



PUBLIC ACCEPTANCE OF ALTERNATIVE BUILDING TECHNOLOGIES FOR RURAL HOUSING DEVELOPMENT IN THE EASTERN CAPE PROVINCE OF SOUTH AFRICA

by

Tshiphiri Tshivhasa

(11500873)

A dissertation submitted in fulfilment of the requirements of the Masters in Rural Development (MRDV) degree

Institute for Rural Development

School of Agriculture



University of Venda

SOUTH AFRICA

Supervisor : Prof. J. Francis

Co-Supervisor : Dr M. Mwale



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DECLARATION

I, Tshiphiri Tshivhasa, hereby declare that this Masters in Rural Development (MRDV) dissertation submitted to the Institute for Rural Development at the University of Venda has not been submitted previously for any degree at this or another university. It is original in design and in execution, and all reference material contained herein has been duly acknowledged.

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Date 17/9/2013

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I would like to acknowledge all people who contributed to the success of this dissertation. The Almighty God gave me the wonderful gift of me, in the way for me all along my academic venture and gave me strength to put through the rough terrain. My academic supervisors (Prof. J. Francis and Dr M. Mvoto) were always by my side to ensure that the work produced was the best possible. My employer, the Eastern Cape Department of Human Settlements, Human Resources, as well as my work supervisors (Mr. Masendu and Mr. Fiatele) always gave me the necessary support to ensure that I performed well both academically and professionally. Furthermore, my employer accorded me the opportunity to carry out my research on one of its development projects in the Ndeyana community.

The support of the Buffalo City Metropolitan Municipality's Housing Portfolio Committee, in particular Councillor Mgezi, deserves special mention. Thank you to Councillor Mphatajala of Ward 49 and Ward Committee members, as well as civic organisations in the Ndeyana community, for ensuring that data collection and feedback reporting took place in conducive environments. The Ndeyana community at large willingly availed themselves to serve as respondents. My research assistants made the field research activities seem so easy. Thank you for your dedication and commitment. Dr. Pathwell Moyo guided me through face to face

I dedicate this dissertation to my father (Mr. A.J. Tshivhase) and my mother (Mrs. N.R. Tshivhase) who raised me in a God loving family where there was a positive stress on hard work and courage to achieve the best academic results.

I also want to thank the Research Committee for making this study a success by providing funds for research assistance during data collection.

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I also want to thank the University of Venda's Research and Publications Committee for making this study a success by providing funds for research assistance during data collection.

Officers working in the Eastern Cape Department of Human Settlements (ECDHS), the Buffalo City Municipality (BCM), alternative building technologies (ABT) companies, community leaders and members of the case study areas were the respondents. Qualitative and quantitative research methods were used to address the objectives. Purposeful and systematic sampling methods were adopted. Semi-structured interviews, focus group discussions and formal survey questionnaires were used to collect data. Content analysis, Chi-square and simple matrix analyses were carried out.

The key findings of this study provided empirical evidence on the reasons for the Ndevana community to reject ABT for housing development, it also served as guide to develop the best approach for the facilitation of community buy-in of alternative building technologies for housing development in the Eastern Cape Province. The results revealed various areas of local perceptions of ABT by the Ndevana community. These areas included community understanding and knowledge of ABT and their general perceptions regarding ABT. The

ABSTRACT

Millennium Development Goal (MDG) Target 11 states, "By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers." Indicator 32 (7.2) of the MDGs clarifies the expected outcome as "the proportion of households with access to secure tenure." The Constitution of the Republic of South Africa of 1996 mandates the state to take reasonable legislative and other measures in ensuring that everyone enjoys a right to adequate housing, social security and appropriate assistance. Since 1994, South African governments have created about two million housing opportunities, mainly benefitting the urban-based poor. In the process, rural housing was not sufficiently addressed due to lack of appropriate technology for construction. This implies that it was necessary to introduce alternative building technologies in order to speed up housing delivery in rural South Africa.

Alternative building technology was introduced in the Eastern Cape Province as a pilot human settlement project aiming to speed up housing delivery. However, the Ndevana community where it was piloted rejected the technology at the procurement stage. There was no clear reason for rejection of the technology. This justified conducting a study to explore public acceptance of alternative building technologies for housing development. The specific objectives of the study were to: (a) determine what community members perceived to be the ideal characteristics of alternative building technologies; (b) to establish whether the perceptions on alternative building technologies vary across the community; and (c) assess the reasons for the rejection of alternative building technology by community members.

Officers working in the Eastern Cape Department of Human Settlements (ECDHS), the Buffalo City Municipality (BCM), alternative building technologies (ABT) companies, community leaders and members of the case study area were the respondents. Qualitative and quantitative research methods were used to address the objectives. Purposive and systematic sampling methods were adopted. Semi-structured interviews, focus group discussions and formal survey questionnaires were used to collect data. Content analysis, Chi-square and simple matrix analyses were carried out.

The key findings of this study provided empirical evidence on the reasons for the Ndevana community to reject ABT for housing development. It also served as guide to develop the best approach for the facilitation of community buy-in of alternative building technologies for housing development in the Eastern Cape Province. The results revealed various areas of social perceptions of ABT by the Ndevana community. These areas included community understanding and knowledge of ABT and their general perceptions regarding ABT. The

community perceptions on why ABT was rejected as well as their views towards the acceptance of the ABT were also presented in the results.

Some of the key results areas include the rejection of ABT related to cost for change, the community was not involved in the choice of their housing development using ABT, and they thought that ABT houses were non-habitable and could pose risks to the lives of the inhabitants. They also feared that the ABT houses might not enter the housing market and they might no longer benefit from the housing subsidy scheme if the ABT houses suffered extreme structural defects that might make them non-habitable. The community members believed that for ABT housing development to succeed there were certain issues that needed to be improved. Some of these issues include that ABT houses could be extended without structural defects, constant inspection should be done during the construction phase and proper consultation should be done to prepare the community for the implementation of ABT for housing developments. Whilst the ABT development administrators thought that the policy should be formulated to manage the implementation of ABT, the contractors who use ABT products suggested that the payment model should also be strengthened.

Key words: Alternative technologies, development, housing, public acceptance

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ENG Breaking New Ground

ECDHS Eastern Cape Department of Human Settlements

EMIH Eric Molohe Innovation Hub

FG Focus group

FGs Focus Groups

EPC Energy Performance Certificates

HIPs Home Information Packs

HUDCO Housing and Urban Development Corporation

IASP International Association of Science Parks

IDP Integrated Development Plan

IRBC Indian Rural Building Centre

IRD Institute for Rural Development

LM Local Municipality

MDG Millennium Development Goals

MRLGH Nam-Dien Ministry of Regional and Local Government and Housing

NDohS National Department of Human Settlements

NGO Non-Governmental Organisations

NHBRC National Home Builders Registration Council

PEA Predicted Energy Assessment

RHEP Rural Health and Environment Programme

SANPAD South Africa Netherlands Research Programme on Alternatives in Development

SCOGA Southern Cape Coastal Condensation Allowance

SPSS Statistical Package for Social Sciences

STATSA Statistics South Africa

STS Science, Technologies and Sustainability

UNCHS United Nations Commission on Human Settlements

UN-HABITAT United Nations Human Settlements Programme

ABBREVIATIONS AND ACRONYMS



ABT	Alternative Building Technologies
BCM	Buffalo City Municipality
BNG	Breaking New Grounds
ECDHS	Eastern Cape Department of Human Settlements
EMIH	Eric Molobi Innovation Hub
FG	Focus group
FGs	Focus Groups
EPC	Energy Performance Certificate
HIPs	Home Information Packs
HUDCO	Housing and Urban Development Corporation
IASP	International Association of Science Parks
IDP	Integrated Development Plan
IRBC	Indian Rural Building Centres
IRD	Institute for Rural Development
LM	Local Municipality
MDG	Millennium Development Goals
MRLGH	Namibian Ministry of Regional and Local Government and Housing
NDoHS	National Department of Human Settlements
NGO	Non-Governmental Organisations
NHBRC	National Home Builders Registration Council
PEA	Predicted Energy Assessment
RHEP	Rural Health and Environment Programme
SANPAD	South Africa Netherlands Research Programme on Alternatives in Development
SCCCA	Southern Cape Coastal Condensation Allowance
SPSS	Statistical Package for Social Sciences
STATSA	Statistics South Africa
STS	Science, Technologies and Sustainability
UNCHS	United Nations Commission on Human Settlements
UN-HABITAT	United Nations Human Settlements Programme

1.1. Background

By the year 2030 an additional three billion people, which is approximately 40% of the world's population, would need housing. This translates to a demand of 96 150 new affordable housing units every day and 4 000 every hour (UN-Habitat, 2005). One out of every three city dwellers - nearly one billion people - live in a slum. The number of slum dwellers is expected to double by 2030. Lack of water and sanitation, overcrowding, non-durable housing structures and insecure tenure characterise slum dwelling (United Nations Habitat: UN-Habitat, (2006). As much as 70% of the urban housing stock in sub-Saharan Africa, 50% in South Asia, and 25% in Latin America and the Caribbean is of poor quality and not compliant with local regulations (Kissick, 2006). In view of this, South Africa faces numerous challenges and a wide range of main structural issues to which both the public and private sectors are exposed. This relates to availability of land, affordability, subsidy constraints, access to funding and the limitations of development planning (Khakhi, 2009). According to UN-Habitat 2006 report prepared for the World Urban Forum in Vancouver, Improving conditions and addressing the global housing crisis should be a high priority for national governments and international donors but, for reasons that were not clear, in many countries around the world opportunities to achieve economic, social and civic development goals through housing-related initiatives were being missed.

The UN-Habitat was assigned the responsibility of assisting member states to monitor and gradually attain the "Cities without Slums". This is Target 11 of the Millennium Development Goals (MDG). It is one of the three targets of Goal 7, coined as "Ensure Environmental Sustainability". Target 11 states that "a significant improvement in the lives of at least 100 million slum dwellers should be achieved by 2020. Indicator 32 (7.2) of the MDGs clarifies the expected outcome as the proportion of households with access to secure tenure (Khoza, 2008; Samari, 2010).

In addition to the international perspectives highlighted above, the Constitution of the Republic of South Africa mandates the state to take reasonable legislative measures to ensure that everyone enjoys the right to adequate housing, social security and appropriate assistance. Since 1994, the South African government has created about two million housing opportunities, mainly benefitting the urban area-based poor (Majova, 2008). However, rural housing remains not sufficiently addressed. In an effort to address this situation, the National Department of Human Settlements (NDoHS) introduced the Rural



Housing Subsidy: Communal Land Rights Policy of 2009. The policy seeks to accelerate the delivery of housing to rural communities.

Majova (2008) is of the view that typologies of rural housing must consider the specifics of the site and landscape area. New technologies must conform to the identity of the target community and housing needs. If this happens the settlement patterns in rural areas would be maintained. Apart from this, the people's cultural heritage would be preserved and the National Home Builders Registration Council (NHBRC) standards would be met. Moreover, use of appropriate alternative building technologies would be enhanced and promoted. The technologies used must allow for future changes and renovation in the different contexts of rural areas. They must comply with the requirements, policies, systems, tools, institutional arrangements and financial models of housing development.

The Extended Cabinet Lekgotla held in January 2010 tasked the NDoHS to implement "Sustainable Human Settlements and Improved Quality of Household Life". Four areas of work to be achieved by 2014 were prioritised, namely accelerated delivery of housing opportunities; access to basic services; more efficient land utilisation; and an improved property market in the field of housing opportunities. According to the South African National Minister of Human Settlements (Sexwale 2010), a target of 220 000 units per year was set. This situation necessitated the introduction of appropriate building technologies to speed up housing delivery in the country.

1.2. Statement of the Research Problem

The Eastern Cape Provincial government acknowledged the opportunity that alternative building technologies presented, resulting in it introducing pilot projects aiming to test their suitability in housing development. However, the Ndevana community where this was first piloted rejected the technology at the procurement stage. It is unclear why this community rejected the technology. This study was undertaken to explore the reasons why the Ndevana community rejected the ABT. The lessons generated through this study might give useful insights worth taking into account when introducing similar technologies in other parts of the Eastern Cape Province.

Apart from the pilot projects referred to above, the South Africa Netherlands Research Programme on Alternatives in Development (SANPAD, 2008) carried out a study focusing on "the process of making bricks using earth also known as earth construction. According to Steyn (2008), earth construction was more acceptable in providing private building (housing) to local communities in support of local economic development. The study revealed that



earth construction was regarded as backward technology and thus the community rejected it (Steyn, 2008). It was also reported that participation of beneficiaries in this study considerably fluctuated. It was not clear why there was such a fluctuation in participation. Therefore, it was important to determine the reasons for the lack of clarity, which necessitated conducting a study to explore public acceptance of alternative building technologies for housing development.

1.3. Objectives

The main objective of the study was to examine the perceptions of community members regarding public acceptance of ABT for housing development. This was achieved through carrying out studies focusing on the following specific objectives:

- (i) to determine the community-perceived ideal characteristics of ABT for housing development;
- (ii) to determine whether the perceptions of ABT varied among community members; and
- (iii) to assess the reasons for the rejection of ABT by community members.

1.4. Research Questions

The two research questions that this study sought to answer were:

- (i) Why did the Ndevana community reject the ABT?
- (ii) What needs to be done in order to ensure that communities adopt ABT?

1.5. Research Hypotheses

- (i) The perceptions of community members on the ideal characteristics of alternative building technologies for housing development are the same; and
- (ii) Community members have the same perceptions on the reasons for rejecting alternative technologies for housing development.

1.6. Definition of Key Concepts

Public acceptance in the context of this study refers to the recognition and approval of a subject matter by any entity. These may range from communal, civic, municipal and provincial to national government levels.

In this study *alternative technology* means any expertise, skills, knowledge, equipment, machinery or tools other than conventional ones meant to accelerate the delivery of housing.



In the process the technology should not compromise quality and durability of any erected structure.

2.1. Introduction

This study adopted the definition of *housing construction* as a form or a manner of building or putting together various parts of a housing structure.

1.7. Organisation of the Dissertation

Chapter 1 introduces the underlying imperatives of the study. It covers the background, where the international concerns that led to the adoption of MDGs are explained. The South African policy response to MDGs is discussed. Challenges faced in implementing the policy on housing are used, leading to the definition of the statement of the research problem. Two broad research questions that this study addresses are also included. The last part of the chapter is devoted to the definition of key concepts.

In Chapter 2, previous research on acceptance of alternative technologies, housing development policies and other relevant literature are explored and explained. Special attention is devoted to discussing the factors that might elicit acceptance or rejection of seemingly appropriate innovations. The major issues considered when introducing and facilitating adoption of alternative technologies for social development are reviewed.

Chapter 3 presents the research methodology used in the study. The activities executed in order to achieve the objectives of the study are described. The following aspects are included in this chapter: research area, population and sampling procedures, as well as data collection and analysis. Ethics adhered to when conducting the study are infused in relevant parts of the research methodology. Thereafter, full details on the references used to build this chapter are given.

Chapter 4 presents the results of the qualitative research. It outlines the ABT trajectory in the Eastern Cape Province, starting from the time of embarking on a search for best practices. Reference is made to the pilot housing development project in the province, with Ndevana being selected as a pilot site. In Chapter 5, the results of the quantitative study are presented.

Chapter 6 integrates the results and presents a synthesis of the issues that this study unravelled. This is done taking into account the context of the body of knowledge on theories relating to rejection and acceptance of innovations. Recommendations obtained from the findings of the study are infused with the general conclusion in Chapter 7.

2.1. Introduction

In South Africa, backlogs in the provision of housing continue to grow despite the fact that more than 2.4 million subsidised houses have been delivered since 1998. In 1998, the national backlog was about 2.2-2.5 million houses (Khoza, 2008). Since then, many changes have taken place, especially in the rural areas. The changes include diminishing involvement in farming and the decline of micro-level institutions of governance (Bekker, 2003). As a result of these changes, the land economy continued to collapse, leading to the migration of workers to more dense rural settlements closer to ancestral homes or urban areas. According to Bekker (2003), the principal reason for the migration to urban or more dense rural areas was the search for income and employment. There were also others who migrated in search of better infrastructure, including housing, schools, health facilities and access to transport. Migration and urbanisation worsen the demand for housing and services such as waste management and transportation facilities. In some instances, this has resulted in urban sprawls on the outskirts of existing settlements.

The United Nations Commission on Human Settlements (UNCHS, 1997) defined housing as physical shelter as well as related services and infrastructure. Inputs such as land and finance which were required to produce and maintain houses were part of the services and infrastructure. In addition, the United Nations (1978) recognised rural housing as the dwelling units, in addition to utility services such as roads, water supply, sewage disposal, electricity and fuel. This definition encompasses markets, health centres, social and cultural areas for education, religion, recreation, and community participation and management. Agricultural facilities and agro-industrial activities and services form part of the system. Wienecke (2010) adopted this definition in his article entitled *Promoting alternative technologies*.

According to Wienecke (2010), the reliance on conventional building approaches had not helped addressing the backlog in housing delivery. The author further alluded to the fact that attempts have been made to alleviate some of the constraints. A case in point was the introduction of community-based projects or involvement of emerging contractors in housing construction processes. A slower growth rate in income and a constant increase in the prices for conventional materials and services negatively affected the extent to which many households afforded the technology. Among other initiatives, alternative technologies were often considered in order to lower the costs and overcome the challenge of housing delivery.

This chapter serves as a review of existing literature on housing development. Special attention was devoted to recent studies on alternative building technologies, which was the principal focus of this study.

2.2. International Policy Perspectives

2.2.1. Poverty and Housing

According to the “American Housing Survey” report (Kaufman, 2012), more than 17.6 million households with children experience at least one major housing problem. This equates to more than one out of every two households with children in the country. In addition, poorer families were more likely to confront housing problems, reflected in almost 87% of poor households with children experiencing at least one such challenge. However, by far the most widespread challenge facing poor families was that housing was not affordable. It affects millions in less tangible ways than other housing challenges because families who pay large parts of their incomes for housing often have little left for food, clothing, health care and other necessities (Kaufman, 2012). In addition, Ashley (2013) found that in 2008, the number of households that spend more than half of their income on housing each month rose by a third, to 18.6 million households. If this was translated into the number of Americans, it would equal 44.2 million. In addition, more than 9.2 million households that have children pay for housing.

2.2.2. Millennium development goals

In September 2000, the leaders and representatives of 189 countries met to lay down tangible goals to combat poverty throughout the world. At the summit, the leaders agreed to adopt the Millennium Development Goals (MDGs) which set out eight key areas to be achieved by 2015, using 1990 as the baseline year (UN-HABITAT, 2003; Samari, 2010). The United Nations Secretary-General, Ban Ki-Moon, described MDGs as the “human needs and basic rights that every individual around the world should be able to enjoy. This included freedom from extreme poverty and hunger; quality education, productive and decent employment, good health and shelter; the right of women to give birth without risking their lives; and a world where environmental sustainability was a priority. The leaders also pledged to establish a wide-ranging global partnership for development that would engage the private sector and civil society organizations, and make the benefit of new technologies available to everyone so as to achieve these universal objectives” (Samari, 2010).

2.2.2. Provision of housing for the poor

Reddy (2009) revealed that in 1985 the first national programme for housing for the rural poor was introduced in India Awas Yojana. For the rural poor, this was a basic need carried out with a sense of pride, ownership and belonging. Over the years more than 130 houses were constructed. However, the extent of homelessness in rural areas and the number of those without permanent housing remained a staggering 150 housing units. Only massive investment in the provision of housing could bridge this gap.

According to Odhiambo and Wekesa (2010), the majority of the poor in urban areas in most developing countries occupied settlements characterised by inadequate dwelling units and lack of basic infrastructure such as portable water, electricity, access to roads and sanitation facilities. According to Statistics South Africa (STATSA, 2011), 11.1 million people in the country currently reside in informal settlements. The Housing Development Agency (HDA, 2012) report on South Africa Informal Settlements Status also confirms that.

Alternative technologies should ensure that adequate shelter was provided to the poor in both rural and urban areas. Adequate shelter may vary among individuals, communities and countries. This also depends on socio-economic, cultural and political factors. Habitat Agenda (1996) suggested that adequacy should be determined together with the people concerned. Odhiambo and Wekesa (2010) supported the view of Habitat Agenda that adequate shelter was a whole process that integrates the socio-economic, cultural and environmental factors of the target community.

2.2.3. Provision of construction technologies to accelerate delivery of housing

Reddy (2009) believed that an important concern with housing for the poor, whether in rural villages or in the slums, had been ensuring that there was a reduction in the costs of construction. The search for cost-effective construction technologies which also use local materials has gathered momentum. Steyn (2003) held the view that such technologies also make use of renewable energy and materials, which were simple and work in harmony with the environment. Odhiambo and Wekesa (2010) indicated that alternative building technologies should be responsive to the needs of the urban poor and their environment.

As had been the case with many traditional crafts, there was a risk of losing house construction skills. This implies that the preservation and propagation of such skills must be a key priority (Reddy, 2009). Also, Donovan (2010) suggested that technologies should be

shaped by knowledge, values, skills, and resources of the societies producing them. At the same time, technologies shape that particular society.

In an effort to recognize the need for rural housing, the Indian government introduced Rural Building Centres or Nirmati Kendras with the support of the Housing and Urban Development Corporation (HUDCO) and the Ministry of Rural Development. A Rural Building Centre in a district utilises and showcases relevant construction technologies of that area which were cost-effective and adoptable in housing programmes (Reddy, 2009). Rural Building Centre functions were identical to science and technology parks. In South Africa, Eric Molobi Innovation Hub (EMIH) was initiated to showcase and test the new housing technologies available in the building industry.

2.2.4. Science and technology parks

A science and technology park was defined by the International Association of Science Parks (IASP) as an organisation managed by specialised professionals whose main aim was to increase the wealth of its community through promoting the culture of innovation and the competitiveness of its associate business and knowledge base institutions (Larsen, 2004). Larsen (2004) promotes the identification of a need for a conceptual framework for addressing integration of policy in the context of science and technology parks in the United States. This framework highlighted three features. Firstly, science and technology parks were spatially agglomerated economic activities. They focus on certain technology areas. Another feature was the development of parks, which was often linked to stakeholder processes. This involves actors representing various interests. Lastly, there was a need for public policy that promotes the development of science and technology parks. It should act as a vehicle for industrial renewal, growth and innovation. The development of the parks was considered to constitute a component of public science and technologies policy aiming to promote regional development and innovations.

Appropriate rural technology parks were introduced in India as an intervention. This came in the form of close working relationships between the government and development executives working in various districts, practitioners in civil society/NGOs, resource institutions, academic institutions, research organisations, elected representatives, religious bodies and other stakeholders. Located in an area of 65 acres (1 acre = 0.4 ha) earmarked for the rural technology park, the different constructions in the building centre provided an opportunity for showcasing various materials and construction technologies (Reddy, 2009).

In addition to this, new technologies would be tested and demonstrations made showing that, indeed, the technologies worked.

The same initiatives described above were introduced in 2002 by the Namibian Ministry of Regional and Local Government and Housing (MRLGH) (Sokopo, 2010). They supported the proposal to build the parks to investigate and test alternative technologies, building materials and approaches. This helped to ensure that resources were better utilized. Among these resources were old tyres, building rubble and metal drums.

2.3. The South African Policy Perspectives on Housing Delivery

2.3.1. Application of rights to adequate housing

The Constitution of the Republic of South Africa of 1996 mandates the state to take reasonable legislative and other measures to ensure that everyone enjoys the right to adequate housing as well as social security and appropriate assistance. Since 1994, the South African government has created about two million housing opportunities for the poor in urban areas (Majova, 2008). The latter author further mentioned that rural housing was not receiving much attention compared to urban housing development. In an effort to deal with the delivery of housing to rural communities on communal land, the National Department of Human Settlements (NDoHS) introduced the Rural Housing Subsidy: Communal Land Rights Policy of 2009 which seeks to accelerate the delivery of housing to rural communities residing on communal land.

Another key policy imperative was South Africa's anti-poverty strategy, whose sixth pillar, namely *improved access to assets such as land, housing, funding and other resources*, acknowledges that provision of housing should be a priority issue. Through effective implementation of this strategy, the government would improve the participation of the urban poor in promoting savings, accumulation and education as the route out of poverty. Cheru (2001) stated that in South Africa poverty was inter-twined with a host of social and economic issues. The burden of poverty was exacerbated by limited access to basic services, poor housing, limited employment opportunities and inadequate infrastructure, all of which had their roots in the legacies of apartheid.

Although the government made considerable inroads into housing provision, there was still considerable debate relating to innovative ways of making available affordable shelter in livelihoods-accessible locations. Parnell (2008) pointed out that densification was still an

important issue even though attention had turned away from compact city planning in its earlier form due to the high costs and scarcity of urban land (Cross, 2008). The goal of delivering as many units as possible held down the prices of individual units in South Africa. This has led to the development of projects in the urban periphery and in localities not favourable for poverty livelihoods.

2.3.2. Accelerating rural housing delivery

An Eastern Cape Provincial Rural Housing Summit held in 2008 acknowledged that delivery of decent and affordable shelter in rural areas was beset with many challenges. Ambiguous classification of rural dwellings as “informal” was one major challenge which contributed to backlogs. The summit concluded that rural communities jealously guarded their housing settlement patterns, which helped them to preserve their traditional heritage (Majova, 2008). There was a need for taking this into account when recommending alternative technology for housing development projects in rural areas. Therefore, it was imperative to link rural housing with the National Housing Framework and National Housing Builders Registration Council (NHBR) standards. This review identified the gap left by the summit in exploring other factors that may lead to social acceptance or rejection of alternative technologies. In order to address this gap the following section deals with social resistance to change.

2.4. Resistance to Social Change

Not all technological options and alternatives are developed or explored and adopted. Quite often, alternatives may be more expensive or less economical, in addition to other reasons. Currently, many organisations do not implement technologies aimed at reducing and minimising waste, despite their high levels of availability and probable cost savings (Beder, 2010).

Horton and Hunt (1989) argued that society does not always accept all proposed innovations. There is often resistance when the change is imposed on them, is not well-understood, and is regarded as a threat to the values that people subscribe to (Spicer, 1952; Majova, 2008). Furthermore, Horton and Hunt (1989) pointed out that acceptance of innovation is never total and is always selective. These authors argued that a process of selective acceptance operates as some innovations are adopted instantly while for others there is a long delay. Some innovations are rejected outright while others are partially accepted.

Noel (2011) believes that acceptance is the first step towards social change. The author further mentioned that accepting an innovation does not mean passive acquiescence. Goldston (2010) suggested that the idea of growth and change often stems from the basis that people were disadvantaged in some way and that there was a need to improve lives. Wienecke (2010) further accentuated employment creation and utilization of locally available materials as vital to social acceptance of alternative technologies.

2.4.1. Specific attitudes and values

Apart from a general attitude towards change, each society has many specific attitudes and values, which it cling to its objects and activities (Horton and Hunt, 1989; Donovan, 2010). If an object has a purely utilitarian value, that is if it is valued because of what it would do, change may be accepted more readily. In contrast, if a feature of traditional culture is valued intrinsically, change is less readily accepted.

Sokopo (2010) revealed that alternative technologies could be beneficial in accelerating housing delivery because of faster construction methods such as 2-3 days of assembling wall panels, roofing and plastering. Majova (2008) suggested that rural housing typologies must consider the specifics of the site and landscape area. New technologies must conform to community identity and housing needs. However, they must align with changing settlements patterns in rural communities.

The South Africa Netherlands Research Programme on Alternatives in Development (SANPAD) conducted a study on the process of making earth construction more acceptable (Steyn, 2008). The study revealed that earth construction was regarded as a backward technology and thus was not accepted. The study was meant to develop an effective tool to change people's attitudes towards alternative technologies.

2.4.2. Demonstrability of Inventions

Supporting their ideology that acceptance correlates with usefulness of innovations, Horton and Hunt (1989) stated that not all innovations are useful. They spelt out that an innovation is most quickly accepted when its usefulness could be easily demonstrated. They pointed out that many innovations work so poorly in their earlier stages because most people waited until they were perfect. Some innovations are easily demonstrated on a small-scale while others are costly because they are only demonstrable on a large scale.

Many social inventions can be tested only through a long-term trial, involving at least an entire society. People hesitate to adopt an innovation until they had been shown how it works. Yet they can only determine the practical value of the social inventions through adopting them. This dilemma often slows down their acceptance of the innovations (Horton and Hunt, 1989). In South Africa, the Eric Molobi Innovation Hub was instrumental in utilizing alternative technologies across the country's provinces. As Sokopo (2010) revealed, some provinces welcomed the idea of establishing provincial innovation hubs to showcase various technologies.

Wienecke (2010) suggested that alternative technologies need to be incorporated in the formal education system, ranging from vocational to tertiary education institutions. Mutagamba (2004) believes that education and acceptance of alternative technologies are closely correlated. In line with this argument, he pointed out that the Ugandan government carried out advocacy work in support of utilising alternative technologies as a strategy for accelerating housing delivery. This drive helped enhance education on the technologies.

2.4.3. Compatibility with Existing Culture

According to Horton and Hunt (1989), innovations are most readily accepted when they are not in conflict with the existing culture. They believe that few innovations are compatible with local culture. Compatibility is achieved through considering the following: potential conflict with existing patterns; need for new patterns not part of the culture; and the fact that some innovations are substitutive and not additive. In the following sections, these factors are explained.

Innovations may conflict with existing patterns

When an innovation conflicts with existing cultural patterns, it is possible that it may be rejected, accepted or conflict cultural traits may be modified to accommodate it. Also, technology may be accepted and its conflict with existing culture may be concealed and evaded through rationalization. While not always decisive, conflict with the existing culture discourages acceptance of an innovation. Sometimes an apparent conflict could be avoided through compartmentalizing its role.

Majova (2008) suggested that rural housing typologies must consider the specifics of the site and landscape area. Also, new technologies must conform to community identity and housing needs but not change the settlement patterns of rural communities. They must also preserve the cultural heritage, meet NHBRC standards and enhance and promote the use of

appropriate alternative technologies. Apart from this, it is important to ensure that technologies allow for future changes and renovation in different rural contexts. Lastly, there is need for complying with the housing development requirements, policies, systems, tools, institutional arrangements and housing financial models.

Innovation may call for New Patterns not present in the culture

In general, a society tries to use an innovation in old, familiar ways. When this fails, the society may develop new ways of making effective use of the new element. In order to beef up this idea, Horton and Hunt (1989) used an example that disguised new building materials to make them look like old, familiar materials. In this case concrete blocks were faced like rough finished stone. Asphalt and asbestos shingles were finished to appear as if they were brick or wood. Aluminium sliding was made to resemble wood. After some years, these materials were used in designs and ways which made full use of their own properties and possibilities. Most innovations called for some new patterns in the culture, which took time to develop (Majova, 2008). This also served as a subject of measurement in relation to this study.

Some innovations are substitutive not additive

Some innovations are not readily accepted. It is easier to accept innovations which could be added to the culture without requiring the immediate discarding of some familiar trait. Arensberg and Niehoff (1971) agreed with this view and revealed that whenever the nature of the choice was such that one could not have both the new and the old; acceptance of the former is usually delayed. As a result, only a few innovations can simply be added to the existing culture. Sokopo (2010) reported that consumer perceptions that houses built with alternative building materials could not be extended, presented acceptance challenges as explained below.

2.4.4. Cost of Change

In general, people who are very poor often resist change because they cannot afford to take any risks (Arensberg and Niehoff, 1971). Change is nearly always costly. It disrupts the existing culture and might destroy cherished sentiments and values, in addition to being costly at times. For example, a study carried out by the NDoHS (Sokopo, 2010) revealed a high cost of new technology (ZAR1, 004 – ZAR3, 600/m², excluding land and foundation) compared with conventional methods of housing construction. The amount presented in this case was equivalent to \$US118- \$424 at the exchange rate of ZAR8.5. Initial costs of

alternative building technologies and high levels of maintenance often exceeded the subsidy quantum (Sokopo, 2010). This study also explored whether there was a relationship between the rejection of ABT by the Ndevana community and the issues discussed in this section of the literature review.

In some cases, there are stakeholders who view the status quo as profitable and thus have vested interest. Most social change carries real or imaginary threats to such people. Each group is often an advocate of progress but this is usually not at the expense of its own vested interests. Those with vested interests only promote change whenever they believe it is profitable to them (Horton and Hunt, 1989). Therefore, most social reforms are never secured unless powerful people with vested interests redefine their interests and decide that it will benefit them. There are instances when change is so profitable to some that its harmful consequences are ignored (Arensburg and Niehof, 1981). For example, business people believe that strong government interventions infringe on their autonomy mainly because of the reluctance of governments to act against business interests. Legislation and economic instruments are seldom tough enough to foster technological change of the type required in order to achieve sustainability. However, such regulation would probably strengthen business in the long run.

2.5. Summary of Review of Literature

The study conducted by the SANPAD revealed that earth construction was perceived as a backward technology and thus was not accepted. Most authors suggested that rural housing typologies must consider the specifics of the site and the landscape area. Also, new technologies must conform to community identity and housing needs but not change settlement patterns of rural communities. They must also preserve the cultural heritage, meet NHBRC standards, enhance and promote the use of appropriate alternative technologies, ensure that technologies allow for future changes and renovation in different rural contexts, and, lastly, comply with the housing development requirements, policies, systems, tools, institutional arrangements and housing financial models.

In analysing the reasons for the rejection of ABT by the community members, the literature review reveals that many social inventions could be tested only through a long-term trial involving at least an entire society. People may be indecisive to adopt an innovation until they have been shown how it works. Yet they can only determine the practical value of social inventions through adopting them. This dilemma slows their acceptance of the innovations. Change is nearly always costly, disrupts the existing culture and might destroy cherished

sentiments and values at times. Most social changes carry real or imaginary threat to people with vested interest. Those with vested interests only promote change whenever they believe it is profitable to them. Also, the scarcity of some alternative building materials from local markets impacts negatively on their acceptance. A society may try to use an innovation in old, familiar ways. When this fails, the society may develop new ways of making effective use of the new element or totally reject the innovation.

It was also revealed by the literature review that science and technology parks were developed in various countries as a way of facilitating public acceptance of ABT. The example of such in South Africa is the Eric Molobi Innovation Hub which is situated at Soshanguve, Pretoria, in Gauteng Province. The country's provinces were encouraged to develop hubs in order to facilitate social buy-in of alternative building technologies within their reach.

The chapter on methodology that follows will be a road map to describe how the objectives of the research will be achieved.

3.2.1. The relevance of the case study area

The study was conducted in the Ndevana community (Figure 3.1) located within the Buffalo City Metropolitan Municipality (BCMM). According to the 2011 State of the Cities Report, the BCMM is situated on the east coast of the Eastern Cape Province, South Africa. It includes the towns of East London, Bisho and King William's Town, as well as the large townships of Mdantsane and Zwelitsha. The BCM was established as a local municipality in 2000 after South Africa's reorganisation of municipal areas. It was named after the Buffalo River, at whose mouth lies the only river port in South Africa. On 18 May 2011, the BCMM was separated from the Agathole District Municipality and converted into a metropolitan municipality.

The State of the Cities Report (2011) further states that the area has a well-developed manufacturing base, with the auto industry playing a major role. Daimler Chrysler has a large assembly plant located next to the port of East London, which produces a variety of vehicles for export. According to the Buffalo City Official Site, the climate is mild, with year-round sunshine and an average rainfall of 850mm (33.5 inches).

Statistic South Africa (STATSA, 2011) reveals that the population of 701 370 was largely Black (85.2 %), followed by White (8.4 %) and Coloured (5.7 %) minorities. There was also a small Indian community (0.6 %). The population grew at an average of 0.6 % per annum from 1996 - 2001. Households have, however, grown at a much faster rate, as extended

3.1. Introduction

The review of literature in the previous Chapter revealed some factors that might lead to the rejection of alternative building technologies (ABT). It was possible that some or all of the factors might explain why the Ndevana community in the Eastern Cape Province rejected the ABT when they were introduced. This study was carried out in Ndevana within Ward 49 of the Buffalo City Metropolitan Municipality (BCMM), aiming to reveal the reasons for the rejection of ABT in the area. This chapter is devoted to describing the research methodology used. The activities that were executed in order to achieve the objectives of the study presented in Chapter one are also outlined in this chapter. The research area, study population, sample and sampling procedures, data collection approaches and techniques, and data analysis are also described.

3.2. Description of the Case Study Area

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households 'disaggregate'. The Buffalo Municipality Integrated Development Plan Review (2011) reveals the growth rate for households over the five year period was 19, 8 %. This was an average annual household growth of 3.68%. The growth in the number of households translates into an increased demand for municipal services.

In terms of housing, the Community Survey (2007) estimated that 74% of households had formal shelter. The BCM estimates in its IDP (2012) that the total housing backlog for low-income households currently stands at about 70 000 units. The challenge of housing as well as the provision of basic services to all residents of BCM was confirmed in the ward survey conducted in 2007 and at previous public consultations. The challenge as spelled out in the IDP (2012) was not only about providing basic services and housing, but also about building sustainable human settlements, where residents have access to social and community facilities, economic opportunities, and a healthy and sustainable environment. The BCM Annual Report (2012) further added that the sustainable human settlements should also create opportunities that could be accessed through convenient public transport and a safe road network.

Ndevana is a congested semi-rural settlement stretching along the N2 road to East London about 10kms south of King William's Town. The shortage of some basic services as well as the rejection of ABT qualifies the Ndevana community to be selected as a case study area.

3.2.2. Search for best practices

In 2008, the Eastern Cape Department of Housing, formally known as Human Settlements, undertook what was described then as a "Tour for Best Practices". Its main objective was to find the solutions to curbing the backlog in housing delivery. The backlog in housing was partly attributed to social and technical issues. Among the social issues was rural to urban migration in search of good quality education, job opportunities and the quest to be in the proximity of markets. Technical issues were identified as the rugged terrain that characterised the rural areas in the province, distances between development sites, and lower subsidies in relation to actual amounts that could be spent on servicing the rural sites for the establishment of housing units. However, the Eastern Cape Province learnt that Gauteng was successful in mass delivery of low cost housing using alternative building technologies (ABTs). Therefore, the Eastern Cape Province considered replicating this practice in its delivery chain. In order to explore more about ABT, delegates from the Eastern Cape visited some successful projects in Gauteng Province. They investigated the quality, speed and cost of ABT products.

3.2.3. Priority projects for the Member of the Executive Council

For a long time, the people in the Ndevana community waited for decent housing. There was a high state of readiness for housing development in the area. The community requested the Member of the Executive Council (MEC) for Housing to assist in realising their quest for decent housing. In response, the MEC mandated his department to prioritise an urgent intervention in housing development for the community. In this case, the department considered pilot-testing the ABT in Ndevana. Compared with conventional methods, ABT was identified as the fastest way of delivering houses within a short space of time.

3.2.4. Introduction of alternative building technology pilot project at Ndevana

During the year 2008, the alternative building technology housing development project was introduced to the Ndevana community. The beneficiary administration was done parallel with the procurement of the contractor. The department chose a contractor based on the observation of performance during the visit to Gauteng Province. The company that was contracted by the department came to erect a show house on site. The community cooperation towards the success of the ABT project started to decline after the show house was built. In this case, the community started to contest the alternative building technologies.

3.3. Research Design

This case study was carried out in the Ndevana area. The primary units of analysis for this study included both male and female heads of households, irrespective of whether they were elderly, disabled or too young. This emanated from the knowledge that, as heads of their families, they were the major decision makers.

Community leaders spearheaded development within the area. For this reason, they were the fundamental entry point for any developmental programme implemented in the area. In this case, traditional leaders, civic associations and ward committees represented the community. District and local municipalities play crucial roles in prioritising local development needs through formulating integrated development plans (IDPs). Moreover, at municipal level, a Housing Sector Plan for a particular financial year was a pre-requisite for any procurement process. Depending on their capacities, local municipalities lead the implementation of human settlement projects. Ndevana was also part of those areas that were in the priority list for housing development according to the municipal IDP. Buffalo City Metropolitan Municipality (BCMM) was also at the centre of the implementation of alternative building technologies in Ndevana. The municipal officers who were responsible for the implementation of the ABT project provided useful information to enrich this study.

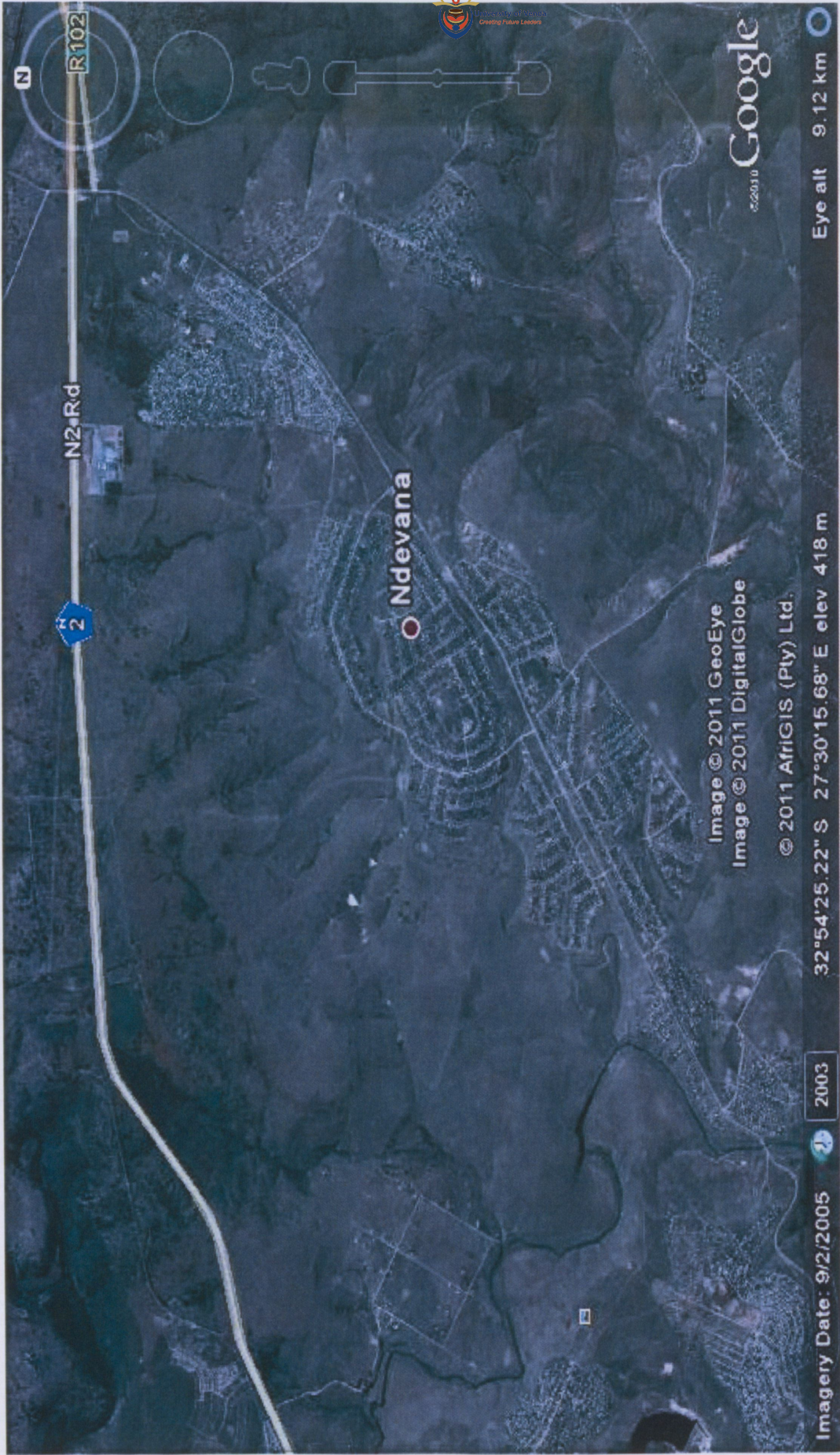


Figure 3 1 Bird's eye view of the Ndevana community in the Eastern Cape Province of South Africa

The Eastern Cape Department of Human Settlements develops and serves as a custodian of policies on human settlements. Human settlement projects that appear in the Housing Sector Plan of a municipality in question receive funding. Through its regional offices, the ECDHS provides technical skills required to implement prioritized projects. In addition, through its supply chain management the ECDHS maintains a database of service providers and assists municipalities in the procurement process. The relevant officials from various sections within ECDHS were also identified to participate in this study.

Companies that utilize ABT construct houses within designated communities. This study sought to understand their experiences when dealing with the communities. In addition, the companies' perceptions on ABT were also sought.

3.5. Securing Stakeholder Permission to Carry out Study

Relevant stakeholders within the study areas were made aware of the study. This helped to maximize the participation of the residents in the study. Among other factors, field researchers felt more secure when the community was aware of their presence in the area. In order to formalize the permission to carry out the study, letters (Appendix 7) were sent to relevant authorities seeking access and further requesting permission to conduct the study. In this respect, the letters were sent to the ECDHS, the Buffalo City Metropolitan Municipal Manager, and the Councillor who was the Portfolio Head of Housing in the Municipality and Ward 49 Councillor. Field researchers were encouraged to always carry their data collection files whilst on duty. An official letter granting access and permission to carry out the study was part of the package in each field researcher's file.

3.7. Population and Sampling Procedures

3.7.1. Sampling for the qualitative study

Study populations and samples included, among others, officials from the ECDHS, the Buffalo City Municipality (BCM), and ABT companies, as well as community leaders and residents of the case study area.

A purposive sample of ECDHS officials who were in charge of implementing ABT projects was drawn. This included officials in the Supply Chain Management, Project Planning and Policy Development, Project Management and Quality Assurance and Housing Research sections of the ECDHS. One representative per section was selected taking into account

his/her field of specialization with respect to ABT. Letters seeking permission to involve them in the study were sent to the Directors of each section. Two municipal officials were selected for interviewing. One of them was from the Human Settlements section. The other one was selected from the technical section. A letter requesting permission to interview each official was sent to the Municipal Manager.

At least one representative of each company in the ABT database of the ECDHS was included in the purposive sample. The representatives were expected to be knowledgeable about the technical imperatives of the ABT. Also, the representatives were expected to know the backgrounds of their companies with respect to implementing the ABT.

The ward Councillor for ward 49, and representatives of civic organizations in each study sub-area, were interviewed. Letters were sent to the Councillor and Chairperson of civic organisations in each sub-area with the aim of securing appropriate dates and times to interview them.

3.7.2. Sampling for the quantitative study

The case study area was heterogeneous in character. In order to yield reliable data, the Stoker table was used to determine the sample size (de Vos, 2001). The Stoker table suggested 20% as the minimum sample size for population sizes of 200 to 500 people. In the Ndevana housing project, there were 465 beneficiaries. This meant that a minimum of 93 systematically selected beneficiaries was an acceptable representative sample. A list of beneficiaries of human settlements in Ndevana was used to draw the sample for the study. Every 5th person on the list was selected. To increase the reliability of the data, 155 individuals were interviewed.

3.7.3. Demographic descriptors of respondents

Most of the respondents (58%) were females. The proportion of respondents aged 40-49 and 50-60 were the same (26%). Those aged 30-39 constituted 25% of the total number of respondents. The rest of the respondents aged less than 20 years. With regard to highest educational qualifications, approximately 82% had passed Grade 12. The remaining participants had diplomas (9%), Bachelor's degrees (3%), Honours (3%) and Masters (2%).

The majority of respondents (51%) were unemployed. There was 30% of employed entries and 19% represented the self employed. Only 30% of entries were captured with 70% missing entries under the employed sector. Out of the 30% captured, 21% represented the

private sector whilst only 9% represented the public sector. Only 8% of the entries captured carried construction skills and, of these, 4% was for brick laying, with plumbing and carpentry both contributing 2%, respectively. The majority of households (89%) earned below ZAR3 500 while only 2% earned ZAR7 500-R15 000. There were no entries above ZAR15 000.

About 42% of the households had 5-8 members. This was closely followed (40%) by those with 1-4 members. In the remaining households, there were 8-10 members. The majority of the respondents (78%) had resided in the community for more than 15 years. Only 9% had stayed in the area for 11-15 years. The rest of them had been part of the community for at most 10 years.

3.8. Data Collection

Both qualitative and quantitative data was collected. The questionnaires (Appendix 6) were administered to 155 respondents in Ndevana. Data collection was done with precaution to avoid unnecessary conflict with the respondents. Issues of consideration to ensure the rationalization of the study were observed accordingly.

Full information about the study was given to all participants. For example, they were informed that the information gathered would not be used for any other purpose than the execution of a research study towards the achievement of a Masters Degree in Rural Development and to assist the Eastern Cape Department of Human Settlements with the implementation of Alternative Building Technologies for housing development.

All respondents were made aware of their rights to participate and to withdraw from the study if they did not feel comfortable at any stage. The respondents of the project remained anonymous. Norms, values and beliefs of the respondents were considered and respected for the entire duration of the study. No respondents were discriminated against in terms of their religious and political affiliations or their vulnerability. All respondents had the right to disclose or to keep their health conditions confidential. Feedback was given to communities upon completion of the study.

Five field researchers were hired and trained on focus group facilitation and administration of the questionnaire. This was done before the pilot study was conducted to ensure that the field researchers were familiar with all research tools. When going to the field, all field researchers were expected to carry access letters, consent forms (Appendix 8) and empty questionnaires. For quality assurance all completed questionnaires were verified for

common errors by the researcher. Questionnaires that were not correctly completed were traced and follow up interviews were done to ensure reliability. All verified questionnaires were signed by the researcher. Any questionnaire that was not signed was regarded as null and void and was not captured for analysis. After all the questionnaires were counted, they were checked against their sample percentage representation. This was the last step towards data analysis.

3.8.1. Qualitative data collection

Qualitative data collection was regarded as the first level of achieving required data sets. Data sets were drawn from various sources. These ranged from available bodies of literature, open discussions in focus groups and formal events, such as seminars and conferences bearing related themes. Alternative building technologies (ABT) companies as well as officials from all spheres of government that form housing development value chains, which includes provincial and regional Department of Human Settlements and the municipal officers also served as qualitative data sources. There was no exception made to community leaders.

(i) Key informant interviews

In order to source data, various set of questions (Appendix 1) were developed for face-to-face interviews. The questions were set in relation to variables of measurement. To ensure the reliability and validity of the information, each set of questions was developed based on the mandate and functions of the concerned respondent.

The Government officials who participated in the interviews include two regional directors, one SCM official and one contract manager for ECDHS. Only one housing official from the Buffalo City Metropolitan Municipality participated in the interviews. There were eight alternative building technology companies in the departmental database. Out of these eight companies only four companies were able to be interviewed through an open ended question. All of them were asked one question to answer openly and follow up questions were made based on their responses. The responses were common so they were generalised in the results of this study.

(ii) Focus group discussions

A focus group tool (Appendix 3-5) was also developed based on themes that were driven from the same variables. These themes were discussed in open discussions with relevant

target groups. Focus groups consisted of 8  individuals. This was to ensure that the group was well managed for maximum participation.

(iii) Audio visuals

For interview and focus group data management efficiency, a voice recorder was used with the consent of the respondents. This served as a data collection method that was more reliable than a note book for capturing explanatory data. This was because the discussions were captured in their full and original format rather than as a list of key points captured in a note book. Still photos of certain areas of interest were captured to depict the settlement situation of the area under study. This served as the evidence of the settlement issues under discussions.

3.8.2. Quantitative data collection

Quantitative data was collected from the case study area, namely Ndevana. The qualitative data obtained during the first phase of this study was consolidated into a questionnaire requiring responses on a Likert-type scale of 1 – 5 (strongly agree) to 5 – 10 (strongly disagree). In addition to this, the questionnaire captured relevant demographic information.

3.8.3. Pilot testing of the questionnaire

Prior to actual data collection, the questionnaire was pre-tested with 40 respondents. One area with common characteristics to the case study areas was identified and used for piloting. This helped to identify gaps that would have affected the reliability and validity of data collected. After the pilot study, the research tool was refined and geared up for the implementation.

40 respondents were drawn from Chalunca which is a rural set up just outside of East London. This area bears common characteristics with the case study area. The field researchers collected data and familiarised themselves with the research tool. The collected data was captured on the spreadsheet for analysis. Data generated on the spreadsheet was checked for repetitions and some identified gaps were closed.

3.9. Data Analysis

Data was analysed in two distinct phases. First, qualitative data was analysed followed by quantitative data. Qualitative data analysis sought to explore the factors contributing to the rejection of ABT. Phase 2 of data analysis quantified the perceptions revealed in the

exploratory stage and also tested the hypothesis. Some of the variables relating to ABT that were considered in the analyses were the value to the targeted communities, the costs of alterations, modification-related issues, the influence of vested interest towards acceptance or rejection, demonstrability in facilitating acceptance, availability of materials in the local market, competency in inspection, availability of funding options, and ABT companies' capacity to deliver, as well as the durability and quality of ABT materials.

3.9.1. Qualitative data analysis (Phase 1)

Data collected from project implementation plans, minutes of meetings, focus group discussions and other forms of qualitative techniques were transcribed to the MS-word format. The transcribed data was captured using thematic content analysis.

3.9.2. Quantitative data analysis (Phase 2)

The Statistical Package for Social Scientists (SPSS) was used to analyse quantitative data. The data matrix where each variable of measurement occupied its own column and each study case occupied its own row was created in the spreadsheet. For each variable the total of 149 entries was expected to be captured. This was the exceptional case with the employment sector where only 45 cases were captured and 12 cases captured construction skills. The missing cases were due to non responses.

The results were measured using a Likert-type Scale ranging from zero (1) to ten (10). In the analysis zero meant that the respondent was not sure whether to agree or to disagree. This was presented as 'unsure' in the data collection tool. The Likert item from 1-5 meant that the respondent disagrees and from 6-10 means that the respondent strongly agrees with the Likert statement. Univariate images of data which depicted frequencies and statistical indexes were presented. The bivariate analysis was incorporated to determine the existence and the strength of relationships across variables. The t-test and chi-square tests were computed and presented in the results Chapman (2009). If probability (P) is greater than 0.05, then the hypothesis was accepted. There were two cases where the probability was less than 0.05 and the hypotheses were rejected.

Table 3. 1 Sampling, data collection and analysis procedures



Objective	Population	Sampling method	Data collection method	Data analyses
a) To determine what community members perceive to be the ideal characteristics of alternative building technologies	465 housing beneficiaries	Systematic random sampling	Semi-structured interview and questionnaire	Thematic content analysis; Descriptive statistics, Cross-tabulations, Chi-square, Correlations, Regression analysis.
b) To establish whether the perceptions on alternative building technologies vary among the community members.	155 community members	Systematic random sampling	Questionnaire	Descriptive statistics, Cross-tabulations, Chi-square, Correlations, Regression analysis.
c) To assess the reasons for the rejection of alternative building technology by community members.	465 Housing beneficiaries of Ndevana	Systematic random sampling	Focus groups and priority ranking techniques	Thematic content analysis



4.1. Introduction

This chapter presents the results of the study. The perceptions of the community on ABTs, the reasons for rejection of the latter and suggestions for their acceptability are highlighted. Also presented in this chapter are the administrators' views on ABT, specifically interrogating ABT project planning, procurement, quality assurance and contracting. The ABT contractors' viewpoints are also outlined. The hypothesis tested in this study was that the mean score for the perceptions of males and females regarding ABT are the same.

4.2. Community Understanding of Alternative Building Technologies

4.2.1. Alternative building technologies knowledge

Table 4.1 shows that all the ten (10) focus groups (FGs) knew what ABT were. They indicated that they saw structures constructed using ABT from a distance in the neighbouring village although they had never used them. Out of the 10 FGs, five indicated that they wanted to know what ABT were. For this reason, they wanted someone to explain to them in detail what the ABT were. Four FGs mentioned that they were not familiar with ABT. They further said that they had not seen how the structure was constructed.

Table 4.2 shows the mean value was seven for both male and female respondents on the response that ABT were only seen from the neighbouring village. The mean value of six for both male and female respondents was computed for the response that ABT had not been seen constructed. The mean value of five was computed for both male and female respondents who disagreed with the notion that there was a need for someone to explain to them what ABT were.

Table 4. 1 Focus Group responses on knowledge of alternative building technologies for housing development

Do you know what alternative building technologies are?	Beneficiaries: Adult		Beneficiaries: Youth		Beneficiaries: Non Adult		Beneficiaries: Non Youth		Community Leaders		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
	6	6	6	6	6	6	6	6	6	6	
a) We know them through seeing a structure from a distance in the neighbouring village but we haven't experienced them	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
b) We would like to know what ABT were, and would like someone to explain them to us			✓		✓		✓		✓	✓	5
c) We know the structure but are not familiar with the name ABT; also we have not seen them being constructed		✓			✓		✓				4



Table 4. 2 Mean scores and standard deviations for ABT knowledge of the respondents

Variables	Mean Scores and Standard Errors				Significance
	Male (nm=63)	Female (nf=86)	Mean	SE	
Neighbouring village	7	152	7	117	Ns
Not seen them constructed	6	229	6	198	Ns
Need explanation	5	268	5	216	Ns

Key: Ns = Not statistically significant;

SE = Standard error;

nm = number of males;

nf = Number of females

4.2.2. Community members' perceptions regarding alternative building technologies



(i) Structural perceptions

Table 4.3 revealed that ten (10) FGs thought that houses constructed with alternative building technologies could not be easily extended. Eight FGs were concerned about the wire nails that may be difficult to penetrate the walls in case they need to put on curtain rails or wall portraits. Hence, six FGs said that ABT wall panels developed cracks easily, even before they were assembled as a house. In this case, they thought that the ABT could not be used to build a permanent house. Further to that, four FGs said that the foundation was not properly made, so it seems as if there was no foundation. They added saying that a proper foundation must have deeper trenches than the trenches excavated for these houses. One of the FGs said that the foundation was fine. The concern of the same groups was that of the wall diameter which they believed was too thin.

Table 4.4 shows the common agreement between both males and females with the mean value of eight that the ABT houses could not be extended and that they easily develop cracks. The mean value of seven was computed for both males and females with the statement that the ABT house wall was too hard for wire nails to penetrate. Both males and females also agreed at the mean value of six that the roof might be difficult to re-assemble if it was carried away by wind, and that the foundation was not bad. The disagreement with the mean value of three was recorded on a statement that the wall diameter was thin. The respondents also disagreed at the mean value of one with the view that the house had no proper foundation.

(ii) Social perceptions on structural performance

Table 4.5 revealed that ten (10) FGs thought that houses constructed with alternative building technologies were not good at thermo regulation. Three FGs' responses reflected that the level of the foundation was too low in a way that it may not withstand even a minor flood. They (three FGs) further discouraged the use of zinc for construction of the roof by saying that a roof made of zinc could not be good for the coastal region due to condensation that might lead to damp walls and ceiling boards in the house. Furthermore, one FG thought that the roof may be difficult to re-assemble if it was blown away by wind. This was because the wall panels were made in a way that they might easily break if the wind blows and it could be difficult to replace as the walls may crumble when they try to create a way to re-attach the roof to the walls.

Table 4. 3 Focus Group responses on structural perceptions of alternative building technologies for housing development

What do you know/think about structural issues relating to alternative building technologies?	Beneficiaries: Adult		Beneficiaries: Youth		Beneficiaries: Adult		Beneficiaries: Youth		Non Beneficiaries: Adult		Non Beneficiaries: Youth		Community Leaders		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Number of focus group participants	6	6	6	6	6	6	6	6	6	6	6	6	6	6	60
a) The structures could not be extended	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
b) The walls are too hard for wire nails to penetrate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8
c) They develop cracks easily even before they are assembled as a housing unit	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	6
d) They have no proper foundation which seems as if there was no foundation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	4
e) The foundation is fine															1
f) The wall diameter is too thin															1
g) The roof may be difficult to re-assemble if it could be taken by wind due to the nature of the panels															1



Table 4. 4 Structural perceptions of ABT by respondents

Responses	Mean Scores and SE						Significance
	Male (nm=63)			Female (nf=86)			
	Mean	SE	Mean	SE	Mean	SE	
a) Could not be extended	8	159	8	168			Ns
b) A develop cracks easily	8	140	8	107			Ns
c) A wall too hard	7	211	7	218			Ns
d) Roof difficult to re-assemble	6	215	6	268			Ns
e) A foundation was fine	6	305	6	239			Ns
f) A diameter too thin	3	331	3	261			Ns
g) A no proper foundation	1	234	1	187			Ns

Key: Ns = Not statistically significant; SE = Standard error; nm = number of males; nf = Number of females

Table 4.6 shows that the community members strongly agreed, with the mean value of eight, that they believe ABT houses are not good for thermo regulation. The common agreement with the mean value of seven was also calculated with the statement that ABT houses could not stand the damp conditions in the sea areas and their lifespan was unknown to the respondents' community. The males with the mean value of six agreed and the females disagreed with the mean value of five with the statement that these houses have shallow foundations that may not stand minor floods. Both males and females at the mean value of four disagreed with the statement that ABT houses could invite criminals.

(iii) **Social attitude and value of alternative building technologies**

Table 4.7 shows that 10 FGs mentioned that ABT house could pose a health risk to the dwellers due to dampness and the cold nature of the concrete, especially for asthmatic individuals and those with tuberculosis (TB). Nine FGs indicated that they did not know how long ABT houses could last. Moreover, seven FGs thought that ABT houses were non inheritable; therefore, they did not regard them as a legacy to their next generations. It was further revealed that five FGs called the ABT wall panels "ipitsi" (slabs), and that they believe that these slabs may be good for fencing a yard or used for storage rather than for housing people. Also four FGs believe that there was no safety and comfort for beneficiaries staying in ABT houses. Three FGs stated that ABT were not a part of their background because they were never historically used for housing development in their area. They further did not regard them as valuable assets as they believed that ABT houses could not enter the housing market. They (three FG) emphasized that they do not trust these ABT houses, and therefore compared them with shacks. One FG further said that ABT houses could invite house breaking criminals because they believe the wall panels can be easily broken.

Both males and females agreed that they never used ABT in the past; the level of agreement was high with the mean value of 10 (Table 4.8). They also agreed that they did not trust ABT houses, and in this case the mean value for females was nine whilst the mean value for males was eight. The variety in level of agreement was also revealed with the statement that ABT houses could not be passed on to relatives. In this case the mean value for females was at eight whilst the one for males was at seven. Both male and female entries commonly agreed, at the mean value of seven, with the statement that ABT were good for fencing or storage facilities. The agreement with the statement that an ABT house was comparable to a shack was measured at the mean value of three.

Table 4. 5 Focus group responses on perceptions on structural performance of alternative building technologies houses

What do you know/think about ABT house performance?	Beneficiaries: Adult		Beneficiaries: Youth		Beneficiaries: Adult		Beneficiaries: Youth		Non Beneficiaries: Youth		Community Leaders		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
	6	6	6	6	6	6	6	6	6	6	6	6	
Number of focus group participants	6	6	6	6	6	6	6	6	6	6	6	6	60
a) They are not good in thermo regulation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
b) We do not know how long they could last	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
c) There is no safety and comfort when staying in an ABT house	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	4
d) The roof material is zinc and is not good for coastal region as they cannot stand the damp conditions of the sea													3
h) The level of the foundation is so low that it may not stand even minor floods													3
e) The wall panels could easily be broken by house breakers (could invite criminal activities)													1



Table 4. 6 Mean scores, standard errors and significance for perceptions on structural performance of ABT

Responses	Male (nm=63)		Female (nf=86)		Significance
	Mean	SE	Mean	SE	
Thermo regulation	8	187	8	128	ns
Damp conditions	7	133	7	111	ns
Lifespan	7	131	7	166	ns
Shallow foundation	6	176	5	184	ns
Invite criminals	4	174	4	186	ns

Key: ns = Not statistically significant; * = $P < 0.05$;

SE = Standard error; n_m = Number of males; n_f = Number of females

Table 4. 7 Focus group responses on attitude and value-based perceptions regarding ABT housing development

What do you know/think about ABT?	Beneficiaries: Adult		Beneficiaries: Youth		Beneficiaries: Adult		Beneficiaries: Youth		Non Beneficiaries: Adult		Non Beneficiaries: Youth		Community Leaders		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Number of focus group participants															60
f) They could pose a health risk	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
a) They are non-inheritable	✓		✓		✓		✓		✓		✓		✓		7
b) They could not be easily extended (cost)					✓		✓		✓		✓		✓		6
c) They could not be used for a permanent structure					✓		✓		✓		✓		✓		6
d) They could be good for fencing a yard and as a storage facility rather than housing people									✓		✓		✓		5
e) We call them slabs									✓		✓		✓		5
f) They are not from our background					✓		✓					✓	✓		3
g) They are not valuable assets to enter the housing market so we compare them with shacks												✓	✓		3



4.3. Why Communities Reject Alternative Building Technologies

4.3.1. The views of the community towards the rejection of alternative building technologies

(i) Views on rejection due to structural perceptions

All the ten FGs responses strongly indicated that ABT were rejected by the Ndevana community because the houses were not built using bricks as depicted in Table 4.9. The use of a grinder was given as an example. In case one needs to change the doors or window frames, the wall needs to be cut carefully without extreme vibrations like when hitting the walls with a hammer. The fact that they have lots of structural defects was mentioned six times. Respondents (four FGs) were concerned about the possibilities of extending the house in response to family growth. Only one FG mentioned that ABT materials are not available at the local market. They (1 FG) also think it can be difficult to re-build the walls if a car crashes into the house. Seven FGs responses reflected a concern over the issue of affordability in terms of the way alterations can be made.

The mean value of 9 for both males and females as shown on Table 4.10 supported the perception that alternative building technology was rejected due to its association with structural defects. The idea that an ABT house may be difficult to re-build if it gets crushed by a car was measured with the mean value of 8 for both males and females. Both males and females also agreed at the mean value of 6 with the statement that it may be difficult to do some alterations of ABT structures.

(ii) Views on rejection of social attitudes and values

Nine FGs believed that ABT could pose a health risk. About eight FGs were of the view that houses constructed using ABT were inhabitable (Table 4.11). They (6 FG) further mentioned that it was not even known to their culture. Also six FGs said they do not know the level of risk attached to ABT houses. Five FGs responded that ABT could be life threatening to the beneficiaries; they gave an example of one community member who almost died when the ABT house that he built for himself collapsed in the area. Furthermore, they thought they would lose out on government subsidy if the ABT house they received experienced a technical error in the long run. They mentioned that they were given a chance to make a choice and they chose brick. One FG also indicated that they were not comfortable when ABT were tested on them. As far as they knew, ABT were never used anywhere in the province and yet it was still tested in their community. They also believed that when one was

staying in an ABT house, it was the same as if the individual had no house, yet government would be thinking that they have delivered a house.

Table 4.12 shows that there was a variation of agreement with the statement that alternative building technology was not known to them with the mean value of nine for males and eight for females. There was also a variation with the mean value of nine for females and six for males on the belief that alternative building technologies were rejected because people may not afford the alterations. Both males and females had common agreement at the mean value of eight when they said ABT were imposed on them. A difference of agreement was also observed when the respondents said that they rejected ABT because they were used as a testing ground for its implementation. In this case, the mean values were eight for males and seven for females. The mean of seven for males and six for females' shows variation of agreement when they said ABT were unknown in their culture. Table 4.12 also shows the significant difference observed at 0.026 when males and females associate ABT with health risks. The mean for males was eight and seven for females. The significant difference was also observed at the value of 0.024 in the agreement with the statement that ABT could pose risks to life with the mean value of seven for males and six for females. The mean value of six was measured on the statement that the beneficiaries might not be able to afford alterations of ABT. They further said it would be taken as if they have already benefitted from the grant if they accept ABT houses and that it would appear as if they had a subsidised house whereas they believed that they had none. Both males and females agreed in harmony that ABT houses were rejected because they were non-habitable.

Table 4. 8 Focus group responses on the reasons for rejection of ABT with reference to structural matters

What do you think were the reasons behind the rejection of ABT in your area?	Beneficiaries: Adult		Beneficiaries: Youth		Beneficiaries: Non Adult		Beneficiaries: Non Youth		Community Leaders		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
	6	6	6	6	6	6	6	6	6	6	
Number of focus group participants	6	6	6	6	6	6	6	6	6	6	60
a) ABT was rejected because it was not bricks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
b) They have a lot of structural defects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	6
c) To change the position of the doors may be difficult	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	3
d) ABT materials were not available at local markets											1
e) It could be difficult to re-build in case of a car crash accident										✓	1



Table 4. 9 Focus group responses on the rejection of ABT based on social attitudes and values

What do you think were the reasons behind the rejections?	Beneficiaries: Adult		Beneficiaries: Youth		Non Beneficiaries: Adult		Non Beneficiaries: Youth		Community Leaders		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
	6	6	6	6	6	6	6	6	6	6	
Number of focus group participants	6	6	6	6	6	6	6	6	6	6	60
a) They could be a health risk	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
a) People could not afford the alterations			✓	✓	✓	✓	✓	✓	✓	✓	7
b) They are unknown to our culture	✓	✓		✓		✓	✓	✓		✓	6
c) We do not know the level of risk of ABT houses				✓	✓	✓	✓	✓		✓	6
b) They are inhabitable	✓			✓		✓	✓	✓	✓	✓	8
c) They could be life threatening						✓	✓	✓	✓	✓	4
d) If a serious technical error is experienced, we may not benefit as we have already benefited from the grant											1
e) We were given a chance to make a choice and we chose bricks, but ABT were imposed on us					✓						1
f) It was still tested and we were not comfortable when it was tested on us										✓	1
g) We believe that when one is staying in an ABT house, it is the same as if one had no house at all, yet government would be thinking they had delivered a house to us											1

Table 4. 10 Mean scores for respondents' structure related on rejection of ABT

Responses	Male (n _m = 63)		Female (n _f = 86)		Significance
	Mean	SE	Mean	SE	
Not known to us					ns
Benefited from grant same as to house	9	1.51	8	1.71	ns
Materials not available	9	1.39	8	1.01	ns
Structural defects	9	1.16	9	0.95	ns
Difficult to rebuild	8	2.23	7	1.47	ns
Difficult to change doors	6	2.26	6	2.05	ns

Key: Ns = Not statistically significant; SE = Standard error; n_m = Number of males; n_f = Number of females

Table 4. 11 Mean scores for respondents' attitude-related views on ABT rejection

Response	Male (N _m = 63)		Female (N _f = 86)		Significance
	Mean	SE	Mean	SE	
Not known to us	9	1.287	8	103	ns
Benefited from grant same as no house	8	151	8	171	ns
ABT imposed	8	115	8	137	ns
Level of risk	8	127	8	149	ns
Not habitable	8	093	8	104	ns
Used as testing ground	8	1.103	7	144	ns
Health risk	8	146	7	138	*
Risky to life	7	093	6	107	*
Not afford alterations	6	228	6	182	ns
Unknown to our culture	5	281	5	213	ns

* = P < 0. 05

Key: ns = Not statistically significant

SE = Standard error; n_m = Number of males; n_f = Number of female



4.3.2. The Views of the community on acceptance of alternative building technologies

Ten FG respondents believe that ABT may be acceptable if the community could be trained on the way its construction and maintenance were done as presented by table 4.13. They also mentioned that the advantages and disadvantages of the new technology must also be revealed in advance so that people must not be startled by the problem that was known before. Six FGs were in favour of the notion that improving the quality of ABT housing structures may also contribute to the acceptance of ABT. This was also re-inforced by four FGs who suggested that contractors should build a house of the same quality as the show house they built when marketing their products. Three FGs advised that departmental inspectors must always be on site to ensure that quality houses were built. Only one FGD indicated that ABT may be acceptable if the possibilities of extending the house built with ABT could be done without the wall panels cracking. They further encouraged community developers to gain access through proper consultation with the community leaders for decision making as well as community participation. Hence one FG mentioned that “nothing best could be done, these houses were just unacceptable.”

Table 4.14 shows the difference of responses with the mean value of 10 for females and 8 for males for the statement that ABT could be acceptable if it was possible to extend the house. The mean value of 8 for females and 7 for males shows the variation of agreement with the statement that ABT could be acceptable if the house could be extended without structural defects. The harmony of agreement was shown by the mean value of 9 where both males and females agreed that ABT may be acceptable if the quality of the end product would be the same as that of the show house. The same means also goes with the statement that there should be constant inspection during the construction phase of ABT houses. There was also the common consensus with the mean value of 8 when they said if the quality of the ABT structure could be improved and proper consultation be done, then ABT could be acceptable. Both males and females disagreed at the mean value of 4 with the statement that ABT houses were unacceptable.

Table 4. 12 Focus group responses based on community perceptions towards what could be done best to ensure the accessibility of ABT for housing development

What do you think could have been done best to ensure acceptance of ABT in your area?	Beneficiaries: Adult		Beneficiaries: Youth		Non beneficiaries: Adult		Non beneficiaries: Youth		Community Leaders		Tallies
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
	6	6	6	6	6	6	6	6	6	6	
Number of focus group participants	6	6	6	6	6	6	6	6	6	6	60
a) To be educated and informed how ABT works	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
b) Improve the quality of the structure					✓	✓	✓	✓	✓	✓	6
c) Constructor should have built houses which were of the same quality as the show house		✓		✓						✓	4
d) Inspectors must always be on site to ensure quality of structures built	✓							✓		✓	3
e) Nothing best could be done; these houses were just unacceptable					✓						1
f) If it could be extended without the wall panels cracking									✓		1
g) The way to extend must be made available to local markets										✓	1
h) Proper consultations and gaining access with the community leaders for decision making.										✓	1



4.4. Views of Administrators on Alternative Building Technologies

4.4.1. The views of project managers and housing officials on alternative building technologies development

The interviews with Eastern Cape Department of Human Settlements (ECDHS) officials revealed that there was neither national nor provincial policy to provide guidance on the use of ABT. In this case, the regional offices were not bound by any documentation towards the use of ABT. This was also revealed by the officials from the local municipality. These officials further indicated that it was mainly the Member of the Executive Committee (MEC) for the Department of Human Settlements's speeches which encouraged the use of ABT. The lack of a specific budget dedicated towards the promotion of the use of ABT was also seen as a

drawback on the use of ABT by the officials of the Eastern Cape government. The government officials also mentioned that there was a lack of financial capacity and skills to steer alternative building technologies developments. They emphasized that the regions are supposed to be naturally capacitated and trained for the management of alternative

building technologies development. It was reported that all project managers and inspectors had prior experience in construction build. The government officials further indicated that ABT housing development is a broad concept that is not well explored. Furthermore, they thought that ABT is putting extra pressure on existing human resources. They also mentioned that the government should specifically with ABT projects. The government officials further indicated that ABT projects should be driven by its own policy like any other housing developments. The

government officials also mentioned that the Eastern Cape Department of Human Settlements (ECDHS) should have a section on quality assurance. The important was to ensure that the quality of the housing projects is maintained. The officials also mentioned that the government should have a section on quality assurance. The important was to ensure that the quality of the housing projects is maintained. The officials also mentioned that the government should have a section on quality assurance. The important was to ensure that the quality of the housing projects is maintained.

Quality assurance and an organized team were essential to drive the development of alternative building technologies. The government officials further indicated that ABT projects should be driven by its own policy like any other housing developments. The government officials also mentioned that the Eastern Cape Department of Human Settlements (ECDHS) should have a section on quality assurance. The important was to ensure that the quality of the housing projects is maintained.

When it comes to the quality of the housing projects, the officials mentioned that the government should have a section on quality assurance. The important was to ensure that the quality of the housing projects is maintained. The officials also mentioned that the government should have a section on quality assurance. The important was to ensure that the quality of the housing projects is maintained.

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Table 4. 13 Respondents views towards acceptance of ABT

Responses	Male (n _m = 63)		Female (n _f = 86)		
	Mean	SE	Mean	SE	
extend the structure	8	111	10	1.249	ns
same quality as show house	9	120	9	115	ns
frequent inspection	9	141	9	117	ns
quality of the structure	8	121	8	098	ns
proper consultations	7	116	8	105	ns
extended without defaults	4	275	4	214	ns
houses un-acceptable	7	146	7	144	ns

Key: Ns = Not statistically significant;

* = P < 0. 05;

SE = Standard error; n_m = Number of males;

n_f = Number of females

4.4. Views of Administrators on Alternative Building Technologies

4.4.1. The views of project managers and housing officials on alternative building technologies development

The interviews with Eastern Cape Department of Human Settlements (ECDHS) officials revealed that there was neither national nor provincial policy to provide guidance on the use of ABT. In this case, the regional offices were not bound by any documentation towards the use of ABT. This was also revealed by the officials from the local municipality. These officials further indicated that it was mainly the Member of the Executive Committee (MEC) for the Department of Human Settlement's speeches which encouraged the use of ABT. The lack of a specific budget dedicated towards the promotion of the use of ABT was also seen as a drawback on the use of ABT by the officials of the Eastern Cape government. The government officials felt that there was also a lack of structural capacity and skills to steer alternative building technologies developments. They emphasised that the regions are supposed to be structurally capacitated and trained for the management of alternative building technologies development. It was reported that all project managers and inspectors had experience in conventional building. The government officials further indicated that ABT housing development is a broad concept that is not well explored. Furthermore, they thought that ABT is putting extra pressure on existing human resources that are already overwhelmed with conventional building projects. To start with, there was no dedicated team or structures that deal specifically with ABT projects. The government officials felt that ABT development should be driven by its own policy like any other housing developments. The ABT could not be driven the same way as the conventional method as it was unique in nature. It needed its specific social facilitation approach to introduce the products to the consumers as well as facilitating acceptance. Therefore, the government officials thought that dedicating funds and an organised team were essential to drive the development.

4.4.2. Quality assurance of alternative building technologies

The government officials mentioned that the Eastern Cape Department of Human Settlements (ECDHS) had its own section on quality assurance. The component was responsible for all quality issues in relation to housing products. The Departmental Control Works Inspectors (CWIs) were well versed with the inspection of conventional building methods. When it comes to innovative building technologies, these CWIs still need more training and workshops. In this respect ECDHS had considered working with Agrément SA, NATIONAL Home Registration Council (NHBRC) and local municipalities to ensure the issue of quality ABT housing products. This would also include engagement with the institution of



higher learning to look at opportunities for the training of the inspectors. Each of the identified stakeholders would serve a specific role in the process that would be teased out in the following bullets.

(i) **Agrément South Africa**

Agrément South Africa supports and promotes the process of integrated socio-economic development in South Africa as it relates to the construction industry by facilitating the introduction, application and utilisation of satisfactory innovation and technology development, in a manner which would add value to the process. It was an objective South African centre for assessment and certification. It was responsible for innovative non-standardised construction products, systems, materials, components and processes, which were not fully covered by the South African Bureau of Standards (SABS) or a code of practice.

(ii) **National Home Builders Registration Council**

The NHBRC was established in terms of Section 2 of the Housing Consumers Protection Measures Act, 1998 (Act No. 95 of 1998) as a statutory body with the prime objective to provide consumer protection through the regulation of the home building industry. In terms of the provisions of the said Act, all home builders must be registered with the NHBRC and a home builder may not commence with the construction of a home unless the home was enrolled with the NHBRC. The NHBRC also published Home Building Manuals and the technical requirements contained in the said manuals were enforced by the NHBRC. The Housing Subsidy Scheme was made subject to the provisions of the said Act with effect from 1 April 2002 and all houses that were to be constructed through the application of the housing subsidy amount only must be enrolled with the NHBRC. These houses would, therefore, be subject to the National Building Regulation (NBR) standards introduced by the NHBRC and the National Norms and Standards contained in the Technical Guidelines Document. The NHBRC requires the results of a geological survey of a particular stand or site and evaluates the findings of the report. It may also require that specified precautionary measures be provided in respect of municipal engineering services and/or the dwelling to be constructed.

(iii) **Local and metropolitan municipalities**

The Department of Trade and Industry (DTI) is the custodian of the National Building Regulations and Building Standard Act. The DTI delegates the implementation through the

municipality to building control. Building control consists of qualified and experienced teams of building inspectors from the municipality who carry out compulsory inspections as work proceeds. Their extensive knowledge of materials, construction methods and local conditions was available to assist at all stages of the construction process. Building control was also responsible for the law enforcement and monitoring of contraventions by any transgressors.

4.4.3. Alternative building technologies contract management

An alternative building technologies contract document was drafted the same way as conventional methods. The Eastern Cape Department of Human Settlements has since realised that this type of contract was not assisting when it comes to alternative building technologies. Some contractual challenges include the contractors not being able to complete the project within the contract period. Others completely defaulted which led to project blockage. In this case, the other companies may not be able to complete work that was started by the other contractor as they may not carry the relevant qualifications for the ABT product used. Even the project could not be completed with the conventional methods as it may not be in line with the specifications of the initial ABT product. The department was currently using the new contract system to implement ABT projects. In this system, the contractor was expected to complete 10 houses from foundation to finish. It was then that the contractor would claim for the first payment for ABT units as phase 1 of the project.

4.4.4. Government officials point of view on alternative building technology companies' capacity to deliver

The government officials within housing development value chains indicated that alternative building technologies were not as effective as conventional building methods in housing development. The main concern was that the company would be awarded a tender promised to deliver certain number of units in time. In practice, some of the constructors deviate from the contract. The material delivery problems of ABT companies resulted in them spending more than the projected costs. Also some of ABT materials were produced in foreign countries and delivered to factories for further processing before they were delivered to the sites. Some of these factories were in other provinces and they have to be transported at a certain cost to the project area. They added that this in itself presented challenges in terms of housing delivery not only in Eastern Cape but also in other provinces.

The failure of an ABT company to deliver within an expected time period may lead to a breach of contract which presents a serious challenge when damage control has to be done.

The project was planned and implemented as an ABT project and, due to the rarity of similar concepts used; the project may take a different shape from the initial one. In this case the units that were not completed by the defaulted contractor tend to become a wasteful resource as the next constructor could not build on them. This also affects the beneficiaries as they would be receiving two different products in the same project.

4.5. Alternative Building Technologies Companies' Point of View

All 4 companies using ABT believe that their systems are cost effective and time efficient. They stated that ABT systems were the solution to the backlogs that the provinces were sitting with. One of them indicated that their technologies were limited from building a house on the rough terrains, whilst 3 were proud that their products were good for any terrain including the deep rural areas where the municipal services are scarce. In some instances, the ABT constructors pointed out that the departmental procurement process has a negative impact on their performance as does the slow payment process during project time. They indicated that a contract takes a long period of time to be completed and signed off hence the project begins after its expected start time. They further indicated that the project leaders within the department would push them to complete the units within a given time; hence payments were not yet effected according to the contract. They said that payments were contractually processed according to the deliverable, for instance, at foundation level. In this practice the payment for foundation may be received by the contractor even after the wall plates and beam filling were completed. The contractors raised the concern that this affects their running costs as they may find themselves taking money from other projects they were running to cover the costs, which also affects the performance of their sister projects if the department keeps on prolonging payments.

5.1. Introduction

This chapter discusses the results of the research with some theories around rejection and acceptance of innovations. It also highlights the influence of the alternative building technologies (ABT) trajectory after its introduction at Ndevana. Furthermore, it reflects on the reception of alternative building technologies for pilot housing development projects in the Eastern Cape Province, where Ndevana was chosen as a pilot site. Community perceptions of ABT, the reasons for rejection and suggestions for its acceptability are also discussed.

5.2. Community Understanding of Alternative Building Technologies

The results of the current study revealed that, at the mean value of 7 for both males and females respondents, there was lack of knowledge and understanding of alternative building technologies (ABT) by the Ndevana community. This was qualified when the respondents mentioned that they had only seen ABT structures at the neighbouring village but they had no idea how they were constructed. To support these results, Mutagamba (2004) believes that education and acceptance of alternative technologies go together. The Ugandan government gave the go ahead for politicians to carry out advocacy work. Further to this, training and empowerment to sensitise the masses on alternative technologies was also recommended. In addition, Hausler (undated) in Staadecker (2011) realizes the importance of acting as a role model in order to encourage future inventors and social entrepreneurs. Hausler has a passion for teaching and spends time abroad training the staff and residents in "Build Change" communities on safer building technology. The expert stresses the need to use these skills that work hand-in-hand with creativity and innovation to make real and sustainable change in the developing world.

According to Diacon *et al.* (2011), Gram Vikas, Winner of the 2003 Rural Health and Environment Programme (RHEP) of the Gram Vikas non-governmental organisation (NGO), demonstrates how rural communities could be involved in the sustainable and affordable development of their own village infrastructure and housing. Initiated in 1992, Gram Vikas works with the entire community to develop sustainable building materials and techniques; promote a range of training, income generation and other community development projects and to work towards strong self-governing institutions with equal participation of men and women (Diacon *et al.*, 2011). Also, Home Information Packs (HIPs) are now compulsory for almost all homes on the market in England and Wales (Murray, 2010). They contain a set of documents with key information such as property searches, proof of ownership,

sustainability information, an Energy Performance Certificate (EPC) or Predicted Energy Assessment (PEA). One of the aims of the HIP, according to Murray (2010), was to improve the sustainability of existing housing stock in England and Wales.

There was a disagreement that was measured in the results at the mean value of 5 for both male and female respondents with regards to the need for explanation of ABT. This disagreement contradicts with the qualitative findings of this study where 5 focus group discussions (FG) indicated that they would need someone to explain ABT to them. It also opposes the theory of Horton and Hunt (1989) which states that the society hesitates to adopt an innovation until they have been shown how it works, hence they could only determine the practical value of the social inventions through adopting them. Horton and Hunt (1989) believe that a dilemma like this slows community acceptance of the innovations.

The community's concern that ABT were still being tested and that they were not willing to serve as a testing ground tells that they want to see these products being tested somewhere else. This was strongly displayed by the mean value of 8 for males and 7 for females. In South Africa, the Eric Molobi Innovation Hub (IMI) was developed to showcase construction technologies that were cost effective and adoptable in housing programmes. According to Reddy (2009) and Sokopo (2010) the IMI function was similar to Indian Rural Building Centres (IRBC). As Sokopo (2010) confirmed, some provinces in South Africa have considered establishing provincial innovation hubs to showcase various technologies and to train communities on the usefulness of ABT for housing development. In light of this ECDHS might develop a comprehensive programme to facilitate ABT acceptance for housing development. In this case, the beneficiaries may have an opportunity to view and have a choice of ABT products that may be compatible with their local setup; thus they would have been educated on what these ABT are. Educating the beneficiaries on the benefits of ABT may improve their perceptions towards the concept.

According to Diacon *et al.*, (2011), new technologies for preventing damage from natural disasters have been developed over the years by a range of winning and finalist practices of the International Housing Innovation Competition. Working in collaboration with local communities to identify needs, the Building and Construction Improvement Programme in Pakistan developed a range of new and affordable technologies for home improvement products for those living in remote mountainous regions. This was meant to intensify community participation for development driven through ABT.

5.2.1. Community members' perception regarding alternative building technologies

The results of the current study were consistent with the study done by Sokopo (2010). The findings revealed that the respondents think that it is not easy to do alterations on an ABT house. They also stated that the house could not be easily extended because the wall panels develop cracks even before they are assembled as a housing unit. The quantitative results of the current study show the agreement at the mean value of 8 for both males and females in support of this statement. This paved way for the respondent communities doubting the strength of the housing structures; for instance, thinking that in cases of heavy rains or wind the roof may be carried away or if a car accidentally hits the wall, then the structure might collapse. The quantitative results of this study depicted the harmony of agreement where both males and females at the mean value of 8 believe that it may be difficult to re-build the walls and the mean value of 6 in agreement with the statement that the roof may be difficult to re-assemble. These respondents think that it may cost a fortune or even not be possible to re-assemble the wall panels. They were referring here to the fact that the wall panels are single structures that are prefabricated with windows and door frames. In the sight of the community, this is similar to a house built with one brick that, if it crumbles and falls, it may also affect the whole housing unit. These findings were concurrent with the ones presented by Sokopo (2010) who reported that consumers' perception that houses built with alternative building materials could not be extended presents acceptance challenges. According to Sokopo (2009), these respondents were also deterred by the thought that ABT walls are too hard for wire nails to penetrate in case they want to hang up their pictures or put up curtains. This agreement was measured at the mean value of 7 for both males and females in the current study.

Even though some members of the Focus Group Discussions (FDG) blamed the thin diameter of the wall as well as the shallow foundations, the results of this study revealed that the conditions of the wall and the foundation had not much influence on people's perceptions about ABT. The disagreement with this idea was measured in harmony at the mean value of three for both male and female respondents.

The respondents believe that ABT houses were not good for thermo regulation which was revealed at the mean value of eight for both male and female respondents in the quantitative results. Their belief drives them to think that ABT units could pose health hazards to its occupants. They supported their argument by indicating that Ndevana was in the Southern Cape Coastal Condensation Allowance (SCCCA) zone. The SCCCA includes areas receiving the winter, all-year and high annual rainfall between 250 and 500 mm per year.

According to SCCCA practice, all housing developments within the radius of 60 km² away from the sea were entitled to be plastered in and out, with ceilings installed and should be well insulated (Seed, 2010).

The statement that ABT were never used in the past also received the highest agreement mean value of 10 for both male and female respondents in the quantitative data. This means that it was never part of the culture of the respondents' community. In this regard, the community had a fear that ABT may change their living patterns, especially their rural set up as spelled out by Majova (2008).

The respondents further mentioned that they do not trust ABT houses (mean value of nine for females and eight for males). Their lack of trust was also influenced by the lifespan of ABT houses which was unknown to them where the responses were measured at the mean value of seven for both genders. The respondents have, therefore, developed a feeling that ABT houses could not be passed on to their relatives. This was also supported by an idea that each society had many specific attitudes and values which make it cling to its objects and activities (Horton and Hunt, 1989; Donovan, 2010).

Diacon *et al.* (2011), support the above statement by Horton and Hunt (1989), as well as Donovan (2010), alluded to the point that the technology, skills, knowledge or processes being transferred should not only be adapted to local conditions but should also be appropriated by the 'receiving' community or organisation in order to ensure the long-term sustainability of the initiative. How the message was delivered was key. It was important to have committed individuals or teams who could champion their good practice, communicate effectively and inspire others (Diacon *et al.*, 2011).

5.3. Why Communities Reject Alternative Building Technologies

Not all technological options and alternatives were developed or explored. Although this was often because alternatives were either more expensive or less economical, there were often other reasons too (Beder, 2010). The results of this survey revealed that the rejection of ABT houses by the Ndevana community was also related to cost for change. The respondents stated that people may not afford the alterations of an ABT unit because it may need specialised tools to do alterations like changing the positions of the door and windows. This was revealed by the mean value of 6 for both gender responses in the quantitative data in the case of this study. The respondents also think that the tools and materials to effect changes may be expensive or not available at the local market (mean value of 9 for females and 6 for males).

Arensberg and Niehoff (1971) accentuated that, in general, the very poor often resist all change because they could not afford to take any risk. These authors, supported by Beder (2010), further highlighted that change was nearly always costly. It disrupts the existing culture and might destroy cherished sentiments and values, in addition to being costly at times. For example, a study carried out by the NDoHS revealed a high cost of new technology at ZAR1, 004 – ZAR3, 600/m² (US \$118 – US \$424/m²; when US \$1=ZAR8.5), excluding land and foundation (Sokopo, 2010). The figures presented before were compared to conventional ways of housing construction. Sokopo (2010) further reveals that the initial cost for alternative building technologies and high levels of maintenance often exceeds the subsidy quantum. Some technologies may need specialised tools to cut the wall panels to prepare for alterations; or else the structure may have faults if it was done manually. Considering that the beneficiaries qualify for a housing subsidy because they were living below the poverty line, this may also result in them not being able to afford the machinery to process alterations of their housing units.

Staaecker and Martinovich (2011) explain the Build Change's model developed by Hausler and based on simplicity. Beginning with a thorough examination of a region's unsafe housing issues, Hausler's team makes slight adjustments to the original building construction plans rather than overhauling an area's traditional architectural structure. Build Change helps community members work with locally available materials and labour to rebuild. The outcome was a cost-effective, easily modified and, most importantly, a culturally accepted construction method the homeowner adopts and understands.

According to Staaecker and Martinovich (2011), Build Change homes cost anywhere from ZAR25, 000 to ZAR144, 000 (US\$3,000 to US\$17,000 at the exchange rate of ZAR8.5) less than similar structures built in donor-driven environments. Despite the clear benefits, many communities were rooted in custom and were, therefore, resistant to change. As a solution, Build Change educates and trains anyone who would play a role in the rebuilding process, including homeowners themselves, materials vendors, engineers and builders. The non-profit organisation also works with local governments to instruct officials on the technology, helping to enforce the reconstruction model as a new building standard, reducing community resistance and leading to further implementation (Staaecker and Martinovich, 2011). This model could also assist in tabling the recommendations for development practice by the current study.

The findings of the current study also indicated that the beneficiaries were given a chance to choose whether their housing development should adopt the use of ABT or the conventional method. The results further revealed that respondents had chosen to use conventional methods but ABT were imposed on them. This was qualified by the mean value of 8 for both genders. This was the same as Spicer (1952)'s view that there was often resistance when the change was imposed by others, was not well-understood, and was regarded as a threat to people's values. In support of this view, Majova (2008) further accentuates the involvement of people in the choice of the development models and options for their communities through active participation.

The reasons for the Ndevana community's rejection of ABT for housing development have all been mentioned under the section on ABT perceptions. One of these reasons is that they think the ABT houses are non-habitable and, therefore, could pose a risk to the lives of the inhabitants. This was measured at the mean value of 8 for males and 7 for females. Donovan (2010) believes that, if an object had a purely utilitarian value, that is, if it was valued because of what it would do, change may be accepted more readily. This study revealed that ECDHS have seen an ABT development as a solution to the housing backlog sitting at the province. In contrast, if some feature of traditional culture was treasured intrinsically, valued for it aside from what it would do, change was less readily accepted (Donovan 2010). In this case the Ndevana community have seen ABT as an inferior housing product, hence the rejection. They indicated that, if they accept ABT houses, they would no longer benefit from the housing subsidy scheme because government would record that they had already received a housing grant. This statement was strongly supported by both genders at the mean value of 8. The respondents further mentioned that they do not consider ABT house as a solution to their housing problem. They suggested that these ABT materials may be used for other functions like fencing or building storage facilities rather than housing people, hence the disagreement was measured at the mean value of 3 for both males and females for the statement that ABT houses could be compared with shacks.

5.4. Community Views on Acceptance of Alternative Building Technologies

Acceptance was the first step to social change; it was the first step in making real and lasting change (Noel, 2011). This was in line with the findings of the current study on the community views of acceptance of ABT. Even though the Ndevana community had generally rejected the ABT housing development project in their area, they still believed that the Eastern Cape Department of Human Settlements (ECDHS) may still succeed in implementing it when certain issues were improved. Among areas of development that they listed were that ABT



could be acceptable if the house could be built without structural defects where the acceptability was measured at the mean value of 10 for male and eight for female respondents. The respondents further promoted the demonstration of innovation by mentioning that the quality of the houses built should be the same as that of the show houses. They further emphasise that constant inspection should be done during the construction phase. The acceptance of these responses was measured at the mean score of 9 respectively across genders.

According to Noel (2011), accepting an innovation does not mean passive acquiescence. This was in line with the findings of this study where the respondents accentuated proper consultation to prepare the community for the implementation of ABT for housing developments. The quantitative result of the current study reveals the acceptance level of eight for both male and female respondents in this statement. Reflecting back to the way the ABT project was introduced at Ndevana, one could understand that the community felt undermined when they were not involved in the “choice making” around their housing development issue. Goldston (2010) suggested that the idea of growth and change often stems from the basis that we were disadvantaged in some way and that we need to improve our lives, hence acceptance of new, improved technologies should also follow proper processes.

In relation to this Miller (2008) argues that Science, Technologies and Sustainability (STS) researchers have called for upstream engagement of the broader public in scientific and technological decision-making, in which citizens become involved in choices of design and implementation, whether as knowledge holders or authoritative decision-makers.

According to Miller (2008), a key challenge was how to enable public participants to understand and make visible the potential technological futures for society that stem from today's choices about the use of new infra-structure or new technologies. Equally challenging was to continue to advance STS research into effective strategies for encouraging effective deliberation of socio-technological options. A third challenge was to structure decision-making processes that ensure that public inputs were meaningful and were effectively integrated into decisions that also entail substantial technical elements. Such processes need to ensure that choices were revisited as the imagined technological futures become concrete as technologies were constructed and used in society; and, finally, important research was needed into the training necessary for technical, policy, business, and civic participants to ensure these processes viably inform decision-making, rather than rendering decisions impossible (Miller, 2008).

5.5. Administrative Views on Alternative Building Technologies



Each developmental activity was driven in an administrative manner. This includes the organisational set up which was tailor-made to achieve the intended objective. The organisational structures were meant to drive the delivery system towards the realisation of the objective. In the light of this study, the planning, procurement as well as ABT companies' capacity to deliver was also explored.

Political will was also important in terms of supporting the final implementation stage, linking transfer processes to local development plans and creating an enabling policy environment; however, care must be taken to ensure that the process does not become politicised (Staadecker and Martinovich, 2011). According to Staadecker and Martinovich (2011), active community involvement and ownership is necessary to ensure sustainability of development.

5.5.1. Alternative building technologies project planning point of view

Technical officers at the regional level for the Department of Human Settlements felt that projects that were implemented using ABT were not assisting with the challenge of the housing backlog sitting with the province. The statement by these officials that ABT projects were not contributing to housing delivery expectations clarifies the idea mentioned before. An expectation by these officials was that ABT would speed up housing development. Sokopo (2010) revealed that alternative technologies could be beneficial in fast-tracking housing delivery because of faster construction methods, for example, two to three days of assembling wall panels, roofing and plastering. On the contrary, it turns out that in the case of Ndevana, the ABT project stalled while the developers were in the process of facilitating the acceptance and it finally got blocked.

The regional officials also indicated that lack of capacity to specifically drive ABT projects at regional level also contribute to the challenges in the ABT implementation. This means there was a need for a specific team with specific project management and inspection skills with regard to ABT development. It was seen not to be feasible to use officials with conventional skills in the development of an ABT project without initially equipping them with the necessary skills. In cases like this it was essential to incorporate ABT skills development in formal education ranging from vocational training to tertiary institutions, as Wienecke (2010) suggested.

Murray (2010) argues that scaling in the public sector had some overlaps with other fields but also some important differences. He further stated that governments could grow an idea simply by legislating it, or turning it into a programme. They could, as well, encourage it by

persuasion, or through the influence of regulators (Murray, 1020). The methods described above for sustaining an idea regarding the use of ABT for housing development were also key to spreading it, including defining the idea in policy or programmes.

A concern about the lack of a specific policy, either nationally or provincially, on the use of ABT was also raised by the regional officials in the current study. This current study further indicated that a lack of a specific budget dedicated to the development of ABT was another challenge. Sokopo (2010) also spelled out that government officials felt not compelled to use ABT due to the existing policy gap. The contradiction was identified in this matter when the regional officials felt burdened by ABT projects. The regional officials suggest that ABT units should not be announced in the provincial budget speech as they were unreliable and they resulted in the province falling short in terms of delivery. The MEC budget speech was currently the only way to compel the province to consider the use of ABT. In the light of this the ABT implementers had to operate without a proper model which was guided by policy.

The Washington Association of Realtors (2009) suggests that policies that were developed to drive ABT housing development projects must be acceptable to a broad segment of the community. It was not necessary to gain absolute consensus, but council members must feel comfortable adopting policies without undue fear for their political future. Moreover, builders must feel confident that they could build projects under the new policies without running into a handful of individuals who could stall their permits, resulting in costly delays. The Washington Association of Realtors (2009) also stated that the community acceptance begins with the adoption of policies that allow new types of housing that reflect local values without stretching the envelope too far.

5.5.2. Alternative building technologies procurement process

To plan and prepare to implement ABT the ECDHS had considered developing a database for the technology systems that were available in the built environment. It was done in a way that quality assurance issues were also considered. In this case this meant using companies with necessary affiliations and approval like the South African Bureau of Standards Products, Agrément SA license building systems as well as valid NHBRC certificates. Agrément South Africa, supported by the Department of Public Works, provides assurance of fitness-for-purpose of products and systems which were not fully covered by a South African Bureau of Standards (SABS) standard or code of practice (Adell and Wekesa 2011). The NHBRC was established in terms of Section 2 of the Housing Consumers Protections Measures Act, 1998 (Act No. 95 of 1998) as a statutory body with the prime objective to provide consumer protection through the regulation of the home building industry. The

ECDHS had also considered taking these organisations on board with issues of ABT development in the province. In the interview with procurement officials of the ECDHS, they made an indication that the ABT product that was introduced in Ndevana obtained the necessary requirements. They further stated that the fact that the ABT product possessed the necessary requirements doesn't guarantee its quality.

A challenge was also faced with contract development where the ABT contracts were not different from contracts prepared for conventional methods. There was a concern that it was not easy to manage ABT with a contract format that adopts conventional building methods. The contract that was meant to drive ABT projects should be able to resolve the issues that were mentioned in the findings. The contents of the ABT contract should cover measures that would be applied in case of a contractor who defaulted. If the contract was well crafted, the project may be easily unblocked using the same ABT system by other contractors or it should open a space for any other means of construction during the process of unblocking the project (Mbanga, 2012).

5.5.3. The capacity of alternative building technology companies to deliver

Whilst ABT companies believe and claim that their building systems are fast and cost effective for housing delivery, the government, including municipality officials, indicated that ABT were not as effective as conventional building methods for housing delivery in the province. They pointed out the challenge of material supply where materials for ABT were sourced from other provinces or even from foreign countries. Also the companies that were contracted were based in other provinces. This incurs an extra cost due to the need for transportation; as a result the project budget tends to be inefficient for the work that was supposed to be done. This also serves as evidence that ABT does not easily allow for the use of local materials which may also hinder the acceptance by the beneficiary community. Also the lengthy process of facilitating ABT acceptance was pointed as one that causes ABT to be an inefficient housing development. If all the challenges of material delivery and acceptance could be addressed, then ABT housing development could succeed.

6.1. Introduction

This chapter presents the key issues relating to alternative building technologies (ABT), including acceptance and rejection by the recipient community. Conclusions are drawn. Thereafter, recommendations are made for improved uptake. Among the recommendations are the themes of the research. All these are underpinned by the set objectives of the study.

6.2. General Discussion of Key Findings

The ECDHS had noticed the continuous housing backlog which continues to recur regardless of timeless efforts towards housing delivery. Alternative building technologies (ABT) were regarded as a solution to this recurring problem. The department, therefore, considered using ABT which was rejected by the Ndevana community when it was introduced to them. The rejection of ABT by the Ndevana community was a good example to show that acceptance is fundamental. The latter was supported by Noel (2011) who believes that acceptance is the first step to social change.

Community understanding of alternative building technologies is a key to any development that adopts the use of innovation. Lack of knowledge and understanding of alternative building technologies ABT by the Ndevana community was associated with the rejection of alternative building technology as an innovation that was introduced for housing development of the community. According to Diacon *et al.* (2011), capacity building and training and development of skills were crucial elements in the success of alternative building technologies projects for housing development. Whilst the quantitative results of the current study revealed that the respondents were not interested to get an explanation of what ABT were, the study further revealed that the beneficiaries had not seen ABT houses before. The reason for the lack of interest in the explanation of ABT was still unclear, which necessitated the social change management programme further to the current study. Similarly, Hausler (undated) in Staadecker (2011) stresses the need to use skills that work hand-in-hand with creativity and innovation to make real and sustainable change in the developing world. To augment this, in Uganda the government recommended training and empowerment to sensitise the masses on alternative technologies (Mutagamba, 2004).

The development of a Technology Park may be useful in addressing the community's concerns as revealed by the current study about the testing of ABT. In this instance the respondents indicated that ABT were still being tested and that they were not willing to serve

as a testing ground. Maltez (2009) defines a Technology Park as an organisation managed by specialised professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions. A Science Park manages the flow of knowledge and technology amongst universities, and research and development institutions, as well as company markets. It further facilitates the creation and growth of innovation-based companies through incubation and spin-off processes, and provides other value-added services together with high quality space and facilities (Maltez, 2009). This was similar to the Eric Molobi Innovation Hub, in the case of South Africa, that was developed to showcase relevant construction technologies which were cost effective and adoptable in housing programmes.

The perceptions of the community members regarding alternative building technologies were fundamental to social acceptance. The current study revealed that the Ndevana community had a general lack of trust with regard to ABT housing development in their area. The lack of trust was qualified by the results of the current study which displays the variety in terms of perceptions of ABT housing by this community. Their perceptions around the structure were common to those of a study done by Sokopo (2010). The findings of these studies revealed that the respondents think that ABT houses would present challenges ranging from difficulties in doing alterations, like extending the house, changing doors and window positions, as well as interior design, especially where walls need to be adjusted or repositioned. The perceptions around structural performance include the view that the structure was not good for thermo-regulation where the respondents believed that this may cause sickness to the occupants of the house. Badarna (2012) uses the approach that involves the observation of nature's principles, methods, transformation and development of these principles to realize sophisticated technological solutions for adaptive building envelopes in terms of lighting, ventilation, and thermo-regulation.

The perceptions around cultural values and attributes include the uncertainty of information about the lifespan of ABT houses, where the respondents think that ABT were not part of their past cultural practices and, therefore, these houses may not be passed on to their relatives as inheritance. In this regard, the community had a fear that ABT may change their living patterns, especially their rural set up, as spelled out by Majova (2008) and Diacon *et al.* (2011). These latter authors supported the notion that the technology, skills, knowledge or processes being transferred should be appropriately adapted to local conditions and to the societal practices for their sustainability.

Beder (2010) argues that there were often various reasons why not all technological options and alternatives were developed and adopted. Concurrently, the current study exhumed various reasons that resulted in the rejection of alternative building technologies for housing development. The results of the current study are linked to Beder's statement (2010) that, among other reasons, the community perceived alternatives as either more expensive or less economical. In this case people think they may not afford the alterations of ABT units as they may need specialised tools for that; for instance if one would like to change the positions of the door and windows. The tools and materials to effect changes might, as well, be expensive or even not available at the local market. Change may involve a risk that often led to resistance by the very poor because they could not afford to take such a risk (Arensberg and Niehoff, 1971). The research conducted by Sokopo (2010) further reveals that the cost of alternative building technologies also affects the South African government in a way that the initial cost and high levels of maintenance of ABT often exceeds the subsidy quantum. Further to this, change disrupts the existing culture and might destroy cherished sentiments and values (Beder, 2010). This concurs with Spicer's view (1952) that there was often resistance when the change was imposed by others, was not well-understood, and was regarded as a threat to people's values.

Bergman (2009) agrees that people do not **resist** change, but they resist being changed. He explains that people usually make their own choices in their personal lives, but under a certain type of leadership they may feel coerced. They then use the only power they have to regain control through resistance. To avoid this resistance people should be given control and allowed to make decisions (Bergman, 2009). The current study has shown that consultation is key to curbing resistance whilst promoting social acceptance of change. According to Burns (2004), consultation should not be confused with community participation. Burns (2004) recommends community participation further than just consultation for the facilitation of technological acceptance as part of developmental change. He described community participation as meaning that communities were playing an active part and have a significant degree of power and influence on their development (Burns, 2004). In support of this view, Bergman (2009) believes that people resist being controlled. He further alluded that they freely choose to make major life changes on a daily basis. The choices referred to include, among others, facing challenges, learning new technologies and developing new skills. Not all of these changes were smooth, but they were mostly essential to a successful community (Bergman, 2009). Bergman (2009) believes that people are willing to change in one situation but resistant to the same change in another situation. If they are offered two choices and they pick a third, there is the opportunity to cede control to

them as long as their choice achieves the acceptable outcome. Then they *own* their decision and are happy with it because they made it themselves. The findings of the current study also indicated that the beneficiaries were given a chance to choose whether their housing development should adopt the use of ABT or the conventional method; hence the results reveal that the respondents chose to use conventional methods but ABT was imposed on them. According to Bergman (2009), credibility was lost when people were tricked into thinking they have control when they do not have it. They have to actually be given some control, while some was kept for change managers, because a change manager was always accountable for the outcome. Political will was also important in terms of supporting the final implementation stage, linking transfer processes to local development plans and creating an enabling policy environment; however, care must be taken to ensure that the process does not become politicised (Staadecker and Martinovich, 2011). According to Staadecker and Martinovich (2011), active community involvement and ownership was necessary to ensure sustainability of development.

The current study reveals that officials of the Eastern Cape government within the housing delivery value chain felt that projects that were implemented using ABT were not as effective as was expected. Sokopo (2010) revealed that alternative technologies could be beneficial in fast-tracking housing delivery because of faster construction methods, for example 2-3 days of assembling wall panels, roofing and plastering. Various challenges include, among others, the lack of capacity to specifically drive ABT projects at the regional level, the lack of specific policy either nationally or provincially on the use of ABT, as well as the lack of a specific budget dedicated to the development of ABT. Sokopo, (2010) also spelled out that government officials felt not compelled to use ABT due to the existing policy gap. According to Murray (2010), New Zealand Distributed diffusion through public policy Strategies with Kids/Information for Parents (SKIP) programme as an example. Murray (2010) describe this as a public policy working to create a scaled programme augmenting, complementing and supplementing within a framework that had clear outcome targets, a single brand, and common materials. Evaluations shows that it achieved considerable success with relatively little money, and explained its success as deriving from the way it helped the communities to work together with the government and the NGOs, drew on their intelligence to design the programme, and promoted fast learning (Murray, 2010).

6.3. Conclusion

The Eastern Cape Department of Human Settlements (ECDHS) had a constitutional mandate to ensure that all citizens have rights to adequate shelter. A shelter alone was not enough towards the creation of sustainable human settlements as stipulated in the Housing White Paper of 1994. The Comprehensive Plan towards the creation of sustainable human settlements, also known as Breaking New Ground (BNG), promotes the creation of economically viable communities with access to basic services like education, water, health, safety and others. Housing was the primary need which always comes first among the list of grievances during community strikes.

During the year 2008, an alternative building technology housing development project was introduced to the Ndevana community. It was introduced in a way that the beneficiary administration was done parallel with the procurement of the contractor. This approach seemed to be non-effective for the implementation of alternative building technologies (ABT). The ABT were new and were unknown to the beneficiary communities; this might be the reason why it was not readily accepted by the Ndevana community. The department chose a contractor based on the observation of performance during a visit to Gauteng Province. This limited the beneficiaries from their rights of choice in terms of housing typologies. As a matter of fact, the beneficiaries felt left out. The company that was contracted by the department came to erect a show house on site. During this time, there were no beneficiary representatives from the community to observe the construction process as part of the introduction of the new technology. The community cooperation towards the success of the ABT project started to decline after the show house was built. In this case, the community started to contest the alternative building technology presented to them.

There were some issues which led to the rejection of new technologies that were explained by various authors. This study was meant to exhume some issues related to the rejection of ABT by the Ndevana community. The causes of the rejection were explored, and some of them include structural defects and performance, as well as cost of alterations. These were issues which change management officials should be aware of when introducing innovations to the communities. It was learnt that social change is a process where innovation is not automatically accepted and adopted even if it brings positive change. Innovation may be partially accepted or entirely rejected. It may need a very comprehensive programme to facilitate the acceptance of innovation in the community. When given a chance to suggest ways to make ABT acceptable, the respondents indicated that ABT may be accepted if

proper consultation is done, alterations may be done without structural defects and constant inspection are done during the construction phase of the project.

After all the explorations around the rejection of ABT by the Ndevana community, it was realised that there was a misconception between the community, the department and the ABT Company. To avoid this situation recurring in the future, this study has suggested some standards of practice towards ABT implementation in the following section of recommendations.

6.4. Recommendations

Accepting an innovation is the first step in making real and lasting change. Therefore, a clear understanding of ABT is essential. Based on the results of this study, for ECDHS to achieve this, the following recommendations deserve attention:

- a) The introduction of ABT to the identified beneficiary community should be done in the way that the beneficiary administration is done as part of pre-planning. Qualifying criteria and warrants after the grant is awarded should be well explained to the beneficiaries. Thereafter, the beneficiary community should be informed, educated and guided on what ABT are all about and the functionality of the houses, without imposing anything on them.
- b) After ABT acceptance, beneficiaries should be involved in the process of selecting the ABT model to be used in the development of their community.
- c) The company that uses the selected ABT system should be responsible for erecting a show house on site in the presence of the Department of Human Settlements, Eastern Cape, and the beneficiaries.
- d) The contract documents for the ABT project should be drafted in such a way that it would be implementable without compromising the quality of the end product delivered to the beneficiaries.
- e) An innovation hub should be established in order to demonstrate and educate Eastern Cape communities about the usefulness of ABT. The likelihood, drawbacks and costs for construction and alterations of ABT structures should be clearly explained to the beneficiary community. The similarities and differences between ABT and conventional methods should also be clearly demonstrated.

- f) The innovation hub should be integrated in a way that allows a space for non-housing innovative technologies to be tried and tested.
- g) The likelihood and drawbacks for repairs of ABT structures in the case of disasters and related incidents should be made clear.
- h) Effective options should be made available for ABT beneficiaries to be able to hang pictures and any other wall decorations without permanent damage to the wall.
- i) The construction process should be constantly inspected by ABT competent inspectors.
- j) A training workshop on ABT house maintenance should be done before the handing over ceremony. In the training workshop the ABT House Maintenance Manual should be handed over to the beneficiaries too.
- k) The houses constructed with ABT should be good for thermo-regulation as well as acoustic performance, and that should be demonstrated to the beneficiaries.
- l) Housing units constructed using ABT should allow for the implementation of the South Cape Coastal Condensation Allowance (SCCCA) and its application.
- m) Housing units constructed using the ABT system must allow for the long term investment in property especially for the next generation. Housing units developed using ABT should bear a market value. Its market value should be demonstrated with proof that the ABT unit could be bank-bonded or may be used as collateral.
- n) Housing development implemented using ABT should allow for the use of quality materials that were available in the local market.
- o) The change management programme should be developed to manage the reception of ABT by the Province.

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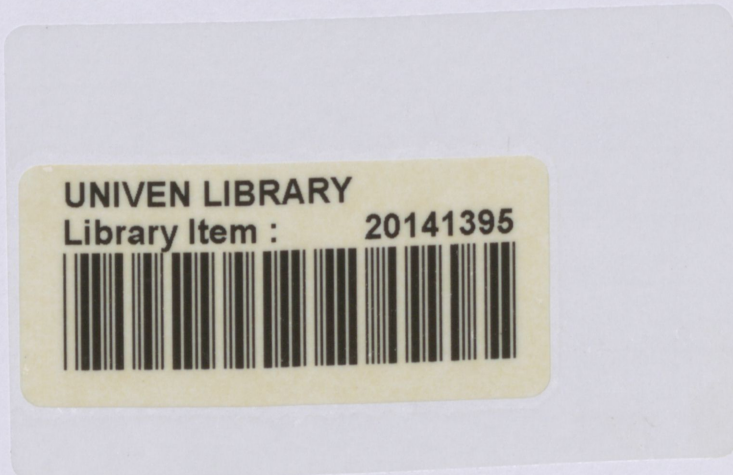
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APPENDICES

APPENDIX 1: QUESTIONS BASED ON OBJECTIVES

- | | TOOL/TECHNIQUE |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| (i) What do communities perceive as ideal characteristics of alternative building technologies?
a. Uyayazi yintoni iAlternative Building Technologies?
b. Wazintoni/Ucingantoni ngeAlternative Building Technologies? | Interviews (Phase 1) |
| (ii) Do the perceptions of ABT vary across communities? | Interviews (Phase 1) |
| (iii) Why do community members reject ABT? | |
| (iv)
a. Factors contributing to rejection/acceptance
• IABT yaziswa yaze yakhatya kulenginqi yakho. Ucinga ibeziziphi izezathu zokukhaba le Alternative Building Technologies?
• Ukubangaba iABT inokwaziswa kulenginqi yakho,ungayamkela/Ungayithatha njani? | Questionnaire (Phase 2) |
| b. Perception of the introduction of ABT
• Ucinga yintoni ekumeleyenziwe uqinisekisa ulwamkelo lweABT kulenginqi?
• Ukuba iABT inokwaziswa kulenginqi yakho ingayindlela enjani engcono ukuyizisa? | |



APPENDIX 2: TOOLS AND TECHNIQUES

OBJECTIVES	DATA SOURCE	TOOL/TECHNIQUE
(i) to determine the community-perceived ideal characteristics of alternative building technologies for housing development	<ul style="list-style-type: none"> • Beneficiaries adult (M and F) • Beneficiaries youth (M and F) • Non-beneficiaries adult (M and F) • Non-beneficiaries youth (M and F) • Community leaders (M and F) 	Focus group (Phase 1)
	<ul style="list-style-type: none"> • ECDHS Project Manager(s) • ECDHS Procurement officer(s) • ECDHS Inspector(s) 	Interviews (Phase 1)
	<ul style="list-style-type: none"> • Community representatives 	
	<ul style="list-style-type: none"> • ABT companies 	
(ii) to establish whether the perceptions of alternative building technologies vary from one community to another	<ul style="list-style-type: none"> • Community members 	Questionnaire (Phase 2)
(iii) to analyse the reasons for the rejection of alternative building technologies by community members.	Community members	Focus group (Phase 1)
		Questionnaire (Phase 2)



PUBLIC PERCEPTIONS OF ALTERNATIVE BUILDING TECHNOLOGIES FOR RURAL HOUSING DEVELOPMENT IN THE EASTERN CAPE PROVINCE OF SOUTH AFRICA

SECTION 1: Demographic Information

1.1 Please indicate your gender

- 1 Male 2 Female

1.2 Please indicate your age

- 1 Less than 20 years 2 20 to 29 years 3 30 to 39 years 4 40 to 49 years
 5 50 to 59 years 6 60 years and older

1.3 What is your highest qualification?

- 1 Grade 12 2 Diploma 3 B Tech 4 Bachelors degree
 5 Honours 5 Masters 7 Doctorate 8 Other: _____

1.4. Indicate your employment status

- 1 Un-employed 2 Self employed 3 Employed

1.5. If employed, please indicate in which sector you are employed

- 1 Private 2 Public 3 Other: _____

1.6. Which construction skills do you have?

- 1 Brick laying 2 Plastering 3 Plumbing 4 Carpentry 5 Other: _____

1.7. What is your household income?

- 1 Below R3 500 2 R3500 – R7 500 3 R7 500 – 15 000 4 R15 000 and above

1.8. What is your house-hold size?

- 1 1-4 individuals 2 5-8 individuals 3 9-10 individuals 4 Above 10 individuals (specify): _____

1.9 Indicate your position in the community.

- 1 Citizen 2 Ward Committee Member 3 Member of Royal Council
 4 Ward councillor 5 Chief 6 Other: _____

1.10 Indicate the duration of time you have lived in this settlement.

- 1 Less than 3 years 2 3 to 6 years 3 7 to 10 years 4 11 to 15 years 5 More than 15 years

SECTION 2: ACCEPTANCE OF ALTERNATIVE TECHNOLOGIES

This section covers public perceptions and the reasons behind why alternative building technologies for rural housing development were rejected by the Ndevana community in the Eastern Cape Province. Using your experience and knowledge, please indicate on a scale of 1 to 10 (1-5= Strongly disagree; 6-10= Strongly agree) the strength of agreement with the statements below:

2.1. Do you know what alternative building technologies (ABT) are?

(kindly **highlight** or place an **X** in the appropriate box)

No.	Statements	Unsure	1	2	3	4	5	6	7	8	9	10
i.	I know them through seeing a structure from a distance in the neighbouring village but I haven't experienced them.											
ii.	I would like to know what ABT are, and would like someone to explain them to me.											
iii.	I know the structure but am not familiar with the name ABT. I also have not seen them being constructed.											

Any comment on this question:

.....

.....

.....

2.2. What do you know/think about ABT?

(kindly **highlight** or place an **X** in the appropriate box)

A. Structural

No.	Statements	Unsure	1	2	3	4	5	6	7	8	9	10
i.	The wall is too hard for wire nails to penetrate-											
ii.	They have no proper foundation											
iii.	The foundation is fine											
iv.	The wall diameter is too thin											
v.	The structures cannot be extended											
vi.	They develop cracks easily even before they are assembled as a housing unit											
vii.	The roof may be difficult to re-assemble due to the nature of the panels if it gets blown off by strong winds											

Any comment on this question:

.....

.....

.....

(kindly **highlight** or place an **X** in the appropriate box)

B. Performance

No.	Statements	Unsure	1	2	3	4	5	6	7	8	9	10
i.	They are not good for thermo-regulation											
ii.	They cannot stand the damp conditions of the sea											
iii.	The level of the foundation is so low that it may not stand even minor floods											
iv.	The wall panels can easily be broken by house breakers (could invite criminal activities)											
v.	I do not know how long they can last											

Any comment on this question:

.....

.....

.....

(kindly **highlight** or place an **X** in the appropriate box)

C. Attitude towards ABT

No.	Statements	Unsure	1	2	3	4	5	6	7	8	9	10
i.	I compare them with shacks											
ii.	I do not trust ABT houses											
iii.	They were not historically used in our community											
iv.	They could be good for fencing yards or storage areas rather than housing people.											
v.	They are non-inheritable.											

Any comment on this question:

.....

.....

.....

2.3. Why does the community reject ABT?

(kindly **highlight** or place an **X** in the appropriate box)

A. Structural

No.	Statements	Unsure	1	2	3	4	5	6	7	8	9	10
i.	They have lot of structural defects-											
ii.	They could be difficult to re-build in case of a car crash into them.											
iii.	It may be difficult to change doors and windows from their current positions to any intended positions											

Any comment on this question:

.....

.....

.....

(kindly **highlight** or place an **X** in the appropriate box)

B. Policy matters

No.	Statements	Unsure	1	2	3	4	5	6	7	8	9	10
i.	People cannot afford the way alterations should be made (use of grinder for instance)											
ii.	ABT materials are not available at the local market											
iii.	We were given a chance to make a choice and we chose bricks, but ABT was imposed on us											
iv.	ABT was still being tested and we were not comfortable when it was tested on us											
v.	If it experiences a serious technical error, we may not benefit as we have already benefited from a grant											
vi.	We did not know the level of risk attached to these ABT houses											
vii.	We believe when one is staying in an ABT house it is the same as if one had no house, yet the government will be thinking they have delivered houses-											

Any comment on this question:

.....

.....

.....

(kindly **highlight** or place an **X** in the appropriate box)

C. Attitude towards ABT

No.	Statements	Unsure	1	2	3	4	5	6	7	8	9	10
i.	They are inhabitable											
ii.	They could be a health risk											
iii.	They are unknown to our culture											
iv.	They could pose a life risk											
v.	ABT was rejected because it was not known to us											

Any comment on this question:

.....

.....

.....

3.2. What do you think could have been done best to ensure acceptance of ABT in your area?

(kindly highlight or place an X in the appropriate box)

No.	Statements	Unsure	1	2	3	4	5	6	7	8	9	10
i.	To be trained on the construction and maintenance of ABT											
ii.	Improve the quality of the structure											
iii.	Constructor should have built houses which have the same quality as a show house											
iv.	Inspectors must always be on site to ensure that quality structures are built											
v.	Means to extend the structure must be easily accessible to the target beneficiaries-											
vi.	Proper consultations and gaining access to the community leaders for decision-making must be adhered to											
vii.	Nothing best could be done; these houses are just unacceptable											
viii.	The structure must be extended without the wall panels cracking											

Thank you very much for your time and cooperation!



University of Venda

To: The Head of Department for Eastern Cape Human Settlements
Municipal Manager (Buffalo City Municipality)
Executive Mayor (Buffalo City Municipality)
Ward Councillors (Ndevana and Orange Groove)

APPENDIX 7: REQUEST FOR ACCESS TO RESEARCH COMMUNITIES

This serve to inform you about an academic study on “Public Acceptance of Alternative Building Technologies for Housing Development in the Eastern Cape Province of South Africa”, that the Masters Student enrolling with the University of Venda is intending to conduct in your area. The student’s name is Mr. T. Tshivhasa, Student No. 11500873. He was also an official in the Research Unit for Eastern Cape Department of Human Settlements. His working experience in the Eastern Cape Province induced his interest in rural development and poverty alleviation with specific focus on human settlements, hence this study.

The study is aimed at investigating community perceptions relating to alternative building technologies, which will be achieved through the following specific objectives: to determine what community members perceive to be the ideal characteristics of alternative building technologies; to establish whether the perceptions on alternative building technologies vary from one community to another; and, to assess the reasons for the rejection of alternative building technology by community members.

This comparative study is planned to be conducted at Ndevana and Orange Grove within the Buffalo City Municipality. The study populations and samples will include, among others, officials from Eastern Cape Department of Human settlements (ECDHS), the Buffalo City Municipality (BCM), alternative building technologies (ABT) companies, community leaders and members of the two case study areas.

This communiqué is geared to request necessary support which includes granting access to the research communities and maximum participation by the affected individuals and organisations towards achieving the objectives of the study.

Your assistance would be highly appreciated in this regard.

Researcher's Signature -----

Date-----

**T. Tshivhasa: Assistant Director, Eastern Cape Department of Human Settlements
Student, Institute for Rural Development University of Venda**

SIGNATURES

Respondent

Date:

Researcher

Date:

APPENDIX 8: CONSENT FORM

Dear Respondent

I am conducting a study entitled **PUBLIC PERCEPTION OF ALTERNATIVE BUILDING TECHNOLOGIES FOR RURAL HOUSING DEVELOPMENT IN THE EASTERN CAPE PROVINCE OF SOUTH AFRICA**. This communication seeks to inform you that the information you provide on the above subject will not be used for any other purpose besides the research I am carrying out towards my Masters Degree in Rural Development and assisting the Eastern Cape Department of Human Settlements in making decisions on how to introduce Alternative Building Technologies in various communities of the province. As a potential respondent, you have the right to participate or to withdraw from study if at any point of the research you feel uncomfortable. Your name will not be disclosed to anyone else and none of the results will be attributed to you. Upon completion of the study, as the principal Investigator, I commit to give feedback on the findings to your community.

If you agree to participate in this study under these conditions, kindly sign in the space provided below. I will countersign to confirm that we have entered into an agreement on how we will relate during this study.

SIGNATURES

Respondent:

Date:

Researcher:

Date: