they gain skills and knowledge in sci-

ence, technology, horticulture and agriculture, life skills, and political competence, and ultimately, are able to take action for sustainability. This has opened my eyes to the potential for a 'community-organising approach' to empower those who are 'previously disadvantaged' in South Africa. However, I am aware that due to social and cultural differences, the approach needs to be contextually appropriate in order to achieve the same level of success in 'citizen science' projects and collaborative action in addressing issues of poverty and food security.

The notion of Transformative Action, which I encountered at a series of seminars presented through the CRESPP Centre for Transformative Action at Cornell University, has potential for promoting reconciliation and collaborative problem-solving in southern Africa. This innovative approach to social change – which draws on Martin Luther King Jr and Mahatma Gandhi's non-violent action – suggests that “social change agents are more successful in achieving their goals when they approach conflict with compassion rather than anger, and seek to transform antagonism into cooperation, enemies into friends, and adversaries into allies.” In a country where the repercussions of apartheid continue to be manifested in many areas, especially the social and economic (including agricultural) spheres, a transformative action approach presents a realistic alternative to fostering collaboration in promoting social and environmental justice.

My resolve to remain critically conscious of cognitive imperialism and guard against hegemonic attitudes has also been strengthened. I was struck by the truth of a quotation which I noticed in a graduate lounge at Cornell University: “If tyranny and oppression come to this land, it will be in the guise of fighting a foreign enemy” (James Madison).

At the North American Association of Environmental Education conference in St Paul / Minnesota, my attention was drawn one of the predictions of the World Future Society (<http://www.wfs.org/>), presented by a keynote speaker: “Children's *nature deficit disorder* will grow as a health threat.” The reason I was struck by this observation is because health and poverty are issues that are usually only addressed in terms of food and nutrition. In contrast, this perspective requires a more holistic approach that addresses not only the physical well-being of humans, but also the psychological wellbeing. People are more likely to find come up with sustainable solutions in their own contexts when they are psychologically healthy and empowered, as well as having addressed their physical needs.

My attendance at the World Food Prize and Borlaug International Symposium in Des Moines, Iowa, was an invaluable experience. I was able to meet with a number of experts in the field, including Dr Norman E Borlaug and Prof M S Swaminathan (Co-Chair UN Millennium Project Task Force on Hunger; Govt. of India Chair of the National Commission on Farmers; Chair of the M S Swaminathan Research Foundation). These experiences contributed to my growing conviction that a strengthened relationship between environmental education and agricultural research and development is vital.

Through my participation in the Cornell University Community Education and Development course, and contact with the National Wildlife Federation (NWF) Director of Affiliate and Community Initiatives and the University of Minnesota Founder of the Center for Democracy and Citizenship, I recognised the applicability of their key principles of movement-building to working with previously disadvantaged and minority communities in the agricultural and educational sectors in southern Africa: (i) connect with people where they are, not where you want them to be; (ii) have faith in people, individually and collectively; (iii) focus on patient, long-term relationship-building in communities (an 'organizing' approach), rather than on relatively short-term campaigns (a 'mobilizing' approach); (iv) use broad, positive, visionary language to focus attention on the larger, public purpose; (v) community-building should be based on a foundation of

core societal values; (vi) commit yourself to participatory democratic practices; (vii) see the role of the expert as facilitation and empowerment, not as controller; and (viii) think creatively about power.

I was also inspired by some insights offered by the NWF director on leadership: great leaders build a great organisation, rather than making ‘great decisions’; they play a role in developing culture. In this respect, good ‘aspirations’ are more meaningful than ‘goals’, and having an attitude of faith in civic engagement and democracy is more constructive than a cynical or contemptuous questioning of the *status quo*.

I also gained a number of technical skills during the Fellowship. Having purchased the ATLAS.ti software, I learned how to operate the programme and gained a better understanding of qualitative data analysis. My successful completion of the online UCHS (Human Subjects) Training in the USA also opened my eyes to different ethical perspectives with regard to interacting with human subjects in research projects.

As a result of using PowerPoint technology and associated printing facilities at Cornell University, I gained greater confidence in developing colour posters and presentations. Although I enjoyed the ease with which such projects can be executed in the USA, it has also heightened my awareness of the relative difficulty of achieving a similar outcome in southern Africa, due to lack of resources and facilities in many instances. I am therefore mindful of avoiding an addiction to technology for its own sake.

Overall, I have found the Fellowship to be of enormous value in augmenting my southern African experiences and perspectives, leading to improvements in my approach to research and the use of associated technology, and increased confidence in interacting with research participants and in giving public presentations. The Fellowship has not only enhanced my personal growth, but has also promoted further collaborative research and development in southern Africa. This will be of benefit to future research undertakings and community education and development programmes in the region.

f. Summary of Key Technical Findings and Conclusions

A “mixed-method” approach to “social inquiry” was used, in order to gather both qualitative and quantitative data. This was comprised of semi-structured interviews, conducting observations and taking digital photographs, making field notes, reflecting in my research journal, and keeping a record of learning support materials and all relevant correspondence.

Data analysis was conducted using the software programme ATLAS.ti 5.2.0, a visual qualitative data analysis software package that I purchased from Scientific Software Development in Berlin, Germany. This ‘knowledge workbench’ has myriad capabilities and allows the researcher to focus on the analysed materials in an intuitive environment. The process is as follows: identify text according to its relevance to the research focus, and assign codes to accommodate the diversity and complexity of the study. Codes are being clustered into five or six main “families” (the term used in ATLAS.ti) – which are identified on the basis of their relevance to the research focus.

The families are presented as analytic statements, and for my study, include the following:

- Incentives for having food gardens influence environmental learning;
- School-community links play varying roles in environmental learning in food garden settings;
- Organisational structure influences environmental learning in food gardens;
- Cultural dynamics influence the depth and nature of environmental learning in food gardens;

- Some pedagogic approaches work better than others in food garden settings in promoting a deeper understanding of ecological processes and their role in supporting life on earth.

I am still in process of thinking through and writing up key technical findings and conclusions. I am in regular contact with my Rhodes University supervisor Prof Irwin, and intend to submit the final draft of my MEd thesis at the end of the year.

g. Publications and Presentations by the Fellow

Köhly, N. (2006). *Exploring agriculturally-based environmental learning in southern Africa*. Department of Natural Resources Seminar, 12 September 2006, Cornell University. Online at URL: <http://www.gardenmosaics.cornell.edu/pgs/aboutus/aboutus4.htm>

Köhly, N. & Krasny, M.E. (2006). *Exploring Agriculturally-Based Environmental Learning in Southern Africa*. Poster presentation, North American Association for Environmental Education Research Symposium. St Paul, MN.

Köhly, N, Krasny, M.E. & Irwin, P.R. (2007). *The Role of School-Community Links in Environmental Learning and Cultural Transformation*. Workshop. 4th World Environmental Education Congress, Durban, South Africa.

Köhly, N. Snapshots from the USA. *Grahamstown Abroad Series*, Grocott's Mail, Tuesday, 29 May 2007 (p 7). Grahamstown, South Africa.

Future publications

Köhly, N. *An exploration of the role of the school-community relationship as an enabling factor in environmental learning*. MEd Thesis, Rhodes University, Grahamstown, South Africa.

Köhly, N., Akinnifesi, F. & Krasny, M.E. A consideration of participatory approaches in integrating agroforestry technologies in school-community gardens in South Africa. Paper to be submitted to *Southern African Journal of Environmental Education*.

Köhly, N., Irwin, P.R., Krasny, M.E. & Akinnifesi, F. The role of school-community links in environmental learning in food gardens. Paper to be submitted to *Environmental Education Research*.

h. Future Plans of the Fellow

In my capacity as part-time Environmental Officer, at Rhodes University, I intend to bring my influence to bear on decisions regarding environmental management systems on campus, as well as community outreach and collaborative projects. I have recently been asked to serve on the Rhodes University Environmental Committee in order to assist in decision-making and to give impetus to policy implementation and communications. This will serve as a useful springboard for exploring more effective community education and development, in the context of local issues such as poverty, food security, nutrition, waste management, water supply and environmental health.

As the coordinator of a volunteer editorial team for the Grocott's Mail Makana Enviro-News column – which focuses on local environmental projects and issues – I intend to play an ongoing role in community education. The column serves as an ideal forum for awareness-raising regarding environmental and community health, and the interrelatedness of social and environmental issues.

As a founder member of the Kowie Catchment Campaign (KCC – a volunteer-led environmental group), I have facilitated the adoption of a 'citizen engagement' approach in our community education initiative – which aims to improve the health of the local river catchment and environment,

and hence the health of the community. The ‘citizen engagement’ approach has been incorporated into the KCC’s updated structure and function document. We discuss the practicalities of its implementation at meetings on a regular basis, and are testing ways of modelling this approach in practice.

In future, I would like to create a community-based forum to engage with the potential for agroforestry technologies, together with the by-products of vermicomposting, for food gardens and agricultural activities in Grahamstown and the surrounding area – which is faced with poor soil fertility, erratic rainfall patterns and limited social capital in some sectors. In this respect, I aim to facilitate partnerships with agriculturally-based educational programmes and networks such as with members of the African Network for Agroforestry Education, as well as maintaining an ongoing collaboration with expertise at CGIAR centres and other international institutions.



Appendix B: Towards a consensus of the peoples

Referenced in Vol 1: pages 9, 145.

Source: Estevá *et al* (2007 quoted in Pimbert 2008: *Towards food sovereignty: reclaiming autonomous food systems*. pp 54-55).

We, more than 100 persons of 36 peoples, from 14 countries of three continents, came together over several days in Mexico City, to talk and to reflect together about our realities and perspectives.

We cannot talk on behalf of the communities and peoples to which we belong, and even less on behalf of all of the peoples of the continent. We believe, nevertheless, that the fabric of ideas and attitudes that we have been weaving in the course of our conversations is inspired by them and perhaps can inspire others.

We are suffering, like many others, the consequences of neoliberal policies. Capital has more appetite than ever, but not enough stomach to digest the many it wants to control. Millions of people are becoming unnecessary, disposable. The constituted powers all over the world, allied to the transnational corporations, blindly apply the senseless policies of the so-called Washington Consensus, at an unsupportable human and environmental cost.

More than these evils, known to all of us, we talked about who we are, and of what we form in a rich mosaic of many “we’s” that define us. We talked about the attitudes that make us be what we are, of the difficulties that we confront, of our dreams and of the meaning of our struggles.

The “conclusions” that we reached are only a moment of reflection on a path that we started long time ago, and on which we continue walking. It has not been an easy and straight path. We have been forced to walk it in the middle of conflict, of the confrontation imposed to us. It is a path of dignity and also of rebellion. Who walks today through these paths needs to do it struggling.

One of these “conclusions” is that it seems that there is in the process of formation, at the grass-roots, a CONSENSUS OF THE PEOPLES. This consensus, if it effectively would be reached, could articulate and connect their activities, with the full respect to the diversity and autonomy of each community and people, who can live this consensus in different ways. We hope that others, particularly in the communities, can enrich what we have woven so far, which has, among other things, the following elements.

1. *Radical pluralism*. We want to create a world in which many worlds can be embraced. That the dissolution of cultures and peoples in order to integrate them into one design on the terms of the old western project of domination is stopped. We want a world in which the cultural differences are appreciated and respected, for them to coexist in harmony, based on a radical pluralistic attitude.
2. *Personal Dignity*. We celebrate the dignity of each man and woman, which nurtures the dignity of their peoples and cultures. Based on it, the richness of their diversity will flourish. The extension of personal and cultural dignity will challenge all the existing political and economic systems, and will demonstrate that they have an oppressive, unjust and irrational character.
3. *Autonomy*. In dignity, we base the de facto autonomy of our communities and peoples. We will continue to struggle until we get its legal recognition. Since the laws of the colonizers, the legal machinery has always been at the service of the powerful and the bad government. The courts are a travesty of justice. Without abandoning our internal normative systems, we continue to revindicate the legal and political process; together they form the structure of freedom. We will conquer legal autonomy.
4. *New Political Regime*. The constitutional recognition of the existence, autonomy and self determination of the peoples who form the most profound layer of our societies, could forge a

new political regime that leaves behind the structure of domination inherent in the nation state, and is sustained by the sovereignty of the people and preserves it, even in the globalizing disorder.

5. *Subordinate the economy.* We want to reestablish politics and ethics as the center of social life, expelling from it the economic obsession of the dominant system, that only concentrates privileges in the few. Instead of submitting needs and desires to the competitive fury of the great economic powers, to feed their voracity, we will put the economic operation at the service of the persons, the communities and the peoples.
6. *Radical Democracy.* Given the current disenchantment with so called formal democracy, in which political parties and governments are unable to harmonize the collective endeavors in a just order, we want to base our efforts in our community democracy, that weave a consensus at the grassroots. Democracy can only be where the people are. In our own places we are reconstructing society, with the participation of everyone, in order to generate new social and political consensus.
7. *Conviviality.* We generate a convivial way of life in our communities and neighborhoods. We will not let consumer society, in which he who is not a prisoner of the addiction to products and services he has learned to consume falls victim to envy for those he cannot afford, dissolve it.
8. *Communality.* Before the possessive individualism that continues to affect our daily lives, we raise communality, as a condition of harmony in our living together, with full respect for liberty and the rights of natural and human persons.
9. *Remake the world.* To change the world, and all of its oppressive institutions is very difficult, next to impossible. It seems however viable to construct a new world that is economically feasible, socially just, and ecologically sensible. Those of us who have not let ourselves be restricted by forces and structures that seem unstoppable and pretend to determine everything are already doing it.
10. *Autonomy in exchange.* We resist the false choice between “free trade” and “protectionism”. One hands over power to the corporations, the other to the bureaucrats who often are at the service of the first. “Protectionism” does not protect the people. “Free Trade” does not respect our freedom. Exchanges have to be controlled from our autonomy, so that the people themselves determine what they prefer.
11. *Socialization.* We resist equally “privatization” and “statization”. We are looking for socialization of goods and services, constructed on the basis of autonomy. It is insane and unjust to turn over social resources and public services to private voracity. Bureaucratic monopolies are not an effective or appropriate alternative. We rather put our trust in a decentralized and autonomous administration of general goods and services, with citizen participation.
12. *Service and Reciprocity.* We want the strengthening and articulation of the coalitions of the discontent with the dominant system. From them, we will widen our interactions, to learn from one another and to offer mutual solidarity, in the spirit of service and reciprocity defining us.
13. *Horizon and Transcendancy.* Our knowing wants to be wisdom. We are oriented towards being, rather than having. The same principle inspired our conversations and is at the center of all our attitudes, behavior and gazing. It is not a doctrinal or ideological principle. It is born from the heart, not the mind. Its name is spirituality.

Mexico City, December 9th, 2003



Appendix C: The Millennium Development Goals (MDGs)

Referenced in Vol 1: page 14.

Source: <http://www.undp.org/mdg>

By 2015 all 189 United Nations member States have pledged to:

1. **Eradicate extreme poverty and hunger**
 - Reduce by half the proportion of people living on less than a dollar a day
 - Reduce by half the proportion of people who suffer from hunger
2. **Achieve universal primary Education**
 - Ensure that all boys and girls completes a full course of primary schooling
3. **Promote gender equality and empower women**
 - Eliminate gender disparity in primary and secondary education preferably by 2005, and all levels by 2015
4. **Reduce child mortality**
 - Reduce by two-thirds the mortality rate among children under five
5. **Improve maternal health**
 - Reduce, by three-quarters the maternal mortality ratio
6. **Combat HIV/AIDS, malaria and other diseases**
 - Halt and begin to reverse the spread of HIV/AIDS
 - Halt and begin to reverse the incidence of malaria and other major diseases
7. **Ensure environmental sustainability**
 - Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources
 - Reduce by half the proportion of people without sustainable access to safe drinking water
 - Achieve significant improvement in lives of at least 100 million slum dwellers, by 2020
8. **Develop a global partnership for development**
 - Develop further an open, rule-based, predictable, non-discriminatory trading and financial system
 - Address the least developed countries' special needs
 - Address the special needs of landlocked countries and small island developing states
 - Deal comprehensively with developing countries' debt problems
 - In cooperation with the developing countries. Develop decent and productive work for youth
 - In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
 - In cooperation with the private sector, make available the benefits of new technologies – especially information and communications technologies.

/.... Key links between environment and the MDGs

Key links between environment and the MDGs

(Source: Lee & Ghanime 2005: 11).

MDG 1: Eradicate poverty and hunger: Poor people often depend on natural resources and ecosystems for income and livelihoods (food, shelter, etc.). The economy of the poorest countries relies on natural resources exports, such as agricultural commodities and raw materials, and ecotourism.

MDG 2: Universal primary education: Time spent collecting water and fuelwood by children - especially girls - can reduce the time at school or prevent school attendance.

MDG 3: Gender equality: Time spent collecting water and fuelwood by women can reduce the time for schooling, for undertaking income-generating activities, and for participating in the community's decision-making activities. Unequal access to land and other natural resources limits possibilities for decision-making and empowerment.

MDG 4: Reduce child mortality: Children are more vulnerable to environmental related health problems because their immune systems are not fully developed and their metabolisms are different from those of adults. Environmental related diseases (diarrhoea, acute respiratory infection, leukaemia, childhood cancer, etc.) are primary causes of child mortality.

MDG 5: Improve maternal health: Indoor air pollution and carrying heavy loads of water and fuelwood negatively affect women's health, can make women less fit for childbirth, and are at greater risk of complications during pregnancy.

MDG 6: Combat disease: Most diseases in developing countries are environmental in origin, as specific environmental conditions may contribute to the growth and the spread of illnesses and limit access to treatment facilities and supplies. For example, a range of environmental factors affect malaria, as stagnated water and increasing temperatures associated with climate change create favourable conditions for disease-carrying mosquitoes.

Adapted by Matteo Marchisio from DFID et al. (2002), and World Bank (2002)



Appendix D: The practical aims of WEHAB

Referenced in Vol 1: page 14.

- **Water and sanitation:** To halve by 2015 the proportion of people without access to sanitation
- **Energy:** To increase access of modern energy services, energy efficiency and the use of renewable energy: to phase out subsidies, where appropriate, and to ensure access to energy for at least 35% of the African population within 20 years – as set by the New Partnership for African Development (NEPAD)
- **Health:** To ensure by 2020 that chemical use and production would not harm human health and the environment; to improve by 2010 developing countries access to environmentally sound alternatives to ozone depleting chemicals.
- **Agriculture:** To develop by 2005 *made in Africa* food security strategies, and for the Global Environmental Facility (GEF) to consider inclusion of the Convention to Combat Desertification to attract funding
- **Biodiversity and ecosystem management:** To reduce biodiversity loss by 2010; to undertake initiatives by 2004 to implement the Global Programme for Action for the Protection of the Marine Environment from Land based Source of Pollution.

Source: Chetty, in Jahan 2003.



Appendix E: Plant species associated with agroforestry in Malawi, Zambia & Zimbabwe⁶⁶

Referenced in Vol 1: pages 15, 95, 102.

Latin name	Family	Common name	Notes	Uses										
				Food plant	Edible fruit	Drink / jam/sauce	Medicinal	Non-food product	Animal fodder	Woodlot	Living fence	Insecticidal	Mulch	Soil fertility
<i>Acacia</i> sp.	Mimosaceae (thorn-tree)	Thorn tree / Ntete	Indigenous tree										♣	♣
<i>Acacia galpinii</i>	Mimosaceae (thorn-tree)	Monkey thorn	Indigenous tree, fast-growing											♣
<i>Acacia pycnantha</i>	Mimosaceae (thorn-tree)		Indigenous tree								♣			
<i>Acacia ?saligna</i>	Mimosaceae	Port Jackson willow	Australia, small tree, invasive											♣
* <i>Adansonia digitata</i>	Bombacaceae (Kapok)	Baobab / Malambe	Indigenous tree		♣	♣	♣	Oil, cereal bar						
<i>Albizia ?adanthifolia</i>	Mimosaceae (thorn-tree)	Flat crown	Indigenous tree, popular for shade			Sauce from seeds	♣							♣
<i>Annona senegalensis</i>	Annonaceae (custard apple)	Mporia / Mpoza	Indigenous tree		♣									
<i>Arachis hypogaea</i>	Fabiaceae (pea)	Groundnut / peanut	South America, shrub, popular fresh/dry food	Ground nut										♣
<i>Artocarpus heterophyllus</i>	Moraceae (fig)	Jackfruit / Jaca / Nangka	India, tree, huge fruit on main stem		♣									
<i>Azanza garckeana</i>	Malvaceae (hibiscus)	Matowa / mkole / tree hibiscus / snot apple	Indigenous											
<i>Cajanus cajan</i>	Fabiaceae (pea)	Pigeon pea	India, shrub, popular fresh/dry food	Pea										♣

⁶⁶ Some plants recorded here are used in Tanzania, according to the references used (listed at end of table).

Latin name	Family	Common name	Notes	Uses										
				Food plant	Edible fruit	Drink / jam / sauce	Medicinal	Non-food product	Animal fodder	Woodlot	Living fence	Insecticidal	Mulch	Soil fertility
<i>*Calliandra calothyrsus</i>	Caesalpiniaceae (bauhinia / cassia)	Bussea	MPLTS - called 'indigenous' but native to Mexico						♣	♣				♣
<i>Carica papaya</i>	Caricaceae (pawpaw family)	Pawpaw	Southern Mexico, Central America, tree		♣									
<i>Coffea</i> sp.	Rubiaceae (coffee)	Coffee	Indigenous bush			Hot drink from roasted berries / drupes								
<i>Colocasia esculenta</i>	Araceae (arum)	Euchlora / elephant ears / taro / coco yam / callaloo	Southeastern Asia, bush, 'potato of the tropics'	Tuber / corm										
<i>Dovyalis caffra</i>	Flacourtiaceae (wild peach)	Kei-apple	Indigenous tree		♣						♣			
<i>Eleusine coracana</i>	Gramineae (grass)	Finger millet	Indigenous, traditional food	Grain										
<i>Ensete ventricosum</i>	Musaceae (banana)	Wild banana	Indigenous tree, monocotyledon		♣									
<i>Eucalyptus</i> sp.	Myrtaceae (guava)	Gum tree	Australia, tree, invasive potential					Timber		♣				
<i>Faidherbia albida</i> (= <i>Acacia albida</i>)	Fabiaceae (pea)	Apple-ring thorn tree / Msangu	Indigenous tree, slow-growing						♣	♣				Uncommon
<i>Ficus</i> sp.	Moraceae (fig)	Wild fig / Kachere	Indigenous tree		♣									
<i>Ficus sycomorus</i>	Moraceae (fig)	Sycamore fig / Mkuyu	Indigenous tree		♣		♣							
<i>Flacourtia</i>	Flacourtiaceae	Flacourtia /	Indigenous tree		♣		♣							

Latin name	Family	Common name	Notes	Uses										
				Food plant	Edible fruit	Drink / jam/sauce	Medicinal	Non-food product	Animal fodder	Woodlot	Living fence	Insecticidal	Mulch	Soil fertility
<i>indica</i>	tiaceae (wild peach)	wild peach / Nthudza												
<i>*Gliricidia sepium</i>	Fabiaceae (pea)	Mexican lilac	Mexico, Central America, northern South America, tree											♣
<i>Grevillea robusta</i>	Proteaceae (protea)	Silky oak	Tree, Australia								Wind-break			
<i>Hibiscus esculentus</i>	Malvaceae (hibiscus)	Okra / gumbo	Herbaceous		♣									
<i>Jatropha curcas</i>	Euphorbiaceae (spurge)	Physic nut / purgeer-boontjie	Tropical America, tree, used to prevent soil erosion, bio-diesel (Madagascar) (CARA category xx?? in SA)				Seeds purgative; bio-diesel	Cosmetic oil			♣			
<i>Khaya nyasica</i> = <i>K. anthotheca</i>	Meliaceae (mahogany)	Red mahogany / Mbawa	Indigenous tree				♣			♣				
<i>Kigelia africana</i>	Bignoniaceae (jacaranda)	Sausage tree / Mvunguti	Indigenous tree, slow-growing			Used for fermentation	♣							
<i>Leucaena diversifolia</i>	Fabiaceae (pea)	Wild tamarind / red leuceana	Mexico, shrub/tree, invasive											♣
<i>Leucaena leucocephala</i>	Fabiaceae (pea)	Wild tamarind / lead tree	Mexico, shrub/tree. MPLTS. Invasive (CARA category II in SA)						♣					♣
<i>*Mangifera indica</i>	Anacardiaceae (mango)	Mango	India, tree		♣									
<i>Manihot esculenta</i>	Euphorbiaceae	Cassava / yucca/ manioc	Introduced, shrub, raw / cooked root,	Root										

Latin name	Family	Common name	Notes	Uses										
				Food plant	Edible fruit	Drink / jam/sauce	Medicinal	Non-food product	Animal fodder	Woodlot	Living fence	Insecticidal	Mulch	Soil fertility
	(spurge)	/ tapioca / semolina	high starch content											
<i>*Moringa oleifera</i>	Moringaceae (horse radish tree)	Moringa tree	India, tree, fast-growing, naturalised in Africa, high protein content leaves as fresh vegetable	Leaves, roots										♣
<i>Mucuna pruriens</i>	Fabiaceae (pea)	Mucuna / Buf-falo bean / Chitedze	Indigenous, vine plant, pods fine hairs: cause pruritis (severe itching, blistering)	Seeds									Weed suppression	
<i>Musa</i> sp.	Musaceae (banana)	Banana	South east Asia, fast-growing, monocotyledon, popular food		♣									
<i>*Parinari curatellifolia</i>	Chryso-balanaceae (coco plum)	Mobola plum / Maula / Mbula	Indigenous tree, miombo woodland	Nuts	♣			Pari-nari oil						
<i>Passiflora edulis</i>	Passi-floraceae (granadilla)	Passion fruit / granadilla	Introduced, vine plant		♣									
<i>Psidium gua-java</i>	Myrtaceae (guava)	Guava	Central America, tree, invasive potential		♣		♣							
<i>*Sclerocarya birrea</i>	Anacardiaceae (mango)	Marula / Mfula	Indigenous tree, miombo woodland, prized fruit		♣	Wine	♣	Marula oil						
<i>Sesbania sesban</i>	Fabiaceae (pea)	River bean tree / jere jere	Indigenous, MPLTS fast-growing, popular for intercropping											♣
<i>Sorghum bicolor</i>	Poaceae (grass)	Sorghum / mabele	Indigenous, traditional food	Grain										
<i>Sterculia ?africana</i>	Sterculiaceae (cacao)	African star-chestnut /	Indigenous tree, fibrous bark					Bark for						

Latin name	Family	Common name	Notes	Uses										
				Food plant	Edible fruit	Drink / jam/sauce	Medicinal	Non-food product	Animal fodder	Woodlot	Living fence	Insecticidal	Mulch	Soil fertility
		ngoza / tick tree						rope, mats						
<i>*Strychnos cocculoides</i>	Loganiaceae (wild elder)	Corky bark monkey orange / Mateme / Kamezameza	Indigenous tree, miombo woodland, prized fruit		♣	Juice, jelly								
<i>*Syzigium cordatum</i>	Myrtaceae (guava)	Water berry / Umdoni / Jamula / Ma-fowo	Indigenous tree, used magically		♣		♣							
<i>Syzigium guineense</i>	Myrtaceae (guava)	Water berry / masafwa	Indigenous tree		♣	Juice								
<i>*Tephrosia candida</i>	Fabiaceae (pea)	White hoary-pea / white tephrosia / ntutu	India, Bhutan, Nepal, shrub, intercropping									♣	Weed suppression	♣
<i>Tephrosia purpurea</i> var. <i>sericea</i> (= <i>Mundulea sericea</i>)		Poison pea-bush / cork bush / purple tephrosia / wild indigo	Indigenous shrub, slow-growing, intercropping, rotenone in bark (kill fish, pesticide, emetic). Same species or closely related?				♣					♣		♣
<i>Tephrosia vogelli</i> (was <i>T. purpurea</i>)		Vogel's tephrosia / fish poison bean / dirigi												
<i>*Uapaca kirkiana</i>	Euphorbiaceae (spurge)	Wild loquat / sweet apple / Mahobohobo / Masuku	Indigenous tree, miombo woodland. Insect-resistant		♣	♣	♣	Timber				♣		
<i>*Vangueria infausta</i>	Rubiaceae (coffee)	Wild medlar / Nziru	Indigenous tree		♣									
<i>Vigna unguiculata</i> subsp. <i>unguiculata</i>	Fabiaceae (pea)	Cowpea / blackeyed pea	Indigenous shrub, drought tolerant	♣					♣					♣

Latin name	Family	Common name	Notes	Uses										
				Food plant	Edible fruit	Drink / jam / sauce	Medicinal	Non-food product	Animal fodder	Woodlot	Living fence	Insecticidal	Mulch	Soil fertility
* <i>Vitex mombassae</i> & other spp.	Verbenaceae (verbena)	Black plum, poora-berry, chocolate berry	Indigenous tree, aromatic leaves		♣	♣								
<i>Zea mays</i>	Gramineae (grass)	Maize / corn / mielies	Introduced. Monocotyledon, popular large grain	♣										
* <i>Ziziphus mauritiana</i>	Rhamnaceae (buffalo thorn)	Masawa / Masau	India / Middle East, tree naturalised in parts of Africa		♣			Masau 'leather'			♣			

The information collated in this table also draws on information in:

Akinnifesi *et al* (2006); CGIAR 1995; Coates Palgrave 1984; Gabre-Madhin & Haggblade 2003; Murray & Powell, *ca* 2002; Snapp, Kanyama-Phiri, Kamanga, Gilberts & Wellard 2002; van Wyk & van Wyk 1997; Vandenbosch *et al* 2004; van Wyk, van Oudtshoorn & Gericke 2000).

*Species with asterisks indicate where most of ICRAF's fruit tree domestication initiatives are currently focused.

MPLTS = Multi-Purpose Leguminous Tree Species.

Indigenous: Sorghum [*Sorghum bicolor*] and millet [*Eleusine coracana*] as well as cowpea [*Vigna unguiculata* subsp. *unguiculata*], coffee [*Coffea* spp], palm oil [*Elaeis guineensis*], yams [*Dioscorea* sp], and African rice [*Oryza glaberrima*] (Gabre-Madhin & Haggblade 2003: 4).



Appendix F: Recommendations for school gardens

Referenced in Vol 1: pages 26, 27.

Guiding principles for developing a school garden (FAO 2007: 25-26)

- *Beneficiaries:* Children are the primary direct beneficiaries.
- *Purpose:* The main purpose of school gardens is learning for children.
- *Motivation:* Interested and motivated facilitators and teachers should guide the programme.
- *Learning agenda and curriculum:* A coherent learning programme, including nutrition education, should be linked to (i) the school garden, (ii) to school feeding, and (iii) incorporated into the mainstream curriculum.
- *Agricultural technologies:* Garden-based learning should draw on local resources, locally-adapted crops, promote indigenous techniques, and adapt approaches to local conditions.
- *Intersectoral collaboration:* A wide range of institutions, including education, agriculture, health and environment ministries, should be represented in school garden policy-making.
- *Community support:* Participatory planning and community involvement are essential to the establishment and maintenance of the school garden.
- *Management:* Children should be involved in garden planning and management, and other strategies should be tested and evaluated.
- *Capacity building and information exchange:* Capacity-building and awareness-raising are required at supervisory level, among school staff and extension staff, in PTAs and the community, and in education colleges.

Recommendations for follow up by focal points at national level (FAO 2007: 27-28):

Government policy regarding school gardens should:

1. Bring together the ministries of agriculture, education, health, and the environment.
2. Recognize and clarify the potential role of school gardens in enhancing food security and mitigating the effects of HIV and AIDS.
3. Link school gardens to school health and nutrition policy and children's dietary needs.
4. Clarify the balance between income generation, food production, and learning aims.
5. Formulate guidelines for schools.
6. Explore alternatives to using school gardens as main sources of school meals.
7. Promote agricultural approaches which safeguard the environment, respond to climatic change, and make use of local resources.
8. Extend and clarify institutional roles and responsibilities in relation to school gardens.
9. Help to establish and maintain a regional school garden network.

School garden projects and initiatives should:

1. Analyse nutrition needs, practices and attitudes, and home and school gardening practices to ensure that food production and nutrition learning will genuinely enhance children's diet.
2. Take steps to deal with motivation and attitudinal or conceptual gaps and barriers.

3. Promote locally-adapted crops and use of local resources.
4. Promote organic gardening approaches.
5. Ensure input from agriculture, education, health, and environmental institutions and good co-ordination between them.
6. Explore and evaluate local partnerships, community links, and garden management structures; build on existing structures.
7. Assess capacity resources and gaps in all participants.
8. Develop value-for-money Information, Education, and Communication (IEC) strategies.
9. Start training and materials development early.

Developers of curriculum and garden learning plans should:

1. Explore existing knowledge, attitudes, perceptions, and practices and the changing social and physical context as a foundation for curriculum development, giving high priority to the special needs of OVC.
2. Establish the balance of nutrition education, environmental education, agricultural education, business skills, garden management, and life skills within garden learning.
3. Explore the possibility of integrating garden-based learning into the existing school curriculum without sacrificing its coherence.

Source: FAO (Food & Agriculture Organisation). (2007). Garden-Based Learning for Improved Livelihoods and Nutrition Security of School Children in High HIV-Prevalence Areas in Southern Africa. Workshop Report Part I. June 12-14, 2007, Pandhari Lodge, Harare, Zimbabwe. Regional Emergency Coordination Office for Southern Africa and Nutrition & Consumer Protection Division, Food and Agriculture Organization of the United Nations (FAO). Retrieved July 30, 2008, from <http://www.fao.org/docrep/010/a1432e/a1432e00.htm>

Additional information on *Setting Up and Running a School Garden* is available at <http://www.fao.org/docrep/009/a0218e/a0218e00.htm>



Appendix G: The International Labour Organisation (ILO) guidelines on child labour

Referenced in Vol 1: page 27.

Acceptable forms of children's work are non-intensive activities for short periods every day that do not prevent children from attending school. Activities could include land preparation that does not involve heavy machines that are too big for children, planting and weeding with appropriately sized cutting and sharp tools, watering that does not involve loads that are so heavy they may cause musculoskeletal disorders, harvesting, feeding animals, bringing animals to pasture, shearing, collecting eggs, and sweeping.

The worst forms of child labour require urgent action for elimination and include tasks that are likely to harm the health of children, such as strenuous work that causes musculoskeletal disorders from repetitive bending, stooping, and adopting awkward and uncomfortable postures. These lead to problems with tendons and muscles and backache. Repetitive carrying of heavy loads is debilitating. Cutting the produce from trees by climbing or stretching and using inappropriate cutting tools puts a lot of strain on the musculoskeletal system. Using knives, scythes, machetes and sickles can result in cuts and sometimes severed body parts.

From: ILO (International Labour Organisation). *Training resource pack on the elimination of hazardous child labour in agriculture*. International Programme on the Elimination of Child Labour (IPEC). Geneva: 2005.



Appendix H: Ten cornerstones of the Farmers of the Future

Referenced in Vol 1: page 27.

1. Enabling policy environment.
2. Experiential learning-based curriculum.
3. Training, teaching and leadership competence.
4. Teaching and learning resources.
5. Pilot sites as learning cases.
6. Tangible benefits.
7. Multi-stakeholder participation.
8. Public awareness, advocacy and resource mobilisation.
9. Strategy and facilitation for institutionalisation.
10. Facilitation and management of the initiative.

Source: Vandenbosch *et al* (2004: 22); Vandenbosch *et al* (2002: 42-67)



Appendix I: Excerpts of interviews, recorded in electronic data log

Referenced in Vol 1: pages 30, 63, 81, 84, 86, 88, 89, 97, 99, 104, 107, 113, 115, 117, 119, 120, 124, 125, 129, 131, 174, 180.

This appendix contains additional detailed examples which could not be included in Volume 1 due to space limitations. As a source of ‘thick description’, it augments findings provided in Chapter 4, thus providing a better sense of the complexity and depth of the research.

South Africa:

Entrepreneurial focus:

The South African Institute for Entrepreneurship’s mission is to create entrepreneurs – both young and old. Over the past 14 years, the SAIE’s team has developed innovative entrepreneurship and business training materials which are now used in more than 75 countries and in 17 different languages. SAIE was established in 1996 out of the Triple Trust Organisation (<http://www.tto.org.za/>) which now operates as a facilitator NGO to make markets work for the poor. All SAIE’s training is SAQA accredited through the ETDP SETA. (Cockcroft pers comm May 16, 2006)

Record-keeping and accountability:

... the children learnt a lot about a sense of responsibility. ... for example, when I gave them seedlings, I gave them a record book... They wrote in their book. The next day, whether the teacher is there or not, they would go and check their seedlings... if all the seedlings are there. “Beetroots: present” ... [*laughing*] because they were young; “present” - meaning that they were all there. And then if there is one missing, “one absent” [*laughing*] ... and now, the essence of it was, what happened to the seedlings. They must know, has the seedling been pulled out, has a certain insect eaten the seedling - you know there was a sense of responsibility. If I came back next week, there would be a verbal report. (Jantjie pers comm May 3, 2006)

Mainstream curriculum concerns:

... if they like to make triangles... [or] if they want circle, they will do that... basic shapes [in mathematics]. [The] integration of subjects was there... language, mathematics, art... and when it’s raining or very cold, they would [work in] the classroom... plan their garden and draw... So we were also working across the curriculum as well. (Jantjie pers comm May 3, 2006).

South African websites:

South African websites with an environmental learning component include the Biowatch Bulletin [www.biowatch.org.za/], the Botanical Society of South Africa [www.botanicalsociety.org.za/], Commercial Products from the Wild [www.cpwild.co.za/], Classroom Practice for a Healthy Environment [www.envirolearn.org.za/elhandbook/index.htm], Department of Environmental Affairs and Tourism [www.environment.gov.za/], the Department of Water Affairs and Forestry [www.dwaf.gov.za/], EarthLife Africa [www.earthlife.org.za/], Eco-Schools South Africa [http://www.eco-schools.org/countries/pages/page_rsa.htm] – which is linked to the international organisation [www.eco-schools.org/], the Environmental Education Association of Southern African [www.eeasa.org.za/], the Environmental Learning Forum [www.envirolearningforum.co.za/], Food and Trees for Africa [www.trees.co.za/], Food Gardens Foundation [www.foodgardensfoundation.org.za/], Full Cycle [www.fullcycle.co.za/], GreenWorks [www.greenworks.co.za/], Project 90 by 2030 [www.project90x2030.org.za/], Science in Africa [www.scienceinafrica.co.za/index].

htm], the South African National Biodiversity Institute [www.sanbi.org], Trees for Africa [http://www.trees.co.za], the Wildlife and Environment Society of South Africa [www.wessa.org.za], and the World Wildlife Fund South Africa [www.panda.org.za/]. The South African Institute for Entrepreneurship (SAIE) brings an economic focus to agricultural learning, under the banner of the Triple Trust Organisation [www.tto.org.za/].

Agroforestry activities:

... what we are doing at Fort Cox College especially in Social Forestry Department concerning Agroforestry. Here we have our Agroforestry demonstration plot that we use for students practical as well as researching on different system of Agroforestry. This plot was established during the partnership between Fort Cox College, Fort Hare University and Oregon State University from USA. Other than that there are Agroforestry projects that were established for communities around the college by the department of social forestry. These projects were also sponsored by Oregon State University. But unfortunately the objective of the projects was never achieved since the two projects are currently not operating. When we reviewed this as the department we thought there was a failure on dissemination of information on what exactly was expected from the communities regarding these projects. However, it is still our intention to revamp these projects and I think with the knowledge you will draw from your visit to Malawi and USA, it will definitely give us a light on how to undergo this process successfully. These projects were necessarily meant for community outreach programme by the department as one of the programme in the functional plan. (Tshidzumba pers comm April 25, 2006)

Community involvement in school food gardens:

And parents, they become part of this programme, because not all the time would the learners would go to the... food gardens. The parents, they help in watering and taking care ... even, even on holidays. Schools are being vandalised but the parents are always there to take care of this one. And they have sense of ownership of the school. ...

So there are parents who have volunteered to cook for learners, and... again in the garden, parents are volunteering to come and water the garden... to take care of the food garden, on behalf of us while we are busy in class. (Mvula-Jamela pers comm April 18, 2006).

... DD Siwisa and St Mary's came up tops during school competition... with the involvement of parents because they started community gardens... the parents of that area and that particular school. From their own gardens – there was a garden for the school but there was also a garden which is belonging to the community. (Mothlabane pers comm April 12, 2006)

... when we leave the schools, they would keep an eye. If we asked the parents to come and water the gardens during the holidays and weekends, they would do that. Or they would monitor the children to go to school and look after the garden during the holidays.

... if you have a problem of theft... [at] a parents' meeting... I could talk to the parents about that problem. And sometimes it was just solved by the parents. They just say to me, uh-uh, it won't happen again, we are here. It won't happen again. Really! (Jantjie pers comm May 3, 2006)

... most people [have] theft, somebody is stealing their seedlings, as they put them in. And we tried to solve it for over a year. And we solved it pretty quickly once we got the parents involved. (Cockcroft pers comm May 9, 2006)

Resource-heavy, dependency-driven projects:

... they [told me they] don't assist one school. [They asked] can't we cluster and be at least four schools, then they will think of doing something for us. ... they are not providing food, but they will train us in gardening. (Andile pers comm April 12, 2006)

... everything was organised for us... we were just attending... there was nothing that came from us in terms of the finances. And many of the people who were there were amazed to see educators coming from schools... because we were the only educators there who were sponsored... (Andile pers comm April 12, 2006)

... in town, there's always another programme coming, there's always something else coming, and when we finish with one of the schools here – a full three years... – they just get another service-provider to come and work on their garden. And they had no commitment to that garden themselves whatsoever... There's also a mindset that's very 'resource-intensive'...

But immediately the programme finished and we're not coming back... we don't go there once a week any more... as soon as we stopped doing that – they go out and found another service provider, that one happened to be from Johannesburg [Food Garden Foundation] to come and basically do training and whatever...

Unless it's resource-heavy – dense resources coming in – they don't feel they've got a programme. Whereas the point of our [Umthathi] programme is that it's very 'resource-light', so once it's all set up, and it can sustain itself and run itself very easily without any additional inputs. And after 5 years you've got to dig it up and put more kraal manure in, you know you can just go and fetch that – and if you can't fetch it, you can pay somebody like R10 to bring you a wheelbarrow. And that's the resources that you need, and the learners must bring newspapers and you need to collect dry grass from when they cut the lawns. It's not money needed – which is this kind of mindset that you need a formal programme, "we can't do ourselves, and we need money coming in". So it's very dependency-orientated and resource-dense.

... some schools that make that mind-shift are great, and ones that don't – they just feel, when we are gone then the programme's over. (Cockcroft pers comm May 9, 2006)

... people got the farm. So they were given seeds to plant, because they were going to plant some big lands. And I was there listening when the Dept of Agriculture man visited them, nothing had been started. Why? They were waiting for a tractor! *[laughing]* ...

I laughed at them – they were all mad. ...

Now what I said to them, I said I am inviting them to go to Kenton-on-Sea. We started a garden, you know, three by four metres – and then we started a plot. Every time I visited Kenton-on-Sea, we expanded our garden, expanded, until it was a huge land! Using old hoes, spades, and garden forks. You take that... piece of land, each and every day – you cover a big field. Rather than to sit the whole year with seeds...

And I laughed at them and said, hey I'm a woman but I will tell you a plan, I will never wait for a tractor. ...

You know the men, the Xhosa men, they don't like to be belittled. *[laughing]* I tried to belittle them, so that they can... be angry and go and work! ...

... lazy men... I think if you are not ambitious, so it will make you lazy, and you don't feel like doing something for yourself. (Jantjie pers comm May 3, 2006).

... a rural area, a peri-urban area, an urban area, and a farm area. ... rural people have title deeds, they live there, they own the property, and the piece of land. And all those people who were formerly led by chiefs, and headmen. ... there was control, discipline of the whole area. ...

If they don't want to go to work, those are the areas that promoted idleness – because if I don't want to work, who is going to chase me away off my land? You know, when you sit the whole day, "if I don't want to go to the lands and plough, who is going to force me, this is my land!" (Jantjie pers comm May 3, 2006).

These projects were also sponsored by Oregon State University. But unfortunately the objective of the projects was never achieved since the two projects are currently not operating. When we reviewed this as the department we thought there was a failure on dissemination of information on what exactly was expected from the communities regarding these projects. However, it is still our intention to revamp these projects and I think with the knowledge you will draw from your visit to Malawi and USA, it will definitely give us a light on how to undergo this process success-

fully. These projects were necessarily meant for community outreach programme by the department as one of the programme in the functional plan. (Tshidzumba pers comm April 25, 2006)

... what is missing here that prevents continuous food gardening happening? Is it welfare grants, is it the entitlement aura here? Is it that people are too lazy? (Walker pers comm April 22, 2006)

Rivalry:

[HPS] went to Umthathi schools. In some cases, they would divide the sites into two. ... that was our problem that we had to face – if funders had given us fencing... what will happen one day when I bring funders and then the Health Department funders are here also to come and visit...? And now when I bring the funders, what will they say if there is a clash between the two funders? If I say ‘this is our garden’, and you have HPS people saying ‘this is our garden’... we had to battle that. ...

[At] the end of my tenure at Umthathi... there was a launch... Umthathi was not mentioned... after my very, very strenuous work, we were not mentioned. But we were invited, we were there. They would never even mention that ‘we started with Umthathi, thank you for what Umthathi has done for us’. ... all the schools that were involved with HPS were our schools. (Jantjie pers comm May 3, 2006)

Well I still don’t know how they do their programme because we’ve tried to work with them – or we did work with them for many years, then they just shoved us in a corner... we had to step aside for their national [FGF] programme. ... exactly what we’d been using – no difference whatsoever, except these stay with the school for one year, and... we... for three years. If we have a problem within those gardens going after three years – how is some party from Johannesburg going to fly down here, run a three-week course, come back three months later, run another one-week course or whatever, and vanish into the mist. How is that garden going to live? And we told them that in the beginning and now it all happens, and all the gardens are dying... and now they’re saying oh well let’s work together. And I said right at the beginning, we’ll work with you, why not. You know we’ll work together, let’s do it. And for me, the biggest problem from beginning to end was... they came in here, didn’t include us, did their own thing...

... we’ve rearranged our programme around Health Promoting Schools, to make sure we included all of them, because health and the garden is part of Health Promoting Schools’ bouquet of services, or whatever. So we aligned ourselves to them, when this whole programme happened, we said fine, look we’ll work with you. Just, I need one thing, who do I work with? ... you need to give me somebody’s name and number, who runs this programme? ... is this programme a programme of the principal, is it a school programme, or is the Health Promoting Schools... or is it Food Gardens Foundation? I will work with you, just tell me who I must work with, who runs this, who is in charge of the programme, who is coordinating? They could not tell that to me. (Cockcroft pers comm May 9, 2006).

... you can never be a Health Promoting School without having a garden. And unfortunately at my school at the time, we didn’t have a garden. But because of the Umthathi Project ... a school garden was started. (Mothlabane pers comm April 12, 2006)

Lack of intergenerational knowledge transfer:

My sense is that you have to look at the generational and learning gap very critically and very carefully between the school child, the parent, and the grandparent. Or the infrastructure within the school, because you’re dealing with a lot of families where there’s a generational gap because of HIV and AIDS deaths, you’re dealing with some families where the father’s working in another city to try and earn money, you are dealing with children that might be sent in from a rural area to stay with a family. And... you need to look at a couple of models of why information doesn’t flow back to the household and be utilised in the home gardens. Maybe the house is rented and there is no food garden. Maybe the house is built in a back yard and maybe there’s no space to have a garden. (Walker pers comm April 22, 2006)

Malawi:**Income generation focus:**

[People] had no interest before. But when they saw that the funds are there, they were interested in coming now. Most of them enjoyed it... but that's because we are doing something. (Lindani pers comm June 9, 2006).

... very soon – you will see maybe some time in the near future – we will construct a kiosk where we will be showing whatever we are doing, we will be selling there whatever vegetables, even chairs, everything from each section, for people to see whatever we are doing. (Mawonga pers comm June 13, 2006)

... my government gets profit, because... if we have more trees, the result is we have more timber... and the government, they sell it... to other countries... so we have more revenue... (Lamson pers comm June 5, 2006)

Use of fertiliser trees (agroforestry):

... because if these agroforestry technologies are really imparted to all these people in the villages, within a short period of time, then they will stop relying very much on fertiliser, which is very expensive. And the result will be fruitful. (Mawonga pers comm June 12, 2006)

I thought that it was really good technology in agriculture, in order to put back sound measures onto degraded resources. (Gomonda pers comm June 13, 2006)

And this year, we encourage them to use their land... so the village headmen, where these nursery schools are, provided land to these orphan care nursery schools. And we provided fertiliser... and maize seed, and also paying labour charges... (Mawonga pers comm June 12, 2006)

Collaborative learning:

NK: Maybe even at this stage you could see it as a kind of experiment? Because the conditions in Africa might be different to the conditions in Italy, and so, there could be good reasons why it was always done small... so it's good to have these two different conditions and compare them.

CB: Sure, sure.

DC: That's why I appreciated their idea... remove these paths and put in [larger beds] in order to increase the number of crops. (Chikole pers comm June 13, 2006)

Demonstration through role-modelling:

When I go out there and start my projects, people will see the work I will be doing, so they will start to have interest in what I'll be doing. So in one way, I will say that's the way of teaching the people. (Gomonda pers comm June 12, 2006)

Experiential learning:

... [they] only... tell us two... the teacher say that if there are many people, the observation is not going to be good. ... [Our teacher said that] we are going to be teaching our friends...

We were just talking [telling them]... it was theory. (Mussa & Bamusi pers comm June 7, 2006)

Mainstream curriculum concerns (Zambia):

NK: That's amazing you know... So this Production Unit has been in the school curriculum for a long time?

RK: Yeah, it has been here for a long time. ... it has been part of the school for the pupils to participate in the agricultural activities of the school. Not that it's something which is... going to be marked...

NK: Ok... so there's no assessment?

RK: [No], there's no assessment. (Katanga pers comm June 17, 2006)

... we wanted to formalise things in the Ministry of Education... to formalise the uptake of agroforestry in schools. ... Instead of just looking at it from the production perspective, we said, why don't we also take it up. Because the Farmers of the Future concept can be taken up in different ways. It can go through the curriculum. It can go through the colleges. You can take it direct to the schools where it can go through the Production Unit. Also maybe even integrated with the nutrition gardens. And then there's also the other aspect, which is even more interesting, they're integrating it into the whole curriculum at school – through contextualisation of their teaching. It's very interesting, instead of narrowing it down and saying, we are just going to learn about agroforestry, put agroforestry as a method... [rather] fusing into every part of the subject, like teaching it in English, or teaching it in mathematics, or in the environmental science, even in art... (Katanga pers comm June 17, 2006)

... in a more formal way. It's much better. ... we need to build capacity, not only in one teacher. Maybe the capacity should be built from the colleges, so that when the teachers are already going in to the schools they are trained in those things.

... So maybe that's where ANAFE [could] come in... (Katanga pers comm June 17, 2006)

Contextualisation and participatory approaches:

... 2004 we had a very big regional training... we called it *Teaching with Trees*, and it was all about this contextualised teaching and learning. ... It was all about how to develop lesson plans... and how to integrate agroforestry into different subjects at school... (Jacquet de Haveskercke pers comm June 14, 2006)

Because what we are after is not to introduce a system of agriculture in the villages that is new to them. But we would like to say, for instance, their cultivation of pigeon peas with maize... ok, you are doing this, let us do this in this way. We do that and we see the results, and we say for instance, this other type of tree species, we use that on a small scale, and then a big scale, use whatever they have, they have been using. And we tell them the importance... then, little by little, they will also accept this other new technology as theirs... in so doing, they will be thinking that ok, this school is really assisting us, let us do this, and little by little we will strive towards food security as well. (Mawonga pers comm June 13, 2006)

RK: ... On the technologies, on the links – that one will be a discussion.

... And then on how agroforestry can be taught ... the school inspector ... [will] help us with the 'initial planning' – all those things which they do in education which we don't know. And then we also want the [participants] to tell us how they see themselves fusing agroforestry into their lessons – the lessons they are going to teach...

NK: Ok... so you're actually going to get the participants to think a bit.

RK: Yes, yes... to think of it. But then we use our notes which we have, so see whether they are going in the right direction. (Katanga pers comm June 17, 2006)

So that's why now we have changed our type of approach, because sometime back it was a top-down approach, whereby the project... or the... development activities were coming from the top. And now, it's now demand-driven, whereby the farmers or the rural people have to come out with their concerns, and being helped... So we have now changed the way of approaching the farmers... (Walasi pers comm June 13, 2006)

So you have to be careful... you must have a small mouth and big ears... to listen from him! And this what extension is telling us... if we need to learn something, you must have big ears and you must hear twice before you speak... that's why god created us with two ears and one mouth... so that you have to hear twice and speak once. ...

It's the principle of extension, so say that when you want to learn something, you must have big ears and small mouth. ... you have to hear twice, and speak once... So you keep on watching,

hearing from them, and come up with proper solutions... it's very, very important. ... a good trainer is also a good listener. So you have to keep on listening. And thereafter maybe you can come up with a wise decision... (Walasi pers comm June 13, 2006)

In-service training / workshops:

... the training is usually a three-prong approach... [1] *agroforestry technology*: What is agroforestry? What are the technologies used for? How do you establish a nursery? How do you transplant... [2] *contextualised teaching and learning*: how you can use agroforestry in whatever's happening in the school grounds in the different subjects, so you don't need to have an agroforestry subject on its own; you actually don't even need an agroforestry subject at all; as long as you can talk about trees and the environment and natural resource management... [3] *demonstration plots*: how to establish the demonstration plots, how to use them, and make... links with the communities... (Jacquet de Haveskercke pers comm June 14, 2006)

Plan has got a person who is responsible for food security, and a person responsible for learning – the person who works with the schools. So we are going to have that person also in the course, so that also they are brought on board on what is Farmers of the Future in ICRAF is. Then we also have one person from the Ministry of Education... an inspector of schools – so like the person who is the link between the teachers or their schools, and also the outside community. ...

... so we want them to have actually hands-on experience, to have the knowledge of what agroforestry is. So we are going to talk about all the technologies that we have. And then after that, we will look at how agroforestry can be integrated in the schools, and then we are also going to talk about the links between the schools and the communities. (Katanga pers comm June 17, 2006)

Teachers:

... Because the other problem – some of these activities, you train one teacher, then in two months' time that teacher is transferred somewhere else. (Katanga pers comm June 17, 2006)

Written/visual materials:

We have books, we have papers... we have some other drawings... we have things for displaying on the board ... on the wall ...[pointing to a map of the school on the office wall] for example that map... (Ngaiyaye pers comm June 7, 2006)

SG: So after reading the materials, I had to share the ideas with the farmers... that was the best way, the best way of teaching.

NK: Ok... so you would read, and then you would speak to the farmers?

SG: Yeah.

NK: You wouldn't just give the material to the farmer...

SG: No. But to teach once I have read.

NK: Ok... so you are like the interpreter?

SG: Yeah, the mediator. (Gomonda pers comm June 13, 2006)

Study groups:

I just learn from some other people who are learning from other schools... so that after getting those materials we are just going maybe to the teacher and asking what is difficult. And if it is easy, we are just asking each [other]. ... We just ask maybe one member of the school to give us some keys so that we can just go there and do our work. (Masowa pers comm June 6, 2008)

Traditional leaders:

Because you may feel like the farmers are facing this problem... yet it's not their immediate problem, it's not their immediate need, so you are thinking that maybe I'm addressing the need of the people, yet it's not their need. Say, you can just see here... maybe they are lacking a school... so you can come in by constructing the school... you'll be maybe furious to see... maybe the pu-

pils are leaving that school and going to a certain school which is far from there... so you ask yourself, why are they running away from this school? So you were thinking that you were addressing their need, yet, it's not... so, this is another problem. You must be careful to listen if they really need a training, otherwise it's just a waste of time, and a waste of resources. (Walasi pers comm June 13, 2006)

Now I think in absence of these chiefs, even with us, our extension work, it cannot work. ... local leaders are the source of information. We use them as a tool of disseminating information. ... So it's like they've got all the mandate, or all the powers, to say, we are not having this project. ... you have to bring the project that [is] going to help the people of that area, so you have to convince him. So really, they are playing an important role, as far as maybe extension services are concerned. ... they are the ones that are going to tell you, caution you, to say, there in my village, there are different kinds of people... there are people who don't understand things... Because it's difficult for an extension worker to know... about the soil type of the farmer's field. ... So the extension worker will seem very clever, just because he heard from the local chief... and know the strategy to put in place... and this achievement is coming from the chiefs. So you have to be careful... you must have a small mouth and big ears... to listen from him. (Walasi pers comm June 13, 2006)

And happens sometimes that the chief puts limitations... and maybe... and nobody can listen on that... he doesn't want to spread some knowledge on agriculture... and sometimes, or most of the times, the chiefs are very good people that want to develop the village... (Benda pers comm June 13, 2006)

Community members' agroforestry practices:

Ah, these old people, they are already practicing this, but they didn't know that they are practicing agroforestry. Those that are practicing for instance... the cultivation of pigeon peas, together with maize... they didn't know they were doing that as something very important. (Mawonga pers comm June 13, 2006)

SG: Agroforestry is not a new technology... it was there before our grandparents... so the ICRAF people saw that they need to improve the agroforestry technology... though it was already being practiced. (Gomonda pers comm June 13, 2006)

... when you are introducing [agroforestry] to them now, you are talking to the old farmers about the growing of trees, it's strange to them. They say, why should we grow trees, we are cutting trees from the field, you want us again to grow trees? Or, the trees that improve soil fertility – it takes too long for them to see the benefit. But fruit trees, they will grow them very quickly. But in trees where they are going to replenish soil fertility – it takes two years – ah no, that is too much... ... their soil fertility strategies in the past – or even now – is either to leave that piece of land fallow, without putting anything – so they leave that land so the grass and trees regenerate. Or they go and look for another piece of land – a virgin piece land. ... Then the second strategy is... to use manure – cattle manure... goat manure... or pig manure. ... The other strategy they will use is to do crop rotation... where they had beans... groundnuts... pigeon pea. But... they will never grow a field solo – a pure field of pigeon peas. They will usually intercrop pigeon pea with maize and other things. (Katanga pers comm June 17, 2006)

Use of text books:

The steps to follow in establishing an orchard - it's in the book of standard 8 Agriculture... we were following that. (Mussa & Bamusi pers comm June 7, 2006)

Agroforestry demonstration plots:

RK: ... those leguminous trees. ... you have to weed them, you have to put a firebreak around, you have to take care of those trees. So the management aspect has to be there. So the farmer needs to find time to take care of those trees, up to the time he's going to cut them.

NK: So does it really mean a little bit of extra work?

RK: Yes it does. It will mean a little bit of extra work that is going to pay off, when they cut those trees. Because they are not going to be bothered now to go to town to look for fertiliser, to put fertiliser on the trucks, to take it to their homes – there is money involved in all those things! But once you take care of your trees, then you know that you have a fertiliser bank which you can harvest any time you want. (Katanga pers comm June 17, 2006)

Special events:

... we are arranging to have also an open day at this school, to build awareness to the community around... (Mawonga pers comm June 13, 2006)

Use of radio:

... training or dissemination of information to these local people in the villages. ... Malawi at present is using the radio as a mode of communication. But how many people have got radios in their villages? Very few people. And for a radio to work, it needs batteries. How many people can afford batteries? (Mawonga pers comm June 13, 2006)

Expert researchers:

NK: ... those concepts – the understanding of how this agroforestry works, and why it is really a good idea – how much emphasis is there on working on that so that the learning of it is also facilitated?

RK: ... when we do the training of farmers... we actually spend a lot of time to explain the concepts of agroforestry. ... what agroforestry is, the principles of agroforestry, the advantages... how it benefits us, how it can benefit the farmers, the environment. ... before we actually go to the technologies, because that's where we feel that if people understand those concepts, then the technology wouldn't be difficult to understand. But what I do know is that, as human beings, we need to hear these things now, tomorrow, another time, before it actually sinks in! (Katanga pers comm June 17, 2006)

Agricultural 'extensionists':

So the community selects a certain group of community members to be trained in agroforestry so that later on, this critical mass of about maybe 30 farmers will be responsible for taking the technology to the other members of the community in those areas. We call it 'farmer trainers approach' - that's what we are using. Because we cannot afford to be going all around, so if we train 30 people, then they will go and train other farmers. Then we just do the follow-ups and the back-stopping; that's what we are doing in Chadiza. In addition to the on-farm trials, which are also going on in those areas... (Katanga pers comm June 17, 2006)

... the idea of growing trees... replenishing the soil fertility and improving the soil structure. So it's all the things that are taught to the school children when they are still at school, maybe if even they start from grade 5 – because after the secondary school, when they become farmers themselves, when they are in the villages, it wouldn't be a strange thing for them to say... can you grow *Sesbania* for the soil fertility or can you do that... it will be part of their farming skills. Also what we want - our main objective - is that agroforestry becomes part of the farming system. Just as they are able to grow maybe beans in rotation, or cowpeas, they should also say, ah! why don't I put trees here so that I can improve my soil fertility. (Katanga pers comm June 17, 2006)

Foreign workers:

... my objective is to say that these people who are involved in the orphan management should also learn a lot about how they can support themselves in the absence of these people who are coming from far countries. So we should get ideas, like working themselves hard in agriculture, and in so doing, they can get more benefits like money whereby they can support themselves. And food to encourage food security... (Chikole pers comm June 13, 2006)

... it's better to save a friend who is near you, rather than saving somebody who is far from here. So we need to show love with the neighbouring villages. (Walasi pers comm June 13, 2006)

Land and natural resources:

So this forces some of them to go and seek jobs in the... tea estates, coffee estates... they work as farm supervisors, or field assistants, and we have got others working ... [in big poultry farms]. ... some are working in parishes... they are working with the villages there, they import knowledge on agroforestry technologies. (Mawonga pers comm June 12, 13, 2008)

Because when you ask a child what do you want to do after school, zero percent will say I want to be a farmer. But then, when you look a couple of years later, a big percentage of the students are actually farming... well, how come? They end up farming, but they might not have the right training... So, if we know that children in rural schools – mainly with parents that are farmers, et cetera – end up farming, then those are maybe the ones that we can target in Farmers of the Future activities. (Jacquet de Haveskercke pers comm June 14, 2006)

[Our students] will be practicing... in the end then... they'll be farmers of the future, but they will also make more and more farmers. (Mawonga pers comm June 13, 2006)

Private partners/donors/volunteers:

... it's very important because very often ... the private donor want to be very sure – I think it's a good thing – that the moneys are spent for good things and are useful, and that these developing activities carry on. (Benda pers comm June 13, 2006)

... so, we said, ok, let us concentrate on [implementing] our programme... we have left this development of the institution to the donors. (Mawonga pers comm June 13, 2006)

NGO/NPO/CBOs:

Unfortunately, we never ever followed up after that workshop... but you know, if you have time at all, if you could go and talk to one or two of those people who attended, and see how they have used that... I would even be very interested in what you find out - if you are able to talk to any of them. How, if at all, how they used what they learned – what they got from that workshop. (Jacquet de Haveskercke & Mitti pers comm June 14, 2006)

... this Zomba guy; he [said]... they were already using something in Malawi and they called it – I can't remember, but it was called something like 'using the environment in teaching'... and he gave a lecture about that one evening. ... He had an acronym for it [TALULAR: Teaching And Learning Using Locally Available Resources]... it was basically using the environment and objects in the environment in teaching. (Jacquet de Haveskercke pers comm June 14, 2006)

[We] rely upon Makoka library. ... ICRAF... has been bringing us... agroforestry seed... technical support...

... Thondwe Extension Planning Area, their services by coming here now and again, so we've been learning a lot from them. So it's not a matter of just saying we are going to work on our own. No, there should be ... sharing of knowledge, sharing of experiences and even materials. (Mawonga pers comm June 12, 2006)

Mary said the books are a “mockery ... the problem is that with donors, they just give you what they think, without first finding out what you need.” She had in fact asked Frank to wait for them to first compile a list of text books required at the school. My guess is that Frank got sick of waiting for that list, especially seeing as term started on 5 June... some of the students are already here! So I think all sides need to do some changing: the donors should consult more carefully, and develop some patience, and the recipients should be more pro-active in initiating consultation, and speeding up the process of compiling lists of requirements. (Köhly, research journal, June 12, 2006)

... the other interesting thing about Plan is that, I think what’s made it even more exciting to work with Plan is that they usually are in a community, or in an area, for about 10 years or so. ... so that they can see the impact, before they move to another area. So it is looking good for agroforestry activities, because if you only are fighting for five years in a certain area, it’s ... not good enough. So the 10 years with Plan is quite good. (Katanga pers comm June 17, 2006)

Plan Zambia has been working with ICRAF for a long time. I think they’re going now into 6 years of working closely together – especially the last 4 years. ... we [ICRAF] are actively involved in developing the country strategic plan for Plan Zimbabwe for the next 10 years. ... we’ve made sure that FoF is a major strategy for Plan Zimbabwe. (Mitti pers comm June 14, 2006)

Plan Malawi: we had invited them to a similar seminar ... they came in large numbers... But I think after that... ICRAF didn’t follow up... (Jacquet de Haveskercke & Mitti pers comm June 14, 2006)

They asked us to explain what we are doing in order to assist them, because on their own they can’t do anything. So because they ... don’t have enough time to go through the whole district, that’s why they ask the teachers ... do that in... the villages or at the community. So the reports go there... and they compare it to their work. ... we are writing a report. (Lindani & Mmambo pers comm June 9, 2006)

Dependency:

NK: Oh, while I think of it, there was one thing you were talking about earlier on, which raised a flag for me, in terms of funding, something that has come out with some of my interviews – those in Malawi and in South Africa – is that in certain areas, you seem to have a lot of different funders coming in, wanting to do something useful... so there’s funding from this angle, funding from that angle... and you end up with this community that just sits there and waits for handouts and help from ‘on high’. It was just interesting that I had that pointed out to me from very, very different groups...

JM: Are we talking about the problem of the ‘dependency syndrome’?

NK: Mm...

JM: Yeah, I think one must be very careful with these development programmes... because you can actually add to that, and I think in our work we try very much to ensure that whatever we do is building sustainability and an element of community empowerment. But sometimes it’s difficult when you don’t have control over who else is funding and... everyone has different approaches – the way they go to communities and the way they create awareness, and get them excited... without seeing, what is it that the communities themselves are putting in, and what effect are they looking for... and see how are they going to stand on their own without that... and not create a situation where they constantly depend on outsiders. Yeah, I think it’s something to be wary of... (Mitti pers comm June 14, 2006)

CJ: ... even in Zimbabwe, NGOs are now starting to complain that handing out foods has disrupted the whole social structure of the villages. It’s like Joyce was saying, some people who are starving every year – they used to go and work for people to get some food to make some money or whatever... now they just sit back under a tree and wait for WFP to drop a bag of maize meal, rice... So the better off farmers who were using those poor farmers in their fields, can now find nobody to help them harvest... (Jacquet de Haveskercke pers comm June 14, 2006)

JM: ... coping mechanisms: yeah, maybe you don't need to bring in food, you need to [make] those coping mechanisms... work again. I mean surely there are some people who need help, there are some people who are really vulnerable. But the targeting is not done well enough. There's a lot of distortion. Sometimes working in development you start feeling guilty because – personally I really don't want to have an ounce of guilt – adding to making somebody dependant on me. It's not fair. People should really decide a lot of what their destiny should be, you know, and develop their potential, but, if they continue to depend on somebody else all the time I think that's not fair. (Mitti pers comm June 14, 2006)

Intergenerational factors:

... my mother was an expert on this, I learnt it before. ... it's not difficult to share in our family... I shared what I know from ICRAF and I compared it to what I knew before – it was the same thing. (Lindani pers comm June 9, 2006)

... when I was young I was not able to make like that juice... I was waiting for my mother [to make it]... [But] after this [ICRAF training]... I can make it for myself. (Lindani pers comm June 9, 2006)

SG: Before I came here, I was also practicing these technologies... this mixed cropping of *Gliricidia* with maize... So, at first I wondered, why are we doing this?

NK: You were doing it, but you were wondering why?

SG: Yeah. But when I came here, I came to know the reason.

NK: So your family was doing it?

SG: Yeah, right now, they are doing it.

NK: Before you came to the polytechnic?

SG: Definitely.

NK: But they didn't explain to you why?

SG: No. My family was also taught by the ICRAF, but then I didn't know what was happening in our ground. ... (Gomonda pers comm June 13, 2006)

... as the name suggested, Thondwe Village Polytechnic, the 'Village' comes in the sense that our aim is to train students not to work in towns, but to go back to the village and be able to develop... such as to create jobs in those villages. Because if one is practicing agriculture with these students, that means he or she will employ one or two people to assist him or her. In that way then, there is that decreasing number of people – youths – flocking into town seeking employment. Instead, they will be in the villages... Malawi is agro-based – our economy is agro-based. Really this is the backbone of our economy. (Mawonga pers comm June 12, 2006)

The best way is to work with the young children... because ... it's easy for them to listen... and teach them. [*adding, on reflection*]... working with the tertiary group is also good. Because at tertiary level... some don't know... so it is also the time to... learn at tertiary level. [Tertiary] students are able to know things in real situations. (Gomonda pers comm June 13, 2006)

... and they were asking me, how can we get the seeds for these? So I said you are free to come so that we will assist you where we get the seeds for this agroforestry tree species. ... it's really an interesting field and we are proud of it and ICRAF office here in Makoka is really assisting us very much. (Mawonga pers comm June 12, 2006)

Really the course was... very good at the polytechnic... before I went at polytechnic for training, I knew nothing. But coming out of that institution, I've got a lot, that even people – responsible people – they are also giving me respect for what I gained at polytechnic. ... Because of such a response, I see that the polytechnic is... an institution which is doing more for the development of this country... For example, at the bishop's house – Bishop Thomas Msusa – they have taken me as their advisor for all agriculture projects that they are doing there. (Chikole pers comm June 13, 2006)

NK: ... do you talk to these guys about what they do in their own homes? The people who come to work here, have you had the opportunity to talk to them and find out what practices they have in their own homes, in their gardens...?

SG: Yeah... So it's when you teach them, so they come up with a new knowledge; and sometimes they can take things for granted, although they are working here. But some are practicing these technologies which are being done at Thondwe Village Polytechnic. But others, when they go out, they forget about what they are doing here. (Gomonda pers comm June 13, 2006)

... others have been coming here to ask us when we are starting to sell the juice. ... They are just interested in buying... because maybe the process is just too long for them. (Lindani & Mmambo pers comm June 9, 2006)

Because we feel that the school is within the community, so whatever the school does should not be anything which is strange to the community. So it should be something which the community should be able to benefit, and the community should also be able to input into what the school is doing. Because if the school actually stands on its own, then they are not going to go anywhere. They need to have support from the community in whatever they are doing. ... And also, the school is like a learning point, so if the school is doing something which the community appreciates, then we feel that also the community will copy, and there should be some trickle-down for the community. Right now there are schools having problems with the community, where the animals are trampling down on their trees, people are uprooting the trees which the school has been planting around. So we wonder, is it jealousy, or maybe they're saying, oh! these schools, what's going on! And the other thing, every school – even though the pupils in that school are from community – the teachers usually come from outside. So for them actually to be integrated into the whole community, they should do something which is appreciated by the community. So that's why we want to see how the schools and the community actually can be interlinked. (Katanga pers comm June 17, 2006)

Environmental learning:

When I go home, I do try to teach my friends, especially gardening... I like it! I like flowers... oh, they're very nice! And I do try to graft the flowers. (Iris pers comm June 8, 2006)

But the problem was that the granadillas and the mangoes were planted, we put a fence of grass... when the grass fall, they were open and termites spoiled the roots of the granadillas... (Zerena pers comm June 7, 2006)

Like in the villages, many farmers are failing to come up with bumper yields, just because of poor crop protection, like failing to buy pesticides. So with *Tephrosia*, we use it as a pesticide when we have extracted the juice from the leaves. (Chikole pers comm June 13, 2006)

NK: Ok, so that explains to me why there seemed to be – as far as I could see – a lot more reinforcement coming from the communities, for the children. So what they were doing at school didn't seem so strange; because they were also getting [the message at] home, and seeing it happen there.

RK: Yeah... it's already there [in the community], then they also learn something at school.

NK: Yeah, I think that's actually quite a good approach, rather than just the schools, or just the communities.

RK: Yeah. It should be the whole community – when we talk about the whole community even the schools should be involved, everybody should be involved. It should be a holistic approach! (Katanga pers comm June 17, 2006)

The main goal for ICRAF to choose this agroforestry at this institution was, first of all, to ask students - who are learning here - to adopt this technology so that when we go out, we should practice this and also teach others in... the communities, so that in one way, we are conserving environment. (Gomonda pers comm June 13, 2006)

New York:

Community gardens:

I paid visits to a variety of community gardens and educational projects in New York City with my mentor. This was during one of the worst heat waves I have experienced (the newspapers reported a death toll of 24!). We kept on drinking water, and retreated into the shade wherever possible – and fortunately, gardens are better places to be than the average street in NYC. I noticed that amongst some of the apartment buildings in the Bronx, where community leaders had the vision to plant trees 50 years ago, it is quite bearable to be outdoors even during a heat wave. But wherever there is nothing but tall buildings, tarred streets and pavements (e.g. downtown Manhattan – near the World Trade Centre site), there is no respite from the heat. No trees or bushes to soften the reflected heat off the buildings, or to photosynthesise and use up the vast amounts of carbon dioxide being produced by people and traffic. Ironically, the situation on the street is exacerbated by air-conditioners blasting hot air (vented from buildings and from the subways below) into the streets, turning them into a merciless giant convection oven. (Köhly, research journal, August 5, 2006)

And that garden is a vacant lot, there's buildings on both sides. The building on one side was being used as a mosque by Bangladeshi men. The building on the other side was being used as a little school. And the garden is in between. And in the garden there were these Bangladeshi men, and they'd done this raised bed system and they were wearing – I don't know what that clothing is called, but it's sort of – traditional, from Bangladesh. And they had built raised bed garden system with pigeon peas and Amaranths, so it was a kind of legume-grain or green intercrop. Flowering coriander to attract beneficial insects. And marigold to repel the nematodes. So it created a little ecosystem based on, I think, plants and processes that they'd brought with them. And then there was also the kids out there, and they had this greenhouse that was heated by compost and they'd gotten the compost from a juice bar. So they would get buckets of carrot pulp, and wheelbarrow it over to the garden, and it would be all over the garden. And they had a solar powered stream/pond that they'd made... that the water was recirculated with this solar power panel. So I was just struck that here is an incredible laboratory basically for environmental and science education... in the inner city, that provides an alternative to city parks or nature centres, because it's so rich culturally and it's right in the students' neighbourhood. (Krasny pers comm. November 15, 2006)

Gardens as places of personal and social wellbeing:

... there are programmes that run normally Monday through Saturday... and on Friday nights for the pre-teens, we actually keep them until about 9 pm. So we have them from about 3 o'clock in the afternoon to about 9 pm. ... I think the statistics say that between hours of 3 and 6 are when the most amount of crime happens, and when the most amount of teenagers and pre-teens get into trouble with alcohol and drug abuse. And so we want to make sure that we create a safe space after school, but also... on a Friday, where kids are doing a lot of constructive activities. And so we do that by networking with parents. ... We also offer opportunities for parents to learn about nutrition and health, opportunities for them to learn about out-of-school time activities so that we can better service them, so that they know where to look for information about just about anything. And I think that some of the work that comes out of Harvard, the out-of-school time learning experience is enhanced when there's parent involvement. And so we looked at that as a key piece for creating success for our learners. (Simon pers comm December 15, 2006)

Gardens as sites of spiritual development:

... the ethic of 'who's the [best]'... we worship the achiever, we worship the one who's got the [prize]... if you've got [hundreds of awards] you're the *one*, you're some kind of a god... to hell with what you do! You probably just go off and make as much money as you can, and go live in a gated community... but consume more than your share! ... [People] think the Gross National Product is [the] bottom line... [but] the earth's carrying capacity is the *true* bottom line. (Goodridge pers comm December 12, 2006)

Gardens as sites of personal and social development:

... the child who's cut up, the child who the teacher doesn't know what the hell to do with, is most often the best child in the garden...

The... 'standardised child', the little 'A student' who was all neat and tidy and great on [the academic side]... she might be [thinking], 'oh, who wants to be out in this mess, and what am I supposed to do here?' And then these other ones who were... the adventurers, who just got into trouble wherever they were, some of them would be instantly constructive, actually being able to help me in deep ways... thinking... [for example] of a way to use a tool. (Goodridge pers comm December 12, 2006).

... what we focus on... is, what they get from it socially. ... they learn how to talk to adults, and even that skill alone is going to help them deal with teachers and how to be more responsible in the classroom. ...

You know, we have students that say, 'oh well the teacher was being disrespectful to me so I cursed her out, and now I'm suspended; but she was being rude to me, so I had to do that'. But definitely, in the gardening programme, they get treated respectfully, they learn how to be respectful. It's developing their social skills. And especially Zarino... is always getting into trouble at school, he's always getting into trouble at home. He was in our elementary programme for several years and had a file this big [*indicating with hand*] about all the trouble he would get into. And he is like a totally different person in the intergenerational programmes. He did quilting when he was in 5th grade, and you'd think, this little boy who's always punching people and cursing people out, he was there sewing; he was just amazing and as calm as can be. And then he joined the gardening project, and he's the only person I think that's been with us since the beginning. And when he gets there, he's just totally calm. There's just something about the physical labour and working as a team, and being around adults that's really just grounding / calming. It's incredible! And the minute he leaves, he's back to himself, his old self. But while he's there, it's something magical... And staff wouldn't believe me when I would tell them during staff meetings, well you really have to come and see this for yourself. And they would, and they couldn't believe it! And he can take five steps out of the garden and we're walking back to the programme, and he'll slap somebody on the head. I have no explanation for why this happens, but I've known him for several years and when he's there in the garden, he's just totally, totally different. (Mattera pers comm September 25, 2006)

... the idea is to have these gardens continue on, but they have to be used by the public. ... Let's have some activities going into it. ... none of them were doing any marketing stuff, there were just gardeners just doing garden stuff. (Ameroso pers comm September 19, 2006)

Food growing:

We plant seeds, and some flowers, watermelons and stuff; and tomatoes, lettuce, cilantro, radish, eggplants and zucchini – a lot of different stuff. (Velez pers comm September 23, 2006)

We weren't allowed to plant food. It's not our land, it's private land owned by Parkchester, and their concern – and I don't really know if this is valid or not – they don't want to have any food because... they don't want to attract any rodents. (Mattera pers comm September 25, 2006)

But what was frustrating for me, about the herbs, is that I don't think anyone took any of them to use. Like it was wasteful and because there was no system set up for using them. So it might have been that one of the seniors [could] volunteer and put them into baggies, and then you could pick them up when you stopped into the senior centre or something, something so that they could have been distributed. The basil is just abounding. There's just a huge amount of basil and it's just sitting there. (Mattera pers comm September 25, 2006)

Children gaining familiarity with fresh produce through their activities in food gardens:

Because we do start off the year asking the kids where food comes from, and they'll say, the refrigerator or the grocery store. (Chapman pers comm December 13, 2006)

And so when you have the choice of paying 3 dollars for asparagus, or 55 cents for a can of... gross, fake pasta and meatballs... what do you pick, and how does that affect your children? (Mattera pers comm September 25, 2006)

The parents don't eat vegetables. So the kids won't eat vegetables. ...
And also... junk food, the challenge of this has invaded. (Alegre pers comm September 23, 2006)

... and we pick some and bring it here to Abraham House. ... And sometimes we even take it... [home] if it's ready. (Velez pers comm September 23, 2006)

... we cook food for the kids, and we are trying to increase vegetables in their diet. Most of them don't like it, most of them don't eat it. But at least they are slowly getting used to vegetable. ...
... being in contact with vegetables, they are not going to be the 'evil thing' on their plates. It's going to be something more familiar, and also they will realise that there are other people eating vegetables. They are not just planting them, they are consuming them. ...
... some parents eat vegetables, so the [kids] even take it to their house. (Alegre pers comm September 23, 2006)

[They]... think, 'oh! We can feed the people who don't have enough food'. That happens immediately! (Goodridge pers comm December 12, 2006)

... multiple exposures to healthy foods in positive settings will increase a child's likelihood to try new things. (Chapman pers comm December 13, 2006)

Challenges facing healthier cooking and eating:

... when I started working at Abraham House as a volunteer, I [was] cooking... and I tried to do something, for example we had corn, and I cooked corn and eggs, put it in the bottom, added a little milk, so it was kind of soft. And the kids didn't like it! And when I had beans, they'd say, oh no I don't like beans. So, I had a lot of kids that didn't eat what we had prepared. ... it's a problem. They are eating things that they are not supposed to eat, or if they don't eat what we are offering them, they are not eating so they have nothing. (Alegre pers comm September 23, 2006)

I live in a small place, and when I cook my entire house has the smells of what I cooked. And what I realise is... if they live in a house with 15 people, they cannot cook. I mean, it's going to be crazy to cook if their house is going to be invaded by the smells. So the easy way – especially in summer time, food is horrible to cook – then to eat pizza, Chinese food. Take out is the only alternative. Not healthy, but it's what they have. And many times I ask them, why didn't you eat breakfast? To take breakfast is not that hard, you just have to have milk, bread, some cheese. But they say, no, I don't have it at home. (Alegre pers comm September 23, 2006)

Focus on income generation and development of entrepreneurial skills:

... we brought them to the Johnson Business School [at Cornell University] so that they could see one of the graduate students there who's actually also an inventor of a fantastic alarm clock. And so they were able to write for a small grant to get a little bit of money for these youths to invest, and learning about wealth, and how you create wealth, and how you build wealth, and how that translates in real estate in the form of stocks, and in small businesses. (Simon pers comm December 15, 2006)

... the summer school session ends usually around August 14th and then they'll come back after Labour Day... September 7th. So we've got a few weeks of missing prime market time, when

there's a lot of vegetables. ... In those three weeks, when they're gone, I have to deal with it, I get the produce, I bring it out to East New York and have the [market folk] sell it. Just to take care of stuff. (Ameroso pers comm September 19, 2006)

Cultural beliefs and practices:

... our kids don't go to those [two playgrounds in the neighbourhood]... they're afraid of shootings, interracial interaction, problems with other kids... with whom they don't get along... Mexicans, other Latinos and Black people. So it's not safe either for the parents or for the kids to be in certain places. (Alegre pers comm September 23, 2006).

But here in [this] garden, it's a different story. They have – and the parents have – the confidence to send them here, and come here also. Because for the community activities – the parties that we've had here – they come and they bring their little ones and they bring all their relatives. And as I told you, there are more people involved in the garden. There's a lot of work going on here. And last year I saw two people with Paco, this year I saw 10 people! And not only men, but women also. (Alegre pers comm September 23, 2006).

Interest in cultural heritage:

And this is culturally appropriate! This is what they were needing: African American folk who were letting them know. And I encouraged them and I'd be asking questions, 'well how did you play in the woods as a kid?' You know, totally non-produce oriented questions. And here and there the kids would hear these wild stories of mucking about and doing things. I mean it might be interesting to learn from this guy, once you've realised that this guy knows how to wield a [familiar cultural symbol]... (Goodridge pers comm December 12, 2006)

... the parent coordinator introduced herself to me as an initiated woman. (She meant that she was in a group with other African American sisters and that they had developed a community amongst themselves to offer an initiation ritual as well as an ongoing commitment to the spiritual growth of each other) ... they could see the empowerment of the garden as a place of [culture]... And this parent coordinator talked about this as the 'place of the initiation', and she was interested in having some of her initiated sisters do something with this in the garden. (Goodridge pers comm December 12, 2006)

And she saw that *Weed Watch* lesson and didn't know how she was going to get the kids interested in it, because she didn't know anything about it. And so she took the angle of looking at Dr DiTommaso at Cornell, the scientist who collects and uses the data from the Weed Watch investigation.⁶⁷ She read about him online and learnt that he's an immigrant, and so she used that angle to bring the kids in, since many of them are also immigrants, saying, "he's an immigrant, this is what he's doing". And then they got really interested in him, and eventually got to meet him, and he was like a celebrity to them. (Babcock pers comm September 19, 2006)

Negative perceptions of food growing:

And so becoming urban, becoming a participant in the cash economy, buying new things, not everything home-spun and home-grown, can be what means 'I made it'. ... I got some [comments from the parents]: I don't want my kids in this [dirt] and with worms... get my kid civilised! (Goodridge pers comm December 12, 2006)

⁶⁷ An online source explained that "Antonio DiTommaso, a professor in the department of crop and soil sciences at Cornell, is developing new methods for weed control. Students involved in Garden Mosaics projects help DiTommaso by inventorying the weeds they find in local gardens around the country, and uploading the information into a database on the Garden Mosaics site. The 'weed watch' project, as it is called, is modelled after citizen science projects that have helped ornithologists track migratory birds and meteorologists understand weather patterns." Retrieved May 11, 2006 from http://www.ijustgotlucky.net/discoveries/disc_summ.jsp?cntn_id=104544&org=OISE.

I don't think that it's because they are poor, because they have money to buy, to come here and buy chips and buy cola drinks. So it's not poverty. It's something else. I think that the reason is because in their countries, people who buy things in stores mean that they have a social status... And they want that in the home of the poor. Because in this country, they have the money to buy things in the store, even if they're not healthy they have status. (Alegre pers comm September 23, 2006)

Emphasis on empowering children with factual information:

... she gets [nutritional content] information directly from some of the fast food places. And so she... brings that into the classroom... so that they can get a sense of... if I went into KFC or any fast food place, can I get information about the fat content, the sugar content? And that information is provided but only if you ask, and so arming and equipping our youth with that information as well, so that they can go in and make healthy decisions based on all the information or all of the data. ...

... we ask that the kids ask for those charts, when we're out and about. And usually we take them to Wendy's because... there are food alternatives, they provide milk now... and they also provide a yoghurt and fruit parfait dish... there are also salad options. So we equip our kids with that information so that the next time they go to Burger King with their parents, they can say, hey mom, let's get this nutrition survey first, and then make our decision about what we're going to eat. (Simon pers comm December 15, 2006)

Value of garden-based activities for special needs children:

... the emotional kids [CY7s]... A lot of them went through the programme... they developed work skills where they had to learn to do team work. ... They had to work under extreme conditions – hotter than hell out there in summer time on Staten Island, because it's near a wetland. They learned marketing skills because they had to harvest and sell. They had communication skills, they had to deal with customers. We used to even take them sometimes – just as a one day event – to one of the farmers' markets to sell their [produce], so they had to deal with another audience. So they developed skills. And funnily enough, out of those kids... a good 80% of them, when they got the kind of high school education which was – you know, like, you've passed through – they got jobs. They developed work skills. And it's due to them having to be out there, the really hard work – because they would do all the hard work, they would do all the field tilling, they know how to lay black plastic, etc. ... (Ameroso pers comm September 19, 2006)

NK: ... so the hard labour... what happens there?

JA: We have a tractor with a rotor tiller on the back. That's how they till the fields. I have small rotor tillers. But me and the teachers will lay down the black plastic and get the rows lined out, and they do the rest. (Ameroso pers comm September 19, 2006)

Nurturing children's potential:

... I think that the youth development piece is a huge one... that is where all the empowerment comes from, and where the success and the positive outcomes lie... providing opportunities for youth to get involved and to have a say-so, because it... helps to build confidence and self-esteem...

Part of the reason why, and one of the things that I share with all the youth that I work with, the reason why I'm involved so heavily in these out-of-school time experiences and these after-school experiences is because that's where I started, and that's where I flourished... it was because one woman had a vision that youth will be involved in sports, maths and science. And so she created an opportunity for youth to get involved and to have opportunities for them to do presentations, to present to adults and to college students, and that made the difference. And so providing opportunities for youth to get involved and to have these empowering experiences at an early age can have huge impacts in terms of what their career path is, and how they become productive citizens. (Simon pers comm December 15, 2006)

That's a lot of what we do too... initially we try to connect them in that we create a safe space so that we can communicate our thoughts and feel open. And a lot of people don't have that space within their community. (Braverman pers comm September 21, 2006)

And that helped me, because yesterday I had to meet and I spoke about something in the garden to the whole church. ...

I was just speaking at Cornell for the [Weed Watch presentation]... (Velez pers comm September 23, 2006)

You see a lot of kids in 7th and 8th grade where they go in with this... fear of rejection... so they go with this mentality of 'I'm going to do what the most students are doing'. But then other kids who have gone into the garden part of it, they're doing stuff that kids in society aren't usually doing. ... So when the kids are doing this, it's like, well this is like getting dirty, getting into the ground, and shovelling, and finding a tree, and growing some fruits in their greenhouse, and bringing it out, and making it bigger – these are the things they don't see teenagers doing. So when they get into this, there's kinda like leadership, or there's taking a chance. So emotions and perspectives inside begin to grow and develop. So when they get into the 9th grade, or in their 8th grade, they begin to like... get into the basketball team, maybe go on a trip, maybe raise your hand in class – like be the first one to do something different, question something! Because in gardening, they [would] question things because they didn't know what it was. So we're like, 'it's good to... question everything you do! You know, question why a butterfly likes to go on top of the flowers... or why you're sitting [looking] at a bee and not being afraid of it, because they won't sting you if you're not hurting them. ...

And the schools are benefiting from this, because now you get a lot of leadership groups of kids doing things. (Rodriguez pers comm December 15, 2006)

Importance of decision-making:

I said this at a conference this summer, of garden-based learning educators – and they all [said] "Huh!" You could hear the gasp! We were finding that the thing that influences their interest in gardening, as well as their interest in community life and their enhanced social skills, is an increase in decision-making. So the more involved you are about decision-making about your garden programme, the more you're going to be interested in the gardening, the more you're going to be interested in the community of gardening, and the more you are going to interact with your peers. The fewer opportunities for engaging in how things are going to be done in the programme, then all of that goes downhill. (Eames-Sheavly pers comm September 14, 2006)

... I think just making sure that we have children at the table when we're making decisions about programmes, about how they should run. Because if it's a programme run for kids, there should be some youth input. (Simon pers comm December 15, 2006)

I'm always eager to find out... are the young people involved in decision-making or in programme organisation, and if so, in what ways. What we found with the first year of this study, the [adults would] always say yes, and then when we literally pressed them, how are they engaged in decision-making: "well, we give them a chance to choose whether they want to weed or water". So there's a perception that adults have, that they're listening to young people, that they're engaging young people, and if you really press them, sometimes we find that they're not. (Eames-Sheavly pers comm September 14, 2006)

... if [the] garden was to really become the school's, it had to *be* the school's... and they had to conceive of it, and they had to work it, and they had to be taking a part. (Goodridge pers comm December 12, 2006)

Conflicts of interest:

Like there were moments when I just said, well, what about the kids? ... It was almost like a fight. We had these bricks, for example, and... each person who worked on the garden designed a

brick... [to] put somewhere in the garden... [as] their mark. And this year, they took all the bricks and [turned] them over... because they didn't like the way it looked to have all these different painted bricks around. ...

And then we bought these birdhouses, and the idea was for everyone to paint the birdhouses so that there'd be colour in the garden. And they said, well, why don't we just shellac them and stain them so that they're natural wood, they'll look nice there in the garden. And I said, well, we're not trying to have a beautiful, professional designer garden; that's not the idea. The idea is that it's for the community, it's of the community, that people should be presenting themselves. Like sure, it might look a little scattered, it might look a little crazy, but the kids are going to be more likely to bring their parents and say, look I did that...

I wanted to share that, even though it's a sort of secret thing... because I think that does affect education in all realms. Like when the pure goal is not for the children and people involved to get the best experience they can get out of it, your goals get cloudy and limited by what other people's intentions are. (Hildegard pers comm September 25, 2006)

Community organising focus:

And a lot of what I am personally interested in, and also what Added Value is interested in, for our teens, is building an understanding of... movement and social change... so when we talk about community, we talk about this neighbourhood, we talk about teens and youth, and what youth can do as a community... and then also talk about... a larger community of people who care about the world and care about changing the world, and go and meet those people and learn from them, and share ideas...

... [we] are taught like, do it yourself and there's nothing anyone else can do for you. That is maybe part of why it's something that we have to teach each other in the United States, to work as a community, a buy-in club. Like it's something that we had to all sit as this group in the neighbourhood, and like, we all live in the same neighbourhood, we all are facing... all of the children in this neighbourhood are facing serious health risks with the food that they are even served. We could collaborate and save all of us money and, you know, that idea is not prevalent in this country, and I think that maybe that's why a lot of organisations that want to change things and... better our society. [So we] end up using the word community a lot, because it's like, look! Look around you, this is what [you need to focus on]. So that would be my take on why that word pops up a lot, and why that idea is something that, in this crazy, globalised and very impersonal United States, that like holding onto this sense that like, there are people around you who you can partner with, and figure out ways... (Loomis pers comm December 13, 2006)

It is incredible. It really is – in the truest sense of the word – 'community-building', the work that we do in the classroom. And all of the acting at the beginning of each farm lesson is a way for them to separate how things are happening in school with the farm lessons, where they put on their caps and they have this mantra, 'I will respect myself, and my co-farmers, and this space'. And we take a minute to look at everyone in the face and say, ok, you, I'm going to respect today, right in this moment, if only for this hour and a half, where we're all farming together. And it's incredible. I'm learning that it's a really special thing to see when it starts to work, when of their own accord and initiative, and not because anyone – any adult or authority figure – is going to notice, but just of their own accord, they initiate something. It does take a lot really, conscientious moments on our part, as educators, to pick up on those things and be over the top – I mean, I pretty much jump up and down if I hear someone say thank you. I stop the class, it's incredible, Monique just said thank you to Candice! We're so lucky! *[laughing]* And so maybe at first, they do it so that farmer Cristina jumps up and down. But eventually, they perhaps can't articulate it, but it pays off, saying thank you, or sharing, or being nice, because, then suddenly, they're in this caring environment, and someone picks up a pencil that he drops, rather than picking it up and breaking it in half... (Chapman pers comm December 13, 2006)

Well, I'd say first and foremost it's coming from... the people who are funding the project... in this case it happens to be a congressman. So somebody higher up who wants this sort of thing happening. And that's the case with any project really... ultimately you have to be supported at the top. ... it's not arbitrary that somebody says, we're going fund this project; it's because this

community we're working with (South Bronx) for this big project (Garden Mosaics) is the poorest congressional district in the nation. So there is a high need for services in this neighbourhood. (Babcock pers comm September 19, 2006)

The importance engaging with relevant environmental concerns:

I think it's really important to shift the idea that environmental issues are just for a certain group of people... because in the end, it's the under-served populations who are going to be most affected. (Babcock pers comm September 19, 2006).

... thinking about, well what are we going to do with all this fruit and vegetable waste? And so they realised they could create this compost heap. And... they were just taking action, because they felt like this is a great issue for them to work on... to look at food production, and how we accumulate waste and what happens to that. Previous to that, all of them had just thrown their fruit and vegetable waste in the garbage, and they never thought twice about it. ... And then thinking... well we have this great compost heap, but we don't have any plants. And so they were able to do the planting as well, and to use the compost... they were addressing a community issue. (Simon pers comm December 15, 2006)

Challenges of the issues-based approach:

He explained that under the leadership of Alan Hurt, the organisation went the issues-based route – which he felt was disastrous, as it pushed aside anything that was “green”. By focusing on nutrition and health, Steve managed to keep the project alive; he initiated a community development programme [after] Alan's retirement... (Köhly, research journal, August 2, 2006)

Garden-based learning:

... this is a children's garden, this is a learning garden; we would love to have you, we need your expertise... but on the other hand, know that this is the kids'... We can't make this so that the kids don't feel comfortable near the earth. (Goodridge pers comm December 12, 2006)

The reason why a regular school will have a garden is that it always had to do with education. It had to do with connecting with the science education. ... with health issues. ... with food education, nutrition education. A lot of it was basically, they could figure they could do a lot of learning. ... doing gardening correctly, it's like scientific method. To get results, you have to follow the certain steps. ... spacing, weeding, water, fertiliser, the whole bit. ... And also it had to do with maths skills. ... like spacing the plants. ... how much fertiliser per ton. ... they were used always on elementary school level ... [sometimes] with junior highs, but that was basically with food and nutrition. ... But in most cases, never high schools. (Ameroso pers comm September 19, 2006)

Experiential learning:

I pretty much know a lot because in my biology class, we learnt about plants and stuff. Biology is my best subject. And you know the different colouring of the plants? It depends on how much... pH it has in it. ...

... So most plants that make fruit are more acidic... 1 through 6 is acid. And 8 through 14 is a base. And then I think acid plants have a lighter colour green. And then base plants are darker.

NK: Wow, you just taught me something new! And did you learn that in biology, or is this like a mixture of biology and the gardening?

AC: It's both. (Cruz pers comm September 25, 2006)

... for example, the activity where if they selected to take a can of soda over milk, or some form of fruit juice, what happens is they have to pour the sugar into the container and ask themselves if they'd be willing to eat the sugar directly from a cup or a glass. Because that's essentially what they do when they're drinking soda. And so they're asked to think... if they would rather do that, and then journal about it... what the kids' motivation is... when they're eating, and also what their thought patterns are. So they have a food log that's separate. And a lot of times the food log in the

beginning is like, ‘well I want that soda and so I’m going to have it and who cares about the amount of sugar that’s been stacked in this cup.’ And then later on down the line, because lots of our kids are involved in the sports activities, they realise that they should have taken the milk, or they should have taken the juice over the soda because that doesn’t help their performance in these sports activities. And also, they get wound up pretty easily, and then later on, after they come off their sugar high, they’re sort of looking for more sugar. And so looking at those patterns of behaviour, the kids were able to indicate, wow! I had a can of soda earlier on during the day, at school time, and then after school, I was craving that soda, because I had introduced that sugar so early in the day. And so they’re recognising those patterns. And then providing them with research [findings] that supports what they’re actually experiencing, so that they know, wow! This is great, I’ve looked at the observations and I’ve been able to come up with the same answers that researchers have. (Simon pers comm December 15, 2006)

Community mapping:

And so we picked up Garden Mosaics and we did the Neighbourhood Exploration. And that was a great opportunity for the kids to get outside, to get outdoors, and to get them thinking about their community. ... So we first started out in the classroom working on aerial photographs and topographic maps, and actually about 90% of the kids had never seen an aerial photograph. And so that was really important, and special for them to get to see their community from the air. And then that led us into looking at what special attributes the youth had gleaned about their communities... what things did they find to be really special? And at that point, we took the initiative to go out in the community and go on a walk and pick up things along the way. And we found that, wow! This particular community centre is sort of a focal point for the community area, actually the centre, of all their activities. And so, all the places that they can find fresh fruits and vegetables, if they have a nutrition programme there, all the places where they can learn new things, where they can learn about finance, where they can talk about it with their friends, it was all housed in this one place. And so that really made the community centre stand out for them, even though they knew that it was a really important place, but it just brought that to the forefront. And so they continued to do some mapping exercises and created a collage for other folks who come to GIAC to see, this is all that our community has to offer. (Simon pers comm December 15, 2006)

I joined Sam’s group. The ‘leader’ seemed pretty unenthusiastic, the spotter slightly engaged, the photographer a bit more so, and the [note-taker] was the most engaged (she labelled all the photos taken). After walking around for a while, Sam realised that he had perhaps not explained well enough what the kids should be looking for. He clarified that we were looking for green spaces, what was good, what had potential for improvement. (Kohly, data log, September 18, 2006).

Interviewing:

And Miss Dickson was down there and she said, hmm, what’s a pokeweed doing here in Harlem? And I said, well, I don’t know... but tell us about the pokeweed. So she proceeded to tell us and her class, about how as a child in North Carolina, her grandmother who was at the time in her nineties, would send her out in springtime to find the pokeweed and, when it is so big [*showing with hands*] to cut it off, bring it home, and she’d cook it as a ‘spring tonic’. And so she told us about that, and [how] she felt very important going off and getting it. And then we did research on that plant, only to find out that pokeweed has quite a toxic poison. And so [the class addressed] this whole question of what a poison is, and what is a healer in certain circumstances ... And then to learn about her and her past, and this relation to it. Lovely! So the children got to know about their teacher through this plant. (Goodridge pers comm December 12, 2006)

And we realised, their identity as researchers needed to be affirmed. So then in the course of [the] year, the children interviewed 10 community gardeners, and the children’s questions... I wanted it to come from them... and for this bonding to happen. ... And they visited the gardens, and met these folks, many of whom... said, what do you mean... ask me questions? I ain’t no teacher! [But] the diversity of these gardeners! And the diversity of their gardens! And the children being

able to ask them their questions... this was *education!* (Goodridge pers comm December 12, 2006)

Reporting:

... the kids picked up strongly on their doing the Gardener's Story – where they were actually able to chronicle this particular story and then tell it to some of the younger kids. So they were able to take in the information and then give it to some of the younger kids that were in the building and then also to some of the adults that were in the building – they did a mini-presentation of what they had learned – and then they translated that into their nutrition programme so that they could educate their nutrition educator and extension associate about what fresh fruits and vegetables were available at local markets, and to bring in more home-grown products, rather than to pick them up at Wegmanns or Tops or P&C. (Simon pers comm December 15, 2006)

Demonstrations:

And then we have parent teacher conferences; again the numbers have just increased incredibly in terms of who comes to the table... we do plant demonstrations and cooking demonstrations – and so I know exactly how many folks have stopped by, by the amount of cups that are gone. The first year, I went home with half a pot full of [chop] suey,⁶⁸ and then the next year, made double the amount and it was gone within the first hour. And again, in the first year, I think 20 to 30 cups of soil with bean seeds went home. And this past year, over 100 cups. I was rapidly putting holes in bottoms of cups because it was just beyond my wildest expectation that so many parents would say, oh can I take another one for my other kid? (Chapman pers comm December 13, 2006)

Holistic and contextualised teaching approaches:

... we call it... 'through the back door'. And we feel that, we use 'educational moments' to really bring out our points. So this is our approach: we set the stage with an activity that we feel is going to be educational. At the same time, we pick something that we know they're really going to love, so we have their interest. And then once we have their interest, we almost 'trick' them into learning about things. So with the gardening, this is what we tell everybody: ok, we're going to be outside, there's always going to be snacks at the senior centre because seniors love to eat, sign up for gardening, you'll love it! So we tell them that, and then they come, they eat their snacks and juice and then we explain: ok well we have these 4 projects, we need to get them done... (Mattera pers comm September 25, 2006)

... we also like to bring in special guests... this is not gardening, but with the hip-hop poetry class, we have this guy who the kids just thought is the coolest guy in the world. And one of our high school students said, I love this class. *We're learning the same stuff that we learn in English but it's just so much more fun.* ... although they were talking about rappers and music and all that popular stuff, they were learning about Haiku and metaphor and simile and hyperbole – they were learning about literary devices, but in a way that they're going to remember it, that they find intriguing. Why not teach like that? What's the purpose of not teaching them in a hip-hop way?

NK: ... teaching them in a real world!

HM: Right. That's something that I will never forget him saying. And we try to do that with everything [including garden-based learning] because it's just not worth wasting opportunities. (Mattera pers comm September 25, 2006)

In-service training:

... we work with a bunch of people from the south Bronx. We recruit them and they all have to have faxed us their registration forms for the training session and it's at no cost – but they have to agree to implement the programme and it's basically an agreement to time and energy committed

⁶⁸ Chop suey is a Chinese-American dish comprising meat, mushrooms, celery and bean sprouts cooked together in a sauce.

to this programme. So they sign off on it, and their supervisor also needs to sign off on it. So the idea is that they'll be held accountable for it, but also so the supervisor's aware that this is going on.

... having [a teacher who has implemented the programme] come to the training and tell that story, I think it's a great way for new educators to learn from experienced ones...

So that was the first day. And then the second day... it was four hours, and we just went through the investigations, as if they were the students and we were the teachers...

So they could see how it actually happens. Because it's hard just to read something; they really need to conceptualise how it can actually happen. (Babcock pers comm September 19, 2006)

I can give you the copy of the gardeners that were supposed to come – they gave me the sheet – I can make carbon copies of that [*sheet on Brooklyn Queens Land Trust (BQLT)*]. It wasn't well attended, which is typical. Which is always a problem when we deal with community gardeners and stuff like that; they take things a little bit too lightly, we're not giving them something. So therefore like 11 groups that I'm working with now that we demand stuff. Like Just Food, if you want to come to a series of workshops, you got to come to all of them. You've got to make a commitment. And then you've got to do something after you do that. So we've kind of put the screws down on people; if people have every excuse in the world, those food gardens can't be productive. (Ameroso pers comm September 19, 2006)

The integration of food exploration with farming, drawing on an existing programme:

And *Cook Shop* is a curriculum ... for kindergarten through second graders. It's a whole year, and its teachers are provided with resources and curriculum, to teach their students about the reason we grow plants as food. I sat at a table with some folks from Food Change, from the *Cook Shop* programme. [and suggested] how great would it be if we married this cooking and food exploration programme with a farming project, so kids are getting this fully integrated experience with their food, with the primary goal being that the kids are improving their eating habits, and they're having these positive experiences with healthful foods. And they're really investing in their community and learning how to be empowered community members. So *Farm to Classroom* is actually... a little 'seedling' – it's about a year and half or more old. (Chapman pers comm December 13, 2006)

After-school activities:

... at first we looked at the garden, we cleaned up the garbage that people throw around, yeah. And when we finished that, we watered the plants. In the summer, we had to water plants. For the weeds, we made a project called *Weed Watch*. It was fun because we had to count how many leaves each plant had. ...

... we use the book to find out the names of the weeds when we did the project for *Weed Watch*. We use some books, they were telling us the names of big seeds of each plants, and we learned some of the weeds, like the... [Morning Glory]. (Barroso pers comm September 23, 2006)

We need the books, but it's kind of the same thing, but it has more information. In the garden, we just explain it and then, the people that don't know a lot of big words, they explain it easier for them. (Velez pers comm September 23, 2006)

Workshops that foster intergenerational relationships:

... we have speakers coming in from other areas... like ... the Brooklyn Botanical Gardens has experts in composting. ... Or like, about water and water conservation: well, I'm not an expert at that, so we have people coming in and discuss that. (Braverman pers comm September 21, 2006)

Special education programmes:

... the whole parcel is 22 acres... but when we started the project out there, and looked at, “how am I going to run this farm? I can’t do this on myself, I need youth”. ... youth can pass for volunteers. You can’t expect a... regular school to take the load because they have other things. At that point I was working a lot with ‘special ed’ kids in East New York.

... I told myself, well contact... that school, they gotta do something. And then that’s how it all fell in place... they... got this one teacher who was a ‘shop teacher’ [teaching woodwork, metal work, etc]... who loved everything about being out there, like, “hello I’ll be out there [rather than]... sit in the school”. So he had high school ‘special ed’ kids, like 5 or 6, during the year... they had special monies to pay these kids who worked in the summer. So I had kids year round, high school kids instructed by the teacher who knows what he’s doing... I had to teach him how to do the growing stuff, but he can... do anything, he’s very handy. So they ran the farm, they did a market, they sold in the school. Because of ‘special ed’... the parents were there, a lot of teacher ratio... so they had a Wednesday market... excess food... they’d sell and get money back on the farm, they hold the account. (Ameroso pers comm September 19, 2006)

... the autistic kids – like 10 to 15 – do all the planting. And in the winter when I start transplanting, they do about 250 flats [trays] of vegetables. They do everything in the greenhouse: they care for it, take care of the plants, when it’s time to plant. They can’t lay down the black plastic and do the tilling in the field, but they can plant – because they’re working with the ‘paras’. They can do the seeding in the greenhouse, they can do the maintenance, the weeding, the cleanup... (Ameroso pers comm September 19, 2006)

Special events:

At the end of last year, we had a celebration, and a bunch of different folks out here, we had a watermelon seed planting, and we had some chickens out here, but we also have a solo grower who drops off his wheat grass – as compost – and he came out to do the juicing demonstration – he had a hand juicer. (Chapman pers comm December 13, 2006)

It was fun. It was like the elderly were there, and the youth, and then it was all different age groups and we were having fun... And we had music, and we all ate food. And we got to see our garden. (Cruz pers comm September 25, 2006)

Youth conferences:

I took four teens up to Massachusetts as representatives of Added Value to a regional food systems and agriculture conference for youth, and then we visited a bunch of other farms and the teens... each latched on to different ideas, and we brought them back, and they synthesised them into a little document, and they’re... ready to go and ready to share and ready to explain all of that to their peers. Because they get so inspired by what other people are doing. And then they also gained so much pride, like, we went to this meeting and the structure of the meeting was these breakout groups that were sort of open conversations about a specific topic that was defined by the group there. And the teens ended up in ones where either they were learning a whole lot, or they were teaching a whole lot. (Loomis pers comm December 13, 2006)

I’m way more interested in taking the teens to a conference and having them meet somebody who blows their mind and who inspires them who they want be like when they’re older, than [me] being... the only role model that they know who’s interested in food systems... They’re not all going to look at me and... [think] her job or her perspective is what I want to have when I’m older. ... Meeting as many people who are doing cool things as possible... gives you that many more opportunities to find ones who you really want to strive to emulate. (Loomis pers comm December 13, 2006)

Communities and community-based organisations:

There are parents who have a stake in this garden that goes above and beyond the vagaries of pedagogy in this day and age. And it may be that they get a feeling from the earth. And also a place for mothers to air their babies, just as a little life in this part of the park ... a sanctuary of quiet. (Goodridge pers comm December 12, 2006)

Most who committed were people from smaller community-based organisations. To get to the educators, I would contact the supervisor first, because that's the contact information I had, and pitch the programme to them – whether it be a principal or the director of an after-school programme – and if they got really excited about it, then they would try and find somebody in their organisation, but ... that takes a lot of time. (Babcock pers comm September 19, 2006)

... if it's a community that has tons of resources, or a few resources, there are still going to be problems. ... there are parallels in the types of issues that are being faced... there are lots of different stakeholders that come to the table – so you can look at an issue from lots of different perspectives and to get those perspectives all talking to each other, to figure out where the overlap is, and so where you can solve the problems. Maybe a technological standpoint, a scientific standpoint, and then a social standpoint, because those points all need to come together and the nexus is where you'll find rich conversation and rich solutions. (Simon pers comm December 15, 2006)

Community schools:

The Board of Education – I think they're almost a little bit old-fashioned but – they are starting to realise that this is what needs to happen. Especially because science scores are so low, [the school children] need to have some sort of real connection... (Babcock pers comm September 19, 2006)

Community gardeners:

Well, our experiences are through Garden Mosaics, which is research-based and also uses the expertise of community members. Even this Tom Goodridge who is doing some very science-based education in the garden, draws on community members to come and teach the youth. So a large part of it is coming from, I guess, 'laypersons'. (Babcock pers comm September 19, 2006)

Role modelling:

... and then we had two educators from prior years who had done Garden Mosaics, come and lead the Garden Mosaics investigations. So somebody came and showed the educators how they used *Weed Watch*. Somebody else came and showed the educators how they used *Garden Hike*. So that it wasn't just us talking of this great programme, there was somebody actually telling them how relevant it was to their programmes and how they adapted it and actually used it. (Babcock pers comm September 19, 2006)

Cristina treats them with kindness and respect, yet firmly. So sad to see how the class teacher yells at the kids in an 'old-school' authoritarian way. I chatted with Cristina about this afterwards, and she confirmed that this was a problem, but that her approach is rubbing off on other teachers, albeit a very gradual process. (Köhly research journal, December 13, 2006)

... start you thinking, ok, how do we start to communicate about some of that? ... what we want to do as a farm, is not just ... giving kids information, but [also] building community ... a sustainable community" (Loomis pers comm December 13, 2006)

Committed facilitation:

... whereas at Northside, it's driven primarily to get outcomes... and so their primary focus is on homework. And so unless you have someone that's really motivated, that's able to come in and bring a new dimension, then it's really hard to create that type of change. (Simon pers comm December 15, 2006)

University research and extension:

I think there seems to be a lot of interest in this, a lot of interest in the science research being disseminated to the public. So that's one way that our programmes work well for funding. Because the research that happens has to have some sort of an outreach component. So a lot of scientists don't know how to go about that. So that's a plus for us at Extension. Also a lot of environmental type work is looking to target urban areas and minority populations. (Babcock pers comm September 19, 2006)

... he has a grant to work on evaluation programmes with Extension. And actually one of the programmes that he's working on is Garden Mosaics, so he's working with us in New York City. ... to beef up our evaluation efforts. ...

And he's... been good at creating a sort of visual map of how we measure things, what we said our outcomes would be and seeing how we meet them, and things that we don't consider as being evaluative – like have some phone calls from people and informal feedback... that's evaluation! So... he's helping us figure out how to make it more concise and clear. (Babcock pers comm September 19, 2006)

Steve also spoke about some of the difficulties he has been experiencing in his work. He explained that under the leadership of Alan Hurt, the organisation went the issues-based route – which he felt was disastrous, as it pushed aside anything that was “green”. By focusing on nutrition and health, Steve managed to keep the project alive; he initiated a community development programme. After Alan's retirement, the focus returned to “what it should be”... but a very negative review of [his] programme in 2005 proposes that community development should be done away with. Extension work tends to be “grant driven”, and unfortunately, USDA (Dept of Agriculture) is “drying up”. Understandably, Steve is very concerned that both conflicting political interests and decreased funding will permanently jeopardise the future of the programme. (Köhly, research journal, August 2, 2006)

... they did a token review of [my programme] in here [Annual Report], and they just decided that everything we do is useless. ...

... they told me that my urban agriculture project, “oh that should be somewhere else”, we're training the immigrants. It was just a bad review... (Bernard pers comm September 19, 2006)

Public libraries:

I would pursue the Library of Black Research, right here in New York, they have a folk-lore / oral history kind of division. So I wanted the kids to see it. ... Whatever you want to find out about Aunt Tilly and what games she played as a child, or whatever. (Goodridge pers comm December 12, 2006)

Written/visual materials:

I think teachers could bring their kids out to the farm and show them around and tell them about how plants grow, but without this amazing curriculum and this amazing structure that is the Cook Shop and the Added Value partnership, it wouldn't be half as effective in aiding teaching or learning experiences. (Loomis pers comm December 13, 2006)

... we can point them towards resources that can help teach them to grow vegetables, or curricula that are really cool, books that we think are neat – about teaching in gardens, or about youth empowerment work... there's an amazing curriculum out of Boston, from an organisation called the Food Project (Loomis pers comm December 13, 2006)

... a lot of our educational material is taken from the Food Project. (Braverman pers comm September 21, 2006)

Use of websites:

Various garden-related learning web pages, developed in the USA, were also observed. For example, the American Community Gardening Association [<http://www.communitygarden.org/index.php>], the American Horticultural Society [<http://www.ahs.org/>], the Center for Ecoliteracy [<http://www.ecoliteracy.org/>], Civic Ecology [<http://www.civicecology.org/>], the Cornell University Garden-Based Learning website [<http://www.hort.cornell.edu/gbl/>], Food Change [<http://www.foodchange.org/>], the Food Project [<http://www.thefoodproject.org/>], Just Food [<http://www.justfood.org/>], and the National Gardening Association [<http://www.garden.org/>]. Web pages developed in Canada were also referred to in the USA, for example, the City Farmer [<http://www.cityfarmer.org/>].

Promoting collaboration:

Everything is done by collaboration, everything! Even the groups themselves will always collaborate with others. (Ameroso pers comm September 19, 2006).

... all of our work that we do at Extension is through partners... so we never work in isolation. This is true with Garden Mosaics, this is done through community partners... we form relationships with different organisations... schools... Other projects that we're looking to do are in collaboration with other non-profits and environmental organisations. (Babcock pers comm September 19, 2006)

Responsibility for land:

... we're on private land here, we don't get access to the resources that – what's labelled as – community gardens get. So there is all sorts of money and free supplies if you're a community garden. [But] because... the ground is privately owned, we can't get any of that. (Mattera pers comm September 25, 2006)

... we already have a couple of ideas for new projects, we're trying to figure how to get funding for them, and how to make it uniquely different from what other people are doing – to make it more appealing to the funders. And also so you're not redundant – you're not doing what everybody else is doing. (Babcock pers comm September 19, 2006)

And a big source of funds has been federal formula funds... those funds are becoming much more competitive, and they are draining. So that will have an impact on our programme in the future, what kind I don't know yet. ...

... because we're interdisciplinary, we sort of sit between. We're not... enough of a 'human service agency' to go after certain youth development funds, and yet we are not 'mainstream horticultural science' enough to go after general sustainable agriculture funds... the biggest constraint to this programme is funding... a lot of people are in that situation... (Eames-Sheavly pers comm September 14, 2006)

And they give us – for us, because we are a non-profit organisation – a free [Farmers' Market] membership. We used to go every Wednesday to pick up some leftovers that nobody [had come to] pick up. [We use it]... because on Saturdays, we have 200 people coming to our programmes. (Alegre pers comm September 23, 2006)

Fundraising for NPOs and NPOs:

So a lot of time we get primer funding, we get corporate funding, we go for grants. Most of the time it's grants and foundations that we try to apply for, but it's year by year, grant by grant... (Rodriguez pers comm December 15, 2006)

Volunteerism:

... we have a lot of community volunteers... a lot of adults, but those who have that time to spare.

...

Community gardens have a lot of volunteers helping to sustain the gardens. Because they can't only be done by the organisation, or the teenagers – the teenagers would be there maybe twice a week or so. (Rodriguez pers comm December 15, 2006)

... they come to do a voluntary job, but also they do something else that is paid. So... we have 2 people from France and... another one that is coming from Florida, another girl who is from Belgium. ... Jean is a volunteer also. (Alegre pers comm September 23, 2006)

But I have a volunteer with a machine who comes out and cuts with the lawn mowers, cut the grass around the edges, those sorts of things... cleaning up. (Ameroso pers comm September 19, 2006).

And then there's also a volunteer group, so that was the nice thing about having Tamara – our volunteer coordinator – so that she basically coordinated a lot of volunteer groups. (Braverman pers comm September 21, 2006)

I'm working now as a part-time special ed teacher in pre-school settings as I do my research. But I continue to function as a volunteer garden coordinator. (Goodridge pers comm December 12, 2006)

So when I first came to Cornell, I was interested in doing some volunteer work, just some general voluntary work. I find it really important to give back to the community where you've gained your education. (Simon pers comm December 15, 2006)

... we have had about 10 people come and just volunteer, based on, 'I was just passing through' or 'I've been looking through my window and I've seen this, and I think it's amazing'. So I just wonder what kind of impact – you know, we have all of these buildings and different courtyards, and if something was being done in each one of these courtyard – how it would affect the community relationships, and how people react. (Mattera pers comm September 25, 2006)

... he wants to know if he can keep volunteering at the garden throughout the year. For a 13 year old to volunteer at a garden, and do manual labour, is pretty impressive. (Mattera pers comm September 25, 2006)

Hierarchy undermining collaboration and community-building:

... they've been living there, and their lease is up. ... So if they're unfortunate in renting, they can be evicted when their lease is up, just to get higher income people in...

... there are all these lawyers who work for [this housing development] that are finding ways to get people out. And I guess, they bought in this area, they have financial investment in it, they want to do whatever they can to make their money, and that's that! (Hildegard pers comm September 25, 2006)

So basically ever since we've been there... we've seen like about 10 buildings in a matter of 3 years be redeveloped and rebuilt, changed dramatically. ... and all the people who lived in there before moved out because they just can't afford the rent... But none of the people who moved in are people who are interested in volunteering... (Rodriguez pers comm December 15, 2006)

So it's like 'under which thing', and who's going to be your boss; that's the whole thing: power structures and a lot of nonsense. (Bernard pers comm September 19, 2006)

Intergenerational factors:

There's a man name Paco, he always helps us out, he gives us tips: how to plant better, how to make the plants grow. And sometimes we just have fun with him... table games, eating and chatting. (Velez pers comm September 23, 2006)

Like Maria Ting, she knows a lot about it. She has her own garden... she tells me about how to break off the leaves, because sometimes the leaves mess up the growing of the plants or something like that. And she says things like, it has to have this much water, and like we say, ok, ok. So it's cool, getting advice, because she knows more than we do. (Cruz pers comm September 25, 2006)

... the connection with the elder gardeners is extraordinarily important because before, in some groups, the kids would walk by the garden but would never dare go in. Now they're going in and talking to the gardener, and they're friends, and it's breaking down walls. The more they're in the garden, the more they're learning – whether formal or informal. (Babcock pers comm September 19, 2006)

It's [wonderful] to see parents out here, after the kids have had some engagement and some learning. Because the kids can be ... such great teachers! They own the knowledge that they have, once they've got it. ... I have parents who come up to me and say, my daughter wants me to buy a cauliflower. What? Why's she asking for cauliflower? Is she gonna eat it? Because it's 4 dollars, are you sure? And I'm like, yeah yeah yeah... she'll eat it, she'll eat it. (Chapman pers comm December 13, 2006)

... they help the gardens there that basically have seniors there who can't do all the work. They're doing the stuff that the seniors can't do, to keep their garden looking good. That's what you call collaboration. (Ameroso pers comm September 19, 2006)

They allow us to use the land that's there. ... during the summer, we had wanted to make a brick patio, just have bricks next to each other that chairs could be put on. And I think we weren't allowed to do that. And so you'll see when we go there, that it's wood chips around, instead of bricks...

They don't want anything permanent, they don't want anything that couldn't be easily swept away, or dug out! So we couldn't – we wanted to – put a swing. Anything that involves concrete we couldn't do. So that's why it would have been better if we would have more freedom to do things in our rooftop garden, on our own space. (Mattera pers comm September 25, 2006)

But a lot of the classes are taught by youth interns, primarily. ...

I do work with them to prepare, and then they basically facilitate the workshops for the rest of the interns. And most of them have... experience of being a learner in that situation, but then they have the opportunity to really develop it in a way that they feel would work, and is understandable to the other interns. (Braverman pers comm September 21, 2006)

Taking action for sustainability:

... when you've watched a young person or a group of young people go through the programme, learn about their neighbourhood, learn about fruits and vegetables that are being grown in some community garden, learn about the gardeners and their cultures, get some sort of cross-cultural awareness going, and then they integrate intergenerational knowledge, scientific plant ag[riculture], natural resources knowledge, inter-cultural knowledge... they integrate all of that... in order to go take action and "do good". And it's when the 'do good' happens that we feel like, oh! so the programme worked. (Tidball pers comm December 6, 2006)

Aspects of environmental learning:

... I would say, the majority of the educators that we've recruited have not before worked in community gardens or worked outside of their educational setting. So as far as facilitating some sort of environmental learning, I think just getting them to make a connection with a space outside the classroom is the first step. Whether being in the garden itself, or whether it's an exploration activity. I think just taking that first step and helping that come along is key in New York City. ... Manhattan is an island, and almost nobody who lives in Manhattan ever sees the water! You know... people don't take trips to the water... (Babcock pers comm September 19, 2006)

MA: Because we've been doing this Bird Watch at the beginning of the summer, and another one just a few weeks ago, and they found some kind of difference between the amount of birds, and species that they could see. And they've been asking, ah Milagros, what is going to happen in winter? Are we going to have the same birds? Milagros you'll have to bring us here in winter! Maybe it's going to be different. ...

NK: So the kids came up with that idea?

MA: Yes, they come with their ideas, maybe not that they realise about what they're asking. I found interesting changes in their personalities, how they approach to their environment. Because this year I incorporated new kids, and I put them together. And when we were doing our job, I saw a lot of difference: how the new kids approached nature and how the other kids have different interests in their environment... (Alegre pers comm September 23, 2006)

And so the kids got thinking about what they could do in terms of this nutrition programme that they had... they were learning through Cornell Cooperative Extension in Tompkins County about the food pyramid and what food groups they should be eating particularly from, and thinking critically about what they're putting into their bodies and how that translates into other areas. And then what that looks like in other countries. So I was able to bring in my own experience in South Africa and share the different types of things that are available here in the US, versus in another setting. And so that was another opportunity for them to again explore science and culture and to bring those two key aspects together. (Simon pers comm December 15, 2006)



Appendix J: Jacquet de Haveskercke's recommendations for increasing the impact of schools on communities

Referenced in Vol 1: pages 40, 41.

Summary of conduits that may foster links between schools and communities (Jacquet de Haveskercke 2004: 60-61)

- Participatory needs assessment
- Participatory curriculum development
- PTA / school committee
- Local teachers and head
- Teachers use techniques in their own garden
- Involvement of local leaders
- Exchange of material and resources
- Parents or local farmers give lectures
- Field trips to nearby farms and institutions
- The school as a resource centre for the whole community
- School garden
- Nutrition garden
- Establishment of nursery and distribution or sale of seedlings
- Gathering and distribution or sale of seed
- Sale of food and other AF products
- School clubs
- Field days / parents' days
- Competitions between schools or between pupils of the same school
- Homework / assignments to be carried out at home or in the village
- Materials brought from home
- Mirror techniques
- Similar projects with farmer groups
- School newspaper
- School leavers (Jacquet de Haveskercke 2004: 60-61)

Recommendations for increasing schools' impacts on communities (Jacquet de Haveskercke 2004: 64-81)

1. Administration

The headmaster and the deputy head play a major role in linking the school to the community and spreading NRM activities beyond school borders. The admin's approach to running the school influences teachers and pupils as well as parents and other community members.

A headmaster who encourages teachers to participate in decision-making and to treat the curriculum flexibly, creates a motivated staff. In schools with high teacher turnover rates, induction is of great importance to keep the programme going. If trained staff leave and the remaining teachers are not properly informed and included in the programme, it is difficult to keep up the quality of the NRM activities. Pupils also need to be informed and involved to participate in NRM.

Headmasters are among the most esteemed community members. Their authority generates respect from parents, neighbours and even local leaders. Headmasters' advices are followed. When the headmaster lives in the centre of the community, it is even easier for him/her to gain the confidence of the villagers and to become a resource person whom people consult. A clearly visible headmaster's garden with AF is the ultimate proof for people that this practice works.

The administration should promote parents' and others' help in school matters. Cooperating in the development of the school will create a feeling of ownership that will strengthen school-community links.

2. Teachers

Only teachers who are motivated, involved, well informed and encouraged to spread their knowledge on farming, will reach out to the community with a correct and convincing message. This will greatly depend on the sort of policy the administration follows. NRM and AF education in colleges should be intensified too, such that teachers are equipped with knowledge on NRM even before graduating.

Although it is necessary to have a teacher in charge, who is responsible for the NRM activities at school, it is advisable to include several teachers. It is hardly possible for all teachers to be involved to the same extent, everyone has her/his own interests and responsibilities, but the NRM teacher(s) should report back to the others regularly and consult the entire staff before taking big decisions.

Teachers have less influence than a member of the administration, but they are also well respected. Those teachers who have a few friends among the villagers talk to them about the NRM activities if they are informed and involved. Many teachers don't seek contact with community members though; they go home over the weekends and don't plan to stay at the school for a long time. High turnover rates are one of the major reasons NRM programmes in schools often fail. If rural teachers could be offered facilities close to urban teachers' facilities, turnover rates could be reduced.

A good way to include all teachers is to redesign their[teachers] gardens as well. They will gain practical information and will be motivated by the benefits. Like for the headmaster's garden, if these teachers' gardens are clearly visible from the road they send a positive signal to the pupils and the villagers.

Teachers have more contact with the pupils than the headmaster and thus play a role in reaching out through the children. The teachers who tried to adjust their teaching, -by taking the children outside and giving interactive assignments-, all yield positive results. However, this requires an extra effort, flexibility and creativity, with which not all teachers are equally gifted. Better (printed) teaching materials and teachers' guides that provide detailed lesson plans and homework examples, would make contextualised teaching more accessible to all.

3. Guest speakers

Successful farmers on occasion give demonstrations or lectures in schools. But most of the time, community members are not considered resource persons; the teachers undervalue their knowledge. In every village innovative farmers and true entrepreneurs can be found, but often they do not even value their knowledge for what it is worth themselves.

Communities interact with schools mainly through parents' days, consultation days, and prize-giving days. They contribute to NRM activities by giving manure and garden equipment. Community members often also provide labour and in this way know what is happening at the school.

4. Pupils

All interviewed pupils were very positive about the NRM activities at school. They do not perceive it as extra work; on the contrary, they find their obligatory duties in the school garden have become more interesting and varied.

Primary school pupils have very little to say at home. Most parents are reluctant to listen to their children about agriculture. That is probably why children rarely discuss or try AF with their parents. Involving the children in decision-making for the school garden can boost their self-confidence. Becoming a member of an agricultural club has an even stronger effect; most club members copied ideas from the school garden on their parents' farm.

Most young farmers (school leavers) do apply what they learnt at school on their own farm though.

5. Homework and assignments

There is some homework concerning NRM being given, but most of these assignments do not involve the parents/guardians.

Parents and siblings help pupils with homework and they are happy to co-operate in practical assignments. Parents want their children to do well at school. Even if they do not have the education to understand everything the child is learning, parents/guardians will check the children's work by looking into their exercise books. Therefore, these notebooks could form a link, a good channel for information dissemination. Messages, preferably in vernacular, would be read by every parent.

6. Clubs

Clubs give pupils the opportunity to do activities they like and have an interest in. It builds the pupil's knowledge and skill and increases her/his self-confidence. Pupils who are a member of an environmental or agricultural club are much more likely to try something they saw or did at school at home. They will also talk more to their parents/guardians about NRM. So clubs increase information dissemination to the community. An agricultural club should not only inform its members and keep the garden in good shape; it should also conduct experiments to continuously improve NRM at the school.

It is needless to say that a club including parents, teachers and pupils is optimal for adoption by the community.

7. Demonstration effect

A demonstration plot in a school has little or no effect if there are no motivated people to back it up. But the reverse also applies; even very enthusiastic people will have problems convincing others if they do not have a demonstration plot to show the positive results of what they are talking about.

The location of the garden has an influence; the school garden and the teachers' gardens should be visible from the road.

The school garden must be an example of what could happen on every farm in the vicinity. Solutions to local problems should be offered. Locally cultivated crops should be used in combination with new crops that are to be introduced, adapted to local circumstances.

8. Workshops

Members of the community who attended a training on AF, have a much broader knowledge and are more likely to adopt. They in turn become resource persons for their neighbours, but the effect of a workshop is many times the effect of a word of advice.

Schools in general are not getting enough support. Monitoring and evaluation of the programmes is very minimal. A workshop can be an extra motivation for the school staff as well, especially if facilitators come to the school. This is a very effective way of support and evaluation.

9. The School Development Committee

The SDC [School Development Committee] were found to be not at all like a PTA. The number of members is very small. They are mostly influential members of the community, possibly with political aspirations. Although headmasters use the SDC to inform the community, it does not form a good link. Most teachers and parents don't even know who is in the SDC.

There is a strong need for the creation of a communication platform for all stakeholders: parents, teachers, administration, farmers, extension officers, local leaders, pupils, etc. This type of asso-

ciation should not only be founded to discuss AF and NRM, but everything related to the school and the community.

10. Local leaders and extension officers

The visited schools had little contact with extension officers. There was a little more interaction with local leaders. These use the school buildings to hold meetings, but they are not often involved in the NRM activities. It is rare that local leaders and/or extension officers are present at AF trainings.

Other initiatives have shown great achievements by including local leaders and many are willing to cooperate. Local leaders are influential and communities tend to listen and practice what the local leaders say or do. Local leaders also stay in one place. In this way local leaders could actively influence the communities to practice NRM techniques that are being promoted in the schools.

11. Community organisations

Not a lot of interaction with local organisations was observed. Few schools take the initiative of contacting a community organisation. There are factors however that hinder uptake of NRM in schools and communities, like termites and water shortages. Partnerships with organisations that deal with IPM or drilling of boreholes could help solve the problems.

Most rural schools are used as churches, so this could be an opportunity to pass information to the community. NRM information could be disseminated to the community through the respective pastors, priests or elders.

For schools that operate adult literacy programmes, the adult literacy group could be trained on AF matters and since they are community members they could practice and disseminate the information to other members of the community.

12. Mirror techniques

The use of drama, songs and poetry that mimic the habits of the community could be a great link. Mirror techniques have a lot of potential for reaching people, but using them requires creative and highly motivated teachers. Also, opportunities to perform need to be created. Occasions on which many community members are present at the school could be parents' days, church meetings, farmer group meetings, etc.

13. Parents' Days and Consultation Days

A typical parents' day has prize-giving, speeches from guests of honour, demonstrations, songs, traditional dance and drama. Not only parents, also other community members and local leaders are present. A parents' day can take advantage of this large number of people to reach a big part of the community. Everyone present sees the garden, maybe even gets a guided tour, so they can evaluate the results of AF. Basic principles are explained to them and gardening demonstrations can be held. Produce can be sold. Local leaders can publicly support the programme. Songs, dance and drama can emphasize the message by using mirror techniques.

14. Sales and distribution of produce

Pupils can benefit directly from AF if they are given part of the harvest. Free distribution can be a way of introducing a new crop, herb or fruit. Sales create an income for the school and at the same time exhibit the yields of AF farming. The money can be used to buy seeds and tools. This way the school garden is self-sufficient and does not put extra pressure on the often tight school budget.

Seeds should be made available to the community. Schools should be encouraged to harvest seeds from trees and become a seed supplier for the community.

15. HIV and AIDS

HIV and AIDS are prevalent in most of the communities. A lot of children are heads of families and need to acquire knowledge on sustainable farming. The establishment of nutritional gardens can greatly benefit the children. At the schools the orphans are taught how to cultivate their own fields and gardens. If the community sees the children benefiting, they in turn would probably adopt.



Appendix K: Schofield's select bibliography on school-community links

Referenced in Vol 1: page 40.

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Appendix L: Details of study participants in Malawi and New York

Referenced in Vol 1: pages 59, 60.

Malawi:

The researcher visited the Malawi College of Forestry (Dedza) in central Malawi, and a number of sites in southern Malawi. Nearby to Zomba and the Makoka Agriculture Research Station, these included Thondwe Primary School, St Anthony Girls' Primary School, Thondwe Village Polytechnic (TVP), Casa Perugia (associated with TVP), and a Wildlife and Environment Society of Malawi (WESM) school rally in Zomba. In the Thyolo District, sites included Mapanga community-based organisation (Chamasowa), the Naveya Fish Farm (Naveya), Nyambalo Full Primary School (Bvumbwe), Nangombe Chimaliro District Secondary School (CDSS, Bvumbwe), and Chamasowa Full Primary School. In order to glean additional background information on the Farmers of the Future, the researcher also travelled to Tete in Mozambique to meet with an associate scientist and a social scientist from the Southern Africa Regional Programme of ICRAF while they attended a workshop there. For comparative purposes and additional perspectives, the researcher travelled to the eastern part of Zambia, where she visited the SADC-ICRAF Agroforestry Programme at Msekera Research Station near Chipata, and Manje and Mwala Basic Schools in the Chadiza district.

A number of participants were interviewed in Malawi, including: a Nyambalo Full Primary School scholar;⁶⁹ a Mapanga orphan care centre teacher; a Nangombe Chimaliro District Secondary School (CDSS) scholar; two St Anthony Girls' Primary School teachers; two St Anthony Girls' Primary School children; two Thondwe Primary School children; two Thondwe Primary School teachers; the Thondwe Village Polytechnic director and agriculture instructor; two graduated students of the Thondwe Village Polytechnic; and a Catholic priest and agriculture instructor from Casa Perugia. An additional ten people were interviewed on 16 and 17 June 2006 in eastern Zambia. These included the agroforestry development facilitator in her capacity as Farmers of the Future training manager, based at the Msekera Research Station near Chipata, and five teachers and four scholars at Manje Basic and Mwala Basic Schools.

Various informal meetings and discussions were held, including with the Senior Tree Scientist and Country Representative for the SADC-ICRAF Agroforestry Programme; social forestry scientist from ICRAF Zambia; the Malawi College of Forestry principal, lecturer and students; St Anthony Girls' Primary School principal and deputy; Mapanga community-based organisation coordinator, deputy Coordinator and executive committee; Nangombe deputy head and teachers; the Chamasowa Full Primary School head teacher; and a Lilongwe-based entrepreneur who was enrolled in his MBA studies. The researcher also conducted interviews with the Agroforestry Development Facilitator who was also the Farmers of the Future Training Manager for the SADC-ICRAF Agroforestry Programme at Msekera Research Station in Zambia, and interviewed teachers and school children at Manje and Mwala Basic Schools in the Chadiza district.

The researcher conducted an interview with an associate scientist and a social scientist from the ICRAF Southern Africa Regional Programme. Although it was not possible to meet with him initially, ongoing communications were maintained via email with the FoF Global Coordinator, Mr Tom Vandenbosch.

⁶⁹ It should be noted that in the southern African context, many scholars are in their late teens or early twenties. It was not considered appropriate to refer to such individuals as 'children'.

New York:

The researcher conducted interviews with a number of participants, including: the Principal Investigator of the Garden Mosaics project (the US mentor at Cornell University, Ithaca); the Associate Director of the Initiative for Civic Ecology; a Cornell Cooperative Extension (CCE) Senior Extension Associate; a CCE Extension Associate; two CCE Educators; the CCE programme leader for Urban Agriculture and Markets (New York City); the coordinator of the Youth⁷⁰ and Agriculture programme at East New York Farms! a project of the United Community Centre (UCC); the Added Value Farm Educator and the Community Education Coordinator (Brooklyn); a counsellor/tutor at Abraham House (Bronx); the Director of Youth Services at St Raymond Community Outreach (Bronx); a consultant for youth and social responsibility (Harlem); a part-time Special Needs teacher and garden coordinator (Harlem); the programme coordinator for Open Road (Manhattan); and four scholars⁷¹ who were participants in after-school programmes (Bronx and Parkchester). Ethical concerns relating to interviewing children were addressed through an 'assent form' (Appendix U), while adults signed a 'consent form' (Appendix T) – both approved by the Cornell University Committee on Human Subjects. See also the section on ethical considerations (3.5).

Observations of youth/community garden-based learning activities were conducted, including at the Red Hook Community Farm and the Willis Community Garden in Mott Haven (Bronx) and an intergenerational gardening programme at Parkchester Enhancement Programme for Seniors; a Garden Mosaics lesson at Abraham House in Mott Haven, Bronx; an extension educator workshop at the Cornell Cooperative Extension offices; a Harlem Elementary School visit to a community garden; a youth internship programme (after-school) at a community Herbal Garden (East New York); an Added Value 'Farm to School' plant science lesson (Red Hook); and farmers' markets in Brooklyn and Manhattan Island. The researcher also participated in two scholar neighbourhood exploration exercises under the auspices of the Bronx Leadership Academy (South Bronx). In Maryland, garden-based learning activities were observed during an Afro-centric summer camp held at Rognel Heights Cultural Center in Baltimore.

Informal meetings or discussions were held with various subjects, including community gardeners in East New York, Mott Haven (Bronx) and Harlem; several youth interns at East New York Farms!; the Cornell Cooperative Extension (CCE) Programme Leader for Urban Environment; the Associate Director of CIIFAD (Cornell International Institute for Food, Agriculture and Development) in the College of Agriculture and Life Sciences at Cornell University, and the Director of Affiliate and Community Initiatives from the National Wildlife Federation in Reston, Virginia. Communications were also established with the Founder and Co-Director of the Center for Democracy and Citizenship at the University of Minnesota, and a colleague at the Institute for Democracy in South Africa (IDASA). Of value also was the researcher's participation in a fall semester course, Community Education and Development, run by Prof Scott Peters, in the Department of Education at Cornell University.



⁷⁰ The term 'youth' is widely used in New York to refer to teenagers, and sometimes younger children.

⁷¹ In New York, school children were referred to as 'students'. However, in order to be consistent, the term 'scholar' was used in this report, while the term 'student' was used to refer to those engaged in tertiary education programmes.

Appendix M: Focus group interview schedule, Grahamstown, 12 March 2006

Referenced in Vol 1: page 62.

Guiding questions

1. What kinds of activities are part of the Health Promoting Schools programme?
2. How did the National Food Garden project come about?
3. What groups and individuals play a role in / are affected by the National Food Garden project?
4. What issues affect this project?
5. What do you think is needed to support the project and its activities?
6. What other projects do you know of which operate locally?
(e.g. Umthathi Project community gardens; Umthathi school gardens; Eco-Schools programme; Ext 7 Joza Community Garden;.....)



Appendix N: Semi-structured interview schedule, Malawi [draft 06-06-03]

Referenced in Vol 1: page 62.

Guiding theme: Exploring the role of agriculturally based school-community links in facilitating environmental learning and action.

Main codes:

SCL=School-community Links. **AG**=Agricultural / Garden. **EL**=Environmental Learning.

EA=Environmental Action.

Questions & related (underlying) questions →

codes [dark boxes] & sub-codes [light boxes]:

AG :–

MOT=What motivates people to grow and/or harvest food plants, which in turn is linked to the question of... Whether or not it is feasible to incorporate agricultural practices into learning programmes. Links between agricultural practices & learning.

SCL :–

CK=Are community-based knowledge and agricultural practices integrated into environmental learning (links to below), i.e. links between community knowledge & (formal/informal) learning? What conditions promote intergenerational learning and mentoring?

EL :–

What are learners/participants learning? **SK**=How is scientific knowledge and research integrated into environmental learning, whether formal or informal? **LSM**=What learning support materials do educators in rural areas and/or in relatively economically disadvantaged urban settings use?

EA :–

Were you practicing agriculture / teaching about agriculture before the programme was introduced? What actions as a result of learning? Positive changes in the community?

SUS=What are the key ingredients for sustained, effective and relevant community garden projects, i.e. lead to environmental action?

Guiding questions:

PROGRAMME MANAGERS / COORDINATORS

1. How / why did the programme come about?
2. What is the goal of the programme?
3. What kinds of activities take place in this programme?
4. What groups and individuals play a role in / are affected by the programme?
 - Programme funding
 - Participating groups
 - Coordination & planning
 - Teaching / facilitation
 - Community involvement
5. What sources of information / knowledge are used?
6. What educational approach is used?
7. What learning support materials are used?
8. Have you, or any of your participant groups / community taken any actions as a result of this programme?
9. Do you think that the programme can make a difference?
10. What do you plan for the future?

PROGRAMME TEACHERS / FACILITATORS

1. Programme goals?
2. What activities are taking place in the programme?
3. What activities were taking place prior to programme?
4. How is the programme funded?
5. Who is involved in the programme?
6. What are you teaching on the programme?
7. What educational approach do you use?
8. What sources of information or knowledge do you use?
9. What Learning Support Materials do you use?
10. How do you assess / evaluate the programme?
11. Are members of the community involved?
12. Does the community make use of the school or grounds for any meetings or activities?
13. Have you, or any of your organisation / participants or community taken any actions as a result of this programme?
14. What changes have taken place as a result of the programme (at institution / in community)?

15. Did you choose to facilitate / teach on this programme [name]? If so, why?
16. Have you shared anything that you have learned in this programme with anybody in your family or community?
17. Do you think that the programme can make a difference?
18. What are your plans for the future?

PARTICIPANTS / LEARNERS

1. What is the goal of the programme?
2. What are you learning about in the programme?
3. What activities are taking place in the programme?
4. Are there any links between the programme and your school learning?
5. What activities were taking place before the programme started?
6. What materials are used to help you learn?
7. What sources of information / knowledge are used in the programme?
8. Is your community involved in any way in the programme?
9. Does your community make use of the school or grounds for any meetings or activities?
10. Did you choose to be part of the programme [name]? If so, why?
11. Have you shared anything that you have learned in this programme with anybody in your family or community?
12. Have you, or any of your classmates or community taken any actions as a result of this programme?
13. Do you think that the programme can make a difference?
14. What do you hope/plan for the future?



Appendix O: Semi-structured interview schedule, USA [06-08-14]

Referenced in Vol 1: page 62.

Guiding questions:

- How did the community/youth garden programme come about? How long ago?
- What groups and individuals play a role in / are affected by the youth gardening programmes?
In what ways?

(Are youth involved in decision-making or programme organisation, and if so, in what ways?)
- What kinds of activities are part of the community/youth garden programmes?
- What sources of information or knowledge are used?
- How is this knowledge shared? What educational approaches are used?
- Have any changes taken place as a result of the programme (at institution / in community)?/
As a result of your activities, what observations have you made?
- What issues affect the programme?
- How is the programme and its activities supported?
- What other similar projects do you know of which operate locally? Is there any collaboration?
- Vision or plans for the future?

-
- numbers of youth
 - age range
 - adults with youth



Appendix P: Outcomes of workshop, Wed 4 July 2007, 16h00-17h00, WEEC

Referenced in Vol 1: page 63.

Summary

A 1-hour workshop was held in July 2007 at the 4th World Environmental Education Congress in Durban, South Africa, to interrogate the role of school-community links in the context of food gardening activities, in environmental learning and cultural transformation. The outcomes of this workshop will contribute to the development of a conceptual framework for environmental learning in agricultural contexts, in an attempt to address issues such as poverty, food security and health.

Participants identified many incentives for establishing food gardens, which indicates that learning through school/community food gardens would be a viable proposition. Organisations that provide support and funding play an important role in establishing food garden projects, but their ethos and agendas may not necessarily be in line with that of the school/community garden project. This should be taken into consideration as it will have an impact on the activities and learning that takes place. Once the garden project is established, its sustainability and related activities become the main concern.

The way in which activities in the garden are planned and facilitated will influence the nature of learning experiences. Curriculum-linked garden activities provide a framework for learning and a measure of accountability, but teachers may be constrained by a lack of gardening expertise. School-community links can address such constraints, as community members with complementary skills and knowledge will be able to contribute their expertise. However, there are challenges associated with linking the formal school curriculum to informal learning processes such as mentoring and sharing intergenerational knowledge.

Environmental learning can be undermined by the unquestioning acceptance of cultural norms and practices, as it precludes a critical engagement with emerging issues, and limits the potential for generating appropriate solutions. Likewise, blind prejudice against a practice – old or new – would preclude a deeper engagement with the history, cultural context and rationale behind it, thus obscuring an understanding of factors that promote or undermine sustainability. The school/community garden has the potential to serve as a multicultural platform in which youth and adults from different walks of life can work together, draw on complementary sources of knowledge, and challenge current thinking and practices. Skilful facilitation is required in order to promote genuine civic engagement and participatory enquiry, in order to generate a deeper understanding of ecological processes and their role in supporting life on earth. This will in turn contribute to creative and practicable solutions that address poverty, food security and health issues.

Drawing on findings from this workshop, a conceptual framework for educators will be formulated in order to help elucidate the links between environment, culture and education in the context of food gardens. This will serve as a guideline for stimulating learning processes that promote the re-alignment of cultural patterns with more ecologically sustainable practices.

Notes from focus group discussions

Notes submitted by rapporteurs from each of the four focus groups that convened in Meeting Room 22AB of the Durban International Conference Centre on Wednesday July 4, 2007, from

16h00-17h00, are collated below. These notes have been verified by a number of the participants, and additional input and feedback has been added.

1. Focus group theme 1: Support organisations, funding, and the effect on environmental learning in food garden settings.

This group noted that funding and support can be provided by separate organisations, e.g. funding may come from government, and training from a service provider.

Role of support organisations

In the context of food gardening, support organisations can provide material resources and capital, while schools and communities can provide manpower. Generally, we expect support organisations to provide: funding; training; an upfront agreement (with goals, roles and responsibilities); and ongoing assistance with maintenance. They may need to conduct other facilitating activities (e.g. land-use planning; water supply; site food garden on fertile land).

The support organisation should link with the Community Development Forum and get their buy-in. They should negotiate the mechanism of running the garden with the community, e.g. set up a committee to champion the project and run the process, and should facilitate the appointment of a caretaker or custodian from the school/community.

It is important that the school/community receives training so that it can become self-sustaining (e.g. ensure the garden can be organic, generate income, etc).

Factors playing a role in environmental learning

Support organisations may have their own agendas, which could lead to a conflict of interests.

Challenges

Should the support organisation be responsible for facilitating the appointment of a champion to drive the project into the future?

Useful examples or refs

Du Toit, D.R., Pollard, S.R., Dlamini, V. & Chuma, E. (2007). Learning from Change: Transforming Practices through Collaborative Action in a Communal Wetland of Mpumalanga, South Africa. In *Learning in a Changing World. Proceedings, 4th World Environmental Education Congress, July, 2007*. Durban, South Africa. 22 pp.

2. Focus group theme 2: Incentives for having food gardens, and their role in environmental learning in food garden settings.

This group identified a number of benefits and the educational value of food gardening.

Role of food gardens

Because food gardens are a source of fresh food, they can improve learners' nutritional status. They are also valued as a source of healthy food, as an increasing number of people change their preference to organic food.

Gardens can help establish a relationship between people and environment. There is a sense of pleasure and joy in reaping the fruits of your own labours, which in turn engenders a sense of care. Gardens lead to beautification of school yards and the local environment. Gardens thus

promote an improved attitude, sense of ownership and responsibility for environment among the learners and the surrounding community, and a positive change in behaviour.

Gardening can lead to poverty alleviation. It encourages development of skills within the schools (learners) as well as to the community at large. This is supported by the marketing of products and the role of children as social transformers.

Gardening promotes social interaction through intergenerational activities and the sharing of information and knowledge.

Gardening is a source of physical activity, which also allows learners to have fun.

Factors playing a role in environmental learning

The food garden has educational value, as it can be used as a resource for environmental learning. It can promote active participation, and provide a practical link between science and environment.

Gardening activities can also promote innovation.

Challenges

Working in the gardens should not be used as a form of punishment for bad behaviour.

Useful examples or refs

Ceres: a food garden in Australia that has been running very successfully for years; a great model, although it has grown beyond what most would consider to be a community garden. See [www.ceres.org.au / http://www.ceres.org.au/index1024x768.htm](http://www.ceres.org.au/index1024x768.htm)

The Men's Shed: retired men working in gardens in Australia can share their knowledge and feel useful, through intergenerational interaction.

Sikhula: info retrieved August 26, 2007, from <http://www.waronwant.org/?lid=1348>

Sikhula Sonke, which means 'we grow together', is a trade union set up to improve the living and working conditions of women farm workers by building and strengthening the organisation. Sikhula Sonke aims to take up workers' issues as well as gender issues and is building strong leadership structures, organising collective campaigns and negotiations, expanding into new areas and provinces, and ensuring national and international alliances are built to make the position of women agricultural workers visible. War on Want supports Sikhula Sonke's struggle for women farm workers' rights.

Their aims:

- To improve the position of women farm workers through collective campaigns, effective negotiations and relationships with employers' organisations and government structures.
- To expand the membership of Sikhula Sonke annually and to be representative of seasonal workers and the diversity of workers within the agricultural sector.
- To build strong leadership structures, based on democratic principles, within Sikhula Sonke at national and branch level.

3. Focus group theme 3: Cultural background has played a role in changing our environment... what can play a role in cultural change, in food garden settings?

This group struggled to get a common understanding of what was to be discussed; most people had a problem deciphering the question, as well as defining "enculturation". There were a number of different views, and participants struggled to find words to express themselves. Some people in the group focussed on the importance of "maintaining cultural practices". Others inter-

preted the question differently, and had hoped to discuss how “culture” has influenced the environmental issues that we are concerned with today and how we should consider changing or adapting our cultures to become more sustainable.

Enculturation is the process whereby an established culture teaches an individual by repetition its accepted norms and values, so that the individual can become an accepted member of the society and find their suitable role. Most importantly, it establishes a context of boundaries and correctness that dictates what is and is not permissible within that society's framework.

It is the process of learning that takes the person and teaches him or her the ways of life of their people or country. It is a life-long process, affecting not only the child, but the adult too. Enculturation is learned through communication in the form of speech, words, and gestures. The six things of culture that are learned are: technological, economic, political, interactive, ideological and world view.

Conrad Phillip Kottak (in *Window on Humanity*) writes:

Enculturation is the process where the culture that is currently established teaches an individual the accepted norms and values of the culture or society in which the individual lives. The individual can become an accepted member and fulfill the needed functions and roles of the group. Most importantly the individual knows and establishes a context of boundaries and accepted behavior that dictates what is acceptable and not acceptable within the framework of that society. It teaches the individual their role within society as well as what is accepted behavior within that society and lifestyle"

Enculturation can be conscious or unconscious. There are three ways a person learns a culture: (i) direct teaching ... mostly by the parents [telling the child] to do something because it is right and to not do something because it is bad. ... (ii) watch others ... and ... emulate their behavior ... [e.g.] using different slang with different cliques in school. ... (iii) unconsciously, through events and behaviors that prevail in [the] culture. All three kinds ... happen simultaneously and all the time.

Socialization in the study of animal and human behavior is the process by which human beings or animals learn to adopt the behavior patterns of the community in which they live.

Education is a social science that encompasses teaching and learning specific knowledge, beliefs, and skills. Modern education is a part of enculturation, but with methods and goals that attempt to be more consciously chosen, objective and practical (as opposed to, say, transmission of non-rational tradition), with ideas more likely to be shared by a majority. It may evince multi-cultural goals.

Retrieved August 26, 2007, from <http://en.wikipedia.org/wiki/Enculturation>

Role of culture

It is worth noting that *agriculture* is essentially the ‘culture’ of ‘agrarianism’. Various examples were provided to illustrate the role of cultural practices in food gardening.

Crop rotation is a traditional practice and a better farming method; people are encouraged to plant different crops in different years, so that the soil is not exhausted. This often entails planting a leguminous crop such as beans, which have root nodules that fix nitrogen, thus enriching the soil for non-leguminous crops such as maize.

Ploughing without tilling is a traditional practice: you simply dig a hole in the ground and plant bean seeds or maize seeds. Once the seedling has grown, then the soil is tilled, and the weeds are used for mulching.

Indigenous knowledge practices were developed according to the climate, e.g. according to the season, people would collect, plant, graze their animals, rotate use or burn.

Medicinal plants have been used for particular ailments or uses.

Gender has played a role in determining traditional rights for land use, hunting, gathering, planting, etc.

Certain rituals and cultural beliefs promote sustainability, e.g. if you uproot a tree for personal use, then plant another tree.

Some “black cultures” [sic] have clan names that are taken from animals e.g. Mokgatla clan (monkey) which reinforces a sense of interconnectedness with the living world; however, these traditions are not upheld anymore.

Factors playing a role in environmental learning

Intergenerational transfer of knowledge and practices has been the main form of transferring skills. Many suggestions were made regarding the ongoing promotion of traditional practices and indigenous knowledge.

We need to teach the underlying principles, so that people understand *why* they are doing things in a particular way, and are able to make informed choices in future situations.

Education can play a role in cultural change: educators develop learning programme(s) or lesson plans about other cultures, and the outcomes are linked to the various cultures represented in the area or country.

We should share societal knowledge on cultural ways of food gardening e.g. how we do composting.

Use active learning: learning how to do a food garden in the traditional way of a specific culture, e.g. a Venda garden.

Grandparents should be invited to the school garden project in order to share indigenous practices.

Educators should encourage learners to celebrate Heritage Day, a day which embraces our culture; educators could harvest from the garden and cook traditional meals that could be shared on the day. Learners could perform drama that promotes cultural dishes in addressing health problems during Heritage Day activities.

Planting traditional imifino such as imbuya: when you notice that your land is not producing enough, just spread the seed without even tilling or digging a hole, and the imbuya will be propagated.

Understanding traditional herbs and wild vegetables allows us to prepare cultural food, e.g. Amadumbe.

Telling traditional stories helps keep cultural practices alive.

Chiefs, or even the priests, should play a bigger role.

We should understand the richness of our culture in protecting the environment. An example provided: young virgin girls are sent to the mountains to request rain every planting season, or when the community is experiencing drought. But how does this actually promote protection of the environment?

We should promote Umkhosi wenkweshwa – respect for people in authority – when people submit their first harvest to the King (Zulu Culture). This illustrates how people are encouraged to utilise their land by planting, but does not answer questions regarding how to set the limits in order to promote sustainability.

Food gardening demands that people from different backgrounds work together. This will shape society through people's behaviour and attitude towards each other.

Challenges

"Tradition" and "indigenous knowledge" have an almost revered status in some circles. Yet unforeseen environmental changes could mean that the same "cultural practices" may now lead to degradation and a dramatic shift in carrying capacity. It may no longer be appropriate to conduct certain practices in a changed and changing world.

An uncritical acceptance of practices just because they are "cultural" or "traditional" does not empower people to make informed decisions. Without an understanding of the underlying principles, we are not in a position to make wise choices.

The terms "culture" and "tradition" have become "buzzwords" in some cases, devoid of meaning or substance. People are often unaware what their "culture" really encompasses, and may just use it when it is convenient or beneficial to them.

Did the old people in communities always accept their responsibility towards the environment more readily? Did they always know that they should take care of it and that it is essential to their well being? Has "indigenous knowledge" always generated environmentally sustainable practices? If so, how did people come to be so environmentally "tuned in" in the first place?

Why is most of society now so "tuned out"? The state of our environment is a reflection of our society and what we have become, here and now – irrespective of our culture or traditions. It seems that today's youth are so detached that they think that they can buy a new or better environment as soon as they earn enough money. Has society become so detached because of the "easy, consumerist" way of Western life? Have certain religious beliefs contributed to our detachment from our environment? How do we deal with the different belief systems which are linked to various cultures?

How do we rekindle a sense of connection with the environment and an understanding of our dependence on it? How could multicultural food gardening help society tune back into the environment?

Useful examples or refs

Bookchin, M. (2005). *The Ecology of Freedom: the emergence and dissolution of hierarchy*. Edinburgh: AK Press.

Fischer, F. (2000). *Citizens, Experts and the Environment. The Politics of Local Knowledge*. Durham: Duke University Press.

Gruenewald, D.A. (2003). The Best of Both Worlds: A Critical Pedagogy of Place. *Educational Researcher* 32(4), 3-12. Retrieved August 11, 2006, from http://web.pdx.edu/~abyron/peace_ed/Wk3/critical_pedagogy_of_place.pdf

Jamison, A. (2001). *The Making of Green Knowledge. Environmental Politics and Cultural Transformation*. Cambridge: University Press.

McCallum, I. (2005). *Ecological Intelligence*. Cape Town: Africa Geographic.

4. **Focus group theme 4: Curriculum links and their influence on environmental learning in food garden settings – combined with theme 5: Pedagogic processes – what works best in promoting a deeper understanding of ecological processes and their role in supporting life on earth – in food garden settings?**

The question, “Does the existence of a formal curriculum...” could perhaps have been rephrased as, “Does the need for a formal curriculum...” This group undertook a spontaneous merger of two themes, one looking at the role of curriculum links (or not) in environmental learning, and the other exploring what kinds of pedagogic processes best promote environmental learning. Additional perspectives from other focus groups were incorporated into this theme.

The role of the curriculum

Integration with the specific learning areas / learning outcomes in the curriculum is important to ensure regular use of the garden as a learning tool.

For accountability purposes there must be a formal curriculum. It is easier to use a formal curriculum because learners have to achieve some educational outcome; it provides a common umbrella. The curriculum must, however, be school-based, tailor-made to suit the needs of the learners and teachers, and serve the interests of the wider community.

A curriculum may be technocratic, i.e. exam-oriented, result-oriented, final and prescriptive. For Eco-Schools in Kenya, this has been a constraint.

A curriculum may be critical, i.e. it can be contextualised, process-oriented, and adopts a critical approach. However, the critical approach is based on *ideas*, which can be a constraint on *practical* learning.

Some form of assessment has to be done, for accountability as well as motivational purposes. The curriculum should be monitored continuously. Assessment modes should incorporate cognitive, psychomotor and affective domains, as well as practical skills, as part of the exams.

It is important to include ESD issues in the formal curriculum of both pre and in-service teacher training programmes to ensure that teachers are adequately equipped to implement it. ESD needs to be assessed, but how?

Emphasis on examinations is not the best approach if you want to encourage school-community links.

The curriculum also has non-examinable aspects. Emphasis should not be placed simply on passing exams but on equipping learners with lifelong skills which they can apply many years after they have left school. Learners need to appreciate why they have to engage in the school garden in the first place. We don't want the concept to die as soon as they have written and passed their exams, or left school.

The curriculum aims to engage both brain and hands. Educators should avoid equating the school garden with manual work only, and make a deliberate effort to engage both hands and the minds in garden activities. This will also help students and other teachers understand the theory and logic behind the school gardens.

Bottom-up and top-down approaches should work together.

Factors playing a role in environmental learning

Getting outdoors can be exciting for children; the school garden can be a source of inspiration.

The teacher's passion for EE plays an important role in deciding how to use the garden for teaching.

Even if teachers and learners do not have gardening skills or expertise, they can still use the garden for teaching and learning. The teacher can draw on experts, e.g. farmers, to teach what s/he doesn't know. Or experts could do workshops for teachers (e.g. by botanical gardens or associations), a process. Team-teaching is a useful cross-disciplinary approach to teaching and learning, which is especially helpful for teachers who are not familiar with gardening. The team should plan and conduct lessons in such a way that learners understand the biology, maths, beauty, etc, embedded in garden activities.

The best way for a teacher to assess garden activities is by doing it within their subject area.

The school principal must have an understanding of how garden activities can be integrated into the curriculum. The principal should leave it open (specify some themes and subjects, but nothing too specific) and encourage teachers to be creative in integrating the garden into their main subject areas (e.g. maths, language, etc).

Teachers have to take the initiative in linking the school garden and community activities within the formal curriculum. They need autonomy to bring in community ideas for EE in the garden, and needs to create space to tap into community knowledge.

Learning about values through the formal curriculum requires the community to play a key role. The community develops values for a specific school, through intergenerational learning.

In Lesotho, teachers design the curriculum on a 5-year basis. But emerging issues can be taught in between.

Challenges

Soon after independence, the government of Zimbabwe introduced what was called Education With Production (EWP), a programme meant to rehabilitate former freedom fighters that were now placed in farm schools. The schools were supposed to be self-sustaining, meaning the students produced all the food consumed there. The concept was later extended to the "normal" schools but there it faced stiff resistance from parents, teachers and students. They lacked the theoretical understanding of the whole thing and because of that they equated EWP to manual work, hence the resistance. EWP was a noble concept started for a noble cause but it failed dismally due to lack understanding of the philosophy behind its inception. It is therefore vital to educate parents, teachers, school administrators and students about the whole concept behind the school garden issue so that they appreciate why such an idea has to be incorporated in the school curriculum and why it should be extended to the community.

It is not easy for teachers to create a curriculum, and time is required to integrate subjects in a way that works with the garden.

Some teachers don't make gardening educative; they see it only as a situation to conduct a practical or experiment. e.g. in Thailand, learners are taught "how to bake the cake" but not "why the cake is baked".

In some schools, there is no practical component, e.g. in South Korea, they just use the text book and exam in high school.

It is difficult to coordinate a vegetable garden when teaching large groups. It is easier with smaller groups.

It is not always easy to work with parents.

It is important to consider what kind of gardening is being done. Organic gardening is ecologically sustainable.

Teachers may need a pre-service course in gardening, in order to build their confidence.

Useful examples or refs

Albany Alternative School, USA: adapted a whole curriculum based on the garden. School functions as a community.

Catherine Cornbleth provides inspiration.

Tal, R.T. (2004). Community-based environmental education – a case study of teacher-parent collaboration. *Environmental Education Research* 10(4), 523-543.

Vaughan, C., Gack, J., Solorazano, H. & Ray, R. (2003). The effect of environmental education on schoolchildren, their parents, and community members: a study of intergenerational and intercommunity learning. *The Journal of Environmental Education* 34(3), 12-21.

Way forward

During this workshop, held at the 4th World Environmental Education Congress in Durban, South Africa, over 30 participants interrogated the role of school-community links in the context of food gardening activities in environmental learning and cultural transformation. The outcomes will contribute to the process of developing a conceptual framework that supports environmental learning in agricultural contexts, in an attempt to re-align cultural patterns with more ecologically sustainable practices. Workshop participants are gratefully acknowledged for sharing their insights and expertise. In order to facilitate further exchange of ideas and information, a list of contact details is provided on the page below.

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Appendix Q: Excerpt of observational notes recorded in electronic data log

Referenced in Vol 1: page 64.

Friday 9 June 2006:

A long day with Mary Roselyn Lindani, Elias Mmambo and the Wildlife Club at Thondwe primary school. I got there late, at 08h30 – which turned out to be a mercy, as they also started late. And so the guava juice-making process dragged on, all morning, with pupils waiting to take their turns doing stuff: peeling fruit, chopping, washing up equipment, disposing of peels, while others were standing in groups, some looking bored, others chatting, others staring blankly. Their teachers didn't seem to be initiating much discussion around what they were doing. Not much evidence of educational links. The initial washing and chopping operation was also quite frustrating to watch, as the teacher had not put much thought into the ergonomics of the operation. Instead of being organised in a sensible and orderly manner, they were hunched over a couple of buckets on the ground, and as they progressed, more and more wastage, discarded peels and water accumulated on the dirt just below the veranda step. Then each time a child was sent to wash something out, a new piece of ground would be splattered with water, and would become yet another wet spot to be avoided. In their muddled groups, children were bumping and knocking into each other, almost stepping in each other's puddles, chopping knives waving carelessly, yet somehow managing to avoid stabbing themselves accidentally. The fire pot in the future 'home economics' room, in the mean time, was deemed too slow, so it was then taken outside and placed exactly upwind of the group so that we were all smothered in smoke. When I asked a teacher what the purpose of this move was, he said it was for 'better ventilation' (the wind would blow it into a more energetic flame)... and also made a point of highlighting their poverty as a reason for this situation. Those trapped in the poverty cycle do indeed seem to exhibit low levels of common-sense and ergonomic attention at times.

Later in the morning, when the pots of fruits were placed over the fires to come to the boil, I had a gap to interview two of the learners. When I asked, it seemed that they had been pre-selected by their teacher. They didn't seem to know why, but didn't seem to mind being quizzed by me. I suggested that perhaps they had good English, and they seemed to think this might be a possibility. No matter, the two of them manfully tried their best to answer my questions, and I manfully tried to make myself understood to them.

Then back to the final phase of the juice-making process, before making a second dash for ICRAF. This time the paper was ready and waiting, as was a warm body in a chair. But not a warm greeting – this was another person low in the responsibility ranks. I am starting to get used to the fact that the less confident and lower down in the ranks a person is, the less friendly and decisive they are in taking initiative to deal with visitors and queries or solve problems. Anyway, I got the policy brief that Sebastian had promised – and read it over whilst waiting for Lindani and Mmambo to finish dealing with their students, before we had our interview.



Appendix R: Excerpt of reflections recorded in research journal

Referenced in Vol 1: page 65.

Tuesday 6 June 2006:

There are so many things to reflect on! The initial thoughts that whizzed around in my head were concerning the different standards of living rural and urban people have, but also between those that are financially wealthy and those that are not. I feel self-conscious about all my 'things' that I bring with me into this simple setting. Pots of moisturiser, packets of different medications including anti-depressants which help make my life more or less 'normal' (I wonder what you can give to the average Malawian to make their life 'normal'?), and half a dozen different gizmos: digital camera, battery charger, laptop, spare battery, cassette recorder, library books ... all the clutter of stuff that seems to go with being western or academic. And at the end of the day, let's be honest... academia does not put food on the table. These rural folk – with their simpler lifestyles and relatively insignificant ecological footprints – are the ones who put food on the table. Every day, they feed themselves and others from their fields.

Breakfast was boiled cassava root (manioc) and bananas ... and in all honesty, I find the cassava far more satisfying than the awful light, white stuff that people call 'bread' in this country. It may not be highly nutritious, but cassava has the starch content to satisfy hunger. That is a good start.

Going down to the fish farm was an interesting experience. I had been pretty clear on the phone to Lawrence Zuze – I thought – that I wanted to explore the school-community relationships and the role this played in learning. But of course the CBO executive committee also has its own agenda. So stopping off at the Chamasowa primary school on our way to the dam was almost incidental – oh, yes, we can stop if you like. We were not expected, but were nevertheless welcome. The teacher who patiently fielded my questions seemed very committed, and their notice board was littered with little notes about the sort of behaviour they promoted in the school.

A quick walkabout on the school grounds to see their woodlot and garden was a fairly major feat. We had literally hundreds of young children running after us, squealing with excitement at the prospect of being in one of my photos, and more or less stampeding each other to get closest to me and be at the front of the picture. I had to more or less run to get a quick photo of the fenced veggie garden before the swarms of children blocked out the view. And taking a sensitive pic, "African child holding young tree seedling", was an absolute farce – the stream of children trying to get into my picture more or less trampled any young tree in their path. Abel lost his cool a bit, and was quite violent in the way he wrenched a little boy away, who was trying to get in front of a little girl I had selected for that "special moment" – which was meant to show her gently cupping the little tree in her hand. Joke. Well, clearly family planning is non-existent in this village. We escaped the screaming throngs of beaming little children and climbed into the car.

Saturday 5 August 2006:

Reflecting on First week of August: I paid visits to a variety of community gardens and educational projects in New York City with my mentor. This was during one of the worst heat waves I have experienced (the newspapers reported a death toll of 24!). We kept on drinking water, and retreated into the shade wherever possible - and fortunately, gardens are better places to be than the average street in NYC. I noticed that amongst some of the apartment buildings in the Bronx, where community leaders had the vision to plant trees 50 years ago, it is quite bearable to be outdoors even during a heat wave. But wherever there is nothing but tall buildings, tarred streets and pavements (e.g. downtown Manhattan - near the World Trade Centre site), there is no respite from the heat. No trees or bushes to soften the reflected heat off the buildings, or to photosynthe-

size and use up the vast amounts of carbon dioxide being produced by people and traffic. Ironically, the situation on the street is exacerbated by air-conditioners blasting hot air (vented from buildings and from the subways below) into the streets, turning them into a merciless giant convection oven. “The first world gone mad!”

Saturday 23 September 2006:

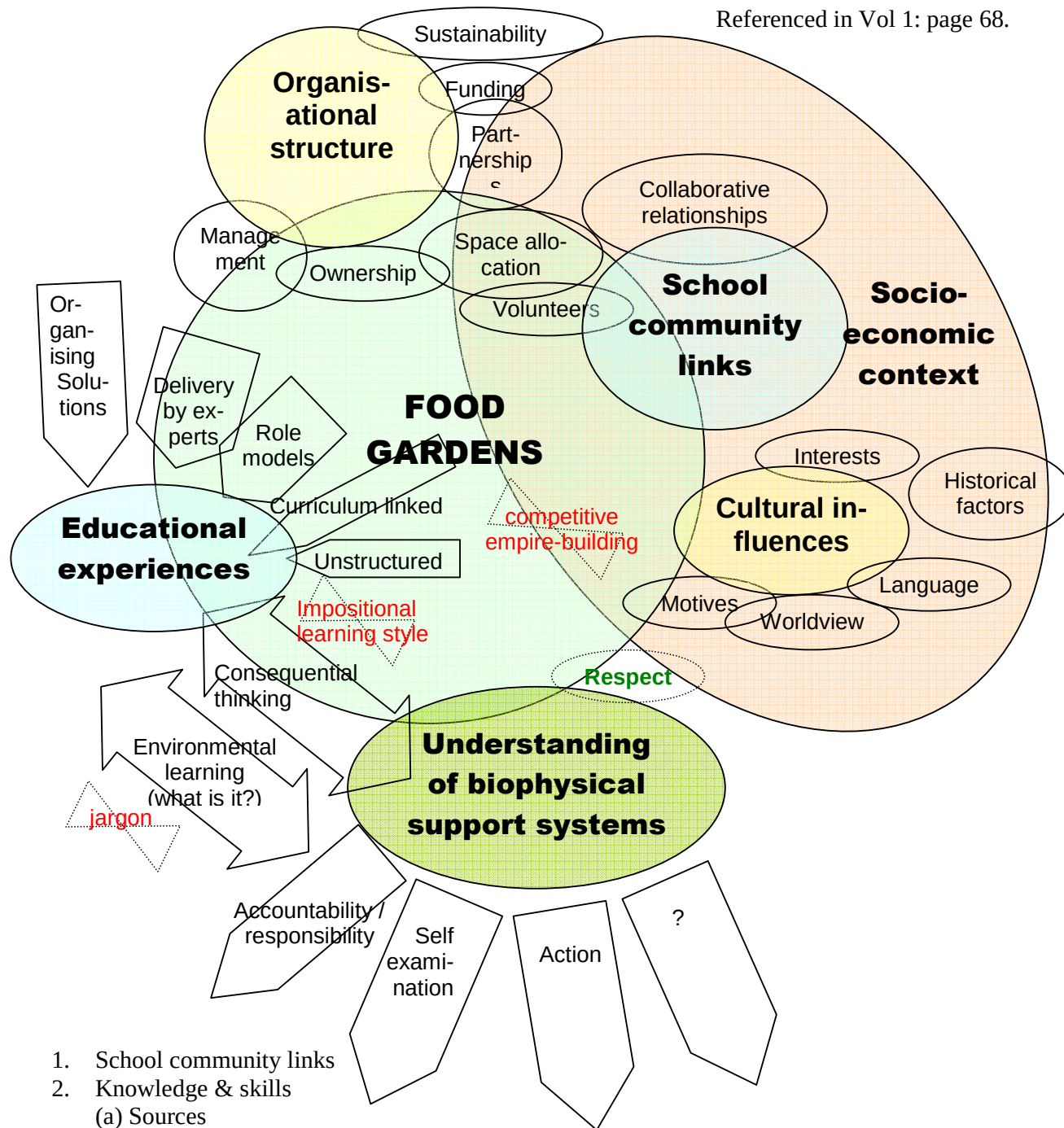
Reflecting back on the diagrams that have emerged from my thoughts around community groups, organisations and interactions in Malawi, and now more recently in the USA, I realise that one of the key differences is that there is a much stronger focus on the individual. Ah yes, that dreaded swearword, ‘individualism’, that the developing world hates so much. But what strikes me is that by focusing on individual progress and development, the broader social structures are strengthened enormously. I think it is more frequent in Africa that I have encountered individuals who will take any gap they can find in order to escape the hegemonic obligations imposed upon them by the ‘group structure’, because they want to make good for themselves first. I sense that it is more common here for individuals who have ‘risen up’ from the slums to voluntarily immerse themselves back in the very communities from which they came, ploughing capacity back. Am I a cynical whitey, looking through rose-tinted glasses too dimly? It’s something I need to explore a bit more perhaps.

As I transcribe my interview with Jonah Braverman, I am also struck by the level of empowerment of the disadvantaged East New York kids after just a year on his programme. Incredible that a young intern can be left to run a programme without any direct supervision from senior staff, and also incredible that the senior staff stand back and allow them to try out their ‘wings’. Now there are two ways of looking at this. On the one hand, maybe it is because kids here mostly grow up with a ‘can do’ attitude, so take up a sense of responsibility without too much difficulty (especially once the cycle of violence etc is broken). On the other hand, maybe they are just as mentally disempowered as South Africans before going into the programme, but the difference is that here, the trainers and facilitators allow them to run the show in their presence, without breathing down their necks, or patronising and judging them – so the kids don’t get feel like they have to carry this scary heap of responsibility and they’d better be careful ‘or else’ (read between the lines!). This makes me think of the time shortly after I joined the company, when Melissa talked to me like that – saying that I was ‘the most senior person in the company’ after her and Janet, and asking me to ‘hold the fort’ in her absence. And I felt sickened because it felt like she was just trying to manipulate me into doing things her way, and didn’t necessarily believe in my capabilities. A subtle matter, but these are nevertheless the real day-to-day dynamics that influence how a person develops...



Appendix S: Thematic typology: an early draft before coding and categorising data

Referenced in Vol 1: page 68.



1. School community links
2. Knowledge & skills
 - (a) Sources
 - (b) Sharing
3. Support and resources
4. Environmental learning
5. Perceptions of agricultural activities
6. Evidence of action / change

Jargon



Appendix T: Adult Consent Form, USA, 2006 [06-08-14]

Referenced in Vol 1: page 72; Vol 2: page 68.

You are invited to be in a research study about the way youth/school and community garden activities influence environmental learning and action. You have been selected as a possible participant because you are involved in youth/school and community garden activities that we are interested in studying. We ask that you read this form and ask any questions you may have before agreeing to participate in this study.

The study: The purpose of this study is to find out how youth/school and community garden activities help youth and adults learn about the environment. The study will also help us find out what aspects of the youth community gardening activities link up with what children learn at school, and what adults learn in community settings. If you agree to participate, you will be asked to talk informally with the researcher and answer a few guiding questions, in order to give a sense of how youth/school and community garden activities have influenced the way you view the environment. You will be asked to share your views about these garden activities, how these may be linked to what you have learned from youth, and whether this has influenced the way you do things in your home environment. The informal interview will take approximately 1 hour, or a bit longer if you would like to talk further.

Risks and benefits: The only risks involved with this study involve the possibility that you may feel uncomfortable talking to a stranger from South Africa. You are welcome to speak to the researcher together with a friend or colleague present. You will also be welcome to ask the researcher questions about her research, so that you can find out about some of the youth and community garden activities taking place in South Africa.

Confidentiality: The records of this study will be shared with my research colleagues and supervisors, but will otherwise be kept private. I will make a note of gender and age, and your name only if you are in agreement. If you would prefer your identity to be protected, I will not record your name on my data form. Consent forms will be kept securely along with data for 7 years after completion of this study.

Voluntary nature of participation: Your decision whether or not to participate will not affect your current or future relations with Cornell University or any affiliated institution. If you decide to participate, you are free to withdraw at any time without affecting your relationship with the University or affiliated institution. Furthermore, you may refuse to participate or discontinue participation at any time.

The researcher conducting this study is Ms Nikki Köhly. You may reach her at 607-254.5479, or n.kohly@ru.ac.za. You may also contact her supervisor Marianne Krasny, at: 607-255-2827 or 607-280-0801 or mek2@cornell.edu or access her website at <http://www.dnr.cornell.edu/mek2/index.php>.

Please feel free to ask any questions you have now, or at any point in the future. In addition, if you have any questions or concerns about your rights as a research subject, you may contact the Cornell University Committee on Human Subjects (UCHS) at 255-2943, or you may access their website at <http://www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm>

Name: _____ Signature _____ Date _____

Participant's approval of recording (audio/photo) by researcher:

Signature _____ Date _____

This consent form was approved by the UCHS on 15 September 2006



Appendix U: Children's Assent Form, USA, 2006 [06-08-14]

Referenced in Vol 1: page 72; Vol 2: page 68.

We are doing a study to try to learn about what helps people to learn about the environment and do something to make it better. We are asking you to help because we don't know much about what kids learn from doing gardening activities with people from their community.

If you agree to be in our study, we are going to ask you some questions about youth/school and community garden activities - this will take about 1 hour (or a bit longer if you have lots of things to talk about). We will want to know what you have learned and what people in your community have learned during activities together in the garden. For example, we will ask you if the things you learn from garden activities with the community might have anything to do with your school learning.

You can ask questions that you might have about this study at any time. Also, if you decide at any time not to finish, you may stop whenever you want. Remember, these questions are only about what you think. There are no right or wrong answers because this is not a test.

If you sign this paper, it means that you have read this and that you want to be in the study. If you don't want to be in the study, don't sign the paper. Remember, being in the study is up to you, and no one will be mad if you don't sign this paper or even if you change your mind later.

Signature of Participant _____ **Date** _____

Assent to recording (audio/photo) by researcher:

Signature _____ **Date** _____



Appendix V: Examples of organic recipes used in by Mapanga CBO, southern Malawi

Referenced in Vol 1: page 105.

(1) <u>Liquid Fertiliser</u> (1 x 2 litre bottle): 50 kg fresh cattle dung → cover & soak 3 weeks in 50 litre drum (anaerobic fermentation) → to use, dilute 1:2
(2) <u>Liquid Growth Hormone</u> (1 x 2 litre bottle): Chip/slice 3 kg young, tender banana stem → mix in 1 x 500 g pkt brown sugar → cover 10 days (anaerobic fermentation) → squeeze out solid pieces → store liquid in container → to use, dilute 1:500 (apply 4 times) They have had great success in promoting plant growth with this.
(3) <u>4:4:8 insecticide</u> (5 x 2 litre plastic containers): (a) Hot pepper (2 bottles): 1 kg hot peppers. (b) Sisal mix (2 bottles): 3 kg sisal (<i>Agave</i> sp) + 3 kg Ntutu (<i>Tephrosia candida</i>) + 3 kg wild flowers + 3 kg Fusa (species unknown) + 3 kg Thugwi (species unknown) - pounded together & diluted with water. (c) Lemongrass mix (1 x 2 litre bottle): 3 kg lemongrass. Mix the above three together. Scrape in 1 tablet of sunlight soap. Apparently kills worms within 5 seconds, and is safe for human consumption within 2 days of spraying plants.

Source: The ingredients were noted during a demonstration of a Philippino volunteer's recipes.



Appendix W: Plants seen growing in urban food gardens, New York State, USA, 2006

Referenced in Vol 1: page 116.

Information collated in this table draws on information in Hey 1996; National Terminology Services 1991; <http://www.hri.ac.uk/ENVEG/data/raw/vegdata.htm>). * Labelled plants seen at Cornell University agricultural experimental farm.

Latin name	Plant family	Common name	Notes on uses, etc.
<i>Allium sepa</i>	Alliaceae	Red onion	Good for the heart (tested by the hospital).
<i>Amaranthus</i> sp.	Amaranthaceae (family)	Calalou / callaloo / Jamaican spinach / Trinidad plant / bajie	Calalou is a blanket term for a Caribbean vegetable soup or stew (using leaves of cassava, taro or sorrel). A taro cultivar, grown in Florida and the West Indies for its cormels (eddos) and edible shoots. Amaranth species are cultivated and consumed as a leaf vegetable in many parts of the world.
<i>Apium graveolens</i>	Apiaceae or Umbelliferae (carrot family)	Celery (also German & Russian varieties)	
<i>Brassica oleraceae</i>	Cruciferae (cauliflower family)	Collard greens / curly kale /	Leafy plant, grows well in cold weather, when nothing else survives.
* <i>Brassica campestris</i>	Cruciferae (cauliflower family)	Canola / oilseed rape	
<i>Capsicum</i> sp.	Solanaceae (nightshade family)	Bulgarian carrot pepper & Chocolate pepper	Used for canning and pickles
* <i>Colocasia esculenta</i>	Araceae (arum family)	Euchlora / taro / daschen / coco yam / elephant ears	Leafy plant with edible tubers/corms. Sometimes called the 'potato of the tropics'. Native to southeastern Asia.
<i>Cucumis sativus</i>	Cucurbitaceae	Cucumber	Creeping vine, fruit eaten fresh or pickled.
<i>Cucurbita pepo</i>	Cucurbitaceae	Marrow / zucchini	Creeping plant, squash fruit eaten as a vegetable. Popular amongst Latinos.
* <i>Echinacea purpurea</i>	Compositae (aster family)	Purple cornflower / echinacea	Daisy plant, flowers used medicinally.
<i>Ficus</i> sp.	Moraceae (fig family)	Edible fig	Tree, edible fruit.

Latin name	Plant family	Common name	Notes on uses, etc.
<i>Fragaria</i> sp.	Rosaceae	Strawberry	Creeping plant, edible fruit.
* <i>Manihot esculenta</i>	Euphorbiaceae (spurge)	Cassava / manioc / tapioca / semolina	Shrub with high starch content in root, eaten raw or cooked.
* <i>Linum usitatissimum</i>	Linaceae (flax family)	Flaxseed oil, linseed oil	Important source of Omega oils.
<i>Helianthus annuus</i>	Asteraceae (daisy family)	Sunflower	Flowering plant, seeds eaten or pressed for oil.
<i>Hibiscus esculentus</i>	Malvaceae (hibiscus family)	Okra / gumbo	Seen growing above strawberries, also above cucumbers.
<i>Hibiscus</i> sp.	Malvaceae (hibiscus family)	Hibiscus	Ornamental shrub, edible flowers.
* <i>Jatropha curcas</i>	Euphorbiaceae (spurge)	Physic nut	Tree introduced from tropical America. Non-edible oil used cosmetically.
<i>Menthe piperita</i>	Lamiaceae (sage / mint family)	Peppermint	Aromatic herb.
<i>Monardia didyma</i>	Lamiaceae (sage / mint family)	Bee balm / bergamot	Flowering plant, indigenous to North America. Strong aroma.
<i>Brassica rapa</i>	Brassicaceae	Asian turnip	Root vegetable, similar to radish. Delicious raw.
<i>Daucus carota</i> ssp. <i>sativus</i>	Apiaceae	Carrot	Root vegetable, similar to radish. Delicious raw.
* <i>Coffea</i> sp.	Rubiaceae (coffee family)	Coffee plant	Herbaceous plant. Originates in Africa. Widely cultivated for coffee production, using the fruits / drupes / “coffee berries”, or “coffee beans”, which are roasted and ground for hot drink.
* <i>Musa</i> sp.	Musaceae (banana family)	Banana	Fast-growing monocotyledonous plant, native to south east Asia. Edible fruit, major food crop.
* <i>Humulus lupulus</i>	Cannabaceae (hemp family)	Hop	Vine plant... used medicinally (insomnia).
<i>Ocimum basilicum</i>	Lamiaceae (sage / mint family)	Sweet basil	Herbaceous, aromatic plant. Originates from India and Egypt.
<i>Phaseolus lunatus</i>	Fabiaceae (pea family)	Butterbean / lima bean	Leguminous plant, edible beans.
<i>Phaseolus vulgaris</i>	Fabiaceae (pea family)	Climbing bean / garden bean	Leguminous plant, edible beans.

Latin name	Plant family	Common name	Notes on uses, etc.
<i>Phaseolus</i> sp.	Fabiaceae (pea family)	Long bean / footlong / bora bean	Leguminous plant, edible beans.
??	Fabiaceae (pea family) Bean family	Sims	Leguminous plant, pretty pink & white flowers.
<i>Rubus fruticosus</i>	Rosaceae (rose family)	Blackberry	Thorny, woody plant. Edible fruit prized for making jam or eaten fresh.
* <i>Triticale</i>	Poaceae (grass)		Hybrid of wheat (<i>Triticum</i>) and rye (<i>Secale</i>).
<i>Solanum melongena</i> var. <i>esculentum</i>	Solanaceae (tomato/potato/ tobacco family)	Egg plant / brinjal / aubergine	
<i>Solanum melongena</i> var. ?	Solanaceae (tomato/potato/ tobacco family)	Turkish eggplant	
* <i>Pennisetum glaucum</i>	Poaceae (grass family)	Pearl millet	
* <i>Fagopyrum</i> and <i>Eriogonum</i>	Polygonaceae (dicot family)	Buckwheat (pseudo-cereal)	
* <i>Simmondsia chinensis</i>	Buxaceae (box family)	Jobba	Herbaceous plant. Fruit cold-pressed to yield oil used in cosmetic industry.
<i>Stevia</i>	Asteraceae	Stevia / sweetleaf	Herbaceous plant, leaves used as a natural sweetener by diabetics.
<i>Valeriana officinalis</i>	Valerianaceae (valerian family)	Valerian	Herbaceous plant. Originates in Europe and Asia. Used to calm nerves.
* <i>Vigna unguiculata</i> subsp. <i>unguiculata</i>	Fabiaceae (pea family)	Cowpea / blackeyed pea	Leguminous shrub, related to pearl millet & sorghum, introduced from Africa. Edible peas, also used as forage plant.
* <i>Zea mays</i>	Gramineae (grass family)	Corn / maize	
<i>Zingiber officinale</i>	Zingiberaceae (ginger family)	Ginger	Herbaceous plant. Originates in South East India and China. Both leaf and root used.
<i>Gossypium hirsutum</i>	Malvaceae	Cotton plant	To educate youth on the history of cotton pickers in the USA.
Not established		Wild pepper	Usually regarded as a weed, but a good substitute for peppercorns.
<i>Portulaca oleracea</i>	Portulacaceae	Purslane / pigweed	It is called something else here, a species of <i>Portulaca</i> eaten as a vegetable and considered a weed, known as summer purslane.
Not established	Cucurbitaceae	Bitter melon	Traditional use; blood purifier; pickle or cook; treat with salt like egg plant.

Latin name	Plant family	Common name	Notes on uses, etc.
Not established		Wild spinach	Bitter.
Not established		Malabar Red Spinach / African Spinach	Up to 16 foot long.
? <i>Pycnanthemum</i>	Lamiaceae	Mountain mint	Used in cooking and herbal teas.
<i>Pisum sativum</i>	Fabiaceae (pea family)	Salad pea	Great in salads.
Not established	Cucurbitaceae	Citroen melon	For making citroen marmalade.
Not established	Cucurbitaceae	Lemon cucumber	Great in salads.
<i>Catalpa speciosa</i>	Bignoniaceae	Catalpa tree	Has bean-like pods, from white flowers.



Appendix X: Added Value Programme Description, Fall 2006

Referenced in Vol 1: page 116.

ADDED VALUE

Building a Sustainable Future through Youth Empowerment and Urban Agriculture

Added Value is a non-profit organization promoting the sustainable development of Red Hook by nurturing a new generation of young leaders. We work towards this goal by creating opportunities for the youth of South Brooklyn to expand their knowledge base, develop new skills and positively engage with their community through the operation of a socially responsible urban farming enterprise. Since opening our doors in 2001 Added Value has provided long-term training to more than 85 teenagers who work an average of seventeen hours each week on our Farm, at market, on the computers, and out in the community. For their efforts, they receive a monthly stipend of \$300 (expanding their families' household income by as much as thirty percent.).

Summer Youth Intensives: During this intensive eight-week training period, participants work each day on our Farm. Working under the supervision of our staff, college interns and senior youth leaders, new participants develop a strong sense of self and community while learning the skills necessary to grow food from seed to sale.

Academic Year Program: Beginning in the fall with the Added Value Institute, teens strengthen their core skills while taking over operation of the Farmers' Market, and building a strong foundation of knowledge related to the critical issues affecting our community, such as under employment and obesity while developing their capacity to be agents for change.

Added Value's Leadership Institute: Youth begin the spring honing their abilities to educate and motivate their peers and our community. Working together in groups and on individual projects, they sharpen their skills while selecting a core program to specialize in: Digital Horizons (Multimedia Laboratory), Herban Solutions (Sustainable Business Development), or Project Real Improvement (Community Education and Organizing). Participants in the Institute attend local, national or even international, conferences on youth empowerment, urban agriculture, food security and sustainability. Added Value's youth make key contributions at these conferences by planning events and activities, delivering trainings, and documenting the proceedings. As active participants in a growing movement they educate their colleagues about our local efforts and harvest knowledge that will be shared back home in the community through trainings they develop or on the web.

Participants who complete the Institute have gained the skills and knowledge necessary to achieve their educational and employment goals and are prepared to lead their peers and community towards a more just and sustainable future. Youth wishing to continue their work with Added Value may apply for a Youth Leadership position and work with staff and Interns to run our summer program.

Red Hook Community Farm: working with the New York City Department of Parks and Recreation, Added Value is transforming a dilapidated playground into vibrant community resource where young and old work, study and grow together as they sow, nurture and harvest plants on a 2.75 acre urban farm. Much as the parks of the late 19th and early 20th century were designed to educate and improve the lives of a growing urban population, we are working with partners like Heifer International and Cornell University to build a 21st Century Park that will nurture 21st cen-

tury citizens, people who care about the health of their community, are stewards of their environment and participants in a vibrant, life giving local economy.

Operated by our staff, youth leadership team and a dedicated core of volunteers and interns, the Farm is a vibrant intergenerational space and experiential educational environment for all. Food grown on the Farm is sold at our Farmers' Markets, to local restaurants and donated to those in need. Today the Farm provides sustenance to residents, creates meaningful work for neighborhood teens, generates economic activity and improves the health and well-being of our community.

Growing A Just Food System: Through our Farmers' Markets and CSA, we are creating new opportunities for regional farmers and producers to market the highest quality meats, dairy, vegetables and value added products to urban consumers. By working with project partners we are ensuring that all can have access to locally grown, healthy, safe and affordable food. Profits from the sale of produce are cycled back into the program to support stipends for our youth participants.

Farm to School: Through local school outreach programs, Added Value hosts a variety of educational activities. Schools may choose to come for a day or half-day of service learning in which they explore the Farm environment while learning about the social, economic, and environmental issues related to urban agriculture. A school may also choose to develop a more long-term relationship with the Farm. During 2005, over 150 students from first- and second-grade classes from PS 15, PS 27 and the Brooklyn New School made weekly visits to the farm. Using scientific inquiry, hands-on activities and standards-based lessons, the students explored seasons and cycles, learned about composting, and grew produce in dedicated beds.

Sowing the Seeds of Change: Now with a solid foundation inside the schools, our staff and youth leadership teams are working to organize the community to take on the epidemic of health related illness in our community.

During the summer and fall of 2005, the teens conducted a community food assessment. Over three months, they developed and refined a survey, studied the food system, and practiced their public speaking skills. When prepared, they visited every establishment in the community that served food or sold produce. What they found was deadly serious. Of the 24 stores, fully 75% sold less than eight types of produce and all of it was deemed to be low quality and high price. Armed with this information, these participants are now developing a PowerPoint presentation that they plan to show to their peers and community elders. In concert with the teens' actions, Added Value has been working with the parents and staff of our local schools to establish community wellness councils in which we as a community can define for ourselves what it means to be healthy and whole people, and how we as a community are going to achieve our goals of health, individual self-reliance and community interdependence.

Program Sponsors

Added Value's programs are made possible with the generous support of the following individuals and organizations:

Heifer International, The EchoingGreen Foundation, The Independence Community Foundation, The Jesse Smith Noyes Foundation, The JM Kaplan Fund, The Levitt Foundation, The New York City Department of Parks and Recreation, The Petra Foundation, and The Robert Wood Johnson Foundation, The Office of Congresswomen Nydia Velazquez, The Office of State Assemblymen Felix Ortiz.

Added Value's work is supported through partnerships with the following organizations: Cornell University Cooperative Extension, The Gowanus Canal Community Development Corporation, the King Street Block Association, The Lower East Side Girls Club, O'Connell and Associates, Red Hook East Tenants Association, The Red Hook Public Library, The Red Hook Public Safety Corps, The Red Hook Seniors Center, Red Hook West Tenants Association, The South Brooklyn Community Health Center, and The South West Brooklyn Industrial Development Corporation

Added Value's work would not be possible without the ongoing support of our dedicated volunteers and individual donors. Added Value is a federally recognized 501-C-3 organization, as a not-for-profit. All deductions of material resources and funds are tax deductible. For more information about our programs or to make a donation please visit our website at www.added-value.org or call the office at 718-855-5531



Appendix Y: Three categories of intelligence

Referenced in Vol 1: pages145, 156.

Capital	Intelligence	Function
Material capital	Rational intelligence	What I think
Social capital	Emotional intelligence	What I feel
Spiritual capital	Spiritual intelligence	What I am

Source: Zohar, D. (2005). Spiritually Intelligent Leadership. *Leader to Leader*, 38: 45-51. Retrieved December 14, 2007, from <http://www.leadertoleader.org/knowledgecenter/journal.aspx?ArticleID=84>



Appendix Z: Potential agroforestry plant species for use in South Africa.

Referenced in Vol 1: page 181.

Additional information drawn from Coates Palgrave (1984); Dold & Cocks (1999); van Wyk & van Wyk (1997); van Wyk, van Oudtshoorn & Gericke (2000).

Latin name	Plant family	Common name	Notes on agroforestry potential, uses, etc.
<i>Acacia</i> sp.	Mimosaceae (thorn-tree family)	Thorn tree / Ntete	Indigenous leguminous tree. Frost hardy. Improves soil fertility. Helps hold moisture in soil.
<i>Acacia galpinii</i>	Mimosaceae (thorn-tree family)	Monkey thorn	Indigenous leguminous tree, fast-growing. Frost hardy? Improves soil fertility.
<i>Albizia</i> spp	Mimosaceae (thorn-tree family)	Flat-crown / false-thorn	Indigenous leguminous tree, fast-growing. Could improve soil fertility.
<i>Amaranthus</i> sp.	Amaranthaceae (family)	Marog	A taro cultivar, grown for its edible corms and shoots. Amaranth species are cultivated and consumed as a leaf vegetable in many parts of the world. Same as Calalou? (blanket term for Caribbean vegetable soup – using leaves of cassava, taro or sorrel).
<i>Arachis hypogaea</i>	Fabiaceae (pea family)	Groundnut / peanut	Leguminous shrub, originally introduced from South America. The fresh and dry ‘nuts’ form part of the traditional diet.
<i>Boswellia freereana</i> and <i>Boswellia carteri</i>	Burseraceae (torchwood family)	Frankincense	Indigenous to Somalia, used for centuries been a source of frankincense.
<i>Boscia albitrunca</i>	Capparaceae (caper family)	Shepherd’s tree	Indigenous tree, slow-growing. Drought resistant. Edible fruit. Also used medicinally.
<i>Cajanus cajan</i>	Fabiaceae (pea family)	Pigeonpea	Leguminous shrub, originally from India. Popular in home-gardens in Africa. Improves soil fertility. The fresh and dry peas form part of the traditional diet. Frost hardy?
<i>Calliandra calothyrsus</i>	Fabiaceae (pea family)	Bussea	Indigenous MPLTS / Multi-Purpose Leguminous Tree Species. Improves soil fertility.
<i>Carissa macrocarpa</i>	Apocynaceae (oldeander family)	Big num-num	Indigenous shrub. Frost tender. Thorny, useful for hedges. Edible fruit sought after.
<i>Commiphora harveyi</i>	Burseraceae (the myrrh family)	Bronze paper commiphora / rooistamkan-niedood	Small deciduous tree with bronze papery peeling bark, often growing in hot, rocky river valleys. Produces aromatic resins, used medicinally and as incense (note: <i>C. myrrha</i> & <i>C. molimol</i> produce the fragrant resinous substance, Myrrh; <i>C. gileadensis</i> produces ‘Balm of Gilead’).

Latin name	Plant family	Common name	Notes on agroforestry potential, uses, etc.
<i>Cordeauxia edulis</i>	Fabiaceae (pea family)	‘Yicib’ / Jeheb nut	Indigenous to Somalia, shrub grows in the central arid districts, utilized for nutritious nut-like seeds and for livestock fodder and firewood.
<i>Cordyla africana</i>	Caesalpiniaceae (bauhinia / cassia family)	Wild mango	Indigenous leguminous tree, deciduous. Fruit with high vitamin C content eaten fresh or cooked.
<i>Crotalaria capensis</i>		Cape rattle pod	Indigenous leguminous tree. Hardy. Improves soil fertility.
<i>Glycine soja</i>	Fabiaceae (pea family)	Soya bean	Leguminous shrub, originally introduced from ?. Beans are a source of complete protein (contains all amino acids essential for growth and cell repair). Frost hardy alternative to groundnut.
<i>Dicrostachys cinerea</i>	Mimosaceae (thorn-tree family)	Sickle bush	Indigenous leguminous tree, fast-growing pioneer. Invasive potential, hardy. Could improve soil fertility.
<i>Diospyros mespiliformis</i>	Ebenaceae (ebony family)	Jackal-berry	Indigenous tree, sexes separate. Edible fruit sought after. Also used medicinally.
<i>Dovyalis caffra</i>	Flacourtiaceae (wild peach family)	Kei-apple	Indigenous tree. Hardy. Edible fruit. Thorny, useful for hedges.
<i>Eckebergia capensis</i>	Meliaceae (mahogany family)	Dog plum	Indigenous tree. Hardy. Edible fruit.
<i>Elaeis guineensis</i>	Arecaceae (palm family)	African oil palm	Native to west Africa. Oil-producing seeds, can be used for biodiesel production, as in Darwin, Australia.
<i>Eucalyptus</i> sp.	Myrtaceae (guava family)	Gum tree	Woodlot tree, from Australia. Invasive potential, must be managed carefully. Used for timber & firewood.
<i>Ficus</i> sp.	Moraceae (fig family)	Wild fig / Kachere	Indigenous tree. Edible fruit.
<i>Flacourtia indica</i>	Flacourtiaceae (wild peach family)	Flacourtia	Indigenous tree. Edible fruit (round). Also used medicinally.
<i>Harpephyllum caffrum</i>	Anacardiaceae (mango family)	Wild plum	Indigenous tree. Hardy. Edible fruit (oval).
<i>Jatropha curcas</i>	Euphorbiaceae (spurge family)	Physic nut / purgeer-boontjie	Tree introduced from tropical America; invasive potential. Used in Madagascar for biofuel, as well as preventing soil erosion. This could be explored in southern Africa.
<i>Parinari curatellifolia</i>	Chrysobalanaceae (coco plum family)	Mobola plum	Indigenous tree, occurs in miombo woodlands. Edible fruit & nut. Frost sensitive.
<i>Sclerocarya birrea</i>	Anacardiaceae (mango family)	Marula	Indigenous tree, occurs in miombo woodlands. Highly prized for its edible fruit. Also used medicinally.

Latin name	Plant family	Common name	Notes on agroforestry potential, uses, etc.
<i>Sesbania sesban</i>	Fabiaceae (pea family)	River bean tree / jere jere	Indigenous MPLTS / Multi-Purpose Leguminous Tree Species, fast-growing, popularly used in intercropping with food crops, improves soil fertility.
<i>Strychnos cocculoides</i>	Loganiaceae (wild elder family)	Corky bark monkey orange	Indigenous tree, occurs in miombo woodlands. Prized for its delicious fruit.
<i>Syzigium cordatum</i>	Myrtaceae (guava family)	Water berry / umdoni / jamula	Indigenous tree. Edible fruit. Also used medicinally & magically.
<i>Tephrosia candida</i>	Fabiaceae (pea family)	White hoarypea / white tephrosia	Leguminous shrub, native to India, Bhutan and Nepal. Used in intercropping with food crops, improves soil fertility. Secondary benefit is weed suppression.
<i>Tephrosia purpurea</i> var. <i>sericea</i> (= <i>Mundulea sericea</i>)		Poison pea-bush / cork bush/ purple tephrosia / wild indigo	Indigenous leguminous shrub, slow-growing. Presumably these are two closely related species, or one and the same. Contains rotenone in the bark, used as a natural pesticide, killing fish, as an emetic and for other medicinal practices (either or both species). Used in intercropping with food crops, improves soil fertility.
<i>Tephrosia vogelli</i> (was <i>Tephrosia purpurea</i>)		Vogel's tephrosia / fish poison bean	
<i>Vangueria infausta</i>	Rubiaceae (coffee family)	Wild medlar	Indigenous tree. Edible fruit.
<i>Vigna unguiculata</i> subsp. <i>unguiculata</i>	Fabiaceae (pea family)	Cowpea / black-eyed pea	Indigenous leguminous shrub, related to pearl millet & sorghum. Tolerant to drought. Edible peas, also used as forage plant.
<i>Vitex</i> spp.	Verbenaceae (verbena family)	Black plum, pooraberry, chocolate berry	Indigenous tree. Aromatic leaves. Edible fruit.
<i>Ziziphus mauritiana</i>	Rhamnaceae (buffalo thorn family)	Masawa / Masau	Fruit tree, native either to India or Middle East, naturalised in many parts of Africa ("from Africa", according to ICRAF). Thorny, useful for hedges.



The antidote to overconsumption is community building (Paul Connett & Bill Sheehan, 2001: 17).