Revalidating vernacular techniques for a sustainable built environment by way of selected examples in the Eastern Cape

By

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Declaration

I, Colleen Avice Steenkamp declare that ‘Revalidating vernacular techniques for a sustainable built environment by way of selected examples in the Eastern Cape’ is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Signature: 

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COLLEEN AVICE STEENKAMP

Date: 

______________________________
Abstract

Hassan Fathy, an Egyptian architect, held that architects are in a unique position to revive people’s faith in their own culture, and if, as authoritative critics, they show what is admirable in local forms and even go so far as to use them, the local people at once begin to look on their own products with pride. Furthermore in 1994, as the government of the new South Africa took to the international stage, Nnamdi Elleh, an Associate Professor at the School of Architecture of the University of Cincinnati, stated that as temptations existed for quick design solutions arose to meet political needs, architects should exploit the traditional precedents around them (Figure i.) and not let political expedience guide their design concepts.

This dissertation examines the revalidation of local vernacular building techniques through a multi-layered study addressing issues such as social equity, cultural identity, tradition, sustainability and apprenticeship specifically within the uMasizakhe community in Graaff-Reinet. Vernacular case studies within an isiXhosa community built by the local people elucidate the reintroduction of the local vernacular techniques to strengthen the sustainability of the built environment moreover improving the cultural identity of the populace.

The research promotes the implementation of vernacular building techniques and indigenous knowledge into contemporary architecture through a participatory approach to community development. Following the findings, the knowledge concerning a local vernacular cannot be inconsequential to contemporary architecture which may play an essential role in guiding architects through the past in order to navigate to the present and sustainable future.

Figure i. The vernacular architecture of the isiXhosa people in the Eastern Cape. Architects need to exploit these precedents to strengthen the sustainability of the built environment thereby improving the cultural identity of the South African populace.
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Glossary of Terms

1. Indigenous Knowledge

Índi'gênoüs, a. Native, belonging naturally.

(The Concise Oxford Dictionary, 1950)

Indigenous knowledge is, according to Hirji, Johnson, Maro and Chiuta, “a system of methods, customs and traditions developed over many generations, through a traditional way of living and the in-depth knowledge regarding a system or systems by local people” (2002: 313). Indigenous knowledge was described by the National Research Foundation (NRF) as being the complex set of knowledge and technologies existing and developed around specific conditions of populations and communities indigenous to a particular geographic area (cited in Rozani, 2006). In this study the term indigenous knowledge will refer to the knowledge that is inherent to the people of a particular area.

The relevance of documenting indigenous knowledge is verified by Ezaguirre (1992: 19) who postulated that local indigenous and technical knowledge within the building practise should never be overlooked as the indigenous peoples’ knowledge about the specific conditions in which they live and work may be more exact than the knowledge of practising individuals in the built environment. Furthermore, De Gutchteneire, Krukkwer and Von Liebenstein noted the danger of losing indigenous knowledge due to the manner in which this information is handed down orally from one generation to the next (cited in Rozani, 2006: 5). Equally conceded was the need for the recording and protection of indigenous knowledge as it can be utilized in ways which benefit owners and communities.

The knowledge, experience and skills of the indigenous Xhosa people, specifically in the Eastern Cape, still has an essential contribution to make concerning the creation of sustainable settlements and buildings needed in the future as was also remarked by Ozkan (2006: 108). The contribution which indigenous knowledge can make to the built environment is verified not only by the research conducted in uMasizakhe and Luxolweni among others, but also in the case of the Greenshops Financial Services Centre in Centani where a participatory system was used to integrate the indigenous knowledge of the local people with contemporary architectural design and technologically appropriate methods. Confirmed by Sawyer, (1992: vii) past and present indigenous knowledge plays a key role in sustainability. It seems imperative then that an architectural perspective is created - in which valuable indigenous knowledge is integrated with equally valuable modern innovative technology – demonstrated in the case of the New Auditoria and Teaching Complex at the Fort Hare University in East London (Figure ii.).
Why has the indigenous knowledge of the South African people been largely overlooked by architects, our government and even by local communities? According to De Guchteneire, indigenous knowledge is generated within communities, is location and culture specific, is the basis for decision-making and survival strategies is not systematically documented and concerns critical issues of human and animal life (cited in Rozani, 2006: 6). Furthermore, indigenous knowledge is dynamic and based on innovation, adaptation, is experimental and is oral and rural in nature. Elleh further asserted this occurrence to the economic considerations as well as cultural, political and climatic factors which underscore the need to develop indigenous African building technology to meet 21st century needs (1996: 343).

2. Vernacular Architecture

**Vernăcūlar**, a. and n. Of one’s native country, native, indigenous, not of foreign origin or of learned formation.

(The Concise Oxford Dictionary, 1950)

As remarked by Lawrence, vernacular buildings are human constructs that are the results of interrelations amid ecological, economic, material, political and social factors (2006: 110). Further postulated by Ozkan (2006) vernacular architecture utilizes the most accessible materials and employs the widest available technologies.

Bourdier and Minh-ha further explored the vernacular architecture by referring back to the Latin meaning thereof: “things that are homemade, homespun, home-grown, not destined for the marketplace, but are for home use only” (1996: x). It is this definition of vernacular architecture which has perhaps led to the portentous view of vernacular architecture which architects continue to hold. Prain held that vernacular architecture continues to be associated with the past, underdevelopment and poverty (1992: 52). Such a view has been comprehensively validated whereby vernacular architecture found in Africa is often viewed solely in the clichéd light of mud
huts and thatch roofs (Asquith, 2006: 1-2; Oliver, 1997: xxii). Despite these popular conceptions, Asquith noted vernacular building traditions not as remnants of an underdeveloped or romantic past, but rather as buildings of importance and relevance to many cultures and people in the world, past, present and future (2006: 1-2). Oliver advanced vernacular architecture as that which may embody community values, consequently even a simple dwelling may reflect both the material and spiritual worlds of its builders and occupiers (1997: xxii).

After the damnation of the common conception surrounding vernacular architecture as being the only harbinger of authenticity, as the container of a specifically determined cultural meaning, as a static legacy of a past, what will emerge, also noted by AlSayyad, is perhaps a 21st century South African vernacular which reflects the buildings of the people in a democratic country (2006: xviii). As was suggested by Elleh (1996), architecture is articulated by a vernacular context and appreciation, stressing further that it will not be enough to merely understand climatology and regionalism if we aspire to develop a true and honest African architecture. The South African vernacular should therefore be viewed as a documentation project whose principal mission is the dynamic interpretation and re-interpretation of its past in the light of an ever-changing present (AlSayyad, 2006).

For the purposes of this dissertation, the vernacular definition which will be used is that which was summarised by Oliver (1997: xxii) and verified by AlSayyad (2006), Bourdier and Minh-ha (1996), Asquith (2006), Lawrence (2006) and Ozkan (2006) namely: Vernacular architecture comprises the dwellings and other buildings of the people, and is directly related to the environmental context and available resources of the people; it is usually owner or community-built, utilizing a variety of traditional technologies to meet the specific needs and to accommodate the values, economies and ways of living of the cultures which produce them.

3. Tradition

**Tradition**, n. Opinion or belief or custom handed down, handing down of these, from ancestors to posterity. (The Concise Oxford Dictionary, 1950)

Tradition, as was defined by Asquith (2006), could be viewed as the creative processes through which people interpret past knowledge and experiences to face the challenges and demands of the present. The actual significance of tradition within architectural practise is often overlooked to allow for the prevailing Western influence (Anderson, 1977; Elleh, 1996; Garlake, 1990), but as Bronner observes, “tradition should be seen as a reference to the learning that generates cultural expressions and the authority that precedent holds” (2006: 5).

Confirmed by Elleh, the roots of traditional African architecture can be traced back thousands of years (1996: 19) despite that fact that most of the historical events that shaped African building culture are not documented (Denyer, 1978; Bourdier and Minah-ha, 1996; Oliver, 1971). The words ‘traditional African architecture’ evokes several images for architects and non-architects alike regardless of nationality and education (Steenkamp and Whitfield, 2011: 74). Current practising architects in Africa often lack information on the African vernacular and therefore they cannot fully understand African architecture and are unable to incorporate and interpret it in the changing skylines of African cities (Elleh, 1996; Denyer, 1978).

This dissertation explicitly focuses on the documentation of, among others, the traditional
techniques used and the ability of merging these traditions with contemporary architectural needs in the Eastern Cape, comparative to the writings of Cooke (2009: 23). Equivalent to the proposal by Vellinga (2006: 10), the research will lead to widening the documentation of Eastern Cape vernacular concepts thereby opposing what Rope described as still being in darkness, so that it includes those structures which are distinctive cultural expressions of people who live in or feel attached to a particular place or locality (cited in Garlake, 1990). Such a process would facilitate building traditions to exonerate themselves of the stigma of underdevelopment and a backward past, thereby enabling vernacular and traditional African architecture to act as sources of architectural know-how (Anderson, 1977; Denyer, 1978; Oliver, 2006) allowing it thereby to assume an active part in the provision of sustainable architecture for the future (Ozkan, 2006).

Bourdier and Minh-ha held that the concept of tradition could not be viewed merely as that which opposed modernization without falling prey to the pitfalls of binary dualist thinking (1996: x). They advanced this view by referring to the writings supporting the failure of modern architecture and its participation in the idea of progress being achieved with universal rationality and of emancipation at the scale of humanity, of which the colonial enterprise was a comprehensive manifestation. Habermas further postulated that "modernism is dominant but dead" (1983: 6). Postmodernism as bearer of 'old' truths that have been made particularly visible in the last few decades is a way of seeing into the already existing fissures of the modern movement. In other words and as the dissertation argues, it is a way of rethinking the relationship which should exist between traditional and modern architecture, together with vernacular and contemporary architecture (Bourdier and Minah-ha, 1996).

4. Knowledge Transfer: Apprenticeship and Community Participation

**Knowl’édge** (nŏl-), n. Knowing, familiarity gained by experience, (of person, thing, fact); person’s range of information, as it came to my ~ (became known to me), not to my ~, not so far as I know, he had to my (certain) ~ been bribed (I know he had); theoretical or practical understanding (of subject, language, etc.); the sum of what is known, as every branch of ~. Hence ~ABLE (nŏlĭja-) a. (colloq.), well-informed, intelligent. [ME knaulage, century later than obs. vb knowledge confess (KNOW, -ledge unexpl.)]

**Trănsfer’,** v.t. (-rr-). Convey, remove, hand over.

**Apprĕn’tice**, n. Learner of a craft, bound to serve, and entitled to instruction from, his employer for specific term; tiro. Hence ~SHIP (-ssh-) n.

**Partićiplāte**, v.t. and i. Have share in (thing with person); have share (in thing with person); have something of, as his poems ~ate of the nature of satire. So ~ANT, participantION, ~ātor, nn. [f. L participare (as PART + cip- = cap- st. of caperetake)]

(The Concise Oxford Dictionary, 1950)
The maintenance of an apprenticeship system as was forged by Marchand is where one is bound to another to learn a trade that endows a community (2006: 51). This endowment Marchand explained is functional not only through the technical skills learned, but also through an improved sense of social identity and professional responsibility. An apprenticeship system according to Marchand is the most effective way to guarantee the sustainable reproduction of a distinct architecture and a built landscape imbued with changing and dynamic meaning for the people that live inhabit it. Ozkan supported Marchands view through the reinterpretation of the latter into architectural theory and practise, which encompasses all the factors that surround the art of building (2006: 108). Ozkan further explained that this traditional knowledge is embedded within society and is passed down from one generation to the next by means of cultural apprenticeship systems. It is when these cycles of transmission of information or technology are broken by outside forces that apprentice systems cease to be active. Furthermore Frescura illustrated that in indigenous societies, the technology of construction is learnt as part of the general education undergone by every member of that society, the awareness of building filters through reaching every aspect of rural life (1981: 75). Frescura further alleges that even when specialised builders do arise within a community, the average homeowner and his family have an intimate knowledge of the building process and are able to take part in it.

Unfortunately, changes which ignore the complex nature of social and environmental forces yield architecture which is neither appropriate nor socially acceptable (Elleh, 1996: 229). Corresponding to this statement is the transformation which has occurred in South Africa since 1994. Elleh correctly prophesied that which was South Africa’s largest temptation and downfall in the period of the construction boom: the need for quick design solutions. Irrespective of the positive contribution which Democracy brought about, what occurred simultaneously was the urban-migration which not only created slums (Gwinner, 2011), but also the militaristic ranks of housing which have reduced opportunities which might have existed had these migrants had the opportunity to learn traditional skills through apprenticeship systems and knowledge transfer (Simao, 2011). Professionals in the built environment might not complain about the lack of skills in South Africa had these ‘military housing ranks’ and alien building methods not been introduced (Ozkan, 2006; Anderson, 1991; Elleh, 1996).

In a country where the scarcity of energy resources and building materials is only likely to increase (Sexwale, 2011), the determination to make use of abundant local resources, the reintroduction of an apprenticeship system along with the desire to respect and engage with the complexities of cultures, historical contexts, tradition and the pressing needs of habitat, will most certainly give rise to impressive, durable and socially conscious architecture (Popescu, 2006). With regards to the actual apprenticeship system, Schumacher (1980) identifies three purposes of human work: to produce necessary and useful goods and services; to enable communities to use and perfect talents and skills; and to serve, and collaborate with the broader populace, so as to “liberate ourselves from our inborn egocentricity”. Furthermore, King Solomon justified apprenticeship and participation to heighten the craftsmanship and skill of people declaring that a man who is skilled in his work will “serve before kings” (NIV, Proverbs 22:29, “Do you see a man skilled in his work? He will serve before kings; he will not serve before obscure men.”).

Indigenous knowledge, according to Hirji, Johnson, Maro and Chiuta is, “a system of methods, customs and traditions developed over many generations, through a traditional way of life of an in-depth knowledge of a system or systems by local people” (2002: 313). The knowledge, experience and skills of indigenous South African builders and craftsmen therefore have an
imperative contribution to make toward the creation of sustainable communities, including the identity of individual groups. This was confirmed by Sawyer (1992: vii) who held that past and present indigenous knowledge plays a key role in sustainability. It is essential therefore that a housing precedent should be set, where indigenous knowledge is integrated with modern innovative technology. The result of an equally weighted ‘team’ between the latter could lead to the development of settlements and buildings which are both contemporary and modern, yet which build upon the characteristics of the local and cultural traditions and knowledge. This would further lead to the amalgamation of both the environmental and ecological contexts, thereby reflecting the identity of the local community, resulting in the upliftment of individuals and communities through education, traditional and cultural knowledge transfer and the reimplementation of cultural traditions. This amalgamation might become reality in South Africa with the introduction of the SANS 10400 part XA.

In an exciting and significant development the South African National Standards (SANS) 10400 part XA sees all new buildings and refurbishments in South Africa having to comply from 9 November 2011 to minimum standards of energy efficiency - the first of a set of minimum standards for environmental sustainability in new and refurbished buildings (Green Building Council of South Africa, 2011: Online). These documents cover energy efficiency in buildings. When implemented in November 2011, these new standards were said to drastically change the way that buildings are planned and built in South Africa. The SANS 10400XA will cover energy efficiency as relating to various topics such as hot water supply, energy usage and building envelope (covering maximum energy demand), design assumptions, building envelope requirements, orientation, floors, external walls, fenestration and also roof assemblies to name but a few.

5. Sustainability

Sustain’, v.t. 1. Bear weight of, hold up, keep from falling or sinking (cf. Support). 2. Enable to last out, keep from failing, give strength to, encourage, (exx. As in SUPPORT; ~ing food, that keeps up the strength). 3. Endure without giving way, stand, bear up against, (~ed the shock of the enemy’s cavalry; will not ~ comparison with).

(The Concise Oxford Dictionary, 1950)

The report from the World Commission on Environment and Development (UN, 1987: Online) together with the writings of Conway (1985: 31-35) and Whitfield (2010: 147), delineated sustainability as the ability to ensure that humanity meets the needs of the present, without compromising the ability of future generations to meet their own needs; and also the ability of a system to maintain productivity in spite of a major disturbance.

After much investigation regarding the meaning of sustainability, a concise but useful discussion of the foremost, though sometimes conflicting interpretations of what ‘sustainability’ is, is needed. Albeit a brief explanation of the premises of a human ecological perspective on vernacular architecture is presented by McDonough (1993: 398-410), Hatfield-Dodds (2000) and Lawrence (2006) suggest various basic principles which may be applied to increase the sustainability of the built environment.
Lawrence, Hatfield-Dodds and McDonough’s principles emphasize the need to consider ecological and cultural diversity. The importance of interrelations between different geographical scales together with the value of participatory approaches to development maintains the critical need to raise public awareness of the issues concerned. The provision of guarantees that economic activity would not over-exploit natural resources or exceed the capacity of the earth to adjust to the impacts of human thereby ensuring that ecological integrity and resilience to change is maintained by the amount and diversity of natural resources and other environmental assets. The latter consequently reduces the inequalities between human societies and within specific human settlements by authorising institutions to be key actors in reconsidering the environmental and social consequences of the uses of natural resources. Maintaining human well-being and quality of life by promoting broader participation in decision-making - especially at the local community level accordingly fosters ethical frameworks, moral values and attitudes that give more consideration to future generation and non-human components globally. These principles will be further examined in Chapters Five, Six, and Seven.

As was asserted by Dresner (2002), the distinction between sustainability and sustainable development may be viewed independently as sustainable development suggests an emphasis on development and economic growth while sustainability gives priority to the environment. Subsequent to sustainability and sustainable development, lies the concept of a ‘sustainable livelihood’ or ‘sustainable community’ which, validated by Whitfield (2010) is central to poverty reduction, rural development and environmental management. Elucidated by Lawrence (2000; 2006), Hatfield-Dodds (2000) and McDonough (1993) sustainability can be viewed as the bridge by which to fully engage with the world in a way that is empathetic, intuitive, aesthetic and environmentally sensitive. Ozkan (2006:109) moreover legitimised the platform from which to address sustainable responsibilities relating to the social equity of people through vernacular architecture. The identity of indigenous peoples groups within South Africa is vast with a long heritage of artistic, mythical and sacred traditions which have provided this dissertation with a solid foundation on which to base ideas for future architectural endeavours.

McDonough engages on environmental agendas directly to the source of the pollution problem, he then institutes change in the industrial and architectural practise based on respect for human life, the natural world and its complex processes (1993: 385-398). McDonough’s investigation into building construction has found industrialism to be toxic. Delineating this toxic message, McDonough emerged as the major contemporary spokesman for a ‘sustainable’ approach to design.

Sustainability validates a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations. McDonough sought to instil the responsibility of architects, as responsible leaders in developing new definitions and measures of prosperity, productivity and quality of life as was also suggested by Fathy (1986). McDonough also advocated dwellings suggesting that we “...come to peace with our place in the natural world” (McDonough, 1993:398). Sustainability then is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations. McDonough sought to instil the responsibility of architects, as responsible leaders in developing new definitions and measures of prosperity, productivity and quality of life. Following McDonough’s portentous stance, was the emergence of the Hannover Principles, which would act as the ethical guidelines for sustainable design in the future (McDonough,
Jencks noted that the influence of Rowe could not pass without mention as Rowe draws attention to the awareness of architecture as a social and intellectual discourse (Jencks, 1973: 260). Together with Rowe’s contribution, is the urgency exposed by Schumacher to bear on what is certainly one of the most critical tasks which confronts rich and poor societies alike: how to enable the populace to do creative and satisfying work, live independently (self-sufficiently), sustainably in a dignified manner and having done so, to leave the planet in a condition at least no less capable of supporting life than that in which we found it (1980: xi).

6. Cultural Heritage and Identity

Anderson (1991) concluded that modern South African nationalism is the result of colonial impositions of a European style of ‘national’ historical consciousness and awareness that he suggests, needs linguistic unity in order to birth a national culture. Taking pride in one’s cultural heritage instigates and promotes a spirit of ownership (Aikawa-Faure, 1996: 96) simultaneously implementing cultural methods resulting in pride within one’s own heritage (Fathy, 1986: xix-xxiii). Aikawa-Faure further suggested that the intangible cultural heritage, which is closely related to the spiritual life, value systems, visions of cosmology and social practises of peoples and communities, is embodied in cultural identity (1996: 97).

French geographer, Vidal de la Blache conceived the idea of genre de vie, which is the belief that the lifestyle of a particular region reflects the economic, social, ideological and psychological identities imprinted on the landscape (cited in Popescu, 2006). Architecture and identity, individual and collective, appear to be essentially connected. This is true particularly for communities, since they identify themselves with the place in which they evolve (Popescu, 2006: 191).

It would follow that the ability to re-establish worth, ownership and identities of communities – and in so doing, social upliftment - lies in the hands of architect, to design dwellings and buildings which positively reflect the identities of individual communities, rather than treating all communities as a collective whole regardless of the geographical location or cultural stem. Thankfully, the implementation of the SANS 10400 part XP introduced in November 2011 states that, unless it is impossible because of geographical location or other factors, a house should face north, and all living areas should be on the northern side of the house (Green Building Council of South Africa, 2011: Online).

The challenge while searching for cultural heritage and South African identity after emerging from a prolonged state of colonial domination and westernised culture, is, as was asserted by Nettleton to try to imagine South Africa’s own nationhood in new terms, and to define her own identity and heritage (2008: 107). The type of architecture found within individual communities around the world is essentially and intimately related to the identity of the people within (Popescu, 2006). This identity holds the key to South Africans experiencing their environment as meaningful and it is also here that the study of vernacular architecture must make a fundamental contribution (Radford, 1981). It is this narrative property of architecture, seen within (mass produced) architecture which has led to the loss of cultural identity, moral and ethical values and the degradation of various other socio-economic issues. The Reconstruction and Development Programme (RDP) has engendered a loss of traditional, cultural and spiritual
references, and cultural innovative practises, which has led to an urgency to rediscover a true South African identity (Steenkamp and Whitfield, 2011: 72).

The issue of South African identities and cultures is therefore viewed as a volitional process, the significance of which is more noteworthy within a group, since collective identity is overtly constructed. The multiple manifestations engendered by this process have a common denominator: the aspiration towards identity. The diversity of manifestations is determined by the evolution of support for identification (ideological and/or aesthetic).

7. The Reconstruction and Development Programme (RDP)

Following South Africa’s historic 1994 elections, the primary vehicle chosen by the new Government of National Unity to address social housing challenges, was the Reconstruction and Development Programme (RDP) (Figure iii.), which provided a broad framework for socio-economic reform. The first Minister of Housing, Joe Slovo, introduced the public housing scheme in 1994, setting the ambition target of delivering one million houses by the end of the first term under the new government (Pieterse, 2002). It seeks to mobilise the South African populace as well as available resources toward the final eradication of apartheid and the building of a democratic, non-racial and non-sexist future (Blumenfeld, 2003).

Figure iii. The Luxolweni community in Hofmeyr clearly depicts the implementation of the Reconstruction and Development Programme (RDP) which was aimed at mobilising South Africans as well as available resources toward the final eradication of apartheid and the building of a democratic nation.

Bond and Khosa noted that the RDP considered a good environment to be a human right and insisted on participatory policy processes to assure environmentalists and government agreed on how this should be realised (1999). The RDP made its highest priority attacking poverty and deprivation while it called for affirmative action for “black” people, women and rural communities and in particular “vulnerable groups such as farm workers, the elderly and the youth” (Bond and Khosa, 1999). Nelson Mandela, at his victory speech in May 1994 pragmatically said that “we
have emerged as the majority party on the basis of the programme which is contained in the Reconstruction and Development book. That is going to be the cornerstone, the foundation, upon which the Government of National Unity is going to be based. I appeal to all leaders who are going to serve in this government to honour this programme” (quoted in Bond and Tait, 1997: 31).

Addressing rural inequality, government established new structures of local government and local coordination and promoted fair and equitable access to social welfare. The RDP offered explicit standards for an acceptable quality of housing, subject to community negotiation. By 1998, the Housing Minister herself cited community anger about the quality of housing projects and inadequate construction standards on many of the houses delivered (Bond and Khosa, 1999).

Translations

<table>
<thead>
<tr>
<th>English</th>
<th>Xhosa</th>
<th>Afrikaans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ancestral worship</td>
<td>inkonzo</td>
<td></td>
</tr>
<tr>
<td>2. Brak-roof, flat-roofed or Highveld style</td>
<td>Bafokana, iflat, iplata</td>
<td>brakdak</td>
</tr>
<tr>
<td>3. ceremonial totem used for cultural rituals</td>
<td>eXhanti</td>
<td></td>
</tr>
<tr>
<td>4. minister, pastor</td>
<td>umfundisi</td>
<td>dominee, predikant</td>
</tr>
<tr>
<td>5. mud, earth</td>
<td>dagha, d,aka, udaka</td>
<td>modder, grond</td>
</tr>
<tr>
<td>6. Phragmitis australis, common reed</td>
<td></td>
<td>fluitjiesriet</td>
</tr>
<tr>
<td>7. rondavel, a South African round hut. Rondavels (pl).</td>
<td>inqugwala, uronsawuli</td>
<td>Rondawel</td>
</tr>
<tr>
<td>8. tin bucket with perforations around the perimeter to which coals are added</td>
<td>mbawula, imbawula</td>
<td>vuurmaakblik, groot blik met gate ingekap waarin ‘n steenkook vuur gemaak word</td>
</tr>
<tr>
<td>9. veld, or veldt, flat clearing in bush</td>
<td>indle, ithafa</td>
<td>veldt</td>
</tr>
</tbody>
</table>

(Wat what ntoni. Afrikaans Xhosa. 1995)
1.1. **Confronting Objectives and the Background to the Study**

This research has as its aim the understanding of the way in which the indigenous South African people utilize available resources, materials and skills, together with their adaptability within various environments and economic situations. In undertaking this study, caution was taken not to be prematurely authoritative; attempts are made to prove that the indigenous building techniques and use of materials are more sustainable and appropriate than that which is being used in the 21st century. Frescura suggested that “if there is a moral, then it is inherent in the subject matter” and also that indigenous people have proven that architecture without architects is not only possible, but is practised as an everyday occurrence by ordinary people (1981: 3). By analysing selected examples in the Eastern Cape (Figure 1.1), particularly within the uMasizakhe community, a detailed analysis is made regarding the building methods, sustainable development approaches, natural building materials and cultural beliefs influencing the attitudes which exist. As the 21st century dawned, views of vernacular architecture and rural traditions were often tinged with nostalgia (Oliver, 1997: xxiii). Vernacular architecture, which is produced unselfconsciously, relates to the wider nature of society and context in southern African communities, thereby reflecting their identities through architecture. It is this identity which too, needs to be safeguarded from the influences of westernized culture.

![Map of South Africa](image)

**Figure 1.1.** The Republic of South Africa has nine provinces; it is bounded by the Atlantic and Indian Oceans. The Eastern Cape Province is located in the south-eastern part of South Africa, abutting the Indian Ocean. It is the second largest province in terms of surface area following after the Northern Cape Province.
Architects and others involved in the built environment have become increasingly interested in the implementation of ‘traditional’ and vernacular buildings (Denyer, 1978; Frescura, 1981). Embarking on an analytical and systematic pursuit to understand the use of available materials and techniques within the built environment of the Eastern Cape, one aims to shed some light on selected undocumented communities there. It’s through understanding a specific vernacular that architects are enabled to design accordingly; utilising existing indigenous knowledge systems rather than treating all geographical areas as a universally equal point of departure.

Aspects of cultural meaning, the function of space, decoration, and so on, have been thoroughly dealt with and catalogued to the extent of inventing elaborate categories and taxonomies (Denyer, 1978: 133-158); definitive diagrams illustrating the evolution of ‘house form’ (Frescura, 1981: 12, 17-21) and social meaning of structure and function of space in indigenous settlements (Mills, 1984: 24-160) have also been scrupulously considered outside of this dissertation, therefore these topics will be meagrely addressed – this should not be seen as suggesting them as being trivial. Although these publications have been useful in putting indigenous African buildings on record, they have not investigated the possible use of these techniques or materials in the urgent sustainable demand within contemporary architecture.

Contemporary architects’ attitudes toward indigenous architecture and settlements have been to use certain aspects, such as plan, form, cross section, elevation and decoration thereby attempting to give such design an ‘African’ character – without reflecting materials or techniques traditionally used (Macleod, 2002). Much knowledge can be gained by an analysis of materials and techniques and how these could relate to societies and South African architectural identity in the 21st century. Furthermore, as was noted by Knuffel (cited in Frescura, 1985: 89), a number of specialised studies have been published on the subject of rural architecture within a specific region, - with the few notable exceptions from Frescura, Steyn, Peters and others - most still persist in viewing the architecture through the spectacles of their own westernised conditioning.

The intention of the research is to argue that vernacular architecture is not only appropriate but necessary for sustainable contemporary design and construction. This assertion is supported by the findings whereby material availability is directly related to lowered construction costs, energy efficiency and thermal qualities which surpass contemporary counterparts. The social responsibility of architects should be reinforced, whereby communities are bolstered, identity and skill transfer is encouraged, and the implementation of appropriate building techniques is used.

1.2. Clarifying the reason for this study

The stimulus for the research grew as a result of the authors’ upbringing in the Eastern Cape and in particular experience in architectural practise between June 2007 and December 2011.

The demolition of existing traditional and vernacular dwellings in the Luxolweni Community of Hofmeyr in favour of the low-cost housing provided by the Reconstruction and Development Programme (RDP) caused an urgency in the research of the Eastern Cape Vernacular architecture (Figure 1.2.1. and Figure 1.2.2.). The Reconstruction and Development Programme was all embracing, it started as the Redistribution Strategy elaborated by the Congress of South
Introducing the Vernacular Context

African Trade Unions (COSATU). COSATU was launched in December 1985 after four years of unity talks between unions opposed to apartheid and committed to a non-racial, non-sexist and democratic South Africa. Numerous rounds of consultation eventually produced RDP, which immediately became the African National Congress’ (ANC) election platform, which was then converted into a government programme once the ANC achieved a decisive democratic breakthrough in the 1994 elections. The party was given a firm mandate to negotiate a new democratic Constitution for South Africa. The RDP office initially led the reconstruction directly from the President’s office—a powerful and influential power-base. It was this destructive process whereby existing homes were demolished and replaced by RDP dwellings which resulted in an urgency to document the remaining innovative, vernacular techniques and use of available resources. The isiXhosa culture in the remote part of South Africa was subjected to pressures.

Figure 1.2.1. Hofmeyr is positioned in the Eastern Cape, north of Port Elizabeth between Cradock and Steynsburg.

Figure 1.2.2. The destruction of vernacular dwellings in the Luxolweni Community of Hofmeyr in 2007.
Secondly, in architectural practise and field-work throughout South Africa, much work dealt with new building projects which were designed and built within the constraints of conventional practise procedures. It was this experience, and the urgent need to design ‘sustainably’ that heightened the awareness and need to search for an appropriate architectural intervention in the rural developing regions of the Eastern Cape. Vernacular architecture arose as a solution which could not be ignored. Ozkan gave credence to vernacular architecture as being the highest form of sustainable building, as it not only used the most accessible materials, but employed the widest available technologies (2006: 108). Focussing on this departure point, somehow there had to be a way of ‘fine-tuning’ the master-builders’ role to suit the South African context.

This study is inspired by the belief that one way of achieving a pride-filled architectural identity in South Africa would be through the implementation of that which is from the specific culture and environment. When Fathy stated that architects found themselves in a unique position to revive peoples’ faith in their own products, and that if by implementing these products they were able instil pride (1986: xx), why was it not being practised? Rather, to bridge the housing and identity dilemma which occurred as South Africa became an accepted actor on the international stage in 1994 (to produce housing and infrastructure for the previously disadvantaged populace) the ‘plan’ was based upon a model which is not only a foreign form to the indigenous people, but also utilises alien materials and techniques. This has lead to the de-skilling of the populace thereby robbing South Africans of their vernacular building techniques and indigenous knowledge systems. The importance and moreover the value of indigenous building techniques and materials is thereby often ignored by professionals and consultants alike - at the expense of the people for whom they are intended.

Experience in the Eastern Cape has shown that the value of community participation, knowledge transfer and the use of traditional methods and available materials go further than the physical boundaries of floor, wall and roof. It is these specific values which are rooted in both historically inherited ideas as well as the local people’s ability to build in such a way as to suit their given conditions. In order for architectural design and practise to be more appropriate and sustainable, it is essential to de-mystify indigenous methods and materials. Therefore, the reasons for the study are to be aimed at the revalidation of vernacular techniques for a sustainable built environment thereby increasing professional awareness, community pride, cultural identity and essentially global sustainability.

1.3. Key approaches and concepts guiding the research

As assured by Paul Oliver, there exists no sole approach to the study of vernacular architecture and as in any study, there occur certain boundaries (1997:1). This dissertation is structured for research purposes - indicating certain fundamental principles in rural and peri-urban architecture and building as well as the exploration of specific characteristics such as environmental conditions, material resources, structural systems and technologies which have a bearing on architectural form. The approach also comes from the restricted information within the architectural profession regarding the rural vernacular within the Eastern Cape. With the view of relating contemporary South African design to a regional tradition, the potential of the study is to solve problems not only with regard to low-cost housing but also that of our architectural identity, high unemployment rates thereby improving skills development.
Primarily, two approaches will be utilised to arrive at supporting evidence. The developmental approach proposed by Afshar and Norton, which focuses on improved human and ecological well-being expressed in such terms as economic growth, lowered unemployment, improved housing, health and ecological sustainability (1997: 25). Secondly an ecological approach which focuses on habitat as part of the overall environmental system, both natural and nurtured thereby ensuring that humanity meets the needs of the present, without compromising the ability of future generations to meet their own needs (Lawrence, 1997: 31-33).

1.4. Outline: The Structure of the Dissertation

To echo the research question, a literature review in Chapter Two follows this introductory chapter and outlines the literature sources consulted. It starts with the derivative responsibility which architects hold within the built environment to improve the social livelihoods of the populace, followed by methods and beliefs formulated by Hassan Fathy, Roderick Lawrence and Paul Oliver, who each demonstrate how this might be attained. Next, the sustainability of vernacular architecture is addressed followed by the lack of information held by currently practising architects and the resulting loss of a material vernacular. Historical evidence is proposed supporting the loss of the South African vernacular together with the reason for the documentation of surviving examples. Much debate follows in Chapter Two examining vernacular terms, definitions, varying views and the appropriateness of its utilization in the given context. Ultimately, the chapter draws to a close with the introduction of the primary research methods namely the developmental and ecological approaches which, together with the research methodology and design are discussed in broader terms in Chapter Three.

Chapter Four introduces the research population using an outside-in approach, starting with the historical and political contexts within South Africa, followed by the Eastern Cape Province and concluding with a detailed contextual analysis of Graaff-Reinet and the uMasizakhe community. Climatological, environmental and ecological factors are addressed, focussing on the specific geographical location. The research problem and proposed hypotheses together with the research methods follow within Chapter Three. Findings which resulted from the research in Chapter Four are discussed in detail in the trailing chapter.

Chapter Five raises the curtain for the research findings, which follow in the subsequent chapters Six and Seven. Chapter Five introduces the outcomes of the questionnaires within uMasizakhe which validate the reasons of applying vernacular building techniques in rural settlements and peri-urban communities. Findings are divided and applied utilizing the developmental and ecological approaches together with literature which follows substantiating the findings. Chapter Six elucidates the trade-offs and opportunities which exist within a sustainable context whereby contemporary vernacular architecture and innovation is attend to by means of a comparative case study between Centani’s Greenshops Financial Services Centre (GFSC) at Centani and the University of Fort Hare’s New Auditoria and Teaching Complex (NATC) in East London. Chapter Seven discusses the application of the Developmental and Ecological approaches confirming that community participation can most certainly lead to social upliftment and sustainable settlements. Concluding remarks resulting from the findings follow in Chapter Eight.
Chapter Eight is the final chapter whereby conclusions are drawn and recommendations are made with regard to the relevance of the research conducted. The urgency and responsibility held by architects to implement vernacular architectural principles is also addressed. Furthermore as will be concentrated upon, the challenges which exist around coping with the historical conditions of South Africa together with the political barriers, populace demands and human expectations to building are discussed. Finally a summary of the findings and concluding remarks regarding vernacular architecture postulates the need to revalidate vernacular techniques for a sustainable built environment.
The holistic view of vernacular architecture

2.1. Introduction

The implementation of indigenous building techniques and materials in contemporary South African architecture is a derivative belief which is based upon Hassan Fathy’s postulation holding that architects are in a unique position to revive people’s faith in their own culture (1986: xx). In addition to this, Popescu verified that the architecture found within individual communities around the world is intimately related to the identity and culture of the people within (2006: 189). Fathy conceded that architects, as authoritative critics, are in an efficacious position to show what is admirable in local forms – and if, as such, they go so far as to implement commendable forms, local communities will immediately begin to look upon their own products, skill and knowledge with pride.

These admirable local forms as suggested by Fathy refer to the vernacular architecture in an area, also explained by Lawrence (2006) as being human constructs which are the results of interrelations amid ecological, economic, material, political and social systems. There exists a predicament within the current African context of vernacular architecture. However, as was confirmed by Denyer (1978), as scant archaeological evidence remains where vernacular buildings were once inhabited by communities - prior to urban migration and the assault of low-cost housing on the built environment. The relevance of vernacular architecture in the 21st century is advanced by Ozkan (2006), who advanced vernacular architecture as being the highest form of sustainable building, as it uses not only the most accessible materials, but also employs the widest available technologies. The available resources used were customarily owner or community-built, utilizing a variety of traditional technologies and were created to meet specific needs, accommodating the values, economies and ways of living of the cultures that produce them (AlSayyad, 2006; Asquith, 2006; Lawrence, 2006; Oliver, 1997; Ozkan, 2006; Peters, 1997; Frescura, 1981).

Current practising African architects often lack information on the subject of African architecture (Elleh, 1996; Denyer, 1978; Oliver, 1986; Radford, 1989) as these buildings have been meagrely documented, hence African architecture cannot be fully understood and the architects - as the “authoritative critics” (Fathy, 1986: xx) - are “unable to incorporate and interpret the vernacular in the changing skylines of Africa” (Elleh, 1996: 142). Traditional societies, utilising available resources, whose cultural heritage is handed down orally from one generation to the next, have shown themselves to be particularly vulnerable to the impact of the modern sector economy (Elleh, 1996; Bess, 1996), urban migration (Lawrence, 2006; AlSayyad, 2006; Gwinner, 2011), together with the onslaught of mass low-cost housing initiatives which have caused great social, political and educational stumbling blocks thereby consistently aiding in the degradation of communities (Anderson, 1977).

The loss of vernacular, relating to the architectural discourse to which master builders pertain, is an ongoing crisis, with fundamental problems surrounding the loss of cultural identity, tradition and social equity (Makaka and Meyer, 2006; AlSayyad, 2006; Lawrence, 2006). Justified by Elleh (1996) who warned against the temptations which existed as swift designs were hastily implemented, in order to meet the political promises made during the run-up to the 1994
elections. Unfortunately South African architects rarely realized this vernacular precedent: pertinently affirmed by British historian Hugh Trevor Rope (cited in Garlake, 1990: 28) who said that there existed “no African history, only the history of Europeans in Africa and the rest is darkness...”

If vernacular architecture is superior form of sustainable building as was suggested by Ozkan (2006), partially due to the fact that it employs the widest of available technologies, then Elleh (1996), Anderson (1977) and, Bourdier and Minh-ha (1996) merely add fuel to the fire. Western technologies and materials found throughout Africa have had a detrimental effect on the vernacular. These materials, which are neither locally available nor socially inclusive, have made it increasingly difficult for the indigenous African populace to develop their architecture in accordance with the level of their industrial technology. Elleh (1996) stated simply that Africa is designing and building ahead of its technology. This research and the study which follows will reveal a cultural heritage of sophistication and ecological balance that has too long been ignored by many architects and professionals (Boudier and Minh-ha, 1996; Fathy, 1973). Ignorance may be the root cause of the influx of prescribed, expensive and alien solutions (Anderson, 1977: 3), however, the result is inadvertently opposing the “highest forms of sustainability” (Ozkan, 2006: 108).

This dissertation is aimed at shedding some light on the “darkness” in Africa (Rope cited in Garlake, 1990: 28) by documenting local indigenous building techniques and use of materials within the Eastern Cape province of South Africa – specifically these surviving within the Graaff-Reinet and Hofmeyr regions of the Karoo (Figure 2.1..1). Elleh (1996) deduced that the influence of not only other cultures but also the political promise to meet the nation’s infrastructure needs have been detrimental to South African architecture. The uMasizakhe community of Graaff-Reinet is one such example in which the vernacular survives in dangerous territories oft threatened by demolition. Maintained by Anderson (1977), these detriments are as a result first and foremost of the change which was introduced so rapidly, that essential qualities in traditional architecture have been lost in the technical execution of most architectural endeavours. In turn, explained Anderson, the social equity of communities is deficiently distorted to a considerable degree – thereby further supporting the lack of sustainable architectural implementation. Arguably, however, Onatu (2011) stresses that the desire for modern materials and technology is understandable and is in line with the principles of development, as developing countries try to aspire to, and catch up with, developed ones.
Figure 2.1.1. The study was focused on documenting local indigenous building techniques and the use of materials specifically those surviving within the Graaff-Reinet and Hofmeyr regions of the Eastern Cape Karoo.

Thorough debate may follow regarding materials, with Maxwell (1996) deducing that, if only in materials, design is also confronted with a return to the hostility between traditionalism and modernity. Furthermore that tradition views the past through rose-tinted glasses just as modernism does the future. The final face-off would exist as the traditional and indigenous vernacular accepts its place in a tradition, provided that it is done in good faith. The modern, however, refuses tradition and refuses even to be considered a style, thereby claiming that it is only a regular method of work concentrating on the use and function which, if faithfully executed could bring future reality into existence. The material battle has not yet produced a convincing winner. Translating Maxwell’s debate into South African architecture would be prompted with natural materials being viewed as not only an African vernacular but also a traditional style. Rural African people have evolved with these natural materials; therefore it is common for people to feel at home in these ‘historic’ materials (Day, 1990). The need for South African roots has led to revivals of past architectural styles such as the African hut or rondavel (Steyn, 2003). Maxwell (1996) denounced such a revival stating that these revivalist forms constructed using modern materials, look as forged and void as they sound when one knocks them. These false pretences toward a rooted, historical, natural-looking architecture taint the built environment throughout our country (Steyn, 2006). Much contemporary architecture is shaped by style.
This prioritizes time-bound fashion over place-appropriateness: appropriateness of ‘particular’ places and the people of those places (Oliver, 1987). Neo-vernacular and revivalist reactions have something hollow about them: they also seek to impose a singular idea, in this case plucked from a particular period of past history. All such approaches are more concerned with ‘style’ than ‘responsiveness’ (Maxwell, 1996).

Compelling perhaps, the showdown between vernacular and modern may never end. It is here that contemporary architecture ought to initiate a South African identity whereby the distinction becomes vague and rooted in what could become a democratically identified South African architecture. Such an approach would declare South African architecture as neither European, nor African, reflecting a Rainbow Nation where colours are integrated within ‘masterpiece-architecture’ rather than an eternal “darkness” as was suggested by Rope (cited in Garlake, 1990: 28).

Rather than construct synthetic and generally insupportable distinctions in some hypothetical sequence, one should rather choose to examine the sustainability and innovation in vernacular architecture within a specific region, chosen within this dissertation the Eastern Cape, in so doing identifying its source, people, traditions, cultures, materials and skills.

2.2. Introduction to Research Approaches

2.2.1. Developmental Approach

The developmental approach which is discussed was adapted from, and based on the writings of Afshar and Norton (1997: 25-27).

An approach to vernacular architecture as a coherent framework of theory and practise has yet to be articulated. The developmental approach envelops both the process of achieving well-being and the products that manifest its achievement, therefore casting a sound foundation for sustainable development to follow. It views vernacular architecture as an aspect of development (improved shelter, settlement and an enhanced environment), among several (improved food through agriculture, superior goods through industry), therefore proposing a holistic solution rather than solitary answers. The developmental approach used to studying vernacular architecture looks to the future, evaluating the potential of traditional building to meet world housing problems together with the economic or technical support which may be needed in order to do so (Afshar and Norton, 1997: 25).

In order to reason authenticity and support the implementation of the developmental approach within South African architecture, it is essential to confront the historical outlook of the approach (Afshar and Norton, 1997). Early expressions of a developmental vernacular can be seen in the mid-1940s in Hassan Fathy’s construction of New Gourna village in Egypt. In practise, however, Fathy focussed on aesthetics and the finished product – neglecting a participatory process and the socio-economic viability thereof (Fathy, 1973). Later in the 1960s, John Turner (1978) articulated the distinction between process and product, emphasizing the process and
architectures’ contribution to development in ways that also applied to the vernacular rather than focussing (as Fathy did) on the product. The 1970s saw the birth of a comprehensive approach formulated by the Development Workshop which demonstrated how their vernacular ‘indigenous building’ approach could relate to broader development theories and practise (Cain, Afshar and Norton, 1975). The Development Workshop encompassed settlement planning, building material industries, construction and training, all based on vernacular architecture. From the 1980s and well into the 21st century, the developmental approach has continued to be shaped by an increasing number of projects with greater institutional support from government and international aid agencies. The success of such projects enhances the credibility of using vernacular architecture to meet South African contemporary needs.

As a result of the holistic view of the developmental approach, vernacular architecture gains a widening of its scope beyond architecture’s traditional emphasis on the physical product, its design, aesthetics and technology. A developmental approach solicits questions regarding the vernacular influence from outside as well as its influence on broader development processes, therefore, it is possible to understand that vernacular architecture is not only influenced by local conditions but also by the broader and ‘holistic’ developmental perspective being adopted (Whitfield, 2010; Lawrence, 2006; Oliver, 1997; Ozkan, 2006; Peters, 1997; Frescura, 1981). Key opportunities are embarked upon whereby the vernacular can achieve both a better built environment and broader social well-being (Oliver, 2003). The developmental approach argues that vernacular architecture demonstrates how the poor, which constitute the majority of the South African population, can use local resources self-reliantly to meet shelter needs in an ecologically sustainable manner. From this perspective vernacular architecture has much to teach the contemporary built environment (Oliver, 2006).

Utilizing a developmental approach to vernacular architecture would mean exploiting characteristics of vernacular architecture such as local and cultural material resources and techniques to achieve improved shelter, settlements and broader development objectives. In effect the approach thrives upon small-scale developments, technologically and organizationally simple and inexpensive, ideal perhaps for rural and peri-urban South African precincts. Planning and construction can be controlled within local communities and implemented by these and local builders. The values and needs of the local people expressed through the developmental approach together with a demonstration of continuity with change could allow communities to remain rooted in their cultural traditions, while simultaneously incorporating innovation and appropriate external technologies.

In conclusion, the characteristics found within the developmental approach make it cost-effective and therefore economically viable. Labour intensive and therefore job-creating, focussing on accessible resources therefore enhancing local income and utilizing renewable-resources, therefore allowing them to be ecologically sound. The simplicity could encourage community participation and its affirmation of local values and approaches encourages self-esteem and local pride. This indisputably supports Hassan Fathy’s belief that architects are in the inimitable position to revive people’s faith in their own culture (1986: xx).
2.2.2. Ecological Approach

The ecological approach which follows is adapted from, and based on the writings of Lawrence (1997: 31-33).

Human ecology is a holistic interpretation of those ecological and specifically human processes, products, orders and mediating factors that occur at all scales of the earth’s surface and the biosphere. It connotes an integrated framework for the analysis and the comprehension of three logics and the interrelations between three constituents using a historical perspective. These logics are: ‘bio-logic’, ‘eco-logic’, and ‘anthro-logic’ (Lawrence, 1997: 31).

The biological process mentioned above is the order of all living organisms including animals and plants. The ecological processes are the orders of all inorganic constituencies such as air, water, soil and the sun. Finally the anthropological process which is the ordering of cultural, social and individual human factors includes social customs, rituals and values. Given that human products and processes are pertinent for human ecology, all activities, customs and conventions related to the use of resources are relevant for an ecological approach. Essential for the development of sustainable communities is the use of land and material resources, including the construction of vernacular buildings. An ecological outlook provides a conceptual outline that enables academics and practitioners alike to accept divergent disciplinary concepts, techniques and allows the application of an integrated approach. From this perspective, the environment is multi-dimensional and complex, quite opposite to the connotation used by many architects and social scientists that refer to the environment as if it were a neutral background. In order to comprehend this complexity, it is necessary to apply an integrated approach.

The primary benefit of an ecological approach is that it enables selective, sectored interpretations to be replaced by integrated, multi-dimensional ones in which sets of quantifiable material factors and qualitative human factors are considered simultaneously. This approach is based on the following sets of principles: Firstly, the interrelations between humans and their surroundings and should include beliefs, doctrines, ideas and representations. Secondly, the characteristic discursive and reflexive knowledge which exists within the interrelations between the populace and their surroundings is unlike other biological organisms. Thirdly, the ‘human environment’ can be contrasted with the environment of other biological organisms by the instrumental functions and roles attributed to it. Human processes and products transform the constituents of the environment in order to meet prescribed aspirations, goals and needs. In addition, human activities can provoke unintended consequences on environmental constituents and in turn, affect human well-being.

According to Stephen Boyd (1987) ecological and historical analyses of human civilizations show different ecological phases which are defined with respect to the interrelations between the biosphere and human societies on the one hand, and the interrelationship between environmental conditions human well-being on the other. When ecological and historical approaches are combined to study the development of human settlements and building construction in precise localities they can identify both the intended and the unintended consequences of the shift from traditional to modern societies.
The influence which modern or outside cultures have had on African indigenous architecture has also been observed by Anderson who corroborated with these modern influences which have not always been for the better (1977: 33). His argument followed that the introduction of change within any community could be so rapid that the essential qualities of the traditional architecture are lost in the technical execution process. Noted accurately nevertheless, Anderson (1977) as well as Onatu (2011) solicited the desire within rural or traditional communities for modern materials and technology as being in line with the development in other areas, as developing countries try to catch up with the developed ones these aspirations grow. There is, however, an essential differentiating element which comes into play: the community which desires modernity versus the community which is forced into modernity (Steyn and Bosman, 2010: 200).

During the resettlement of 440000 indigenous Kambri people during the construction of the Kinji Dam in Nigeria (completed in 1968), the Kambri’s purportedly left their dwellings and moved into government constructed homes less than a year after they were resettled by the federal government of Nigeria. The initial resettlement intentions were good, with architect Robin Atkinson successfully duplicating the traditional form of the Kambri house with material differences. Unfortunately, the cement blocks, asbestos roofs, along with the spatial aspects of Kambri architecture were not accounted for resulting in the built product being too hot. The linear grid and streets disrupted Kambri lifestyle and the Kambri people were unable to maintain their houses due to their lack of knowledge pertaining to the alien materials used. A combination of technical and socio-cultural problems forced inhabitants out of their new houses (Elleh, 1996: 345-354).

An additional example to the importance of considering the ecological approach pertains to the studied development of Hong Kong prior to the founding of the British Crown Colony and until the 1970s. Boyden (1981) compared the traditional and modern housing and building construction methods, uses of land, energy, water and other resources. Their findings reflected that long-term economic developments in Hong Kong included a growing reliance on the import and export of food, building materials and many other goods in addition to the accumulation of toxic and non-toxic wastes which resulted in significant changes to the diet and well-being of the population. Through this study, Boyden (1981) proved that as the indigenous cultural know-how of traditional building methods declined. The impacts on the layout and construction of the built environment along with the consumption of materials and energy significantly increased.

2.2.3. Concluding the Research Approaches

From these instances, it can be derived that in contemporary architecture there exist dual choices between traditional methods and materials on the one hand; and synthetic, modern materials alongside new technologies on the other; the former – as remarked earlier by Oliver (2006), Rapoport (1989) and Fathy (1986) - typically enables the use and re-use of renewable resources, whereas the synthetic alternative generally requires more energy and skill proficiency resulting in increased non-recyclable waste products lowering their level sustainability on most fronts. The arbitrary use of alien materials can have unforeseen negative impacts on human and community well-being. Validated by Denyer, it should come as no surprise then, that more architects were turning to vernacular architecture, not because they wish to repeat the structures, social orders, materials or technology, but because it is recognised that these
structures satisfy specified communities’ psychological, spiritual, physical and cultural needs far better than modern settlements ever could (1978: 4).

Professor Whole Soyinka, Nigerian Nobel Peace Laureate in 1986, dramatized the quick approach to development together with the lack of consideration taken regarding the ordering of all things living, dead as well as social organisations in his play ‘The Lion and the Jewel’ (cited in Elleh, 1996: 341). The narrative follows with a village teacher deciding to rid himself of his traditional past by refusing to pay the customary bride price since it was not ‘civilized’ to do so. The teacher believed that he could win the girl he loved through civilized romance, the way educated men and Christians do. To his dismay, the girl was disgusted by his affection. She did not understand this method of enticement. The teachers’ efforts resulted in him not only losing his ‘bride’, but also realising that his dreams of converting the small village to which he belonged into a prominent city could only be done by “divorcing the past and clearing the jungle for the railway tracks and every other thing that represented the progress in the modern city” (cited in Elleh, 1996: 341).

Professor Soyinka’s tale is analogous to these architects who decide to plan without utilising the ecological or developmental approaches in a rural, peri-urban and predominantly traditional environment. It is these architects who see development and modernisation as a clearing of the jungle and planting alien structures including roads and other foreign elements completely ignorant to the past and the community’s actual needs. As teachers and “authoritative critics” (Fathy, 1986: xx), architects can learn that ‘courting’ villages, traditional societies and communities is best done by making reference to the past and honouring the people.
INTRODUCTION OF RESEARCH DESIGN AND METHODS INVESTIGATION INTO VERNACULAR ARCHITECTURE

Pavlides remarked upon the numerous vernacular buildings which have been lost to the world through disaster, abandonment, decline of traditions or purposeful demolition (1997: 59). Many of these grounds relate directly to the case of the uMasizakhe community being researched and also impact communities further afield within the Eastern Cape - therefore posing urgency in the documentation of the local vernacular. The research question posed is whether or not adopting vernacular techniques can improve SA sustainability, contemporary architecture and housing needs within the greater populace. It should be noted that the research is specifically based upon peri-urban and rural regions, furthermore, that the research does not suggest the rediscovery of the traditional mud hut, but rather a synergy and interdependence between traditional techniques and contemporary architectural design.

The dissertation will combine theoretical discourse with empirical data. Quantitative research was captured through scientifically and statistically formulated questionnaires. Qualitative methods utilized for the recording and documentation of uMasizakhe together with other case studies are vast and vary from the study of books, journals, personal discussions and conference proceedings to architectural drawings, field sketches and photographs (conveying spatial relationships, qualities of materials and the relative size of occupancies). Preparing a site plan allowed the mapping of documented buildings in relation to orientation, topography, natural resources, land use, communications, site, settlement-pattern, significant structures and aspects of socio-spatial organization have also been noted and documented where relevant. Both quantitative and qualitative methods were used to ensure the effectiveness of documentation pertaining to vernacular architecture thereby enabling findings to be reviewed, judged and supported by literature.

A quantitative and qualitative analysis using questionnaires and structured interviews was used to assess the sustainability of the current vernacular homes; the use of available natural resources, as well as the attitudes of respondents toward their homes was also confirmed by literary findings. Contemporary South African cases, such as the Greenshops Financial Services Centre in Centani in the Eastern Cape, show that traditional precedents have guided design concepts and reportedly contributed to revival within the isiXhosa people’s faith and pride in their own culture.

As this dissertation is aimed at being interdisciplinary there exists some measure of shared competence in the recording and documentation of vernacular buildings, using established techniques that can be read and understood the world over (Oliver, 1997:58). Therefore, utilizing sketches, photographs, questionnaires, recorded interviews, maps, plans and literature, a common resource-base may be formulated regardless of discipline. These techniques significantly augment the data collection.


Research for this dissertation was conducted between April 2010 and November 2011, although hitherto information gathered by the author since 2007 was included. The process of data collection took the primary form of personal on-site investigations, assisted wherever necessary by a translator or person(s) familiar with the local conditions and other visited sites. The collection of data concerning rural architectural practises within the uMasizakhe community was
supported by on-site interviews utilizing non-random participants. Research participants were pre-selected by way of occupying indigenous, vernacular homes. Structured questionnaires provided information regarding vernacular building technology, building materials and land ownership among others. Although formal questionnaires were used (Appendix 1), questions were adapted and simplified as it was found that the questions puzzled interviewees, many of whom had limited education which inhibited a free-flow of information and conversation.

The research approaches used were both developmental and ecological. The former provides two developmental contexts from which vernacular architecture can be explored. Firstly, to impede socio-economic and physical decline caused by broader socio-economic change and environmental degradation and secondly to facilitate communities in meeting changing needs and rising aspirations. The environmental effects have most commonly affected the vernacular through eroding organic materials’ resource base. Both contexts within the developmental approach were explored within the questionnaires together with the biological, ecological and anthropological ordering of organic, inorganic, cultural, social and human factors found within ecological approach.

3.2. Research Instruments

3.2.1. Literature

Literature based on relevant vernacular topics and architectural principles is used to form a conceptual and theoretical basis from which conclusions are deduced in order to answer the research questions (Bak, 2004). Existing studies of vernacular architecture, specifically those of Hassan Fathy (1973; 1986) and Paul Oliver (1971; 1986; 1987; 1997; 2003; 2006) are reviewed for comparison (Anderson and Poole, 2009), together with field surveys conducted by Makaka and Meyer (2006) within related communities in the Eastern Cape. Various authors were consulted, guiding the research and supporting the findings. Authors included Lawrence (1997; 2000), Asquith and Vellinga (2006) and Afshar and Norton (1997) in the explanation of perspectives and directions pursued (Rakotsoane and Rakotsoane, 2007). Finally, the dissertation is aimed at testing theories surrounding vernacular architecture utilising both the developmental and ecological approaches and adding suggestions to build upon (Rudestam and Newton, 2007).

3.2.2. Questionnaires

The questionnaire consisted of both quantitative and qualitative questions (see Appendix 1). The research was conducted in this manner in order for quantitative data to be drawn from the number of individuals living in indigenous dwellings together with the material properties and construction methods used. Qualitative questions were used to determine the reasons and socio-cultural belief systems. The questionnaire was designed to establish firstly, socio-economic factors, followed by the physical dwellings’ material uses and concluding with qualitative open-ended questions.

Findings of the questionnaire are verified alongside the literature review and data analysed to provide percentages of participants living in the various indigenous buildings. These individual
indigenous buildings are compared to contemporary counterparts thereby determining which process holds the greatest holistic and sustainable worth.

3.3.3. Field-Work Photographs

Photographic records will convey or confirm documentary information and is, according to Pavlides (1997), preferable for research and documentation purposes. Utilising qualitative photographic recording methods, the relationship between the documented buildings and their environmental location can be confirmed, and internal spaces together with construction details recorded. Both black-and-white, colour and edited photographs were used, as there exists an inevitable loss of hue utilizing solely gray-scale images.

3.3.4. Data Analysis

As construed from Glatthorn and Joyner (2005), data is analysed by reducing common information which is then grouped accordingly and displayed. At this point, the data can be compared to literature on the subject.

Data for this dissertation was independently and statistically processed by the Information and Communication Technology Services of the University of the Free State.
The purpose of this chapter is to briefly sketch the physical, social, historical and material context on which this study is based. It is intended to serve as an introduction to the place of the indigenous peoples in this region of South Africa, in order to perceive more fully the traditional and innovative methods, and uses of material being investigated in relation to their surroundings.

### 4.1. Introduction to the Research Context

#### 4.1.1. Historical and Political Context within South Africa

The history of the Republic of South Africa cannot be discussed without looking at problems resulting from the socio-political issues within because of the close ties between its economic, socio-political attributes and architecture – the latter of which is largely reflected in settlement patterns and urban landscapes (Elleh, 1996: 215). Nettleton postulated the challenges which South Africa faced as it had to try to imagine its own nationhood in new terms, beyond that of its prolonged state of colonial domination by white people and Western culture (2008:107).

Much confusion arises when addressing the impact of historical and political issues on settlement patterns as there are vast differences between urban and rural landscapes, settlements and building techniques, the latter of which addresses primarily the traditional indigenous impact rather than colonial and apartheid influences which resulted. Mamdani (1996), however, argued that African states inherited administrative forms from colonial regimes based on the two prongs of firstly, direct rule, applied to those in urban conglomerates; and secondly, indirect rule, applied by those in rural areas. It is in as a result of the latter that rural dwellers remain ‘natives’ and too often keep colonially-assigned ethnic divisions. For purposes of understanding the authors’ stance with regard to Mamdani, Nettleton and Ellehs’ views, it is necessary to express a sigh of relief toward the lack of westernised and colonial influence in some rural areas, thereby allowing authentic and virgin documentation to be done.

To write detailed accounts of the historical and political impacts occurring within South Africa could lead to unnecessary debates on topics which should be left to politicians and historians. From an architectural stance, emotive explanations best describe the engaged position. Elleh described the current state of South Africa as taking a leap of faith that goes beyond the present conditions but rather looks to the future with optimism and the hope resulting in the restoration of faith in humankind (1996: 215). Elleh’s approach did not advocate ignoring problems currently faced within the country, such as the socio-political, unemployment, housing and educational struggles, but rather believed that these would have been resolved to the benefit of all concerned.

In spite of the economic challenges experienced by South Africa in the transition to a democratic government in 1994, the mass production of RDP houses did seem convenient as the government took to expanding its educational and housing infrastructure in anticipation of an influx of South Africans who had been denied access to improved living-conditions and better education because of their ethnic background. The apparent increase in infrastructure did not stifle those living in rural areas from continuing with indigenous building techniques through the introduction of modernised materials and obvious transformations in shape and...
form. This is illustrated by Sahlins who pointed out that "culture is a gamble played with nature, in the course of which, wittingly or unwittingly ...the old names still on everyone's lips acquire connotations that are far removed from their original meanings" (1985: ix).

Elleh validated the importance of precedents existing in African architecture as these play an essential role in guiding construction professionals through the complexities of its past and back to the unexplored avenues of the present and future (1996: 227).

4.1.2. Historical and Political Context within the Eastern Cape

The Republic of South Africa has nine provinces (Figure 1.1) covering an area of about 1.2 million sq km. It is bound by the Atlantic and Indian Oceans. The country consists of a coastal plain, an inland plateau and a separating escarpment or chain of mountains. The Eastern Cape Province is located in the south-eastern part of South Africa, abutting the Indian Ocean. It is the second largest province in surface area terms after the Northern Cape Province.

With a total population of 6.4 million, the Eastern Cape is the third most populous province. The black population make up 88%, the coloured group 7% and the white population 5% of the total provincial population (South Africa. Statistics South Africa (SA SSA), 2003:12). The majority of the population (61%) live in the rural areas (SA SAA, 2003: 2). Sadly, however, the Eastern Cape has been a region of resistance and oppression for roughly 200 years (Lind, 2003). According to Nel it is necessary to revisit the colonial period meagrely mentioned earlier to understand how “inequality became entrenched” (1999: 67) in the region as the province even today displays low levels of social development and ineffective economic growth.

Wars between the European settlers and the indigenous population, over land and the control of the region, lasted for almost a hundred years in the 19th century (Switzer, 1993: 3). The characteristics of the political agendas in the Eastern Cape have even manifested themselves in the livelihoods of the people, as asserted by Frescura when tracing the unwillingness of the indigenous people to implement too radical a change in their built form (1981:75).

4.1.3. Historical and Political Context of Graaff-Reinet and uMasizakhe Community

Most colonial vernacular buildings are located in the south and east coastal belt from Cape Town to KwaZulu-Natal, in the semi-arid inland plateau of the Great Karoo, and in the mountain valleys or on the escarpment between them. The Great Karoo, where Graaff-Reinet lies, is semi-arid with little perennial water and low scrub (Japha, D. and Japha, V. 1997: 2152).

"In the Karoo vegetation there is no green patch, no shade of a tree, no field of corn; there is not a mountain, but it is bare; not a river but it is dry; in the vegetable kingdom all appears sapless, withered and dry; the mimosa, the aloe and the Karoo bush alone survive the excessive heat and the prolonged droughts which are features of the climate" (Henning, 1975: 7).

It is from this description that Graaff-Reinet may be viewed as an oasis within the central parts of the Eastern Cape, Great Karoo. Graaff-Reinet was laid-out in a bend on the course of the Sundays River (Figure 4.1.3.1.), it is further surrounded on three sides by mountains. In the
distance, the Sneeuberg Mountain range (Figure 4.1.3.2) towers above the landscape, while to the south, the dry arid plains of the Karoo stretch as far as the eye can see (Henning, 1975:7; Fagan, 2008: 78; Minnaar, 1987:1).

Figure 4.1.3.1. Contextual map illustrating the position of uMasizakhe in relation to its surroundings and the planned layout of Graaff-Reinet enveloped by the Sundays River.

Figure 4.1.3.2. Snow is rarely seen in the valley but is frequent within the surrounding Sneeuberg Mountains.
Minnaar (1987:1) noted that in the colonisation of the Cape Colony, the eastward expansion of the Dutch-speaking farmer (the trekboer) resulted in the establishment of Graaff-Reinet as the fourth-oldest town in South Africa. It was from Graaff-Reinet that the frontiers of the Cape Colony were secured and the interior explored, civilised and developed. By the time of the second British occupation in 1805, Graaff-Reinet was marked as the extreme eastern edge of permanent occupation (Radford, 1989: 21).

While the Southern Bantu people were subjected to influences of Khoisan people as well as western civilizations, each Bantu people is characterised by a national pattern peculiar to itself (Peters, 1997: 2152). The Sotho and Nguni peoples – the vast majority of all Bantu living in South Africa, are distinguished from other cultural groups in Africa linguistically as well as culturally. The isiXhosa people, as part of the Nguni people are spread toward the south of the country, in the Transkei and Eastern Cape (Peters, 1997:2152). The Xhosa settlement found in Graaff-Reinet within the uMasizakhe community is picturesquely situated as one enters Graaff-Reinet on the Middleburg road (Fagan. 2008: 79, Figure 4.1.3.1). The earliest huts and shelters built in uMasizakhe, were round in the Khoisan style (Figure 4.1.3.3.) with reed mats for roofing; unfortunately none of these earlier houses have survived, although it is important to be acquainted with the indigenous technique and available materials used so as to follow the current forms. These techniques and materials will be explained in Chapter Five.

Figure 4.1.3.3. The earliest isiXhosa dwellings in uMasizakhe were round in the Khoisan-style with bulrush mats over brushwood hoops, unfortunately none of these earlier houses have survived

The isiXhosa traditional (Figure 4.1.3.4.) hut as noted above is of the cone-on-cylinder type, commonly referred to as the rondavel (Steyn, 2006; Peters, 1997). The walls of the rondavel are traditionally plastered and consist of wattle poles and woven saplings with rubble or mud infill, or sun-baked mud-blocks, with a pole in the centre to support the cone-shaped roof of rafters and saplings to which thatch, reeds or 'fluitjiesriet' is fixed. ‘Fire-places’ or mbawula are positioned in the centre of the hut for heating, cooking and vermin repelling reasons (Peters, 1997: 2152). The floor is smeared with dung to improve its durability (Peters, 1997: 2152). Rectangular huts with hipped roofs became popular after indigenous peoples had been introduced to European styles of architecture (Frescura, 1985; Steyn, 2006;) (Figure 4.1.3.5.).
The isiXhosa hut is of the cone-on-cylinder type, commonly referred to as the rondavel. Corrugated iron roof-sheeting being held down by large rubble-stones was the norm. These stones could be removed and the sheets removed and cleaned after the winter, before the heavy summer rainfall (Theron, 1972: 41) (Figure 4.1.3.6.). Choice of construction materials is highly dependent on local resources (Peters, 1997; Oliver, 1971; Frescura, 1985) which confirmed that rubble was used for many wall constructions which, together with the thermal qualities of the thatched roof provided comfortable internal environments (Peters, 1997: 2153; Makaka and Meyer, 2006; Fitch and Branch, 1960). Walls are traditionally wholly or partly plastered. The rondavel and four-cornered houses have become the types most likely to be built by the isiZulu and isiXhosa people.

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The uMasizakhe settlement lies 750 meters above sea-level where the semi-arid plateau region of the Eastern Cape Province can be characterised with low and unreliable rainfall and great extremes in temperatures (Frescura, 1985: 37). Undoubtedly, one of the main reasons for the selection of the site at Graaff-Reinet was the abundant supply of water from the Sundays River (Minnaar, 1987: 1) which contrasts greatly with the surrounding arid areas of the Karoo (Henning, 1975: 7). Henning further illustrates the landscape of the Karoo as being “... unique in its ugliness...” and “...wanting in everything that can please the eye or soothe the mind...” he added possibly contradictory descriptions such as the “timeless appeal” resulting from “rugged beauty” found within the “boundless Karoo” The climate of Graaff-Reinet has determined to a large extent the livelihoods of the people as will be postulated in the research findings. Graaff-Reinet has, like the surrounding Karoo, a climate of extremes. Extreme temperatures of up to 38°C can be expected in mid-summer during the day and in the evening temperatures may drop to 32°C with an occasional thunderstorm to relieve the heat (Minnaar, 1987). During the winter months the opposite extreme is experienced. Snow is rarely seen in the valley but is frequent within the surrounding Sneeuberg Mountains, consequently temperatures of well below freezing point are experienced (Minnaar, 1987:1; Henning, 1975:7).

4.2. The Research Problems

Typical of any research conducted on traditional structures, as Anderson remarked, the reality exists that most of these structures are built using natural materials such as wood, rubble, clay or mud. This ensures that very few traces are left once they (the traditional structures) have been abandoned or demolished (1977: 27). It should be noted that much research has been conducted upon abandoned ruins, remnants of past communities and residues of long-forgotten villages, making the supporting literature essential in reproducing valid records.
Field visits to selected cases proved indispensable for the recording of the isiXhosa traditional vernacular – specifically these of the traditional hut or rondavel. Revisiting these cases in 2011 only to find that they had since been demolished or have disintegrated which reduced the documentation thereof solely to photographic records (Figure 4.2.).

Figure 4.2. Ruins of an isiXhosa hut or rondavel have been reduced to photographic records.
“Perhaps the soul could remember a little of its origination, when people still belonged to the spirit of a place.”

(Martin Prechtel, Secrets of the Talking Jaguar, cited in Elizabeth and Adams, 2005: 3)

5.1. uMasizakhe Community Findings:

The research population consisted of 47 respondents (Figure 5.1.1. and Figure 5.1.2.). Of the 47 people, 74.5% were living in traditional vernacular homes (Table 5.1.) at the time the research was being conducted. 12.8% of the respondents were living in RDP government-funded houses and the remaining 12.8% were living in the Royal Block (Figure 5.1.3.), in Queen Street, uMasizakhe. The research was conducted for two days in September 2011 from roughly 09:00am-16:00pm. See Appendix 1 for the Questionnaire.

Table 5.1. Showing the various housing placement of the research population

<table>
<thead>
<tr>
<th>Where do you currently live?</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vlid Traditional house</td>
<td>35</td>
<td>74.5</td>
<td>74.5</td>
<td>74.5</td>
</tr>
<tr>
<td>Royal Block</td>
<td>6</td>
<td>12.8</td>
<td>12.8</td>
<td>87.2</td>
</tr>
<tr>
<td>RDP house</td>
<td>6</td>
<td>12.8</td>
<td>12.8</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.1.2. Members of the uMasizakhe community which were interviewed for this dissertation. Graaff-Reinet, September 2011.
Figure 5.1.3. The Royal Block in Queen Street of uMasizakhe was included in the research population. These dwellings were found to be too small for inhabitants, some of which were measured to be approximately 3500mm wide and 5000mm deep. The historical significance of these row-houses is a planned national asset worth conserving particularly for tourism incentives.

Figure 5.1.1. uMasizakhe community plan depicting the dwellings which were part of the research population. The red blocks indicate these interviewed in the survey.
5.1.1. Problems existing within uMasizakhe Community

As is the case throughout South Africa, the social problems proved vast, ranging from ill-health and unemployment to the lack of education and low nutrition (Table 5.2.). It was found that 61.7% of the 47 respondents within the research population were unemployed with the remaining 38.3% living off some form of financial support. 72.7% were living off either government pension funds or disability funds leaving only 6.4% of the population being self-employed as builders and in other trades.

The majority of dwellings were over-populated, with 45.7% of the dwellings housing between 3-6 people, and an astonishing 20% housed between 7-10 people. 31.4% accommodated between 1-2 people, and 2.9% more than 11 people. 74.5% of the respondents could read, leaving 25.5% illiterate.

Table 5.2. Income, housing and literary variables within the research population of uMasizakhe.

<table>
<thead>
<tr>
<th>Do you/ someone in your home have an income?</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18</td>
<td>38.3</td>
<td>38.3</td>
<td>38.3</td>
</tr>
<tr>
<td>No</td>
<td>29</td>
<td>61.7</td>
<td>61.7</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If you do get an income, from whence does it come?</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government Pension</td>
<td>15</td>
<td>31.9</td>
<td>78.9</td>
</tr>
<tr>
<td>Disability Grant</td>
<td>1</td>
<td>2.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Self-Employed</td>
<td>3</td>
<td>6.4</td>
<td>15.8</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>40.4</td>
<td>100</td>
</tr>
</tbody>
</table>

| Missing                                           | 0       | 28      | 59.6    |         |
| Total                                             | 47      | 100     |         |         |

<table>
<thead>
<tr>
<th>How many people live in your house?</th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2 people</td>
<td>13</td>
<td>27.7</td>
<td>27.7</td>
<td>27.7</td>
</tr>
<tr>
<td>3-6 people</td>
<td>20</td>
<td>42.6</td>
<td>42.6</td>
<td>70.2</td>
</tr>
<tr>
<td>7-10 people</td>
<td>12</td>
<td>25.5</td>
<td>25.5</td>
<td>95.7</td>
</tr>
<tr>
<td>11+ people</td>
<td>2</td>
<td>4.3</td>
<td>4.3</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100</td>
<td>100</td>
<td></td>
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<table>
<thead>
<tr>
<th>Can you read?</th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>35</td>
<td>74.5</td>
<td>74.5</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>25.5</td>
<td>25.5</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

5.1.1.1. Confirming the problems

South Africa is faced with a growing indigent population, increasing water-shortages, inadequate housing, scarce financial resources, a dire lack of sanitation and limited access to unpolluted water (Bond and Tait, 1997: 36). With regard to the problem of overpopulation, Papanek delineated that the concept of overpopulation cannot simply be measured by the number of people sharing a house – instead it should be viewed as a psychological and social notion linked to the culturally transmitted thoughts pertaining to ‘privacy’ (1989: 17). This ‘privacy’ according to Papanek consists of a complex bundle of thoughts, phenomena and meanings – which are
deeply imbedded in mans’ culturally conditioned psyche. Kibuka confirmed the above findings through identifying specific populations (as was done by the author for uMasizakhe), the general pattern of social deprivation, imbalanced rural-urban expansion rates, illiteracy, wellbeing, lack of social security, land tenure systems together with social policies were found to be some of the major elements influencing the African condition (1990 :38). Kibuka acknowledged too, that political conditions and other unidentified social factors intensify the effects of the elements on the African continent and rightly assured that for a continent struggling to develop, “the distance between the jungle and the city is very short” (1990: 32).

Elleh observed that the concentration of amenities in urban centres has had distressing effects on not only rural areas, but on a country as a whole due to the dismal economic imbalance created by the rural and the urban sectors (1996: 339). Elleh’s findings concur with those of uMasizakhe whereby South Africa as a country has cities equipped with basic utility services leaving rural sectors with little or no infrastructure whatsoever. Among the basic infrastructures which Elleh mentioned were electricity and running water, paved roads, schools, hospitals or clinics, deprived also of a police presence and bank. Amenities draw people from their rural communities to the cities and larger towns to seek opportunities further afield. These “urban factories,” as Elleh named them, could not absorb migrants, and those who are absorbed are poorly paid. This results in high unemployment and has lead to the generation of slums and squatter-camps. The effect of the rural population drain has furthermore lead to agricultural devastation on the economy (Whitfield, 2012: 4). An example of this agricultural devastation can be seen in history where Africa was able to meet its food needs and even had excess to export to Europe until the 1960s. Today, however, African countries import food from the Americas, Australia and Europe. It is one reason that development in both vernacular architecture and agriculture is particularly weak, leaving little improvement on living conditions for the most destitute people (Schumacher 1980).

Schumacher identified the critical problems which African countries faced as the most important task ahead (1980: xi). Some of these problems which were confirmed by Elleh and also identified in the research findings include inadequacies in shelter, educational infrastructures, hospitals, ceremonial buildings, and bureaucratic and commercial buildings (1996: 340). Schumacher posed the challenge of how to enable rural people to do creative and satisfying work, earning a decent living, subsist a quality of life in a becoming way (1980: xi) and thereafter as George Kennan put it, “to leave the planet earth in a condition at least no less capable of supporting life than that in which we found it” (cited in Schumacher, 1980: 43).

5.1.2. Identify existing Knowledge and Skills within uMasizakhe

80.4% of the respondents currently living in vernacular dwellings were able to maintain their own homes and were part of the actual building process (Figure 5.1.4.). The research population also showed that 93.6% demonstrated sound knowledge of cross-ventilation together with 60%
of these also having the ability to either cool or warm their dwelling during the summer and winter seasons respectively. Complementing the thermal qualities of materials used, 61.1% of dwellings had floors comprising of natural earth (*dagha*) or cow-manure. 63.8% used *mbawula* (coals which are added to a tin bucket with perforations on the edges - Figure 5.1.5.) in the centre of the house (Table 5.3.). The *mbawula* has dual uses as it was used for cooking and heating during the winter months also eradicating any termite or rodent infestations within the dwelling. 80.9% of the research population have been living in their traditional homes for over 25 years, suggesting the possibility of a rich array of knowledge and skill which continue to exist within the community of uMasizakhe which could aid in solving the housing backlog in the future.

Figure 5.1.4. Home maintenance is practised by inhabitants utilizing available material resources thereby, however, crudely proving their ability to solve problems with innovative ideas and indigenous knowledge.
Table 5.3. Table showing the ability and skill existing within the respondents living in traditional homes.

<table>
<thead>
<tr>
<th>Home maintenance</th>
<th>Responses</th>
<th>Percent</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who is responsible for your home maintenance?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>You/ the inhabitants</td>
<td>41</td>
<td>80.40%</td>
<td>87.20%</td>
</tr>
<tr>
<td>The Owner</td>
<td>6</td>
<td>11.80%</td>
<td>12.80%</td>
</tr>
<tr>
<td>Family members</td>
<td>1</td>
<td>2.00%</td>
<td>2.10%</td>
</tr>
<tr>
<td>Community members</td>
<td>2</td>
<td>3.90%</td>
<td>4.30%</td>
</tr>
<tr>
<td>Contractors</td>
<td>1</td>
<td>2.00%</td>
<td>2.10%</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>100.00%</td>
<td>108.50%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cross-ventilation: Does your house cross-ventilate?</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>44</td>
<td>93.6</td>
<td>93.6</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>6.4</td>
<td>6.4</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100</td>
<td>100</td>
<td>nbsp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Floor material type</th>
<th>Responses</th>
<th>Percent</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>What does your floor comprise of?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td>21</td>
<td>38.90%</td>
<td>44.70%</td>
</tr>
<tr>
<td>Cow-manure/ misvicoer</td>
<td>4</td>
<td>7.40%</td>
<td>8.50%</td>
</tr>
<tr>
<td>Daghal/ natural earth floor</td>
<td>29</td>
<td>53.70%</td>
<td>61.70%</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>100.00%</td>
<td>114.90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Winter heating</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Mbwuwila</td>
<td>30</td>
<td>63.8</td>
<td>63.8</td>
</tr>
<tr>
<td>Fire place (with chimney)</td>
<td>4</td>
<td>8.5</td>
<td>8.5</td>
<td>72.3</td>
</tr>
<tr>
<td>Heater</td>
<td>11</td>
<td>23.4</td>
<td>23.4</td>
<td>95.7</td>
</tr>
<tr>
<td>None, my house is cold in the winter</td>
<td>1</td>
<td>2.1</td>
<td>2.1</td>
<td>97.9</td>
</tr>
<tr>
<td>None, my house is warm in the winter</td>
<td>1</td>
<td>2.1</td>
<td>2.1</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How long have you (respondent) lived in this house for?</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>1-5 years</td>
<td>4</td>
<td>8.5</td>
<td>8.5</td>
</tr>
<tr>
<td>6-15 years</td>
<td>3</td>
<td>6.4</td>
<td>6.4</td>
<td>14.9</td>
</tr>
<tr>
<td>15-25 years</td>
<td>2</td>
<td>4.3</td>
<td>4.3</td>
<td>19.1</td>
</tr>
<tr>
<td>25+ years</td>
<td>38</td>
<td>80.9</td>
<td>80.9</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Figure 5.1.5. *Mbawula* are used for heating the dwellings in the winter, for cooking purposes as well as for repelling vermin and insects within the homes.

### 5.1.2.1. Substantiation of available indigenous knowledge:

A reassessment of the practical virtues of the traditional environment is needed. This was perpetuated by Anderson who held that it should not be done to promote a sentimental, backward-looking and inevitably artificial imitation of pre-industrial and post-democratic times, but to preserve the existing skills and knowledge of local materials and methods of construction (1977: 2-3). In so doing, the future built form may be suitably adjusted to the changes in lifestyle and building practice. Counteracting the use of vernacular architecture, as Karl Marx put it: “Men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past. The tradition of all the dead generations weighs like a nightmare on the brain of the living” (cited in Wilkinson, 1981: 44). If the validity of this understanding of history is accepted, then the primary task of professionals within the building industry shifts to concerns facilitating change and coming to terms with the seemingly negative “tradition of all the dead generations”.

From an ethical and social point of view, Richard Tawney being one of the great ethical thinkers of our time, spoke of the immense hatred of a system which stunted human personality and corrupted their relationships by permitting the use of man by man as an instrument of pecuniary gain (cited in Schumacher, 1980: 27). He further elucidated that the basic aim of modern industrialism is not to make work satisfying but rather to raise productivity; its proudest achievement is labour saving, whereby labour is stamped with the mark of undesirability. Schumacher denounced industrialism describing its undesirability as something which cannot confer dignity resulting in the working life of a labourer as a life without distinction. The result, not surprisingly, is that it often stimulates a spirit of sullen irresponsibility that refuses to be mollified by higher wage awards (Schumacher, 1980: 29).

In many rural areas in South Africa, there exists a resentment regarding traditional earth dwellings. The general opinion leans rather toward the desire for ‘modern’ houses of brick or concrete blocks and mortar together with the perception that traditional vernacular dwellings do not qualify as ‘real’ houses (Steyn and Bosman, 2010: 214; Macleod, 2002: 2). In conclusion, Day affirmed that even aesthetic responsibilities are not only visual and sensory experiences
but also to the intangible and perceptible ‘spirit of place’ (1990: 14). This would require those involved in housing to bury stylistic and individualistic preferences in favour of ‘listening’ to what the place, the moment and the community ask for. The rich and wide variety of food resources, architectural heritage and other economic activities are being virtually obliterated. Tapela further argued that these resources and heritage are being replaced with mass-marketable foods, building materials, technology and other economic activities that benefited the unfolding settler capitalist agriculture and industry (2007: 106). From Day’s point of view, and also noted by Maxwell (1996: 48), it is possible to think of culture, not as clutter, from which the architect has to free himself, but as a field rich in possibilities, an architecture that is full of heritage, innovation and ideas that can be shaken up, transpiring into the catalyst for future rural communities.
5.1.3. Evaluating the Potential of Traditional Buildings to meet existing Challenges

Table 5.4. Table shows the potential of traditional buildings to meet current housing challenges

<table>
<thead>
<tr>
<th>Do you love and take pride in your home?</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>YES</td>
<td>44</td>
<td>93.6</td>
<td>93.6</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>3</td>
<td>6.4</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>47</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Would you rather live in a traditional or RDP home?</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Traditional</td>
<td>28</td>
<td>59.6</td>
<td>59.6</td>
</tr>
<tr>
<td></td>
<td>RDP</td>
<td>19</td>
<td>40.4</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>47</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Does this house belong to you?</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>YES</td>
<td>45</td>
<td>95.7</td>
<td>95.7</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>2</td>
<td>4.3</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>47</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

### Wall Material

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percent</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the primary walling material used?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fired Bricks</td>
<td>11</td>
<td>16.70%</td>
<td>23.40%</td>
</tr>
<tr>
<td>Earth (adobe) / clay bricks</td>
<td>34</td>
<td>51.50%</td>
<td>72.30%</td>
</tr>
<tr>
<td>Stone</td>
<td>12</td>
<td>18.20%</td>
<td>25.50%</td>
</tr>
<tr>
<td>Timber planke and earth /dagha</td>
<td>1</td>
<td>1.50%</td>
<td>2.10%</td>
</tr>
<tr>
<td>Tin/ corrugated iron</td>
<td>6</td>
<td>9.10%</td>
<td>12.80%</td>
</tr>
<tr>
<td>Natural Earth/ dagha</td>
<td>1</td>
<td>1.50%</td>
<td>2.10%</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1.50%</td>
<td>2.10%</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>100.00%</td>
<td>140.40%</td>
</tr>
</tbody>
</table>

### Source of wall material:

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percent</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where did you source the wall material?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Shop in Graaff-Reinet</td>
<td>33</td>
<td>49.30%</td>
<td>70.20%</td>
</tr>
<tr>
<td>Shop – outside of Graaff-Reinet</td>
<td>3</td>
<td>4.50%</td>
<td>6.40%</td>
</tr>
<tr>
<td>Sitter Hand made</td>
<td>19</td>
<td>28.40%</td>
<td>40.40%</td>
</tr>
<tr>
<td>Local / veldt</td>
<td>12</td>
<td>17.90%</td>
<td>25.50%</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>100.00%</td>
<td>142.80%</td>
</tr>
</tbody>
</table>

### Floor material type

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percent</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>What does your floor comprise of?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td>21</td>
<td>38.90%</td>
<td>44.70%</td>
</tr>
<tr>
<td>Cow-manure/ misvier</td>
<td>4</td>
<td>7.40%</td>
<td>8.50%</td>
</tr>
<tr>
<td>Daghai/ natural earth floor</td>
<td>29</td>
<td>53.70%</td>
<td>61.70%</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>100.00%</td>
<td>114.90%</td>
</tr>
</tbody>
</table>
It was found that an astonishing 93.6% of people living in uMasizakhe took pride in their homes; together with this, only 40.4% of these chose an RDP home over the traditional counterpart (refer to Table 5.4.). (It should be noted that of the 40.4% of respondents who chose an RDP house over a traditional dwelling, 11% did not own the house and were renting – possibly impinging on ownership rather than material choice). Furthermore, the research showed that there exist many more sustainable principles (discussed in Chapter Two) within the traditional vernacular architecture than those found in the western-inspired RDP houses. These include material benefits whereby 51.5% of walls were constructed of earth (adobe/dagha), and 18.2% of site-sourced rubble (Figure 5.1.6.); 46.3% of the materials used for the walls were sourced from the site, handmade or found in the nearby veld, the thermal properties of the traditional homes also proved without a doubt better than that of the RDP houses as the results show in a study conducted Makaka and Meyer (2006: 71-86). Validated by their findings, RDP houses had a diurnal temperature difference of 11.7°C while the vernacular homes had only between 4.3°C - 5.6°C. The thick walls and heavy insulating roofs of the traditional homes assure minimal thermal loss, together with floor materials varying from natural earth (53.7%) to cow-manure (7.4%). The spaces surrounding traditional homes also lend themselves fit for traditional ancestral worship which is practised by 100% of the research population (Figure 5.1.18.).

Retrofitting the existing RDP houses to meet the advantages found within the vernacular dwellings would mean adding wall and ceiling insulation and simultaneously educating people regarding house maintenance. It was noted that inhabitants of the RDP dwellings rely predominantly on family members, community members and contractors for maintenance and upgrading. Such exercises in an effort to match the comfort of traditional housing would have to include education regarding recycling and even including participatory exercises during the retrofitting process. On the other-hand, however, changing the RDP housing system to support
traditional methods utilizing available resources, labour and skill would greatly reduce the cost of each house. Implementing such an exercise would also improve the quality of the houses’ thermal and sustainable properties. The latter concurs with Fathy’s belief, further strengthening each community’s tradition and know-how (1986: xx). An advantage resulting from the latter would be the reduction of maintenance costs and an improved sense of ownership and pride (Steenkamp, 2012).

Throughout the research into vernacular architecture of the isiXhosa people, it was found that the government’s approach to housing was largely inappropriate (Bond and Tait, 1997: 20-21). The current approach was a top-down advancement in which NGO’s and government entered communities with preconceived ideas of what was wrong and how to fix it. Essential questions were never asked and the local populations were rarely involved in the building process (Bond and Tait, 1997: 31-32). The local people whom the built environment purported to serve needed to be included in more of the decision making, and although the term is so frequently used, the residents of individual communities need to be ‘empowered’ (Lemanski, 2009: 473).

5.1.3.1. Potential, demand and innovation

Analogous to the research findings, Anderson established that the vernacular architecture of a community demonstrates an individual environment produced without the intervention of professionally trained experts (1977: 4). The economy, precision, balance, skill and integration within the built environment of each community should become rather an object lesson to experts. Fagan confirmed the research findings by assessing the materials and resources available saying that “…it is in this desolate and dry region of the Karoo where plants are rare and stones abound” (2008: 190). He further authenticates the findings stating that early settlers constructed their buildings of rubble and mud and laid flat roofs of earth on ceilings of local reeds on joists made of the flower stems of giant agaves. The thick mud walls, small windows and brak-roofs provided the necessary insulation where temperatures can reach 40° in summer and the winters are icy cold (Fagan, 2008: 190) (Figure 5.1.7. and Figure 5.1.8.).
Figure 5.1.7. Variations of the brakdak roof construction methods described by Fagan (2008) and Henning (1975). Brakdak dwellings utilised mats of woven reeds on poles as rafters at some 600mm centres due to the weight of the earth layer placed above. Reed mats were occasionally covered with hessian bags or a layer of tar, after which a clay and earth (brak) layer is placed on top adding to the insulating properties of the dwelling.

Figure 5.1.8. Illustrations of the descriptions given by Fagan (2008: 190). The sketches depict the use of rubble and ‘mud’ together with Fagan’s description of earth on ceilings consisting of local reeds. The thick walls, small windows and brak-roofs provided necessary insulation for inhabitants.
Both Anderson (1977: 4) and Denyer (1978: 93-94) further perpetuated that the universal rediscovery of vernacular housing methods coincided with the growing realization that modern architectural design which is overly animated for innovation has too often ignored the social and environmental disadvantages of utilising high technology and industrialised materials. The study of traditional forms and methods is, from Anderson’s perspective, now seen to be a first step towards the new generation of housing forms which will hopefully embody the lessons of integration of man, activity, and environment. The maximum use of renewable materials for economic reasons, the improvement of traditional methods to reduce the amount of regular maintenance needed for longevity of buildings and the controlled and rational uses of modern materials, only when they can contribute to a saving in maintenance costs and an improvement in living conditions and health standards, are ideas which follow from Anderson’s investigation.

Denyer noted what was confirmed in this research: that traditional homes were often plastered with a mixture of mud and cow-dung as this was found to be particularly good for repelling pests (1978: 93-94). With South African interior temperatures, the characteristic climatic problem is related to extremely high and varying diurnal temperature ranges (discussed in Chapter Four): against such fluctuations, the desirable material would be one with a high heat-capacity. Fitch and Branch explain the capability and qualities of the required material as being one with the ability to absorb solar radiation during the day and slowly re-radiating it at night (1960: 138). Therefore the diurnal temperature difference inside the building would be “flattened out” into a much more comfortable profile as was confirmed 50 years later by research conducted Makaka and Meyer (2006:84). Makaka and Meyer’s research compared the thermal comfort of traditional isiXhosa huts and the low-cost houses being built whereby it was found that the traditional architecture offers better thermal comfort. The thick walls and heavy insulating roofs of the traditional huts assure minimal thermal loss (Figure 5.1.9.). This was also confirmed by Fitch and Branch who noted that clay and stone are high heat-capacity materials (1960: 138). Although the thermal performance of RDP houses are notably inferior to those of traditional vernacular dwellings, residents of these structures feel as though they have advanced socially (Minnaar and Cloete, 2006: 68; Steyn and Bosman, 2010: 200). In a survey done in 2004 by the Nova Institute which aspires to the improvement of the quality of living for the poor populace, found that 78% of rural and urban respondents indicated that they did not open their windows at night for fear of witchcraft and ‘spiritual’ superstitions.

Figure 5.1.9. The small door and window openings, 300-350mm thick rubble walls and heavy insulative thatched roofs of the traditional isiXhosa huts assure minimal thermal loss.
Henning also noted the advantages of the thick 305mm walls with shuttered windows which ensured air-flow during the hot summer months (1975: 187). Henning moreover noted the 150mm ‘mud’ ceiling on a reed or slat base, with its misvloer (cow manure) or peach-pip studded floor (one example of such a house was found within the research population) was eminently practical and certainly cheap to construct. Maintenance of the brakdak (or ‘flat-roofed’ house) reed and mud ceiling was discussed by Fagan whereby “…for £2 one could buy a load of brak that had been picked out at a brak patch... The lumps of brak were now crushed to dust, sifted and spread one inch [25mm] thick onto the existing roof. The roof would then be watered for five consecutive mornings with a watering can, after which the brak was so hard that no dust would sift through” (2008: 174). Following this, Henning found it exceedingly difficult to establish with accuracy the date of the flat-roofed or brakdak construction in Graaff-Reinet area as they were built predominantly throughout the 19th century, some revealing specimens of fine workmanship and others indifferently constructed (Figure 5.1.10. and Figure 5.1.11.). Opinions on these rectangular, classic designs differ considerably. For example, Ronald Lewcock noted that these houses were especially climatically adaptive and was achieved by employing relatively primitive building techniques and naturally available – but crude – materials (Lewcock, 2006). On the other hand, Eric Vos described the same structures as being put together with a fine feeling of proportion and that these elements produced a simple style of dignity and charm (cited in Henning, 1975: 187). Frescura described the development of the flat-roofed dwellings as a “material, technological, social and economic transition in the southern African hinterland” (1989: 7), to which Steyn responded to articulate that the latter was in a reaction to contemporary pressures, realities and resources (2006: 33). The key element which caused the shift away from the flat-roofed house was the introduction of lightweight corrugated metal sheeting, which was introduced during the period of British colonisation (Steyn, 2003: 186).

Figure 5.1.10. Highveld, flat-roofed or brakdak houses found within uMasizakhe.
The choice of material and thermal functions also plays an essential role in developing an indigenous building technology for Africa. Confirming the research findings, Elleh found that the traditional adobe structure and pliable roofing materials kept the house cool and noted that “...few things are worse than being caged in an aluminium-roofed house in mid-summer without air-conditioning” (Elleh, 1996:343). On the other hand, poor energy supply and lack of resources within contexts such as uMasizakhe make the cost of cooling by air conditioning not only expensive, but actually unthinkable. It is therefore important to seek building materials other than brick and aluminium. This raises the question of how South Africa can financially cope with the construction of houses that use unnecessarily expensive industrialised materials.

5.1.4. Identify Economic or Technical Support needed

Financial and technical support toward more than just building materials and structural details is needed. Research showed that 71.4% of individuals living in the traditional dwellings were unemployed. Of the remaining 28.6%, 72.7% were dependant on government grants. With 45.7% of these dwellings housing between 3-6 people, it is safe to say that these individuals too, are surviving off ‘secondary’ government finance (research observation), (Table 5.2.).

Most of the research population currently living in the traditional dwellings have chosen to continue living in these houses (68.6%) for various reasons, for the most part reactions were
a product of deep-set traditions, cultural beliefs and the importance of family, friends and the community within the isiXhosa (refer to Table 5.4.). Of the 68.6% of individuals choosing traditional homes over RDP homes, 22.9% held value to their larger homes, its adaptability and ability to accommodate their extended families. Various respondents noted the fact that the RDP houses could never accommodate large families. 8.6% of the people were content that their dwelling was apt for their living conditions together with the fact that they were now too old to move. 37.1% of the respondents opted for sentimental-rooted reasoning surrounding their traditional home, one of the respondents said “...this is my home, I love it, my family built it when I was a child and I was born here. There is a lot of heritage in this house and my ancestors will haunt me if we had to move”.

A meagre 11.4% of respondents were unable to maintain their house due to rotting timber, leaking roofs and unmaintained walls and floors (Figure 5.1.12., Table 5.3). Unfortunately, as is the case throughout the isiXhosa community, friends and family members care for younger children while urban migration forces parents to work elsewhere. Taking care of young children allows no time or money to be spent on maintenance of a traditional home. Urbanization had lead to many social issues in this regard. Maintenance of traditional homes was done as a family or community effort in the past, following that the young men and women who would usually aid in maintenance are now unable to do so.

Technical and economic support is urgently needed in the rural communities. Training and educating the unemployed with regard to traditional home maintenance through an apprenticeship system, together with basic health and nutrition and small food gardens would not only increase the quality of traditional homes, but also decrease unemployment rates thereby leading to increased income through entrepreneurial exercises and improved health and nutrition within these communities.

Figure 5.1.12. Poor-Maintenance remains a problem throughout uMasizakhe as traditional vernacular homes deteriorate. Rising damp and rainwater appears to be a common problem. Maintenance problems include leaking roofs which result in rotting timber which follows with moisture infiltrating the earth walls and dagha floors. Urban migration is considered one of the primary reasons for poor-maintenance as families traditionally unite whilst undertaking repairs and maintenance.
5.1.4.1. Supply economic and technical support

Henning in his writings concerning Graaff-Reinet said that the local settlers of the early ninetieth century evolved a building style which eminently suited the material and environmental conditions (1975: 186). Contributing factors were the limited economic opportunities, the geographical isolation from the Western Province which eliminated the possibility of importing skilled artisans. Together with the fact that residents had semi-skilled isiXhosa slaves and others who could build with minimum supervision, the shortage of suitable reeds for thatching and the non-existence of forests suitable for timber in the Karoo added to the challenges faced. This vernacular architecture has been somewhat neglected by researchers, but it is in these symmetrical square-designed *brakdak* dwellings which allow a town such as Graaff-Reinet to retain its old world charm and atmosphere, and for this reason, commands our attention (Fagan, 2008: 175).

### 5.1.5. Biological Relationships

The poor biological order within uMasizakhe can be seen from all fronts. Natural resources are being overexploited. Timber is widely used for building purposes as well as for firewood, with little recycling or returned yield to the environment. Livestock such as cattle, sheep, goats, donkeys and chickens together with dogs and cats scavenge the streets for food. There is an urgent biological order which needs to be introduced within the community.

100% of respondents practice ancestral worship which includes the slaughtering of especially cattle and goats. 63.8% of respondents utilize *mbawula* (Figure 5.1.5. and Table 5.3.) for cooking and heating during the winter months whereby available timber is burned. 2% of walls are constructed of timber most of which is found on site or in the surrounding natural veldt (5.6% found in surroundings), together with 11.1% of ceilings being constructed of timber or reeds (Figure 5.1.13.). With timber being such a widely utilised resource, the availability thereof is being reduced substantially with each passing day as replenishment is not visible.

From a biological perspective, uMasizakhe would be greatly fortified through the introduction of specifically zoned areas for grazing, planting and recycling. Education on the utilization of natural resources should be bolstered together with animal husbandry.

**Figure 5.1.13.** Mats of woven reeds placed on rafters, followed by hessian bags and brak (forming the bases of dwellings which were previously *brakdak* dwellings) are evident in 11.1% of dwellings and add to the insulating properties of dwellings. These dwellings have since added corrugated-iron roof-sheeting above the brak-roofs.
5.1.5.1. Confirming the importance and existence of biological orders

Frescura noted that many rural residents had fires in their dwellings for both heating and cooking functions (1985: 65). He also found that the smoke from these fires was allowed to rise and percolate through the thatched roof where applicable thus effectively fumigating and discouraging vermin infestation. This process was also effective where clay walls were concerned.

The environmental and biological subsystem of any community can be bolstered through permaculture gardens whereby the creation of an economically sound environment where the infrastructure and humans, plants, animals and buildings are placed in the landscape in a way so as not to pollute and to be ecologically sound and viable (Minnaar and Cloete, 2006: 70) (Figure 5.1.14). According to Mollison, permaculture is based on the observations of natural systems, creating a cultivated ecologically sound system generating through it an excess of animal and human food than is generally found in nature (1991: 1).

![Permaculture gardens at GFSC](image)

Figure 5.1.14. Permaculture gardens at GFSC were introduced by renowned sustainable agriculturalist Tim Wigley from Kula Darma near Haga-Haga. These gardens provide nutritious fruit and vegetables for the staff of GFSC, the use of waste-water as well as rainwater together with composting vegetative matter has greatly improved the quality of life in this rural locale.

5.1.6. Inorganic Relationships and Materials

Adobe is used widely as a building material with 54.9% of walls being constructed utilizing the latter and a further 61.5% of floors utilizing the same material (Table 5.5.). Together with the utilization of earth as a building material was the poor ecological maintenance thereof: leading to excess evaporation and soil erosion. Natural lime was found to be a good soil stabiliser and was used throughout the community with limited ecological degradation.
Table 1.5. Inorganic relationships are lowered with the use of excess corrugated iron and limited insulation within dwellings.

<table>
<thead>
<tr>
<th>Primary roof material:</th>
<th>Responses</th>
<th>Percent</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the primary roof material used?</td>
<td>Corrugated Iron</td>
<td>43</td>
<td>91.50%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>4</td>
<td>8.50%</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Roof/ ceiling insulation:</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there insulation in the roof/ ceiling?</td>
<td>YES</td>
<td>11</td>
<td>23.4</td>
<td>23.4</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>36</td>
<td>76.6</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

With the vast majority of floor material used being a mixture of clay (dagha), cow-manure and earth (69.2%) the inhabitants have produced a comparatively warm, yielding and clean surface throughout their dwellings. The floors need to be maintained by regular re-coating. Maintenance has been previously mentioned as a problem, with the lack of labour and finances being a primary contributor.

Other inorganic relationships are less influenced by the built environment; abundant rubble found in the Graaff-Reinet area for instance, provide a sound material for foundation, plinth and wall construction. Rubble walls in many traditional homes were up to 1m wide and built up to sill-height (±900mm from interior finished floor level) (Figure 4.1.3.6.). Where concrete floors have replaced the traditional dung or dagha floors, there is little room for comparison, the former being found too cold and hard resulting in higher diurnal temperature variations and uncomfortable living conditions.

It was also found that 91.5% of the respondents in uMasizakhe used corrugated-iron sheeting as their primary roof material with only 23.4% of these having some form of insulation in their ceilings. The relationship between corrugated iron and the inorganic materials should be noted as unsound as the thermal properties reduce the quality of interior space (Figure 5.1.15.). The corrugated iron heats and cools quickly owing to its poor thermal capacity. The thermal qualities of materials used will be discussed in more detail in the following sub-section.
The use of corrugated iron as a building material has had a negative impact on the thermal qualities of many dwellings. Unfortunately when compared with the brakdak construction, corrugated iron offers inhabitants care-free protection from water, while brakdakke were high maintenance. Erecting a corrugated iron roof is also cheap, easy and requires little skill, while brakdakke require sound knowledge of the construction method and is labour intensive. Corrugated-iron sheeting over a brakdak is not unheard of, and where implemented properly allowed inhabitants both protection, low-maintenance and thermal insulation.

5.1.6.1. Validation of findings

According to Pase (2011) many houses found within uMasizakhe were built during the initial ‘cattle killing’, which occurred between 1856 and 1857, were constructed using the most accessible materials, such as rubble, adobe and grass. The earliest isiXhosa houses were round in the Khoisan style with bulrush mats over brushwood hoops (Figure 4.1.3.3.); unfortunately none of these earlier houses have survived.

Elleh reminds us that the African environment is in continuous transition both in the rural and urban areas (1996: 355). South Africa is not isolated from this transition as economic conditions of the past few decades have put enormous stress upon the environment. The call for sustainable communities is rightly the solution to these economic and inorganic relationships, whereby communities can not only be self-sustaining but also self-reliant. The distinct style of Karoo brakdak houses which was developed was noted by Pase (2011) and confirmed by both Frescura (1985) and Peters (1997) who maintained that rural architecture derived its existence...
from the availability of natural materials. This distinct style uses the natural environment as a ready resource quarry, obtaining timber, rubble, clay and thatch required for construction. The architecture found within rural areas such as uMasizakhe have proven the highly functional and thermal qualities obtained when utilizing available natural resources in accordance with their natural properties.

The sustainable relationship between materials, the environment and the built-form is perhaps nowhere better illustrated than in the communities found in peri-urban and rural areas (Frescura, 1985:41). Furthermore, the degree of inventiveness shown by the uMasizakhe community in utilizing common objects out of their familiar context and adapting them to fulfil new functions, successfully demonstrates a shared ability to grasp the fundamental nature of materials.

Anderson perpetuated that the study of traditional detailing reveals a cultural heritage of sophistication and ecological balance that has too long been ignored by most architects and professionals - who have prescribed expensive and alien solutions in rural and peri-urban areas, reliant on prestigious, modern materials and techniques (1977: 3). He furthermore notes that the new, industrially produced materials often introduced in the rural areas are not used with the same understanding and skill as is clearly evident in the traditional use of the organic and inorganic material relationships. The use of these new materials is often associated with the building activities of government and the urban centres, consequently symbolizing progress and prosperity deluding rural people who then replaced sustainable organic and inorganic materials with industrial ones (Onatu, 2011). Fagan observed the beauty which sometimes existed in rural areas where each house had its own identity and enlivened the whole environment (2008: 2). However, these individually identifiable characteristics are no longer evident as Anderson pointed out (1977: 34).

When traditional materials are no longer available, it is interesting to see how traditional techniques adapt. Denyer observed that the impact of corrugated iron (Figure 5.1.16.) was not the rigidity thereof as much as competing economic, social and political pressures (1978: 99). Westernised architectural pressures suffocated indigenous vernacular methods from then onwards. Corrugated iron sheeting will therefore not go without mention.

![Image](image.png)

Figure 5.1.16. Transkei, 2009. The evolution of the dwelling form: from circular to four corners is greatly as a result of the introduction of corrugated iron as well as the overture of mass-produced furniture.
Although corrugated iron was invented during the late 1820s, it seems certain that its export to the Cape Colony occurred as from 1850 (Henning, 1975: 189). According to Anderson (1977) corrugated iron is seen as time-saving. Although these sheets have proven to be more durable than traditional roof construction techniques, they are less subjective (Oliver, 2006). The use of such sheeting also influenced the shape of the traditional dwelling from circular to rectangular (Figure 5.1.17.) resulting in more skill which is now needed to evenly distribute the weight of the materials used. In areas where the marked diurnal temperature range is wide, the use of this material makes it necessary to have more fire wood, warmer clothes and bedding resulting in a less sustainable environment and inorganic relationship.

5.1.7. Anthro Studies

Anthropological research was done cursory and although there exist no traditional isiXhosa dwellings such as huts or rondavels which previously “lined the streets” (Fagan, 2008: 2; Pase, 2011), the social customs of the isiXhosa people together with their values and traditional rituals have not changed. Ancestral worship is still practised throughout the community although the somewhat modernised settlement layout has limited the vast open spaces the isiXhosa people once enjoyed for such rituals (Figure 5.1.18.). From a more recent anthropological perspective, the research has evidence regarding space-use and religious ceremonies which require ample room to accommodate families and friends. 68.6% of respondents preferred their traditional homes over RDP homes for this reason. Many families currently living in RDP homes utilize the traditional homes of friends or family members for ceremonies (research observation). It can be concluded then that modern community layouts, dictated by

Figure 5.1.17. The evolution from a circular plan to a four-cornered dwelling was supported by the spatial ease in which western furniture could now be used and moved within the shelter. The four-cornered dwelling no longer required a central structural pole which previously limited movement and overall perimeter once the wall were built. The figure also illustrates the ease at which available corrugated iron roof sheets could now be included in dwellings.
housing policies do not support the livelihoods of the isiXhosa people. Amankwah-Ayeh argues this position persuasively stating that “African settlement patterns are curved, non-rectangular, with a strong sense of enclosure and a fine sense of adaptation to the environment… The stiff social-class formation and authoritarian top-down hierarchy that gets revealed in square and rectangular forms and spaces of western traditional culture are predominantly non-African in origin and therefore pose several challenges to adaptability, maintainability and sustainability in Africa (cited in Tapela, 2007a: 107). They form bases of cultural imposition and forcible displacement of indigenous structures in physical, economic, material, social organizational and environmental terms”.

Figure 5.1.18. Conceptual sketches illustrating the spatial transition in the settlement pattern which has occurred in uMasizakhe. The traditional isiXhosa settlement pattern is rounded with a heavy feeling of inclusion and safety. The linear and grid systems which are currently being implemented not only in uMasizakhe, but across South Africa are birthed from a westernised and authoritarian culture. These settlement patterns inhibit traditional and cultural practices through the limited ability particular to community members to exercise such traditions. The grid system form the base of isiXhosa cultural imposition and forcible displacement of vernacular structures in physical, economic, materials and social organizational and environmental terms thereby limiting sustainable communities.
Traditionally, the isiXhosa people designated a part of their enclosure to be used as a space for the close family during rituals. An eXhanti or ceremonial totem (Figure 5.1.19.) was erected in the selected area. The eXhanti consisted of a vertical timber or steel pole set deep into the earth, reaching a height of approximately 1600mm above the natural ground level onto which horns or antlers of sacrificed cattle, goats and wild buck were fixed with wire or twine (research observations and discussions). It is within these spaces (amongst others) that the spirits of the families’ ancestors survive. With linear RDP layouts as they exist in areas of uMasizakhe, this ceremonial area is difficult to create – limited by pedestrian traffic between houses and eliminating the traditional sacred area entirely (Figure 5.1.18.). Today many South African villages have been replaced by grid organized townships built with government funding as mentioned previously. “Traditional patterns of movement no longer clearly articulate lives around the clusters of associations linked to the village - evening and night, society, leisure - and bush - daytime, heavy labour, source of food and water” (Vogel, 1997). It should again be noted that the linear formation of streets and homes of low-cost housing initiatives are diluting tradition and diminishing the culture of the isiXhosa communities. UMasizakhe is one of the few communities where the traditional homes have not yet been demolished (as an example, the case of Luxolweni community at Hofmeyr which had vernacular dwellings demolished in 2005). Urgent action needs to be taken to prevent modernization from destroying a dignified cultural tradition and South African vernacular.

Figure 5.1.19. eXhanti - a ceremonial totem used for cultural rituals and inkonzo or ancestral worship.

5.1.7.1. Holistic historic studies for contemporary success

Denyer emphasised that religion often accentuated the continuity between available materials and the cultural environment, by relating the individual to the spirit of his or her ancestors (1978: 16). Sometimes little distinction between the living and the dead was made when referring to people: the dead had merely changed state and were still a potent force. Anderson gave prominence to traditional dwellings which are seen as more than a mere shelter but also a national asset (1977: 24). These traditional homes along with other institutions of society have evolved to meet changing conditions and the aim of this research would be to ensure that
this natural process is not disrupted but strengthened by introducing new, socially acceptable and innovative methods. Fagan stressed the importance of research into the South African vernacular – which might contribute to the appreciation and conservation of not only building methods but also what is left of traditional streetscapes (2008: 1).

Jekot remarked that regional cultures embrace the values, significance and understanding of climate and available resources thereby allowing a bridge between past and present architectural practices synonymous with solutions and accomplishments in the future (2007:74). She further described architecture as the material expression of the culture that built it. Anderson confirmed that in order to build and shape the environment for the future, it is essential to understand the past (1997:25). The buildings and settlements demonstrate what is valued and what is not. The dwellings further illustrate patterns of collection and production together with forms of economical, political, social and cultural behaviour. Architecture is therefore a statement. Not only of the patterns of privilege and power, but of the established relationship between humans and the environment. Furthermore, Anderson delineated that without understanding the past, no genuine South African architecture will emerge as planners will continue to borrow randomly (and expensively) from foreign models and conflicting ideas on national building targets and how best to fulfil them (1977: 7-13).

Papanek solicited the importance of anthropological studies of vernacular architecture which together with the task of providing shelter, forges close community involvement which may account for the purity of style typically found throughout South African vernacular dwellings (1989:17). From Papanek’s perspective this also results in a harmonic relationship between dwellings which are ever-changing. Aesthetic values force a style that is often a vivid response to man’s psychic inheritance. Jung’s ‘collective unconscious’ (Jung, 1968: 3-41) linked to what Freud called ‘archaic remnants’ (cited in Nesbitt, 1996: 176-181), and a whole collection of demons, gods, mystical inhabitants from ‘beyond’ or ‘the far side’, and of ancestors who are deemed to have never ‘really’ left home. But with all the considerations mentioned above, there comes an intoxicating trace of the romantic, exotic or richly eccentric. This elevation of vernacular forms cloud the issue and make it difficult to see the many manifestations of vernacular for what they really are, a functional and prudent response to man’s needs, climate and ecology.

5.2. Further Findings within the Eastern Cape

5.2.1. The isiXhosa Hut (Rondavel)

Traditional isiXhosa huts or rondavels which are being referred to were discovered between September 2009 and June 2011. The first hut is existent on the R390 route south-west of Steynsburg toward Hofmeyr (Figure 5.2.1.), the second on the R391 north of Hofmeyr toward Burgersdorp and the third (now demolished) on the R401 south-east of Hofmeyr toward Queenstown. Unfortunately these rondavels, particularly those found on the R401, have since been demolished and only photographic records exist.
5.2.1.1. The case of three rondavels

Case 1: R390 rondavel (between Hofmeyr and Steynsburg)

Utilizing the available rubble, timber, reeds and dagha, this hut was inhabited at the time the research and documentation was being conducted (Figure 5.2.2., Figure 5.2.3. and Figure 5.2.4.). The load-bearing rubble walls made use of a central giant agave timber posting. With a radius of approximately 2800mm, the hut comfortably houses its inhabitants.
Figure 5.2.3. Notice the central post which supports the *fluitjiesriet* roof of this unaltered hut, together with the *dagha* plastering on the external facade.

Figure 5.2.4. Section and plan illustrating the construction and spatial layout of the rondavel on the R390 between Hofmeyr and Steynsburg.
The load-bearing walls of rubble are laid in a mixture of clay and earth after which they are plastered externally with a combination of dagha, cow-dung and veld-grass – much of this plaster has since weathered away, but remnants remain particularly in the areas protected from environmental exposure. A lime plaster covers the internal walls. The floor is of rammed earth, coated with a layer of dagha and finished with a cow-dung. The floor is raised approximately 100mm from natural ground level. A central post sourced from the stalk of a giant agave, which is readily available in the surroundings, supports the conical roof. The roof covering is constructed using available reeds or fluitjiesriet which are fastened to the conically shaped frame which is made of saplings that project radiantly from the central post acting as rafters which are all supported by the centre-post. These are held together by concentric rings of saplings which span the radial rafters which carry the reed roof. The roof overlaps in layers which are tied to the saplings beneath. The apex is covered with flattened sheet-metal. The eaves projection is approximately 300mm. On the floor, a large flat stone accentuates the threshold also averting water outward.

Case 2: R391 rondavel (between Hofmeyr and Burgersdorp)

Slight variations occur between the R390 hut and these found on the R391 between Hofmeyr and Burgersdorp (Figure 5.2.5, Figure 5.2.6 and Figure 5.2.7.). Once again, the rondavel utilized the available rubble, timber, local shrubs, cow-dung and dagha. Unfortunately these huts have weathered severely, but key construction elements can still to be seen.

Figure 5.2.5. The rondavel on the R391 between Hofmeyr and Burgersdorp utilized available material. Although the hut is neither inhabited nor maintained, the structural form remains steadfast. Notice the roughly coursed stonework with dagha-plaster.
Figure 5.2.6. Notice the earth and clay which was placed on top of hessian bags on the roof limiting the earth from seeping into the rondawel, also notice the thick, coarsely laid stone walls and centre post providing structural integrity to the rondawel.

Figure 5.2.7. Sketches illustrating the method of construction used for the rondavel between Hofmeyr and Burgersdorp.

The monolithic stone wall has been placed directly onto the natural ground without a proper foundation or footing. The load-bearing walls were laid on earth and the double skin of stone is clearly evident. This rondavel had an internal radius of approximately 2400mm. The central timber pole supported the conical roof which has been constructed of hardy local shrubs and grasses. Hessian bags traditionally used for the storage of wool and fodder have been positioned over the grass which was then covered with earth and clay. The hessian bags prevented the earth and clay from permeating the internal area, also adding waterproofing to the roof. The internal walls were plastered with dagha, cow-dung and painted with lime, and later a water-based paint of various colours, available from the local trading store. External walls were also plastered, although this has since weathered leaving faint reminders.
The floor was packed with earth which is all that remains therefore limiting further detailing thereof. The floor level of the rondavel was raised approximately 150mm from the natural ground level. The conical roof is supported by a central post which seems to be sourced from a nearby eucalyptus tree. The roof is constructed of saplings which radiate from the central crown onto which concentric rings of battens span the radial segments. These radial segments carry the various hardy local shrubs and grasses fixed with baling-twine which is then covered with goiensakke or hessian bags and ‘buried’ or weighed down by the earth and clay. The threshold of the rondavel has a Rhodesian teak railway-sleeper positioned between the finished floor level and the outside. The remaining stable door is only 1600mm high and 600mm wide, while the two tiny windows measure approximately 300mm wide and 200mm high. The door and window openings allow minimal natural light (and heat) into the rondavel thereby also limiting the amount of heat and cold which could enter. The thermal properties of the materials comfortably adapt to varying diurnal temperatures as was previously noted by Makaka and Meyer (2006). Alongside the huts are the remains of stone kraals for animal enclosure and protection together with a refuge site nearby revealing bone, broken glass and tins.

Case 3: R401 rondavel (between Hofmeyr and Queenstown Tarkastad)

The load-bearing stone walls of the hut on the R401 does not make use of any timber posting to either reinforce the wall or take up the roof-load but is rather a monolithic walling structure made of stone masonry which carry the roof directly (Figure 5.2.8., Figure 5.2.9. and Figure 5.2.10.).

Figure 5.2.8. The rondavel ruins found on the R401 between Hofmeyr and Queenstown were unfortunately demolished in 2011. The roughly dressed stone and remains show once again the vast amount of horizontal stone available within the Karoo which is good for coursing.
Figure 5.2.9. Notice the horizontal stone acting as a lintel for the small window opening together with the tyre which holds together the radiating rafters.

Unfortunately there was no proof as to what the roof was made of, probably thatching, millet-stalk, or a combination of both. These materials were then fastened to the conical frame which was made of saplings projecting radially from the central apex. They are held together by concentric rings of battens which span the radial rafters and which carry the thatching. An elaboration at the apex of the roof is evident as an old tyre acts as the capping holding the radial segments together.

Figure 5.2.10. Illustration of the plan and section showing the structural detailing of the rondavel. Notice the tyre binding the radial rafters which would have carried the thatching.
Unfortunately the floor had already weathered leaving few remains. The threshold and windows are constructed of available timber and fencing poles respectively. As with the earlier rondavel cases, this hut also had small windows and single door which allowed for partially-controlled natural-light and cross-ventilation, similarly limiting excess heat and cold into the dwelling.

5.2.2. Literature concerning the isiXhosa Hut (Rondavel)

Several researchers have identified the circular form as arguably the most distinctive characteristic of African patterns and spatial organization (Frescura, 1981; Tapela, 2007). As Tapela observed from a micro level in the rural setting, the basic spatial patterns and built forms are the circle, the cone and the cylinder (2007:107) (Figure 4.1.3.4.). These shapes are repeated in various forms and configurations for most buildings and structures such as the hut, storage buildings and animal kraals. An interesting transformation resulting from outside influences is the adaptation of the simpler circular and rectangular shapes (and associated forms of circle, cone and cylinder) (see Figure 5.1.16. and Figure 5.1.17.), to the rectangular and cube-type built forms of indigenous African built dwellings (Figure 4.1.3.6.).

Every Bantu people is characterised by a national pattern peculiar to itself (Peters, 1997: 2152). The isiXhosa hut is traditionally of the cone-on-cylinder type, commonly referred to as the rondavel. Tapela (2007: 108) explained the seeming ‘unplanned’ clustering of buildings around the labyrinths of alleyways or cul-de-sacs as a result of the nature of ‘organic planning’. The inherent flexibility which is the nature of organic planning underlies its value in informing current planning processes where, for instance, the inherent resourcefulness of households and communities that resort to housing themselves in informal settlements is often misconstrued as obstacles to orderly urban development, rather than harnessing this as an opportunity for engaging with community-driven development (Steyn, 2006: 30).

Steyn observes that the indigenous hut is still found in rural areas, not only in southern Africa, but also in large parts of sub-Saharan Africa (2006: 21). Schoenauer describes the “typical African round-hut compound dwelling” as “a cluster of round huts facing an enclosed central courtyard” (2000: 62) (Figure 5.1.18.). Schoenauer also observed that in more recent times the rondavel type has often existed side by side with thatched and flat-roofed rectangular buildings in rural areas (Figure 5.1.16.) and in rare instances, even in informal settlements near urban areas. The rondavel is, as was found in the research, a physical demonstration of a multifaceted value system that combines tradition, kinship, climate, available resources and geographical location. Unfortunately, many thinkers view the rondavel from a European perspective and therefore hold that a hut is not a home (Rozani, 2006: 15; Steenkamp and Whitfield, 2010: 74-75; Steyn, 2006: 24). The latter statement was confirmed by many younger respondents in the research population. Both Oliver (2003) and Steyn (2006) opposed the latter through descriptions of the ‘praiseworthy’ traditional rondavel. Steyn emphasised the rondavel characteristics as being “remarkably robust” and ‘resilient’ whilst postulating that the rondavel is such a unique type that there exists a need to document the indigenous knowledge available and to preserve representative examples, in conjunction with the skills to construct and maintain them (2006: 25, 35).

Brodrick described the construction of the round hut as being built up from four or more stakes which are driven into the ground (1954: 103). These serve as a framework for the walls, which may consist of anything from leaves to clay or dried mud. Since the walls cannot stand much lateral pressure, the roofing must be light-weight and its skeleton is, essentially, a set of ‘umbrella ribs’ tied together at the centre with the other ends resting on the weight of the roof covering. In larger huts, Brodrick further noted the use of a central pole in order to support the roof (Figure 4.1.3.4. and Figure 5.1.9.). Steyn (2006) found that although statistics are meagre, the number of rondavels in South Africa is certainly declining. The decline could be attributed to various factors including urban migration, declining indigenous knowledge systems and socio-political expectations (Elleh, 1996: 215). Regardless of the decline, Steyn held that the indigenous rondavel should remain as a prominent presence within the South African landscape and built environment – it is from this position that the author suggests rather the revalidation of indigenous knowledge, techniques and materials rather than form or plan.
5.2.2.1. Materials, method and form of the isiXhosa rondavel

Peters described the structure and materials used for the construction of rondavels (1997: 2153). Through his generalized view he explained that the walls of rondavels are traditionally plastered and consisted of wattle poles and woven saplings with stone or mud infill, or sun-baked mud-blocks, with a centre pole supporting the conical-shaped roof and rafters. Thatch is then affixed to the rafters and saplings (Figure 5.2.11.). *Mbawula* or ‘fireplaces’ are positioned in the centre of the hut and the floor is smeared with dung to improve its durability (Peters, 1997: 2152) (Figure 5.1.5.).

5.3. The Vernacular: Luxolweni Community of Hofmeyr

Unlike uMasizakhe, Luxolweni’s architectural vernacular survives only in historical photographic evidence (Figure 5.3.1.). Demolition of the traditional houses occurred in 2005 in an effort to improve the living conditions of the populace after the 1994 elections. Vernacular homes were demolished and replaced with RDP houses by 2007 and construction has continued well into 2012.

Figure 5.3.1. The Luxolweni community outside Hofmeyr. These comparative photographs taken in 2005 and 2007 depict the change which occurred since the introduction of the RDP low-cost houses.

From the photographs (Figure 5.3.1.) it is evident that the uses of hipped-roofs as well as flat-roofed dwellings were constructed utilizing corrugated iron as a prevalent roofing material prior to the demolition in 2005. Having excess clay available – unlike uMasizakhe, homes were largely constructed with a rubble plinth, lowering the possibility of rising damp. Walls were constructed of various materials utilising diverse methods of construction. From photographic evidence it can be seen that there existed an assortment of techniques used for construction utilizing available resources (Figure 5.3.2., Figure 5.3.3., Figure 5.3.4., Figure 5.3.5 and Figure 5.3.6.). Figure 5.3.3 illustrates an open-order timber frame with rubble infill as an example of the indigenous knowledge which existed (Frescura, 1981: 126-127).
Figure 5.3.2. Open-order timber frame structure (Frescura, 1981: 126-127). Double sided laths and wire mesh are used to contain the rubble infill in place.

Figure 5.3.2. and Figure 5.3.3 demonstrate the structural construction of an open-order timber frame with rubble infill. Timber columns, which are ultimately positioned in order to carry the roof-load, are set into the ground at intervals of between 500mm and 1000mm with wire mesh to contain the rubble. The space between the timber columns is then built up with rubble often bonded in earth. The interior and external wall faces are then plastered over with a dagha mixture.

Figure 5.3.3. An illustration of an open-order timber frame with rubble infill. Timber columns are positioned on a stone plinth which raises the floor above natural ground level also redirecting water away from the dwelling. The timber columns carry the roof-load with horizontal latte and wire mesh to contain the rubble.
Figure 5.3.2. and Figure 5.3.3 demonstrate the structural construction of an open-order timber frame with rubble infill. Timber columns, which are ultimately positioned in order to carry the roof-load, are set into the ground at intervals of between 500mm and 1000mm with wire mesh to contain the rubble. The space between the timber columns is then built up with rubble often bonded in earth. The interior and external wall faces are then plastered over with a daga mixture.

Figure 5.3.4. Roughly coursed stone plinths raise the dwelling from the ground level reducing surface water from entering the house. Adobe blocks are laid onto the rubble acting as a monolithic structure supporting the roof.

Figure 5.3.5. Adobe blocks are laid on a plinth of sundried bricks. The bricks are stronger and less permeable than adobe blocks. Mud is mixed with small quantities of veld-grass and laid into a timber template, or alternatively dried and ‘cut’ into ‘blocks’ by a garden spade or trowel. Note the various materials such as timber or steel which are used as beams supporting the corrugated iron roof.
Figure 5.3.6. A well maintained adobe dwelling, notice the plinth which seems to consist of available rubble, also the slightly raised threshold preventing storm water from entering the dwelling.

5.3.1. Literary Investigation for an Eastern Cape Vernacular: Luxolweni Community of Hofmeyr

Anderson confirmed that vernacular African homes consisted of an integrated use of materials (most were renewable) which produced buildings that provided satisfactory comfort-levels for the household members and their animals (1977:2).

Denyer noted that most African houses traditionally had mud floors, and while a mud floor tends to conjure up the idea of something soft and insanitary, she reinforced her research findings stating that this was far from the case when the floor was properly prepared (1978:94). A well prepared floor as Denyer further described, could be almost as hard as cement and relatively smooth. A good, firm floor was obtained by beating the mud with a wooden mallet while it was setting; the *dagha* was also mixed with charcoal, other small aggregates or with cow-dung and then smeared with ash. In certain areas it was found that the mud from low ant-hills (common in the Eastern Cape) was particularly good for making hard, practically waterproof, bluish cement (Stulz and Mukerji, 1988).

Structurally, Fagan speaks of walls built of clay which had to be carefully prepared (2008: 210). He furthermore describes the process by which clay was thoroughly mixed with *kraal* manure and straw which was carefully trodden and then left in a heap covered with bags to ferment. This process, according to Fagan was repeated for seven days after which the mix was ready for building.

Susan Denyer explained that African societies were by no means static in the past, but changes
in the twentieth century may have been more cataclysmic and irreversible than ever before (1978: 192). She posed the question as to the variability of traditional architecture completely vanishing under the plethora of cement and corrugated iron where the possibility of vernacular architecture adapting to the twenty-first century way of life was opposed. While Fagan describes the aesthetic properties of the vernacular architecture found throughout Southern Africa as “...a nostalgic longing for the simple buildings, so modest and similar, yet each with its own identity, economically planned and built with basic materials – mud, rubble, wood and sometimes whitewashed with lime” (2008:1), Denyer continued her argument stating that under the current conditions, the individual has had no choice but to accept what is offered or possible. Should the traditional styles praised by Fagan be allowed to simply decay under the industrialized way of 21st century living? This question according to Denyer can only be answered by each community concerned (1978:193). It should not be outsiders who dictate policies which may be said to spring from sentimental European notions of conservation or a hankering to return to pre-industrial harmony. What is important, however, is that those making decisions should not be inhibited by the feeling that everything about traditional architecture is wrong. In many cases the old materials may be unsuitable for modern living, though many people find that a mud floor and a thatched roof are far more comfortable than a concrete floor and a corrugated iron roof (research observation).

5.4. Results of Findings: The Benefits of applying Vernacular Indigenous Building Techniques in Communities, Settlements and Contemporary Architecture: The Cases of uMasizakhe, Luxolweni and the surrounding Eastern Cape

The prevalence of the rondavel has been commented on by Steyn (2006: 21-38) and Schoenauer (2000: 58) who stated that “the basic dwelling forms of a sedentary society are the cylindrical hut with conical thatched roof, the oval house and the rectangular dwelling with rounded corners and a saddle-type roof”. Walton proved that the rondavel was dominant in about 66% of sub-Saharan Africa toward the middle of the twentieth century (1956: 24). Finally, the rondavel is described by Frescura as “possibly the most universal of southern Africa’s house forms” (1981: 53). It is proposed that the reason is a combination of resistance to change and the suitability of the rondavel type to prevailing conditions. Rapoport confirmed the findings that circular huts are more difficult to roof than rectangular ones, but emphasises that the choice might ultimately depend on the symbolic nature of the forms, adding in a footnote that some traditional cultures do not have a word for ‘straight’ (1969: 25, 77). The fact therefore remains that the round plan must have been the result of an elementary choice, with the rondavel simply the most appropriate solution for the conditions. Steyn noted that the rondavel offered unlimited flexibility to respond to different social structures, economic activities and external threats such as predatory animals, human raiders or climatic challenges (2006: 29). A spatial comparison between the rondavel and rectangular dwelling, illustrates that although the circular shape of the rondavel was the elementary form of choice, the rectangular dwelling accommodated furniture and spatial use better (Figure 5.1.17.).

Indigenous knowledge systems in the built environment have for too long been limited to the study of exotic or primitive architecture, and the organic nature of the development of such settlements, emphasising the essentially transient nature of planning systems that engendered these built forms. Until the arrival of Europeans, the myth existed that Africans had lived in
universal ‘chaos’ and ‘stagnation’ supporting such a statement, Amankwah-Ayeh noted that “...for countless centuries, while all the pageant of history swept by, the African remained unmoved, in primitive savagery” (cited in Tapela, 2007a: 105). While these myths and legends have optimistically been silenced (Davidson, 1959: 74-93), there still exist anthropological debates of strange Phoenicians building cities of ‘Great Zimbabwean cities’. Roberts (2007) also noted that other variants of African pessimism still permeate contemporary debates on the African vernacular condition, its past and lack of position in the future. The works of Hassan Fathy (1973), Susan Denyer (1982), Paul Oliver (1971; 1986; 1987; 1997; 2003; 2006), Steyn (2003; 2006) and Frescura (1981; 1985; 1989), began to wrestle with analysing and situating the study of African indigenous architectures and systems of planning within the unfolding political, economic and ecological use of resources. This marked a welcome transition from the sensationalist traditions of vernacular architecture and organic planning as was described by Fagan (2008). The authors mentioned have began to move away from studies aimed at the ideological justification for ‘difference’ toward more inclusive discourses that recognize that pre-colonial African settlements and cities were built on sound town planning, design and architectural principles. Coquery-Vidrovitch further observed that “the break in tradition at the time of colonisation consisted not so much of the creation of towns as it did in the replacement of one network [pre-industrial] by another [industrial], giving primacy to coastal towns [industrial resource frontier regions and, sometimes] to the detriment of the interior” (2009: 51).

The research conducted for this dissertation has demonstrated that there exist clear elements of socially sound and environmentally responsive building principles. From the vernacular dwellings surviving, it is possible to inform and educate current planning policy and practise in South Africa. Through such an exercise, villages and settlements would be empowered by sensitive housing approaches in the future. Some of the salient contributions in this regard have focused on the following hypotheses: indigenous patterns of settlements were firmly rooted in the planning, building, construction and maintenance of their vernacular before the advent of colonialism (Tapela, 2007: 107). Furthermore those pre-colonial South African communities minimized urbanism and the feeling of congestion while making maximum use of available space (Coquery-Vidrovitch, 2009; Anderson, 1977) (Figure 5.1.18.). These traits together with a delicate balance of mass and space which accompany such fortuitous spatial intimacy lent themselves to a feeling of cohesiveness and group control. Such principles probably account for the environmental sustainability of the pre-democratic villages (Amankwah-Ayeh 1994 cited in Tapela, 2007a).

In an effort to construct design criteria for economically viable sustainable housing in 1992, the United Nations Conference on Environment and Development Earth Summit Conference in Rio de Janeiro, 180 nations adopted a program in an international attempt to create a normative blueprint for sustainable development worldwide (United Nations, 2002: Online). It is, however, as Minnaar emphasized not completely possible to define a normative blueprint for a worldwide spectrum of human settlements as economical, ecological, geographical, topographical and social contexts differ (cited in Tapela, 2007a). In informal settlements such as these found within the research population of the Eastern Cape, design criteria for sustainable development are of paramount importance within specific geographical locations. The varying design criteria mentioned, have been introduced through the SANS 10400 part XS. Within these new building standards, there now exists a list of design assumptions which need to be accounted
for, specific to each region (Green Building Council of South Africa, 2011: Online). Building envelope requirements include the walls, floor and roof of a building. Each of these units is handled separately within the document.

Geographical differences within the research populace have defined the nature of the architecture which exists within it. The varying environments therefore provided contrasting means of expression to the people who live there. These people have over time, responded to what was available to them in different ways. Arguments were raised about appropriateness of exchanging information, technologies and design standards, about how architecture should be designed and built or settlements planned and placed. When developing the arguments of understanding and responding to a context in order to protect regional identities and culture, one is faced with the issue of applying information and technology transferred from one area or region to another. These questions are especially pertinent when the transfer is from a more ‘developed’ community to a less ‘developed’ one as was described by Jekot (2007: 74).

In conclusion to the research findings, it can be said that regional cultures and vernacular cases such as these which continue to exist in uMasizakhe and which once existed in Luxolweni can influence both the Eastern Cape and South African building culture. These cases may simultaneously be manifestations of a world culture. As tradition is the way of living or doing things in a manner that is handed down from generation to generation, it is vital that within the architectural profession, vernacular architecture is not associated with designing and building in the manner of the ancestors. Such an approach can conversely only be relevant and understandable if nothing has changed from the past and the present implying that people must be living in isolation or that they have no development in vital lifestyles. Such a state of isolation can exist solely when oppressors have frozen local aspirations and progress. Utilizing both the developmental and ecological approach on the other hand, the regional culture could play a crucial role in the successful process of exchanging, adapting and implementing standards in the built environment although the SANS 10400 part XA introduced in 2011 do consider these. It was with great excitement that Bruane, Technical Executive at the Green Building Council of South Africa applauded and congratulated the SABS and government for “putting a stake in the ground for the first time in terms of minimum energy consumption requirements for new buildings and refurbishments” (Green Building Council of South Africa, 2011: Online). Local requirements and sound standards need the cooperation of local governments in setting targets and increasing the exchange of indigenous and environmental information practises and the SANS 10400 part XA may just be the catalyst for such targets. The role of demonstrated examples within contemporary architecture, building according to sustainable standards, whereby traditional techniques and available materials are used could prove invaluable to the built environment of South Africa.
Introduction:

Chapter Six focuses on contemporary architectural designs addressed within South Africa. These designs include: Sustainability, innovative methods of construction, the use available materials and vernacular architectural design. Using literature to support findings within two selected cases in the Eastern Cape Province, comparative analyses will follow between the Greenshops Financial Services Centre in Centani and the New Auditoria and Teaching Complex of Fort Hare University in East London. The author aims to critically analyse the two selected cases observing their context within sustainability, innovation, alternative technologies and vernacular architecture thereby demystifying the terms and bridging the fissure between the architectural academia and building practise. The intension is to establish a positive future for vernacular architecture, traditional construction methods, the use of alternative building technologies and innovative principles in South African contemporary architecture (Steenkamp, 2010: 160).

6.1. Case Studies

Selecting appropriate case examples involved the weighing up of a number or factors: availability and accessibility of the relevant information; the appropriateness of examples to the validity of the research; on-site research as a key component to realizing the project’s objectives in a proficient and equitable manner; the collection of analytical information; the evaluation of innovative methods and technologies; and the actual implementation thereof in the projects all play important roles (Voss, 1992).

The five year time frame (2005-2010) ensured that case studies are up to date for the emphasis of the study. The author chose not to use the familiar fiction, sometimes called the ‘ethnological present’ which implies that the Eastern Cape society and its buildings subsist in an invariable, monotonous state, when in fact, the historical and cultural methods of construction concerned have diminished and many vernacular dwellings have since disappeared or have been demolished (Steenkamp, 2010: 161).

The case studies were selected from a specific region, time period and architectural intention, so as to make relevant and unbiased comparisons. Region specific the Eastern Cape province of South Africa was selected (Figure 6.1.1.), limiting the study to the coastline between East London and Port St. Johns. East London therefore being a primarily urban case study of the University of Fort Hare: New Auditoria and Teaching Complex (NATC) completed in 2011 and Centani which acts as a rural case with the introduction of the Greenshops Financial Services Centre (GFSC) which was completed in 2008.
Figure 6.1.1. Region specific to the Eastern Cape Province, the study has been limited to the coastline between East London and Port St. Johns. East London therefore being a primarily urban case study of the University of Fort Hare: New Auditoria and Teaching Complex (NATC) and Centani’s Greenshops Financial Services Centre (GFSC).

Both selected cases are public-service buildings. NATC serves students’ needs in particular, whilst GFSC has a dual role as both a community hall and meeting place on the one hand, and a community financial services centre on the other. Both case studies have intentions which mirror their design language, with sustainability and innovation at the forefront thereof (personal discussions with Al Stratford and Vernon Collis: 2010).

GFSC was designed and managed by the architects Vernon Collis and Anna Cowen, from the Western Cape; while NATC was designed by local architects Ngonyama Okpanum Associates in association with Native Architecture.

6.1.1. Case Study 1: Greenshops Financial Services Centre (GFSC) in Centani

When cultural changes resulting from national, political or governmental factors occur, old buildings may be adapted to new ways of living, and new buildings may be altered in form to accommodate them (Oliver, 1987: 10). Similarly, GFSC, which was once a centre of administration for the Apartheid Government, has been altered, adapted and renovated to accommodate the community’s needs. The new GFSC reflects Oliver’s views and quarried the ruins of the old buildings on the site and used local materials and skills which previously might have been considered inadequate. In the past and possibly even in the twenty-first century, to contribute to the community’s social development (Figure 6.1.2.) GFSC has earned its position as a worthy sustainable study (See GFSC Plans: Figures 6.1.3. – 6.1.13, and Figures 6.1.14. - 6.1.17.).
Figure 2.1.2. The Greenshops Financial Services Centre utilized local labour, indigenous knowledge and recycled materials during the construction process. Note the wattle and daub walls and site-sourced timber together with the use of natural light and contemporary innovative design.
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6.1.1.1. Sustainability

The critical need to raise public awareness from the GFSC intended to set in motion the healing of all parts of the social body within Centani, using as few as possible of the earth's resources and 'planting' in the community an ethos of independence. This project characterised sustainability unerringly, giving it significance that far exceeds its physical size, acting therefore as a model for architectural method which engages with the unique problems in this country and as an exemplar for sustainable development (Steenkamp, 2010: 162).

Summarizing what Lawrence (2006: 122) presented regarding the “basic principles for professional practise” the research dealt with the ‘adaptability’ of the existing building stock to serve the needs of contemporary daily life. Today, the principles of adaptability are too easily forgotten by architects who chose to demolish, rather than renovate existing buildings. Lawrence went further, stating that “there is a need to consider how to reduce uses of non-renewable resources, how to lower greenhouse gas emissions and lower solid waste disposal”, thereby gratifying the sustainable principles of design (2006:122).

The materials used within the project allowed for unparalleled flexibility, old bricks from quarried buildings were reused, and the newly built forms can be recycled or left to decompose back to the soil. Overall, GFSC should be celebrated and promoted in the light of these economic and ecological attributes (Steenkamp, 2010: 162). Both the latter are confirmed by Marchand under similar circumstances (2006: 61).

rough every facet of the project. Ecological and cultural diversity is echoed through the consistent use of local materials appropriate for the environment. Roof eaves were extended to provide protection from climatological influences (Figure 6.1.16.). The buildings are designed to maximize passive heating and cooling using shading devices, raised floors and variable ventilators (Figure 6.1.15.). Rainwater was collected from the roofs in storage tanks to be used for the permaculture gardens (Cooke, 2009: 24) (Figure 6.1.14-17.).
Figure 6.1.14. Chiefs Hall Plan

Figure 6.1.15. Section illustrating the holistic sustainability of the structure.
Figure 6.1.16. Roof detail utilising available resources.

Figure 6.1.17. Site plan illustrating the garden layout including permaculture and vegetable gardens designed by Tim Wigley, see Figure 5.1.14.
6.1.1.2. Vernacular Architecture

The GFSC has been in use for four years (2008 - 2012) and although still young, has convincingly proven that the traditional methods, vernacular forms, indigenous building techniques and locally sourced materials, can be revalidated in contemporary South African architecture (Steenkamp, 2010: 162-163). The commitment from the architectural design team to make use of local resources, an approach long espoused, was rewarded by the community’s continuous appreciation and independence in every sphere which proved to be exceedingly affirming (Cooke, 2009. 26).

As discussed previously, regarding the principles of vernacular architecture, the Greenshops project successfully inculcates vernacular principles. GFSC was built by the local people to meet their own needs, utilising available resources and a variety of traditional technologies - such as wattle and daub) and finally, GFSC was planned in such a way to accommodate the values, economies and ways of living of the local populace whom produced it. Within the context of vernacular architecture the project has embraced what is known and what is inherited about the building (Steenkamp, 2010: 163). It has included what Oliver called ‘the collective wisdom’ and experience of a society and the norms that have become accepted by the group as being appropriate (1986: 113).

6.1.1.3. Tradition

Echoing within GFSC is what Rapoport (1989; 2006) viewed as significant in the modern concept of tradition namely where the past becomes part of the present as a guide to future action. Lewcock added to the traditional concept of the latter and the GFSC project can easily be viewed as such: a process in which innovation and precedent are dynamically combined allowing continuous change to take place (2006: 16).

Perhaps the most interesting exercise conducted by the architects of GFSC, this social development project aimed to encourage local people, and instilled once-again their appreciation of the traditional building methods of mud and earthen infill as the principal building material (Cooke, 2009:25). Earth construction used as a building material within this project has provided a real alternative for the building sector, its technical performances were established, and it provided an economically viable solution, both in macro-economic terms and in terms of building capital costs. Similarly, GFSC renewed the links with traditional building cultures, thus retaining its local nature, not only by virtue of the raw materials used, but also from a cultural point of view (Booysen, 2003:43).

6.1.1.4. Indigenous Knowledge and Innovation

The GFSC successfully explored the relationship between local knowledge, available resources, cultural identity and architecture. More specifically, the project illustrated the gestation of technical learning and socialization that occurs throughout a project focussed on social development (Steenkamp, 2010:163). As reasoned by Marchand that the indigenous knowledge of local building trades must be central to discussions, studies and projects concerned with the sustainability in the twenty-first century and beyond, each of which were addressed within the project (2006: 46-47).
Innovation was stimulated with the traditional wattle and daub technology being improved by providing concrete foundations and by adding diminutive amounts of lime and boron-treated thatch to the mud mixture, a concept applauded by Rapoport (1989) as the past becomes a part of the present acting as a guide to the future. Innovation was also reflected in the architectural designs’ ability to reuse the materials of ruined buildings – plundered bricks which were cleaned off and broken, hard materials were used as aggregate in foundations. Door handles were fashioned from the original jail bars which were reclaimed from the site. These innovative ideas also aided in the sustainability of the project as a whole (Cooke, 2009: 23-24).

Encapsulating the values of the society surrounding the building, the architects eradicated the myths which surrounded the eucalyptus plantations’ noises which were found to be wind-induced. These bold steps which were taken understand the traditional belief systems added to the strength of the symbolism of a bridge between the changes within: into a community meeting place and financial service hub (Cooke, 2009:23).

The plantations became the primary source of training for the local people, who were set out to manufacture doors and windows utilising eucalyptus and pine. Local residents were trained to fell trees, strip and boron-treat the timber and cure these in a solar kiln for use in the structure as ceilings, screens and ventilators (Cooke, 2009: 25).

6.1.1.5. Apprenticeship

From the start, the architects recognized the local indigenous people as pivotal agents necessary for the execution and long term success of the project. Respect for the local autonomy and regular consultations with the builders about the project aimed at encouraging, consequently strengthened the internal ties and coordinated efforts of the professional team. The project provided local people with valuable opportunity for acquiring practical experience in restoring the old existing buildings on site and fostered skills which would hopefully be inculcated in successive generations of builders (Steenkamp, 2010: 164).

The GFSC was developed beyond the mere site and the architects were well aware that the potential success of the project would be determined by the local skill, and social acceptance of the project. Workshops organised by the architects with local chiefs and cultural leaders, included their needs in order to develop an appropriate approach. In-depth studies of available materials and appropriate technologies to the area were also done at these workshops (Cooke, 2009: 24). Materials can only be exploited within a society who understands the technology and good builders know their materials and therefore make the best of their properties (Oliver, 1987: 59). The architects of GFSC carefully examined the building technologies available, finding them to be a mixture of traditional indigenous methods. With much professional input and traditional influence, the majority of workforces employed were local isiXhosa people. This is supported by Oliver (1987) who for a similar project held that local people developed intuitive senses of appropriateness for the available materials.

The value of participatory and apprenticeship approaches to the development also reflected in
the gardens, which are included to produce food for the staff. This process also created work, seeded small businesses and transferred necessary skills to the people (Cooke, 2009: 24-26).

6.1.2. Case Study 2: New Auditoria and Teaching Complex (NATC) at the Fort Hare University in East London

The architects of the NATC for the University of Fort Hare in East London, Ngonyama Okpanum Associates in association with Native Architecture, developed a ‘pattern language’ - a term originally coined by Christopher Alexander - to regulate the design intent. This inter alia, included all floors to be accessible for services, all buildings to be orientated with long facades facing north, limited air conditioning for apparatus only, naturally ventilated spaces, natural daylighting, locally sourced materials and light-weight construction (Stratford, 2009: 54-57, Figure 6.1.18.).

Figure 6.1.18. Images of the construction process in 2010. The economic activity within the New Auditoria and Teaching Complex at the Fort Hare University was well managed through the use of innovative Wintec precast concrete systems introduced by Al Stratford (see photograph) thereby minimizing the amount of waste on the site and speeding the construction process.

The complex is bounded on the north and south by wide streets. The primary response was to place three wings running east and west which cascade downward from the south towards the north. Each wing is penetrated by a pedestrian concourse that is vertically connected by an elevator in the southern wing and a series of ‘double-acting’ staircases at the intersection of each wing. This concourse starts on the street at parking level on the south side and spills out onto the street at second floor, which is at grade on the northern street. In this way, the concourse becomes a pedestrian arcade of the city (Stratford, 2009: 54-57).
6.1.2.1. Sustainability:

The Latin word *sustenere* meaning to uphold, or capable of being maintained in a certain state or condition, is the origin of ‘sustainability’, therefore, while ‘sustainable’ can mean supporting a desired state of some kind, it can also mean maintaining undesirable conditions (Lawrence, 2006:11).

NATC is oriented with long facades facing north, natural ventilated spaces and natural day-lighting, and a ‘wind scoop’ or ‘wind catcher’ system which aims at regulating temperatures and internal conditions (Figure 6.1.19.). This wind scoop on the roof contains an opening that faces the prevailing wind, which is at a cooler temperature than the interior of the building, because the wind velocity at this opening is greater than it is at the lower windows of the house, air in the shaft of the tower is forced down the shaft to cool the structure (Steenkamp, 2010: 165).

![Figure 6.1.19. NATC is oriented north, natural ventilated spaces and natural day-lighting, and a ‘wind scoop’ or ‘wind catcher’ system which aims at regulating temperatures and internal conditions (image provided by project architect, Al Stratford).](image)

The sustainable principles delineated earlier by Hatfield Dodds (2000) and Lawrence (2006) have had modest regard within the NATC. The ecological considerations have been accounted for through the consented solar exposure given to each wing of the building, reducing the winter shadow. Unfortunately the value of participatory approaches to the development has not enjoyed the same significance which was given to the GFSC, however, it should be noted that the latter was in a rural location making participatory approaches easier (Steenkamp, 2010: 166). The critical need to raise public awareness of the sustainable issues concerned are, however, being addressed regularly by the architects. The economic activity on the site has not over-exploited natural resources due to the use of innovative *Wintec* precast concrete systems which minimized the use of commonly used concrete methods which also limited the amount of waste on the site (Figure 6.1.20.).
Figure 6.1.20. Section through the University of Fort Hare’s New Auditoria and Teaching Complex in East London illustrating the ventilation paths, trombe wall elements and Wintec precast concrete systems (Figure provided by project architect, Al Stratford).

The external façade to the south walkway is faced with a permeable mesh screen, which serves to rupture prevailing winds and alleviate driving rain (Figure 6.1.21.). Inside this mesh screen is a vertical planting screen at each floor which is irrigated with harvested rainwater. This serves to provide evaporative cooling and oxygenation of natural air which is drawn into the building from the cooler side of the building; it also provides a balustrade for the walkway (Stratford, 2009: 54-57). Despite the impressive ventilation systems used as temperature-sustaining tools (as they continually lower the inside temperatures of the building) there remains one intrinsic flaw: colder winter months have not convincingly been accounted for (Steenkamp, 2010: 166).
Figure 6.1.21. Comparative images during construction in 2010 and the completed project in 2012. The external façade to the south walkway is covered with a permeable mesh screen, which serves to rupture prevailing winds and alleviate driving rain. Inside this mesh screen is a vertical planting screen which is irrigated with harvested rainwater. This serves to provide evaporative cooling and oxygenation of natural air which is drawn into the building it also provides a balustrade for the walkway.

6.1.2.2. Tradition and innovation

In the writings of Bronner (2006: 6) tradition is about expectation and social acceptance rather than constraint. As a reference to precedent and a social construction, tradition invites commentary and interpretation and is often continuously re-negotiated, from generation to generation. As such it allows for creativity, adaptations and innovations which might (once they have been socially accepted), be integrated and become part of the tradition. It is this tradition used within the NATC, which needs first to be socially accepted prior to a final triumph being realized (Steenkamp, 2010: 167).

6.1.2.3. Indigenous Knowledge and Innovation:

As in similar instances when architects attribute innovative forms and ideas to particular buildings it was not so much the historical veracity which was of interest, but rather the degree of esteem they accorded to creativity and signature in the building trade (Marchand, 2006:56). Rather than use indigenous knowledge, innovative concepts were tested and stretched A query made by Bronner remains in hindsight: “adaptations, innovations and the social acceptance thereof are all endorsed through the invitation of commentary and the renegotiation of tradition and indigenous knowledge” (2006:6).
6.2. Comparative Analysis

NATC was built to serve a variety of functions to accommodate various faculties as they moved through the space. One of the more important efforts within the project was to create a “micro-climate” acceptable to their occupiers (Stratford, 2009: 54-55).

Designing according to human comfort should use means and methods which are not detrimental to the environment or human health in order to allow the inhabitants to respond to their prevailing climatic conditions as has been exercised within both the GFSC and the NATC (Steenkamp, 2010: 169).

Vernacular resources, technologies and forms such as adobe, wind-catchers or courtyards are generally seen to be well adapted to local climatic conditions and are therefore often considered as appropriate bases for environmental design – as has been established in the Centani GFSC. What is needed, however, are methods which enable the systematic test of the actual performance of vernacular traditions and to thereby generate an understanding of how they may possibly be improved to provide sustainable buildings for the new millennium. Although both Centani GFSC as well as the NATC where considered with regard to environmental principles of design, it remains difficult to comparatively analyse these projects within the vernacular framework. One method is in situ monitoring – these results are aimed at showing the projects which have been ‘counter-intuitive’. What is needed within the vernacular architecture of South Africa is research which critically tests the performance of vernacular traditions within various geographical locations in the face of challenges faced in the twenty-first century (Steenkamp, 2010: 169).

The Centani GFSC, in addition to its social and technological concerns, materials and methods of construction were developed taking into consideration the natural resources available (Cooke, 2009: 25).

Linking the indigenous knowledge system observed within the Centani GFSC with industrialised and innovative initiatives of the NATC requires better understanding of both the role of innovative and scientific (architectural) research and the limits of empirical locality-specific indigenous knowledge as espoused by Ezaguirre (1992: 20). There should exist no fissure in the relationship between indigenous knowledge and scientific innovation. If South African Architecture is to mean more than the mere provision of yet another roof and wall; there needs to exist a greater understanding about the qualities which shape the public needs within project. By doing so, the architectural practise may be more effective in designing buildings appropriate to indigenous living conditions and public needs (Steenkamp, 2010:170).

GFSC essentially adopted the importance of local technical and historical methods of construction by including an apprenticeship system together with innovative modern techniques, thereby adding to the community a unifying sense of ownership and responsibility. NATC took a wide approach by designing both engineering architectural solutions, value is thus weighted primarily on engineering and architectural ingenuity rather than on community participation.
All buildings, whatever their functions have to meet certain physical constraints. GFSC was the result of a long tradition of techniques, assembled by trial, error and experimentation over many generations. NATC was based on detailed mathematical and engineering calculations and the application of formulae after experimentations (Steenkamp, 2010: 170). Neither is better nor worse than the other and although there is anticipation regarding which is ‘better’ and an objective view cannot follow by the author.

6.3. Closing Remarks

As was noted by Ezaguirre and also verified within the case studies of GFSC and NATC, local indigenous and technical knowledge within the building practise should never be overlooked (1992: 19). These case studies supported what Fathy (1973) delineated as an approach which focuses on the active application of vernacular technologies, forms and resources in a modern and development contexts will not be without its problems, challenges and setbacks, but would have to address themes and issues that so far have been largely disregarded in the field of vernacular, indigenous and sustainable studies. For instance, as it will have to engage with, or indeed be part of, the so called ‘development discourse’ (Grillo, 1997), there will be need for critical discussions of the political and ethical dimensions of key concepts like sustainability, development, intervention and participation.

Unfortunately, as was noted by Payne (1977), and confirmed within both case studies, western models of planning and designs based on commercial land markets are penetrating most parts of our country. Perhaps rural areas less-so as was shown by GFSC in rural Centani, but finding ways in which vernacular knowledge and expertise may be integrated into urban contemporary building design and practise continues to be one of the primary challenges faced in the twenty-first century (Steenkamp, 2010: 171).

NATC is a precedent from which - after experimentations - have come creativity, innovation, and change. Building typologies continue to evolve and transform while new ones will arguably keep emerging. Though such novel ‘grassroots tradition’ may not be as established as that of local earth construction, it may well represent the future of the sustainable and vernacular in industrialized urban societies (Steenkamp, 2010: 172).

The patterns and principles of good practise from both GFSC and NATC have been identified to successfully sustain the human settlements for which they were designed. Building design and construction together with the layout of the buildings were to explicitly accounted for within them. Innovative approaches of this kind not only help promoting the local architectural environment, but also protect the cultural heritage of human settlements (where applicable) (Steenkamp, 2010:172). In addition they have become a catalyst for a new kind of ecology-orientated tourism and economic investment which was mentioned by Lawrence whilst describing similar projects (2006: 124).

Pressure on architects to design contemporary, truthful, honest and socially acceptable buildings comes primarily from the local market. In urban areas within South Africa, contemporary, modern
and ‘western’ architecture command a considerably higher market-price and social acceptance than traditional designs, methods and materials. As long as the South African elites continue to conceive of earth architecture as the property of their poverty-stricken citizens, the Xhosa-building tradition within the Eastern Cape, as well as the diversity of other building traditions and innovative designs throughout the county, will be progressively denigrated and may one day cease to exist (Steenkamp, 2010: 172).
Introduction:

Chapter Seven suggests that while the issues surrounding true, honest and authentic sustainable development in housing is important, it seems somewhat extraneous when the social equity (concerning identity) of people is being disregarded. It is imperative therefore that those concerned with housing developments for the poor tackle the social issues of our time relating to architectural meaning, identity and culture (Steenkamp and Whitfield, 2011: 72). Chapter Seven is not specifically aimed at criticizing the South African Reconstruction and Development Programme (RDP) or any similar developments, but is rather aimed at a possible solution to the loss of cultural identity within such housing developments. Addressing sustainable development and sustainability, which includes social equity, this chapter focuses on the issues surrounding cultural identity, knowledge transfer and community participation as part of the solution while implementing both the developmental and ecological approaches discussed in Chapter Two.

7.1. Sustainable Development Approach: Implementation Strategy:

Architects and developers should stress that knowledge transfer through public participation needs to be integrated in all areas of development (Ben-Meir, 2005: Online). The implementation of such a transfer system will lead to the ability to achieve ambitious goals, including an ‘appropriate social architecture’ for each region as is suggested by the SANS 10400 part XA regulations. This assertion stems from the basic lessons of development experienced around the world: That local communities need to implement projects that they determine, to effectively promote sustainable development through private-public partnerships, informed decision-making, flexible economies and self-reliance. Within the design process, planners and consultants should encourage strategies that catalyze and facilitate community participation in development planning. Participatory approach should include the transfer of appropriate skills to help the community to successfully manage their environment (Steenkamp and Whitfield, 2011: 73).

From this introduction it is possible to translate such an initiative into practical, sustainable and integrated programmes and projects. The following strategies suggested, promote public participation in local developments and should be considered for any community or housing initiatives action plan. Ben-Meir (2005: Online) proposed housing initiatives for Morocco, and it is necessary to trace the similarities between these two countries to understand its of relevance: Morocco has a wealth of architectural examples that reflect traces of different human settlements and a succession of civilizations much like our ‘Rainbow Nation’. Each region possesses its own ethnic characteristics and has its own peculiarities. This makes it possible for many regions to contribute to a national culture and heritage. From this scanty background, the strategies which follow could help ‘translate’ an initiative - for the benefit of the local people and serve as a model to effectively address the challenges and threats that face similar rural and peri-urban communities in South Africa (Steenkamp and Whitfield, 2011: 72).
Step 1:

Train in Facilitation (Figure 7.1.): Development initiatives should begin with a training period for members of the community. It is imperative to include training in facilitation since it has previously been stressed that communities should embrace the development initiatives to ensure optimal implementation of the development underway. Community members, who are typically young and eager to improve the social conditions in the villages they serve, can be excellent facilitators of community development once they receive the necessary training. Facilitation techniques encourage broad community participation in local development. The interactive development experience creates mutually beneficial relationships and trust among the community participants as well as the developer. Typically, communities themselves can determine their specific development priorities. In the beginning, experts (from both the public and private sectors) could share and adapt with local individual communities and counterparts (Steenkamp and Whitfield, 2011: 72).

Figure 7.1. Train in facilitation
**Step 2:**

Establish community development planning and training centres (Figure 7.2.): These centres can play a key role in providing assistance to people most vulnerable to poverty and therefore address a primary objective of housing initiatives. Planning and training centres, situated in communities and managed by community members, would be able to assist local people in determining their priority goals and then in the final design and implementation of the projects, goals may be achieved. Community members should also be provided with training in management, facilitation, modern agriculture, traditional building techniques (for knowledge transfer), health, and other skills desired by the local community to meet the necessary success (Ben-Meir, 2005: Online).

The aim is to give shape to the method of development and rehabilitate sustainable community activity. Leaders within the community can base projects on their constituencies’ self-described priorities which will help achieve the community targets and increase their prospects for success with heightened local support. The community members described should understand that an effective social movement can begin with a series of community meetings where local people are given the opportunity to express their concerns and interests. They realize too, that inclusive collaboration in the design and management of local developments will open the doors for the region and community to achieve its development potential. A local leadership will emerge that understands and is dedicated to addressing the real issues of concern to citizens (Steenkamp and Whitfield, 2011: 72).

![Figure 7.2. Establish Community Development Planning and Training Centres.](image-url)
Step 3:

Assist the creation of local associations: Experiences around the world show that local associations are created (and civil society grows) when communities work together to accomplish their collectively defined development agenda (Fathy, 1973). This impacts society’s ‘architecture’ because new tiers of co-operation form as neighbouring communities begin to implement projects beneficial to the entire region. An assessment ought to be made of additional reforms to further enable initiatives to promote an innovative civil society (Steenkamp and Whitfield, 2011: 75).

Step 4:

Create a ‘team of co-ordination’ which would act as an administrative framework which organizes the achievements of the previously described strategies. It has the flexibility to operate at regional, provincial and national levels in order to negotiate partnerships (among communities, government agencies and NGOs) that promote local development (Ben-Meir, 2005: Online).

Among the priority cases should be the inclusion of rural and peri-urban settlements which neighbour each development. In many cases, these villages are statistically among the most isolated and poorest in the country (Steenkamp and Whitfield, 2011: 76).

Ben-Meir held that for a relatively low cost, these strategies included in the development initiative could be among the most effective ways of solving the housing backlog. The strategies are, in a sense, natural extensions of the Initiative and share its ultimate objective which is “to enable all members within the community, men and women alike, to avail themselves of a wide range of possibilities and opportunities”, public participation is the method which might effectively attains this (King Mohammed VI cited in Ben-Meir, 2005: Online).

7.2. Closing Remarks:

There already exists a long established, though still somewhat marginalized discourse that focuses on the ways in which indigenous traditions and innovations may be integrated into contemporary building practises, as was previously remarked by Afshar and Norden (1997). At present, however, while concerns over sustainability and cultural identity continue to shed animosity over the processes of modernization and globalization, an alternative, innovative approach to development is continuously being looked for. It seems more opportune and urgent a time than ever to fabricate the achievements of such research into contemporary practise.

What is needed is the disposal of the stigmas of underdevelopment, poverty and the past that clings to the concept of indigenous vernacular architecture. Such research and education should focus on issues of process rather than product, identifying general principles and concepts rather than basic facts and figures. More importantly, it should be critical and actively engaged in realities of the present, rather than remaining focussed on the past. These ideals were further emphasised by Rapoport (2006), however, in order for the sustainable, innovative, indigenous and vernacular architecture to teach lessons that are relevant to the future, a more
problem-orientated, comparative and integrative stage that leads to explanatory theory needs to be entered.

Participatory approaches should become an integral component of the building culture (Marchand, 2006), as well as development initiatives which aim to promote and establish sustainable supplies of locally available building materials (Lawrence, 2006). Local appreciation for traditional Eastern Cape architecture and building methods should be bolstered, and its social, economic and ecological value recognized (Steenkamp and Whitfield, 2011: 72). The post-colonial dichotomy between tradition and modernity must be challenged along with the popular association of tradition with stasis and ‘backwardness’ and the conceptual affiliation of modernity with concrete, corrugated iron and all things Western must be debunked. Changing attitudes can only be achieved through educational processes that promote scholarly investigation, publications, public displays and open discussions (Marchand, 2006).
8.1. Urgency and Responsibility

Jekot identified the conflict which currently exists between regionally appropriate environmental building processes and an increasingly global technical and economic culture (2007: 76). From the research findings it evident that in order to improve the ‘green’ performance of architecture, it is necessary to create a greater awareness of environmental issues. In Chapter Two it was concluded that the discussion is no longer whether there is an environmental crisis, but rather how we can now integrate fragmented, contradictory and competing interests and architectural values. There is a mounting demand for higher comfort performance standards in the built environment – particularly within rural areas - and for the willingness to deliver such architecture, which in turn necessitates new, innovative environmental designs. Within this context, the degree to which clients, users and designers understand the need, and want to implement policies enforcing sustainable design futures such as these which exist in the SANS 10400 part XA, is extremely important (Figure 8.1).

Hassan Fathy (1986) held that architects are in a unique position to revive people’s faith in their own culture, and if, as authoritative critics, they show what is admirable in local structures and even go so far as to use them, the local people at once begin to look on their own products with pride. Architects and designers, through the power of their creativity, now find themselves in the opportune position whereby they can help communities around South Africa to embrace change. Additionally, Nnamdi Elleh (1996) identified the temptations which existed as immediate design solutions arose to meet political needs, moreover, that South African architects should take advantage of the traditional precedents around them and not let political expedience steer their design concepts. The fabric of architecture today should not be an art of imposition, but of discerning potentials and bringing them into play. Rather than being constrained, including vernacular methods and materials involves expanded creativity, helping the new to be born and healing that which does not work.
Today more and more South Africans live in communities but the environment they inhabit is very different from what we think of as a traditional African townscape. It was thus meaningful exploring the role of culture, identity and expression in South African architecture, by looking at the complex interplay between climate, context and technology as well as social and environmental processes. Many people acknowledge the limits of the human intellect and stress the importance of instinct and intuition. As was the case of GFSC, guided by the latter rather than by intellect alone, architectural design requires a harmony between head and hand, experience and memory. Instead of the unthinking application of global tendencies, the individual application should grow naturally from the design task, well rooted in the region and its resources.

South African spaces and places remind and teach us about the potential of creative applications of architectural materials and technologies representing the ‘developed’ and ‘underdeveloped’ as Fathy (1986) acknowledged in similar conditions. The most profoundly rich and dense synthesis of ideas and concerns form what is timeless in architecture. This is the mix of simplicity and sophistication of expression, as may be found in the convergence of the so-called ‘first’ and the ‘third’ world held within the GFSC and also NATC.

8.2. Integrating History, Policy, Demands, Expectations and Solar Barriers

Prior to the discovery of global-warming and the energy and oil crises of 1973 and 1976 respectively, designing and building with little regard to the environment, landscape, climate or inhabitants was fairly easy. Large glass facades permitted entirely too much sunlight to enter buildings during the summer, while these same buildings radiated the heat out during winter reducing them to uninhabitable human fridges. Dealing with such designs released a technological and industrialized chain reaction: tinted glass was installed to protect interior from sunlight and although the light was now dealt with, rooms became too dark for proper functioning. Artificial lighting was introduced solving the darkness – which again caused the building to be heated. The increased heat was solved through air-conditioning which increased heat and energy consumption. A vicious and expensive cycle of additive technological corrections increased energy usage and material waste – this was typical of the modernist era.

Williamson, Radford and Bennetts perceived sustainable development as a three-legged stool, each of these three legs being a subsystem - namely socio-cultural, environmental and economical, that cannot exist in isolation (2003: 84). Minnaar and Cloete added to the three-legged stool two additional legs namely a political and technical one so as to adapt to the instability at local South African government level and also the technical backlog (2006: 67). Dewar instigated the findings of Williamson, Radford and Bennetts during the Apartheid era previously saying that the housing problem is “a symptom of a deeper issue of politico-economic relationships and is not simply a problem in its own right” (1981: 35-39) thereby eliminating the blameworthiness from any racially powered political authority. In November 2011, the SANS 10400 part XA was introduced following on the SANS 204. The SANS 204 goes in-depth into each topic explaining how to work out what those values which are relevant for the building while the SANS 10400XA might require heaters and pipes to be insulated for hot water supply, together with 50% of the heating capacity coming from a source other than electricity (Green Building Council of South Africa, 2011: Online). Certain of these regulations have already been
8.3. Communities of Independent and Sustainable Practise

When Frank Lloyd Wright said that “the true basis for the more serious study of design and architecture lies with those indigenous more humble buildings everywhere that are to architecture what folklore is to literature or folksong to music and with which academic architects are seldom concerned... these many folk structures are of the soil, natural. Although often slight, their virtue is intimately related to the environment and to the life of the people” (cited in Papanek, 1989). Throughout South Africa, vernacular architecture represents the development of a sustainable architectural approach which minimizes the discomfort caused by climatic and economic conditions. The supporters of vernacular architecture claim it to be “a broad-spectrum cure-all for most of modern man’s problems, while its detractors feel it to be romantic escapism, a dreaming of picturesque, exotic or simpler times, a search motivated by nostalgia” (Papanek, 1989). Detractors of vernacular architecture might become silenced if the deep and vivid characteristic thereof is implemented.

Vernacular architecture as a ‘process’ of building is frequently enjoyed more than the resulting end ‘product’ as was exercised by Vernon Collis during the construction of the GFSC. It is this process-product relationship that lends an air of enchantment to vernacular architecture. Sacred and metaphysical modes of the thought surrounding work and shelter are here combined with user participation resulting in communities being strengthened.

In contemporary architectural practise, as explained by Papanek (1989) there exists the familiar fourfold constellation of client, architect, builder and user – which is a direct result of the separation of roles and the division into highly specialized functions that promote contemporary industrial architecture. Contrary to vernacular architecture, in which this quartet is generally ascent: the four specialized functions are compressed either into an individual designer/ user/builder, or else given over to a community grouping based on gender, kinship ties or ritual groupings rather than occupational specialization. Frank Lloyd Wright invariably designed his houses around the individual social and cultural requirements of his clients, and the specific climatic and environmental features of a carefully located site, utilizing whenever possible recycled building materials culled from the immediate area and he also often involved the future owners in the physical act of building their home diminishing the fourfold constellation dramatically. The appearance of ‘client’ as separated from ‘user’ may well be the threshold between marginal vernacular homes and the structured capital-directed RDP houses one has become accustomed to in South Africa. The task of providing shelter forges such close community involvement that this may account for the purity of style typical of most vernacular forms. Hidden in the myriad of anonymous vernacular structures throughout South Africa we may well find the key to turn the architectural profession around, and return to “Architecture with a human face” (Papanek, 1989: 18).

To attain communities which are independent and self-sustaining, planners will have to shift the focus to the establishment of self-supporting settlements in their quest to provide
housing for the masses within South Africa. In all contexts, the benefits will be health, safety and the eventual edification of the built environment. It would be feasible utilizing vernacular building techniques, local skills and appropriate, comprehensive education programmes which empower the community. Educational programs need to disseminate information on topics such as alternative energy, building materials and maintenance. It is imperative that household energy awareness is bolstered together with the promotion of low-impact, re-used and/ or recycled building materials as well as alternative sanitation systems. It is essential to gain the enthusiasm and co-operation of communities in order for them to develop into sustainable villages resulting in a productive life with access to dignified education for all.

Supporting the latter discussions Turner maintained that “the most plentiful, renewable and non-polluting resources can only be properly used by self-governing people working locally” and that the alienation of people from the means of production by centrally administered systems leads to excessive demands on scarce resources as well as exceeding the social limits to growth (1978: 1137). The increase in centralisation of decision-making and provision of housing throughout South Africa has resulted in increased dislocation between human needs and priorities and the quality of housing which results. Clearly, this debate is not as simple as it might seem, two issues exist which, though interrelated, nevertheless persist individually. The self-sustaining approach suggested in Chapter Seven viewed housing from a qualitative point of view, recognising also that certain housing methods perform better than others. The basic issue of this debate is whether quality, efficiency and fulfilment can ever be achieved through the “pyramidal structures and centralising technologies” (Turner, 1978) currently being used. Unfortunately, Turner’s view is partial in that it perhaps ignores the position of housing in terms of more fundamental societal relationships which might exist.

8.4. The architectural Catalyst for Change in a Globalised Environment

Globalisation has not replaced social structures. In itself it is neither good nor bad. Its consequences are largely the results of human decisions, which can be debated and changed (Jekot, 2007: 76-77). The generic imposition of an impersonal globalisation should be replaced by a considered respect for revealed identity discussed in Chapter Seven. Jekot (2007) and Popescu, (2006) noted that in order to succeed; designers and architects have to reinforce the need for a regional, culturally informed architectural environment. This requires avoiding mere imitation of the vernacular and historical pastiche, and creatively engaging with the living culture of a region. The contemporary lifestyle and expectations in most of South Africa are unsustainable and unrealistic. Expectations have been raised to inappropriate levels and are giving rise to questions about the distinction between deep cultural values and impermanent lifestyles (Jekot, 2007). The need for positive intervention and change at a social and cultural level - as was discussed in Chapters Two and Five - in many regions is clearly a critical concern in the global movement.

Sharply varying interpretations placed on exchanging information and technologies may lead to the designing of environmentally-‘progressive’ architecture between cultures discussed in Chapter Six. The ‘developed’ and ‘undeveloped’ can co-operate creatively. Cross-cultural transfer is possible in South Africa, but can be problematic when there is no known way to tackle it. The selected sample of architectural interventions such as those found in Chapters
Six and Chapter Seven illustrate, however, that such transfer can prove a great success. They can be beneficial to the architectural profession, if that which is designed is integrated allowing happier clientele and culturally enriched societies.

Global buildings, regionally grounded yet based on international design standards are present in South Africa and in many places around the world. Globalisation is not a choice - it happens. Contemporary globalisation has had some important positive consequences with respect to cultural regeneration, the decentralisation of egalitarian power, economic productivity and the availability of a range of materials, products, technologies and ideas. There are many negative consequences too, like increased environmental degradation as was discussed in Chapter Five and various examples of cultural violence - and, of course poverty, worsened working conditions and inequalities also noted in Chapter Five. The question is how to address our concerns in many different regions so as to make a stronger and enhanced South African identity as discussed in Chapter Seven.

Nothing imitative is equal to that which is imitated – such as the RDP houses noted in Chapters Two, Five, Six and Seven. Instead of imitating, there should be a search for the principles that made them sustainable. There is a need and demand for architects who tackle today’s requirements and problems with today’s solutions and resources. Well-executed regional architecture discussed in Chapter Five, Six and Seven can make a positive contribution to global development and the upliftment of communities.

8.5. Summarising the Essence of Vernacular Architecture

Ezaguirre emphasised the importance of local indigenous and technical knowledge (1992). An approach which focuses on the active application of local technologies, methods, forms and resources in a modern and development context can vastly improve the housing position (Fathy, 1973). Despite the meagre resources which existed within the research population, the indigenous peoples designed dwellings that successfully met the severest climates. Simple technique and material usages have allowed these undemanding shelters to outperform the structures of most present-day architects. ‘Primitive’ methods solved environmental challenges such as thermal responses which were discussed in Chapter Five whereby vernacular dwellings were found to have an internal temperature swing of between 4.3-5.6°C compared to that of 11.7°C found in contemporary RDP houses (Makaka and Meyer, 2006). The thick walls of earth and rubble together with floors composed of natural earth and/or cow-dung are a vast insulative ‘improvement’ to that of the RDP homes. With climates which require massive structures to absorb the intense solar heat, the vernacular homes and huts from Chapter Five constructed of adobe and rubble built on a solid rock foundation, protected inhabitants from both rain and heat. Vernacular homes have sustainably proven their excellent performance in function, form and material.

The research focussed on the derivative belief that vernacular and indigenous building techniques and materials should be implemented in contemporary South African architecture is no longer challenged. The research has surely established the basic crux: that the isiXhosa people, for all their scanty resources, has built more wisely than expert architects and that in this architecture, the isiXhosa people have established principles of design that have been ignored at great
cost. It would be a mistake to romanticise these accomplishments with respect to ‘civilized’ and ‘educated’ standards of scale, amenity, safety and permanence (Fitch and Branch, 1960), the actual implementation thereof within the Reconstruction and Development Program has proven to be entirely inadequate (Makaka and Meyer, 2006). Discussed in Chapter Seven, the RDP homes offer neither profit in the literal imitation of local people’s handicraft techniques nor in the artificial constraint of building materials to those locally available. Vernacular architecture therefore merits our study for its principles, as these have deep relevance for architects and the South African ill-housed population. The cost in building materials and in fuels has proven to be altogether prohibitive for the sustainable future of rural and peri-urban societies.

It is vital that vernacular and indigenous buildings and homes are studied for the usefulness of their concepts (not merely copied for antiquarian reasons) – and ability to introduce a sound South African identity, sustainable communities, innovative methods of construction, empowering opportunities for local people along with a thread of advantages unmentioned (Biermann, 1971). Emphasis should be placed on self-sufficiency, trying to reduce the overall levels of urban migration and the depletion of resources. By investing in the training of community members as craftsmen, to help build their own communities and understand the processes involved, a chain reaction of empowering the presently redundant populace. Possible teachers may be identified who in turn could start their own programme to teach villagers how to build their own sustainable homes (Chapter Seven).

In closing, the developmental and ecological approach is a process: directions or paths of advancement can be determined and ends can, for the process of sustainable change influence the nature of the problems which currently exist (Chapter Five). If one believes in the basic tenet of freedom or liberation which South Africa ascribes to, one has to accept that the ideological dispensation which emerges over time must be the reflection of the will of the people, not the will of a minority of articulate members. Furthermore, the livelihoods and rights of the generations to come – that of a better life – cannot be sacrificed in the hope that eventual sustainable changes will bring benefits while using the Reconstruction and Development Program in its current state. Therefore architects, as “authoritative critics” who have the ability “to revive people’s faith in their own culture” (Fathy, 1986) must take up a position whereby they effect short-term improvement while recognising uncertainties and facilitating in longer-term societal relationships and processes to be resolved. To do this, architects must ensure that short-term sustainable actions do not reduce longer-term options. It has been justified throughout the dissertation that housing is a symptom of broader qualitative dimensions: it is also an institution that is vitally affected by the interaction of a wide variety of actors and interests. It is this institutional dimension which allows the issue of housing to be used as a vehicle through which broader societal issues crystallise while short-term and significant improvements to the quality of lives are achieved.
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APPENDICES:

1

THE CASE OF uMASIZAKHE TOWNSHIP IN GRAAFF-REINET, EASTERN CAPE, SOUTH AFRICA:

1. Name: ______________________________________

2. House Address: ______________________________________;
UMasizakhe, Graaff-Reinet, Eastern Cape

GENERAL:

3. Can you read?
   a. YES
   b. NO

4. Do you/ someone in your house work/ have a job/ income?
   a. YES
   b. NO

5. If YES, what? ______________________________________

6. How long have you/ your family lived in this house?
   a. 1-5 years
   b. 6-15 years
   c. 16-25 years
   d. 25+ years

7. Does this house belong to you/ your family?
   a. YES
   b. NO

8. If NO, to whom does it belong? ____________________________

9. How many people live in this house?
   a. 1-2 people
   b. 3-6 people
   c. 7-10 people
   d. 11+ people

10. Do you/ your family practice ancestral worship?
    a. YES
    b. NO

11. If YES, where? ______________________________________

12. FLOOR MATERIAL:
    a. Concrete
    b. Concrete + Tiles
    c. Bricks
    d. Timber/ “planke”
    e. Dung
    f. “Dagha”/ Natural Earth
    g. Other

For office use only

□ 1 2 3 4 5 6

□ 7

□ 8

□ 9 10

□ 11

□ 12

□ 13 14

□ 15

□ 16

□ 17 18

□ 19

□ 20 21

□ 22

□ 23

□ 24

□ 25
13. FLOOR MATERIAL SOURCE:
   a. Local shop – in Graaff-Reinet
   b. Shop – outside of Graaff-Reinet
   c. Local/ Farm
   d. Local/ River
   e. Site/ Handmade
   f. Local/ Velt
   g. Other

14. WALL MATERIAL:
   a. Fired bricks
   b. Earth (adobe)/ clay bricks
   c. Stone
   d. Timber “planke” + mud “Dagha”
   e. Tin
   f. Natural Earth “Dagha”
   g. Other

15. WALL MATERIAL SOURCE:
   a. Local shop – in Graaff-Reinet
   b. Shop – outside of Graaff-Reinet
   c. Local/ Farm
   d. Local/ River
   e. Site/ Handmade
   f. Local/ Velt
   g. Other

16. Is there insulation in the walls?
   a. YES
   b. NO

17. If YES, what material?
   a. Cardboard
   b. Hardboard
   c. Newspaper
   d. Timber “planke”
   e. Bags/ Sacking
   f. Plastic
   g. Other

18. ROOF MATERIAL:
   a. Corrugated Iron/ Tin
   b. Thatch
   c. Grass
   d. Roof Tiles
   e. Other
19. ROOF MATERIAL SOURCE:
   a. Local shop – in Graaff-Reinet
   b. Shop – outside of Graaff-Reinet
   c. Local/ Farm
   d. Local/ River
   e. Site/ Handmade
   f. Local/ Velt
   g. Other

20. Is there insulation in the ROOF/ CEILING?
   a. YES
   b. NO

21. If YES, what material?
   a. Cardboard
   b. Hardboard
   c. Newspaper
   d. Timber “planke”
   e. Bags/ Sacking
   f. Plastic
   g. Other

22. Who is responsible for MAINTENANCE in and around your house?
   a. You/ the inhabitants
   b. The owner
   c. Family members
   d. Community members
   e. Contractors
   f. Municipality/ Government

SUSTAINABILITY:

23. How do you keep your house warm in the winter?
   a. Mbaawuula: Tin drum with wood/ coals/ charcoal
   b. Fireplace (with chimney)
   c. Heater (Paraffin, gas, electric)
   d. None, my house is cold in winter
   e. None, my house is warm in winter
   f. Other

24. How do you keep your house cool in the summer?
   a. Open doors and windows
   b. Close doors and windows
   c. Fan
   d. None, my house is hot in summer
   e. None, my house is cool in summer
   f. Other
25. Does your house cross-ventilate?
   a. YES
   b. NO

26. Do you love and take pride in your house?
   a. YES
   b. NO

27. Would you rather:
   a. Live in a traditional/vernacular house?
   b. Live in an RDP house?

28. What is your reason for the above question? ________________________________

   *Voice-recorded answer