HAVE LOCAL AUTHORITIES IN CAPE TOWN DEVELOPED THEIR OWN SET OF INDICATORS AS PART OF ASSESSING THEIR PROGRESS IN PROVIDING ADEQUATE SHELTER?

By

Tenille Thomson

Supervisor: Mrs. L.M. Opperman

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Faculty of Engineering and the Built Environment,
University of Cape Town

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Acknowledgements

I would like to express my warmest gratitude to my supervisor Mrs. Lara Opperman for her helpful guidance, assistance, advice, and encouragement throughout the course of this research.

I also wish to thank those who helped set up interviews and those who spent time doing the interviews for this research.

Finally, I am highly indebted to my family and friends for their invaluable support.

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Abstract

Sustainable development has become a vital part of any nation's future. With South Africa agreeing to, like other countries, adopt Agenda 21, it now has to fulfill its commitment in achieving sustainable development. Part of the process of sustainable development is to develop "sustainable indicators" that monitors the progress made throughout sustainable strategies. This research report was carried out so as to investigate whether Local Authorities in Cape Town have developed sustainable indicators so as to support South Africa in it's commitment in moving towards sustainable development. The research was based on the hypothesis "That Local Authorities in the Western Cape have not developed their own set of indicators as part of assessing their progress in providing adequate shelter."

A literature review was done to provide an overview of South Africa adopting sustainable development principles and the process of developing sustainable indicators. Various definitions for sustainable development and its components are given. The role that the built environment can play in the economy and in sustainable development strategies for South Africa was discussed. Then the literature review elaborates on indicators, indicators in the built environment, traditional indicators and finally indicators of sustainable development.

The different methods available for carrying out the investigation were discussed and the qualitative approach was adopted. A structured interview was drafted, pertaining to the literature review.

Six interviews were carried out with members from Local Authorities in the Cape Town Area. The interview results were then analysed. Based on the finding the following conclusions were made.

The Local Authorities in the Cape Town region have developed indicators for sustainable development. These indicators have been developed for 14 different themes drawing on input from various sectors. The development process starts with establishing objectives or goals to be achieved. Broad community participation and input from stakeholders are drawn from throughout the development process. It was found that the Local Authorities also benchmarked with other countries and drew on aid from universities internationally. These indicators were then reported on in the State of the Environment Report. Within this report, it was found that indicators for housing have been developed within the theme of urbanisation. However, the housing department has not set out to develop sustainable indicators to monitor its development policies.

Therefore, it is considered that Local Authorities in the Cape Town region have developed sustainable indicators for the region and are thereby fulfilling South Africa's commitment to Agenda 21. It is recommended that the housing department also embarks on developing sustainable indicators to assist them in monitoring their strategies and their progress towards a sustainable framework.

TABLE OF CONTENTS

Page

List of Figures, Tables and Graphs

List of Figures

List of Tables

List of Graphs

Glossary

Construction Industry Development Board of South Africa	CIDB
Commission on Sustainable Development	CSD
Global Reporting Initiative	GRI
International Council for Research and Innovation in Building and Construction	CIB
International Institute For Sustainable Development	IISD
Network on Construction and City Related Sustainability Indicators	CRISP
United Nation Division for Sustainable Development	UNNDSD

CHAPTER 1: THE RESEARCH PROPOSAL

1.1 Introduction

1.1.1 Background

According to Reid (1995), "Sustainable development first came into prominence in the World Conservation Strategy (WCS) in 1980." It is a relatively new hub in the world and has caught the attention of all types of industries, academics as well as government. It has managed to earn itself such attention that professionals, academics and government representatives from across the globe gathered at the United Nations Conference on Environment and Development (UNCED) held in June 1992, in Rio de Janeiro, to discuss its issues in an open forum (Reid, 1995).

The thought process of sustainable development originally generated from "writers such as Leopold (1949) and Carson (1962) (who) called for people to embrace a lifestyle which showed more consideration for the environment and which reduces the environmental impacts caused by material- and energy-intensive development" (Hill and Bowen, 1997). It would seem at first that sustainable development is mainly an environmental issue. However one could scratch a little deeper under the surface to understand how other industries, such as the construction industry, are roped into playing a role in achieving sustainable development.

Sustainable development was defined by the United Nations World Commission on Environment and Development as "meeting the needs of the present without compromising the ability of future generations to meet their own needs (WECD, 1987). This definition is one of many descriptions for sustainable development. As the sustainability concept is so "broad" (Hill and Bowen, 1997), it has lead to numerous interpretations by academics and practitioners to develop definitions of their own, that are relevant to their particular field of interest.

Lachman (1997) defines the concept as: "a sustainable community effort consists of a long-term, integrated, systems approach to developing and achieving a healthy community by jointly addressing economic, environmental, and social issues. Fostering a strong sense of community and building partnerships and consensus among key stakeholders are also important elements of such efforts." This definition touches on "the four dimensions of economic sustainability which are: the social, economic, environmental and institutional ones" (Spangenberg, 2002).

Hill and Bowen (1997) also support the idea of four dimensions however describe it as the four "pillars of sustainability" being social, economic, biophysical and technical. As one can note, the "social" and "economic" spheres have not changed from one definition to the other. These terms are relatively easy to understand and some principles of the one may easily relate to the principles of the other. Hill and Bowen (1997) apply these terms to the construction industry such that the social principles embrace activities such as providing the basic needs to those who are poverty stricken; and teaching skills and improving productive capacity of the disadvantaged by allowing them to contribute to the project. The economic principles embrace activities such as: ensuring that the beneficiaries of the project can keep up with the financial responsibilities of the product once complete; "promoting employment creation and, in some situations, labour intensive construction" (Hill and Bowen, 1997).

The economic and social principles for sustainability are relative to the construction industry as this sector, with its vast range of activities, "are responsible for a substantial amount of global resource use and waste emissions" (du Plessis, 2001).

The term " 'sustainable construction' means that the principles of sustainable development are applied to the comprehensive construction cycle from the

extraction and beneficiation of raw materials, through the planning, design and construction of buildings and infrastructure, until their final deconstruction and management of the resultant waste. It is a holistic process aiming to restore and maintain harmony between the natural and built environment, while creating settlements that affirm human dignity and encourage economic equality" (du Plessis, 2001).

"Economics is concerned with resource allocation (Cooke, 1996). When looking at sustainability in the economic realm, one will look at input of resources versus output resources on different levels e.g. costs vs. benefits; capital vs. operating; macro (GNP) vs. micro (household); and public/ social vs. private and distribution vs. size (Cooke, 1996; http://www.bsu.edu/cap/ease/ease09.htm).

An economic sphere is included in the four pillars as well as the four dimensions of sustainable development. As it therefore forms an important aspect in achieving sustainability, the built environment also finds it important to strive towards obtaining its economic goals.

1.1.2 The Role of the Built Environment in Achieving Socio-Economic Sustainability

The built environment contributes significantly to the Gross Domestic Product of the country as "it is a major source of employment" and it produces a significant amount to Gross Domestic Product (GDP) per year. The construction industry has been looked at as a prudent indicator of how well the economy is doing as its business cycle is very similar to the country's economic cycle, only lagging the "macro economy by approximately 9-12 months (Robinson, 2002)."

The "construction industry" is made up of a number of different economic activities ranging from: manufacturing of building products such as cement and

wood; the hiring out of plant and machinery; construction of buildings and infrastructure to the development of real estate (Robinson, 2002). For developing countries striving toward sustainable construction, there are "differences in the priorities, the skills levels, the capacity of the construction industry and government and the approaches the need to be followed" when compared the developed countries (du Plessis, 2001). "Therefore a separate Agenda 21 for Sustainable Construction in Developing Countries was commissioned by the CIB, in partnership with the United Nations Environment Programme (du Plessis, 2001).

Developing countries, such as South Africa, have different economic conditions, lack of local capacity, superficial understanding of sustainable construction, little urban investment and an "uncertain economic environment" (du Plessis, 2001).

South Africa is faced with the social problem where 8-10 million people are living in informal settlements and 25% of the population's income is unable to provide for a normal house as most of this population earns less than R1 500 per month (Boaden, 2003). Therefore, this proportion of the population will be unable to obtain a mortgage bond. Government is now faced with the social responsibility to providing these individuals with formal housing as most of them have been disadvantaged due to the previous political policies (Cross, 1999).

The South African government is aiming to provide housing to the underprivileged individuals through subsidy schemes in the hope that once individuals basic needs, such as having shelter and access to clean water, are met, they will invest in their educations thereby resulting in more productive citizens (Cross, 1999). However, it was found that these individuals who received a house from government could not keep up with the running costs of

the home and ended up moving out after 2 months of receiving the house (Cross, 1999). It can therefore be concluded that the project is not economically sustainable as the beneficiaries could not sustain the completed product.

These issues need to be addressed so that sustainable development can be achieved. Community-based construction has been identified as a mechanism to achieve this. It is a means used "to sustain development and to create jobs in communities (Watermeyer, 1995)."

Watermeyer (1995) defines community-based construction as "the use of labour-based technologies and labour-intensive methods on projects in which the community is, in addition, involved in the commercial, managerial and administrative aspects so as to maximise the amount of refunds retained within the community and to transfer skills and competencies to the community (as cited in Watermeyer and Band, 1993)."

1.2 Research Focus

The core focus of this research will study the steps taken by South African government to develop indicators of sustainable development. Part of any national strategy for implementing sustainable development is to develop a set of indicators that act as a measuring and monitoring tool for decision-makers. As South Africa is a developing country, it can not simply implement the indicators of sustainable development developed by developed countries for developed countries. It is therefore important for South African government to develop their own set of indicators that will be more efficient in aiding them in decision-making. This research will therefore provide insight into South African local authorities progress and actions in developing a set of sustainable indicators relevant its policies, priorities and political concerns

One of South Africa's major concerns at present is the large percentage of its population living in informal settlement areas with a lack of basic services. It is

important to achieve socio-economic sustainability in these human settlement areas as this population of South Africa, living in informal settlements, is an important resource to the economy. In addition to these persons being a resource to the economy, the present South African government is faced with the social responsibility of correcting the previous government's unfair political policies and therefore needs to ensure the human development of these previously disadvantaged persons. They are potential productive resources to an economy. As South Africa has such a high unemployment rate, it is far from reaching its potential productive capacity. With inflation, and more people entering the job market, this situation worsens.

One of the ways to achieve sustainable socio-economic growth in these communities that the government re-houses, is to implement economic and social principles for achieving sustainability e.g. by ensuring that the beneficiaries of the project can keep up with the financial responsibilities of the product once complete; "promoting employment creation and, in some situations, labour intensive construction" (Hill and Bowen, 1997).

Social and economic indicators are important in the process of achieving sustainability in these settlement areas. A general description of an indicator, given by the CSIR (2002), is "something that gives information on the current situation (as cited in the Concise Oxford dictionary).

At present, the Gross Domestic Product (GDP) and the Gross National Product (GNP) are used as measures of economic progress. As these indicators are based on the "underlying assumption of continuing and unlimited growth" (http://www.egs.uct.ac.za/engeo/courses /anne/lecture9.htm), they are money-based per capita measures. These indicators are based capitalist or socialist theories that growth is extremely desirable because the human condition is improved by increasing the quantity and quality of goods. These principles ignore the concept that "sustainable growth both preserves the environment and permits a nation's economy to increase in

size, creating jobs and improving the human condition" (http://www.egs.uct.ac.za/engeo/courses /anne/lecture9.htm).

Therefore, the International Meeting on More Effective Development Indicators was convened in the Republic of Venezuela from July 31st to August 3rd, 1989. At the meeting, the weaknesses of the GDP were highlighted. One of the main weaknesses identified was that these universal indicators "leave out non-money economic processes and the informal sector;" it neglects the social cost of production", nor does it incorporate the cost of resource depletion and environmental programs"; and it is not reflective of the true efficiency of resource utilization" (1989)

At present, there is a movement towards establishing more genuine economic indicators that will be representative of a sustainable framework. These new indicators will be able to monitor the project progress so that variations can be made to future projects if need be to ensure a more sustainable development. There are indicators developed by the developed world, however, these are not necessarily succinct with the developing world's conditions as there are significant differences between the two worlds.

As indicators are to be representative of the sustainable system used, one will find difficulties when using the developed world's indicators for projects in the developing worlds. This is due to the differences between these two worlds in its priorities, skills levels, and the more extreme problems face by the developing worlds.

This research will attempt to illustrate South Africa's progress in developing more suitable indicators of sustainable development in order to monitor and measure the effectiveness of their housing policies. This will be done by reading extensively on what sustainable indicators encompasses and by comparing these issues South Africa's progress of developing its own indicators.

1.3 Problem Statement

The problem presented by this research report can be described as follows:
At the Earth Summit 1997, South Africa has committed itself to adopting Agenda 21. With various Agenda 21 initiatives not being as successful due to an absence of a simplistic national strategy for its implementation. Local authorities have been given the responsibility of developing local environmental strategies and action plans for a Local Agenda 21.

With South Africa integrating principles of sustainable development into its policies one of its main strategies to move toward sustainable development is to uplift the quality of life for the poor by housing this population living in the informal settlements. These housing policies also impact on the built environment as government housing does contribute to building activity in the built environment as well as the construction industry. Therefore, these sectors would also need to play a role in moving towards implementing principles of sustainable development.

To measure the progress in sustainable growth, not only environmental well-being, one needs to identify the most effective indicators which will provide a critical assessment of a particular housing project or settlement area.

The same indicators used by developed worlds can not be used for projects in a developing world. South Africa will therefore, need to select or develop a set of sustainable indicators that provides an accurate assessment of its progress in achieving sustainable development.

This leads to the problem statement, which is "Have Local Authorities in Cape Town developed their own set of indicators as part of assessing their progress in providing adequate shelter?"

1.4 Research Questions

The research questions pertaining to this research are:

- Can developing countries implement the same or similar indicators of sustainable development developed by developed countries?
- What issues are of main concern in South Africa with regard to developing sustainable indicators?
- Have the South African local authorities progressed toward achieving sustainable development?
- Have the South African local authorities developed indicators of sustainable development?
- What development approaches are used for developing sustainable indicators?
- Have these indicators been tested?

1.5 Aims

The aims of this research report are:

- To emphasize the importance of developing indicators relative to South Africa's main strategies for achieving sustainable development;
- To investigate that the Local Authorities in the Western Cape have developed indicators of sustainable development for their housing delivery policies;
- To illustrate that these Local Authorities have tested these indicators.

1.6 Objectives

In relation to the research questions and aims, the objectives are:

- To identify strengths and weaknesses of the traditional indicators utilized;
- To identify the need for South Africa to develop its own set of indicators;
- To identify at what stage the Local Authorities in the Western Cape are at in developing and implementing indicators of sustainable development in housing delivery policies;
- To identify what indicators have been developed by these Local Authorities;
- Identify if these indicators have been implemented.

1.7 Hypothesis

The hypothesis for this research report is as follows:

That Local Authorities in the Western Cape have not developed their own set of indicators as part of assessing their progress in providing adequate shelter.

1.8 Research Methodology

The research methodology undertaken was a qualitative approach. Also, the research done was intended to be representative of sustainable indicators implemented by Local Authorities in the Western Cape in their housing delivery policies.

The research methodology undertaken to achieve the objectives of this research report is based on:

- An analysis and summary of research related to sustainable development, economic development, sustainable construction, sustainable indicators and structures. This literature will be drawn from past case studies, conference proceedings, journal articles, internet sources etc.
- Interviews with members of Local Authorities in the Western Cape. Questions will be formulated so that the topics outlined by this research can be addressed.

1.9 Limitations

This research will be limited:

1.9.1 This study will be limited to investigating if Local Authorities are implementing sustainability indicators in housing delivery policies and it is not looking at housing delivery policies per say.

1.9.2 By time constraints as the research report must be completed within 5 months.

1.9.3 To personal interviews being carried out strictly within the Cape Town area.

1.9.4 To the main portion of information being drawn from secondary sources of data such as literature already published as no case studies will be carried out.

1.9.5 To investigating if Local Authorities are implementing sustainability indicators in housing delivery policies.

1.10 Structure

The following refers to the structure for this research report:

Chapter one will include an introduction to sustainable development including brief descriptions of the relevant areas of sustainability applicable to this research report. It also includes the problem statement, research questions and aims and objectives of this particular study. From this, the hypothesis will be developed and the methodology to be used in this research and the limitations will be stated.

Chapter two defines the concept sustainable development encompasses. The review will include South Africa's commitment to achieving sustainable development, the policies of sustainable development as well as South African housing policies.

Chapter three will review literature of sustainable construction and the role the built environment plays in South Africa's economy. This chapter also discusses he economic and social factors in if housing policies, and indicators of sustainable development and the how these should be developed and implemented.

Chapter four analyses the interviews carried out during for this research and the presentation of the results derived from the interviews. It will present an overall discussion of what is presently implemented by local authorities, the pitfalls and strong points thereof.

Chapter six will present the conclusions and recommendations for Local Authorities in the Cape Town region.

CHAPTER 2: SUSTAINABLE DEVELOPMENT

2.1 Introduction

According to the International Institute of Sustainable Development's timeline, 1962 is considered as the year in which the world became aware of how close the environment and human development is related when Rachel Carson published the book "Silent Spring (1962)." This book related the high level of pesticides used in agricultural farming to human and animal health. This "shattered the assumption that the environment had an infinite capacity to absorb pollutants" (IISD, 1997: electronic source).

Living in the 21st Century, as a civilization we have become more aware of mother earth. With environmentalists screaming out to governments and corporations to stop and look at the impact their business and production activities are having on the environment, we have finally become aware of what we have been doing to the environment for hundreds of decades.

Many individuals have offered or attempted to define the term sustainable development. "At last count, back in 1992, a World Bank study estimated that there were at least 33 definitions surfacing in the literature - all covering one or more aspects of economic, social, and environmental objectives" (Ouattara, 1997:electeonic source). The United Nations World Commission on Environment and Development defined it as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." (Smart Communities Network: electronic source) This definition is broad and rightly so as sustainable development is included all aspects of life.

Robert Gilman says that "sustainability refers to the ability of a society, ecosystem, or any such ongoing system to continue functioning into the indefinite future without being forced into decline through exhaustion... of key resources" (Smart Communities Network, 2003: electronic source). A similar definition is that "it describes development which does not automatically lead to environmental

degradation and does not lead to large inequities in society" (NOREDO, *et al*, 1998).

In 1989, William D. Ruckelshaus spoke of sustainability as "the (emerging) doctrine that economic growth and development must take place, and be maintained over time, within the limits set by ecology in the broadest sense - by the interrelations of human beings and their works, the biosphere and the physical and chemical laws that govern it... It follows that environmental protection and economic development are complementary rather than antagonistic processes" (Smart Communities Network, 2003: electronic source). This definition acknowledges that economic growth needs to be achieved within a sustainable framework so that we do not negatively impact the environment when we pursue our economic policies.

Alassane Ouattara (1997), Deputy Managing Director of the International Monetary Fund, stated in her speech that "perhaps the definition we are most comfortable with is one that takes the viewpoint of the economist, with concerns of the sociologist and ecologist at heart. We see economic growth and the efficient use of resources as the paramount objectives. But we also believe that these objectives must be achieved in ways that allow the simultaneous pursuit of social and ecological objectives."

Essentially, sustainable development deals with issues such as "improving quality of life; promoting equity within generations; maintaining a healthy environment; and understanding that the environment and development are inseparable" (UCT, 2002).

The concept of sustainable development therefore seems to stem from the concern that we are harming the earth's ecosystem through our daily activities as previously discussed. The research carried out following Rachel Carson's book, led to raising awareness of the earth's limited resources, and how dependent our civilisation is on

earth's ecosystem remaining in balance. We therefore now have to ensure that future generations are able to inhabit the earth for another hundred decades, and more, as we do today. It is this concern for future generations that places the worlds focus on sustainable development.

2.2 Components of Sustainable Development

Dr. R. Chiu states that "there are different strands of sustainability to be considered, such as ecological sustainability, social sustainability, economic sustainability and cultural sustainability. There is disagreement over the relationships between these different dimensions of sustainability and sustainable development." She supports this statement stating that "maintaining existing social norms and introducing changes within social limits, is a social constraint on development (cited in D.A. Munro, 1995). In contrast with this view, she says that "others may define social sustainability as the social conditions necessary to support environmental sustainability which is at the heart of sustainable development, and therefore any social development goals should be considered within the limits of environmental capital (cited in Mitlin and Satterhwaite, 1996).

The CIDA framework lists various areas on where sustainable development must be achieved. It does not list environmental sustainability as the focus of sustainable development but makes it as equally important as economic, social, political, and cultural sustainability. Therefore, before one can achieve sustainable development, one would need to be successful in achieving all five subgroups listed in this framework.

In trying to achieve environmental sustainability, economic, social, political, and cultural sustainability, one can address nearly all of society's problems within each of these subgroups. The Framework for Sustainable Development further illustrates the areas that are to be addressed under each subgroup. "Ecosystem integrity," "biological diversity," and the "populations" issues can be tackled within the subgroup of environmental sustainability. "Appropriate economic policies," "efficient

resource allocation," "more equitable access to resources, including "gender equity," and "increasing the productive capacity of the poor" are issues to be addressed within economic sustainability. "Human rights," "democratic development," and "good governance" are issues to be addressed within political sustainability. "Improved income distribution," gender equity," "investing in basic health and education," and emphasizing participation of the beneficiaries," are issues addressed through social sustainability. Lastly, "sensitivity to cultural factors," "recognition of values conducive to development" is issues addressed through cultural sustainability (CIDA, 1994). In listing these issues, the Canadian International Development Agency is highlighting areas, rather than limiting the areas of concern.

Because sustainable development is such a broad term, the concept has been split further into different components. To understand some of the various components of sustainability, one has to have knowledge of what sustainability for each component or strand is defined as. Therefore, the following definitions are helpful in understanding each component.

a) Environmental Sustainability

Goodland (1999: electronic source) states that environmental sustainability aims "to improve human welfare by protecting the sources of raw materials used for human needs, and ensuring that the sinks for human wastes are not exceeded, in order to prevent harm to humans."

b) Economic Sustainability

According to Goodland (1999), the widely accepted definition of economic sustainability is "maintenance of capital." Another definition for economic sustainability is it means that development is economically efficient and that benefits of such development are distributed between generations of people (Texas Alliance for Geographic Education: electronic source).

c) Cultural Sustainability

It "requires that any development should take into account the values and beliefs affected by it. In addition, the range of cultural groups should be maintained and encouraged and the value of their heritage, traditions, and points of view recognised" (Texas Alliance for Geographic Education: electronic source).

d) Social Sustainability

"It requires that development does not cause social conflict. In practice this means that development should increase people's control over their own lives - that all social groups should have the opportunity to participate in decision making ..." (Texas Alliance for Geographic Education: electronic source).

e) Political sustainability

The literature available defining political sustainability is not as defined as it is for the above components. Klaus Stoll presents a training course on Sustainability of Community Public Internet Access Points. Here, he describes that political sustainability can impact on a project positively through "local and national politics, policies and individuals" (Stoll, electronic source).

f) Sustainable Community

Lachman (1997) states that "a sustainable community effort consists of a long-term, integrated, systems approach to developing and achieving a healthy community by jointly addressing economic, environmental, and social issues. Fostering a strong sense of community and building partnerships and consensus among key stakeholders are also important elements of such efforts."

g) Sustainable Future

The Northern Rivers Region (1998:7) defines sustainable future as "recognising the links between our economy, environment and quality of life, now and in the future."

2.3 Sustainable Development Policies

There are a number of strategies put in place to help countries adopt a more sustainable plan of action for their growth. In order to illustrate why and which policy South Africa has adopted, the following are important to look at.

2.3.1 Agenda 21

Sustainable development is a global issue calling all countries, developed and developing, to acknowledge that they need to work together and take the necessary steps to achieve a more sustainable future. In 1992, the "world" attended the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro to discuss environmental issues and sustainable development. This conference is more commonly known as "The Earth Summit." The Earth Summit was supported by 172 government officials', 2400 representatives of non-governmental organisation (NGO's) (United Nations, 1997).

This Summit was not the first time governments were challenged to alter economic development, prevent total destruction of non-renewable resources, and stop pollution. In 1972, the UN Conference on the Human Environment was held in Stockholm. This year represented the year where "a point had been reached in history when we must shape our actions throughout the world with a more prudent care for their environmental consequences. (Declaration of the UN Conference on the Human Environment)" (UNESCO, 2003).

After the UN International Conference on Population and Development in 1994, a programme of action was initiated "to ensure that population,

environmental and poverty eradication factors were integrated in sustainable policies, plans and programmes (UNESCO, 2003) (cited in Chapter 3- Interrelationships between population, sustained economic growth and sustainable development, C - population and Environment, Programme of Action: 1994).

The Earth Summit, convened twenty years after the UN Conference on the Human Environment, resulted in the following documents: "the Rio Declaration on Environment and Development; Agenda 21; the Statement of Forest Principles, the United Nations Framework Convention on Climate Change; and the United Nations Convention on Biological Diversity" (UNESCO, 1997). The Agenda 21 document is an action plan to assist countries across the world in moving in the correct direction to achieve sustainable development.

Agenda 21's Preamble section acknowledges that different countries have different degrees of poverty, hunger, illiteracy, and pollution. It further recognises that in order to solve the problems of the poor and the environment, sustainable development will have to adopt an integrated approach. Agenda 21 is a global document that is implemented by various governments across the world. The document sets a basis for action; objectives; activities and states the requirements for empowering communities; management-related activities; data, information and evaluation; international and regional cooperation and coordination; and the means for implementation (UNESCO, 1992).

2.3.2 South Africa Adopts Agenda 21

As Agenda 21 is a global programme of action for achieving sustainable development, it has been recognised that governments need to take on the responsibility of seeing their countries adopt and implement activities in line with sustainable development principles. "More than a hundred heads of

government pledged to work together for our common future, by adopting Agenda 21, ..."(Local Agenda 21, 2002: electronic source). Local Agenda 21 was developed due to the need for Local Authorities to play an important role in encouraging their countries to adopt the action programme of Agenda 21. Each country develops its own local agenda action plans.

This Local Agenda 21 approach has been adopted internationally by "two thousand local authorities in sixty countries" (UCT, 2002) with South Africa as one of these countries. President Thabo Mbeki affirmed the country's commitment to Agenda 21 at the Earth Summit in 1997 (Local Agenda 21, 2002: electronic source).

Local Agenda 21 has been defined as bringing sustainable development to the local level. It was defined more formerly as a "participatory multi-sectoral process to achieve the goals of Agenda 21 at (the) local level through the preparation and implementation of a long-term strategic action plan that addresses priority local concerns..."(Local Agenda 21, 2002: electronic source).

When looking at South Africa's plans and strategies in adopting Local Agenda 21, an important characteristic to consider is that South Africa is indeed a developing country. Thus the main areas of concern would differ from a developed country.

2.3.3 South Africa's Implementation of Agenda 21

Due to a lack of a national strategy, initial programmes for the implementation of Agenda 21 failed. The Department of Environmental Affairs and Tourism, who had representatives present at the Commission for Sustainable Development in April 1995, educated, aided and encouraged local authorities on the need and means of implementing Agenda 21. With two Local Agenda 21 initiatives being implemented, South Africa realized its need to set up and

measure the progress of actual models so that they would be able to identify and measure what makes a sustainable community. This strategy would provide decision-makers with valuable information to assist them with the development of policies at all levels i.e. local, national and international (Hugo, 1996).

Local authorities therefore have an important role in integrating sustainable development with their development plans for their region. They have been provided with mechanisms to equip them with achieving their sustainable and developmental goals within their region through Local Agenda 21 (Hugo, 1996).

The coordination structure of Agenda 21 at national level is a Subcommittee on Sustainable Development and the Department of Environmental Affairs and Tourism. The United Nations, NGO's, universities, research centres, municipalities are all working together and assisting with development plans. Therefore, access to technical knowledge, skills and experience is made available. Local authorities are also able to attend workshops and receive training to equip them with skills and resources to efficiently tackle sustainable development. A Best Practice Resource Centre will also be available to decision-makers as a tool for national capacity building (Hugo, 1996).

Annette Hugo's (1996) country profile of South Africa identifies key areas for sustainable development to take place and at the same time ranking its priority on government's agenda. Please refer to Table 1.

Objectives	National Priority
Combating poverty	Very High
Demographic dynamics and sustainability	Very High
Protecting and promoting human health	Very High
Promoting sustainable human settlement development	Very High
Integrating environment and development in decision-making	Very High
managing fragile ecosystems: combating desertification and drought	Very High
Conservation of biological diversity	Very High
Environmentally sound management of biotechnology	Very High
Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources	Very High
Protection of the quality and supply of freshwater resources: an application of integrated approaches to the development, management and use of water resources	Very High
Environmentally sound management of hazardous wastes, including prevention of illegal international traffic in hazardous wastes products	Very High
Protection of the Atmosphere	High
Integrated approach to the planning and management of land resources	High
Promoting sustainable agriculture and rural development	High
Environmentally sound management of toxic chemicals, including prevention of illegal international traffic in toxic and dangerous products	High
Environmentally sound management of solid wastes and sewerage-related issues	High
Safe and environmentally sound management of radioactive wastes	High
Transfer of environmentally sound technology, cooperation and capacity-building	High
Promoting education, public awareness and training	High
National mechanisms and international cooperation for capacity-building in developing countries	High
Science of Sustainable development	Medium/ High
International cooperation to accelerate sustainable development in developing countries and related domestic policies	Medium
Changing consumption Patterns	Medium

Combating deforestation	Medium
Managing fragile ecosystems: sustainable mountain development	Medium
Financial resources and mechanisms International institutional arrangements International legal instruments and mechanisms Information for decision making	Medium/ Low
Major groups: Global action for women towards sustainable and equitable development; Children and youth in sustainable development; Recognising and strengthening the role of indigenous people and their communities; Strengthening the role of non-governmental organisations- partners for sustainable development; Local authorities' initiatives in support of Agenda 21; Strengthening the role of workers and their trade unions; strengthening the role of business and industry; scientific and technological community; Strengthening the role of farmers	

Table 1: Priority Level for Local Agenda 21's Objectives (Hugo, 1996)

From Table 1, it is found that Local Agenda 21 introduces principles of sustainable development into South Africa's social objectives of reducing poverty; and its environmental objectives of protecting its natural resources and ecosystems. It prioritises all social aspects as very high placing the people as the focus of development. However, the larger portion of the agenda is concerned with environmental issues with priorities ranked from "very high" to "medium-low."

One goal of the Local Agenda 21 is to combat poverty. Government proposes to achieve this through the Reconstruction and Development Programme (RDP). This national strategy aims to improve the circumstances of the poor through job creation, employment opportunities, increasing household income and improving living conditions. One of its strategies to improve living conditions is to provide the poor with housing and services such as water and sanitation.

The National Housing Programme will be responsible for fulfilling these promises by providing houses to the poor through a holistic approach by creating job opportunities, providing training and improving living conditions simultaneously. This will hopefully have a multiplier effect and create a sustainable community which will be able to support themselves in the end. This development approach is people centred and thereby consistent with South Africa's approach of sustainable human development (Hugo, 1996).

Sustainable Human Development is also another goal of Agenda 21wich is ranked with a priority level of "very high." The Reconstruction and Development Programme's framework will attempt to support it. Due to the apartheid policies, there are a number of communities living in shacks with no roads, no water and electricity, nor any sanitation or sewerage. The present government has to provide this infrastructure in these urban developments. Due to the housing process not able to satisfy the demand fast enough, the National Urban Reconstruction and Housing Agency works at improving the housing delivery speed in metropolitan areas. These projects will effectively improve the "physical, mental, social and environmental well being of the people" in these areas (Hugo, 1996).

The Department of Housing would play a vital part in achieving these goals for sustainable human settlements as set by Local Agenda. The Department of Housing therefore, needs to bring sustainable development into its housing policies and strategies for South Africa so that the local authorities and government can fulfill its promises.

2.3.4 Local Agenda 21

Since South Africa adopted Agenda 21 in 1993 which required local government to implement Local Agenda 21, the National Department of Environmental Affairs and Tourism (DEA&T) was made responsible for the implementation of Agenda 21 in South Africa (Local Agenda 21, 2002).

One of the pressing issues that needs to be dealt with is effects of the apartheid regime. The old political order created a socio-economic gap between different groups of people where they prevented the greater percentage of the population from participating in the decision-making and planning of development and resource use. The new political order is now faced with correcting these socially unjust and environmentally unsound policies (Local Agenda 21, 2002).

With the new government having to reconcile these differences, they are able to include principles of sustainable development in the decision-making process for the future human and environmental development of South Africa. As South Africa has transformed its governmental systems recently, this made it possible for the country to adopt a more sustainable institutional framework. Now local authorities are forced by legislation to include communities and metropolitan councils in the planning process. This has made it possible to achieve an integrated development planning process (Local Agenda, 2002).

The government identified four policy objectives in the 2001 budget. These objectives were: "economic growth; job creation; equity and social development; and strengthening the safety and justice sectors" (Dixon & Pretorius: 13). Today, local authorities are responsible for delivering services such as water and electricity, housing, infrastructure, health and economic development to the people in a manner that supports environmental and socio-economic sustainability (UCT, 2002).

Literature reveals that with government identifying the significant role the construction industry plays in the macro–economy and in satisfying the social needs of the people, a White Paper was produced which creates an enabling Environment for Reconstruction growth and Development in the

construction industry. Also an Agenda 21 for sustainable construction has been drawn up in collaboration of the CSIR, CIDB, CIB, and UNEP.

2.3.5 Department of Housing: White Paper- A New Housing Policy and Strategy for South Africa

Much debate has been carried out over the years about housing the poor. With more and more people coming from the rural areas to the urban areas to earn a living, the number of people living in squatter camps increases yearly. A large percentage of the South African population, specifically the previously disadvantaged is homeless and lack basic shelter (Boaden, 2003). The White Paper recognises that housing is the greatest challenge the government is presently facing. It calls for government and private sectors organisations to form partnerships so that they can provide the poor with their basic human rights (South African Housing, 1995).

The White Paper shows that the hosing sector plays an important role in the macro-economy. It points out four types of linkages: real side linkages; financial linkages; fiscal linkages; and socio-economic linkages. The housing sector can create job opportunities, generate income; increase consumption in goods such as furniture and households appliances; drive the prices of building materials up if enough activity is present (South African Housing, 1995). Private financial institutions e.g. banks and governments, provide households with financial aid for the homes. If no financial aid is given, the poor will never be able to buy themselves a home and the social problem will deteriorate and at the same time, consumption levels will not reach full potential. The government identifies that by providing housing, the people can be more productive, and socio-political conditions will become stable (South African Housing, 1995).

The White Paper describes the situation of the housing sector of South Africa by presenting the following statistics.

Description	Statistic (1995)
SA population	42.8 million
No. of households	8.3 million
No. of members per household	4.97
No. of single people	2 million
% of population living in urban areas	66%
% of population living in rural areas	34%
Income Profiles:	
R0 -R 800	39.70%
R 800 - R 1,500	29%
R 1,500 - R2,500	11.80%
R2,500 - R3,500	5.60%
more than R3,500	13.90%
Total housing stock	3.4million
% of urban households in formal or shared housing	61%
No. of urban informal housing units	1.5miilion
% of Households living in squatters	13.50%
No. of people living below the poverty datum line	17.1 million
Access to Basic Services	
Proportion of urban households without access to water	±¼
% of households without access to adequate toilets	48%
% of households without sanitation systems	16%
% of households without electricity supply	46.50%

Table 2: Statistical Profile of Housing in South Africa 1995

Source: South Africa Housing White Paper, 1995

The above statistics provide a basis for South Africa's stance that the housing problem needs to be solved in a manner that allows these communities to sustain themselves once housed. This stance gives the South African government a unique challenge.

South Africa presently face a housing crisis with a housing backlog forcing people to go on a waiting list before receiving a home. This results in more illegal squatting. These squatters have no tenure security, or access to basic services. Added to the pressure of providing houses, is the pressure of

upgrading the present services in some of the more established squatters (Boaden, 2003).

The government faces the added obstacles of high unemployment levels; insufficient personal savings, gross domestic investment and fixed capital formation; high inflation; high consumption; savings ratio among low-income groups (South African Housing, 1995).

Providing for the underprivileged will require a diverse group of people to sit together and find a suitable action plan. The vision for housing includes creating sustainable environments, communities and households through a sustainable housing process where the development process starts from within the community i.e. the people (South African Housing, 1995).

2.4 Sustainable Development Versus Sustainable Construction

The construction industry is directly influenced by governments' decision to adopt sustainable development. It is also directly involved in activities that impact on the environment. Examples of this is the construction of roads, houses, etc. where land is being used, large tracts of fauna and flora are cleared so that building activity can take place. As many of the environmental concerns of sustainable development deal with preserving the diversity of plant life, and using our resources (e.g. land) efficiently, there is a direct link between sustainable development and what the construction industry has to look at the impact it has on the health of the environment.

Sustainable development also seeks to provide people with their social needs as highlighted in the previous chapter. The construction sector or rather, the built environment is directly involved with the production and supply of these products. With government taking on the social and environmental responsibility of achieving sustainable development on a global platform, and uplifting the poor and previously disadvantaged on a national level, they will have to carefully consider the need and

means to regulate the construction and built environment so that the industry can assist in achieving sustainable development (Radebe: electronic source).

Sustainable construction is simply sustainable development related to the construction industry (Hill & Bowen, 1997). Sustainable construction will help in conserving biodiversity and balanced eco-systems; providing the poor with basic human rights while continuing it's development and construction activities. Hill and Bowen (1997) give another definition for sustainable construction is 'creating a healthy built environment using resource – efficient, ecologically based principles (cited in Kilbert, 1994 b).

Chrisna du Plessis (2002) states "that the principles of sustainable development are applied to the comprehensive construction cycle from the extraction and beneficiation of raw materials, through the planning, design and construction of building and infrastructure until their final deconstruction and management of the resultant waste. It is a holistic process aiming to restore and maintain harmony between the natural and built environment, while creating settlements that affirm human dignity and encourage economic equity.' (Du Plessis, 2002). It is this concept that assists in developing a definition for sustainable construction.

In order to achieve sustainable development through construction, one has to bring these principles in at the planning and design stage of a development. At the planning stage, one would consider the environmental impact the building would have on that area if there were any environment legislation regarding that particular area. In the design stage, the architect and client should consider types of materials to use and how energy efficient the design is. During the tendering and construction phase, one can look at using more labour-based methods and decrease wastage and include an environmental manager in the team. Once the building is complete, one will have to consider life cycle costs and maintenance and the re-use of building materials when building is demolished. These are just a few ways in which building projects can integrate sustainability principles into the process (Hill & Bowen, 1997).

2.5 The Role of the Built Environment in the Economy

Presently, one of the most used economic indicators is Gross Domestic Product. This economic measure has become a universal indicator for development of a country. The South African construction industry contributes approximately 2.3% to GDP in 2003. In 2002 the building sector employed approximately 246 000 people in the formal sector and approximately 123 000 people in the informal sector (Robinson, 2000). From these statistics alone, we can see that the building industry's economic conditions and the macro-economy are closely related. Robinson (2002) states that the economic cycles in the building industry are said to lag the macro-economy by 9 to 12 months. With a decrease in macro–economic growth, this decrease will trickle down into the building industry resulting in a decrease in the number of building projects.

Government can stimulate the built environment through economic policies such as taxes and levies; through government investment, and housing policies e.g. setting the number of units to be built over the next few years. During 1999, government awarded R60, 67millon towards residential housing and R376 48million toward low cost/affordable housing. Other government contracts were also awarded for building hostels, health facilities, schools, shops, factories, etc. Total value of government contracts awarded in 1999 was R1.6 billion (Robinson, 2000). In order for this investment to be maximised effectively, one can increase the building capacity of the construction industry (Zawdie & Langford; 2000).

2.6 Capacity Building

Developing countries primary challenge is to provide the population with basic human rights such as housing services in a sustainable manner. Government needs to introduce sustainability into activities concerned with producing infrastructure by using capacity building. According to the World Bank's statistics of 1994 shows that developing countries spend approximately 4% of GDP on infrastructure. Therefore, if the industry has the level of skill to build the infrastructure, then government can

allocate more to infrastructure instead (Zawdie & Langford; 2000).

When referring to increasing the capacity of the construction industry of developing countries, one is referring to the capacity of the people to execute the work. Capacity building in the built environment has become an important feature for sustainable development since one is able to tackle the socio-economic development policies of the country through the supply of physical infrastructure. The World Bank also shows statistics that "a 1% increase in the stock of infrastructure is associated with 1% increase in GDP across all countries (Zawdie & Langford; 2000: electronic source)." Also construction products are capital goods of which 50% of investments in capital goods is derived from investment in construction (Zawdie & Langford, 2000).

Physical infrastructure falling under the civil sector contributes 50% of construction GDP, the commercial housing sector contributes 30% of construction GDP, and other product type such as schools, clinics, etc contribute 20% of construction GDP (cited in Wells, 1986). Physical infrastructure is a key industry to manipulate economic growth and since it enables social development at the same time, the capacity of the industry is significant. Developing countries adopt a method that focusses the provision of infrastructure around the goal of reducing poverty. One way of achieving this is to award local contractors the tender. The money that has been invested by developed countries can then go to the local contractors. Once they have received the money, they can spend it inside their country and support their own people resulting in a multiplier effect (Zawdie & Langford, 2000).

However they can only deliver if they are technically equipped to do so. This is one of the challenges the developing countries are facing. They find that due to the lack of local capacity, international contractors from developed countries are being awarded the jobs resulting in the developing countries losing out on the opportunity to benefit from the advantages of the multiplier effect. However, government is forced to use these international contractors because there is urgency in providing the infrastructure and the limited local capacity is slowing down the supply of infrastructure.

Government therefore needs to provide infrastructure and develop local capacity in the construction sector in developing countries (Zawdie & Langford, 2000).

One of the alternatives would be for local contractors and international contractors to form joint ventures. This way, there is transfer of skill and the demand is being satisfied. Government can also employ local labour and resources to bring income into the area and continue the multiplier effect resulting in an increase in income and reduction in poverty (Zawdie & Langford; 2000).

Another alternative to developing local capacity in the construction industry is to use labour-intensive construction methods through community-based construction in the housing sector. Which would support National government's approach for development as stipulated in the Local Agenda 21 and the White Paper (Watermeyer, 1995). These alternatives are examples of the challenges facing developing countries. This shows that if these developing countries do adopt a sustainable approach and run programmes to build the capacity of the construction industry, they would also need to develop sustainable indicators to measure there progress toward achieving their goals.

Due to budget constraints, and the need to equip people with skills so that they can be productive, government has opted for self-help housing programmes. Self- help housing process is ideally initiated by the people therefore it is for the community to initiate, plan and execute the housing process with as little help from outside resources as possible. Limited help is recommended so that the community becomes independent rather than to depend on outsiders. They do benefit more as they learn more by doing everything for themselves (Boaden, 2003). The skills and knowledge they acquire can be used in other developments thereby achieving sustained development. Government's role is ultimately to empower people and assist them in developing themselves. This way, the community is self-sufficient and can sustain the settlement areas because they can now use the new skills they have acquired and

perhaps start their own building company and help others in the community (Boaden, 2003).

It is important that government ensures that communities acquire competent skills and that this is a development process for them so that jobs are ultimately created through the construction activities. In addition to the technical knowledge being transferred, so to should contract administration and management to be taught through the process. Labour-based technologies and labour-intensive methods are the cheapest way to provide the people with skills since government can make budgeted savings in the provision of housing. This action plan is also commendable for injecting money into the community (Watermeyer, 1995).

In order for this money to be beneficial to the community development it is important for the community to retain this money and expend it within the area for the multiplier effect to occur. Therefore, local entrepreneurs within the community will too benefit from the development (Boaden, 2003).

2.7 Disparities between Developed and Developing Countries

Perrsend (2001) describes developed countries as wealthy and powerful and the developing countries as poor and weak. She states that "a quarter of the world's population consume(s) three-quarters of the world's energy and minerals, and eat(s) more than half the world's food." She points out that the wealth gap between the developed countries and developing countries are increasing, leaving the poor behind resulting in them becoming trapped in a cycle of unsustainability. Perrsend (2001) takes the view that the poor developing countries are forced to neglect environmental sustainable principles in their need to survive. This problem is not made any easier considering the aid received from developed countries is at its lowest these days. Perrsend (2001) feels that the developing countries are forced to pay debt to developed countries and the developed countries are not recognizing their debt to the environment.

Perrsend (2001) further argues that "sustainable development is simply not possible while millions live in poverty." She says that the World Summit needs to "reframe global issues as issues of global inequality, of poverty, of social and environmental justice" in order to successfully achieve it goals.

In support of Perrsend's statements, the website Population, Poverty and Environment (electronic source) states that presently, the world is facing a huge gap between rich and poor nations. The United Nations population fund states that in 2000, it is estimated that 80% of the world's population live in developing countries. It is projected that with developed countries experiencing a decrease in the population growth rates, it is the developing countries that will experience the majority at the global population growth. Unfortunately, it is the developing countries that face major social problems where large proportions of the population struggling to survive and employing unsustainable activities such as resource depletion. These calls for much attention to be placed on poverty alleviation so that economic and environmental sustainability can be achieved in the long run (Population, Poverty and Environment: electronic source).

Therefore, it can be said that developed countries that do not have the same serious problems as developing countries, do not have to focus their energies on providing a large percentage of their population with food and shelter, and providing education to the illiterate. Instead, they can focus their energies on the environment and develop strategies and implement environmental policies for sustainable development.

In contrast with developed countries, developing countries are mainly concerned with improving health and literacy, and providing shelter, food and water to the poverty stricken. Therefore, governments of poorer countries cannot prioritise environmental sustainable development over sustainable human development.

Similarly to when the world gathered to face the challenge that non-renewable resources were being depleted and many of our plant and animal species were now extinct, developing countries must face the challenge of reducing poverty and

improving living conditions for its people. Therefore, similar to the urgency of the world needing to alter its way of thinking and to redefine its development policies, developing countries need to urgently address their socio-economic problems first. It would not make sense for the developing countries to spend most of its effort on protecting the environment for future generations if the present generation's conditions are not improved.

As discussed previously, Agenda 21 has to be implemented by each country at a national and local level. Due to the disparities between developed countries and developing countries, developing countries would not implement this plan as readily as developed countries would because their socio-economic problems are more critical than environmental problems (Perrsend, 2001). As the global Agenda 21 for sustainable construction was developed by the developed nation, it proved inadequate in addressing the severe social and economic problems developing countries face. Therefore, a separate Agenda 21 for sustainable construction was developed specifically for developing nations (du Plessis, 2002: electronic source).

Part of the Agenda 21's strategy and Agenda 21 for sustainable construction in developing countries' strategy is to monitor and evaluate its plans and progress towards sustainable development. Agenda 21 for sustainable construction in developed countries states that governments on local and national levels need to set up the mechanism to make monitoring and evaluation possible (du Plessis, 2002: electronic source). As it is not in the private sectors economic interest to take on this responsibility, government should ensure that local authorities take on this responsibility and both government and local authorities need to work together in establishing this body.

CHAPTER 3: THE BUILT ENVIRONMENT

3.1 Indicators of Sustainable Development

An indicator is simply a description using numbers, graphs, and percentages to give a description of a situation. The Concise Oxford Dictionary defines an indicator "as something that 'points out' and 'gives information on the current situation," (CSIR, 2002). The Organisation for Economic Co-operation and Development (OECD) states that indicators are "a parameter (i.e.: a measured or observed property), or a value derived from parameters (e.g.: via an index or a model), which provides significant information about or describes the state of environment, human activities that affect or are affected by the environment, or about relationships among such variables" (cited as OECD, 1998).

Indicators such as the Gross Domestic Product (GDP) have been used for decades to measure a country's economic growth. Part of the process for achieving sustainable development goals, is to develop sustainable indicators which is to be used as a measuring tool to monitor the society's progress and its performance in achieving sustainability (Hart, 2000).

From watching the trends or movements in the indicators, you will identify how far you are from your goals and if you are moving towards or away from them. Hart (2000), states that "an indicator is something that helps you understand where you are, which way you are going and how far you are from where you want to be."

Bech (1999) distinguishes traditional indicators from sustainable indicators. He states that traditional economic indicators merely look at the economy without accounting for the relationship it has with the environment or humans-well-being. He further states that "they measure" all economic activity without regard to whether the activity is helping or harming the quality of life" (cited in Hart, 2000.). He says that sustainability indicators on the other hand connect the economy with society's present and future situation.

The CSIR Environtek (electronic source) states that indicators are "used as monitoring, reporting and management tools to allow information about complex environmental interactions with human society to be compiled." This use only looks at linking the environment with society; however sustainable indicators are used to measure the link between the economy, society and the environment.

Decision-makers such as government at local, national and global level, and developers and stakeholders all need to embrace indicators as tools to make the correct decisions. These decisions-makers at government level realise the impact of their decisions on their economy, society and environment and therefore can identify with the usefulness of a reliable set of indicators.

The Mpumalanga province has developed a set of environmental indicators. These indicators were developed using a holistic approach integrating the environment, society, the economy and institutional aspects into sustainable development. They've identified the purpose of indicators as something that is used to "monitor and assess conditions and trends on a national, regional and global scale; compare situations; assess the effectiveness of policy-making; mark progress against a stated benchmark; track changes in public attitude and behaviour; ensure understanding, participation and transparency in information transfer between interested and affected parties; to forecast and protect trends; and provide early warning information (cited in Walmsley and Pretorius, 1996.), (CSIR, 2002.)"

3.2 The Need For More Effective Indicators

Sustainable indicators are different from traditional indicators such as the GDP, stockholder profits and water quality. Traditional indicators are different as they measure a trends in communities, where sustainable indicators would measure progress toward a sustainable economy, society and environment (Hart, 2000).

As early as 1989, The International Meeting on More Effective Development Indicators was held. Then already, concern was expressed over the shortcomings of the traditional economic indicators, particularly GDP, to effectively evaluate the true

development of a country. Problems of the GDP were identified. It was stated that GDP is a money-based macro-economic measure which resulted in many countries making this the criteria for assessing the economy's wellbeing. It is criticised for not accounting for the wellbeing of the society, the quality of life, sustainable human development; and healthy environmental development. The weakness of the GDP has been identified "as: it does not include non-money economic process as well as the informal sector; and it does not give an accurate reflection of efficient use of resources" (CaraCass, 1990.)

Since sustainable development is aiming to change from looking at the economy in isolation from the environment and society, these traditional economic indicators will not be sufficient in assessing the true growth or development of the economy towards sustainability by looking at the trends in GDP and GNP alone.

3.3 Actions Taken In Developing Sustainable Indicators

The inability of the GDP to support sustainable development has lead to the development of new indicators. Hardi and Zdan (1997, pg. 8) state that "although many have offered lists of indicators that would supplement the GDP in an overall assessment of progress, consensus has not emerged." The dynamics of our society and environment are so complex; it is questionable whether a globally accepted list is possible. Despite this perception, the Institute for Sustainable Development attempted to establish a set of improved indicators (Hardi & Zdan, 1997, pg. 8).

Meadows (1998, pg 10) also refers to the difficulty in defining indicators due to the world being "too complex to deal with all available information. Meadows further states that despite "pitfalls and difficulties "in selecting and using indicators, there is still a need for "a set of indicators small and meaningful enough to comprehend" (Meadows, 1998, pg. 10).

In response to organisations, communities, businesses, and government's willingness and actions to develop a tool for assessing their progress toward sustainable development, capable organisations from various locations across the world have

developed guidelines for measuring sustainable development and developing indicators.

Literature surveyed on these guidelines for assessing progress toward sustainable development includes the following documents:

- Assessing Sustainable Development: Principles in Practice by the International Institute for Sustainable Development;
- Sustainability: Reporting Guidelines by the Global Reporting Initiative;
- Guide to the Dow Jones Sustainability World Indexes Guide by Dow Jones & Company; and SAM Group;
- Neighbourhood Sustainability Indicators Guide Book by the Crossroad Resource Centre; &
- Indicators of Sustainable Development by the United Nations Division for Sustainable Development.

3.4 Developmental Approaches for Indicators Of Sustainable Development

a) Hart (1998, pg. 146) had identified eight steps in developing indicators for sustainable communities. These steps are as follows:

- Define sustainability- This definition or goal is to be used for generating a number of possible indicators.
- Identify how interconnected the issues are as well as what the key links are. Hart (1998) holds the view that one of the main differences between traditional indicators and sustainable indicators is how they link. Hart (1998) states that traditional indicators lack the links between the environment, economy and society. Figure 1 illustrates how isolated the traditional indicators are.

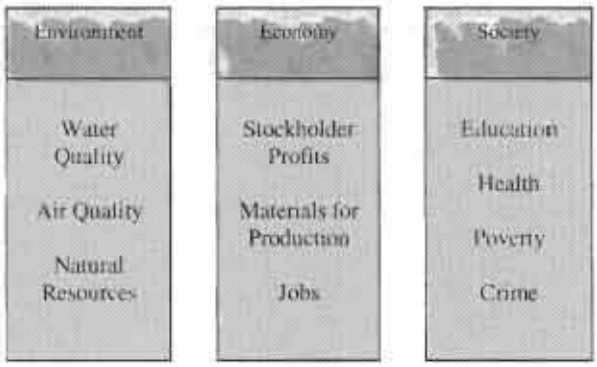


Figure 1: Traditional Indicators

Source: Hart, 1998: 42

- Consider as many links possible so that all stakeholders' futures can be accounted for. Below is a diagram illustrating how to identify these interlinks when developing sustainable indicators:

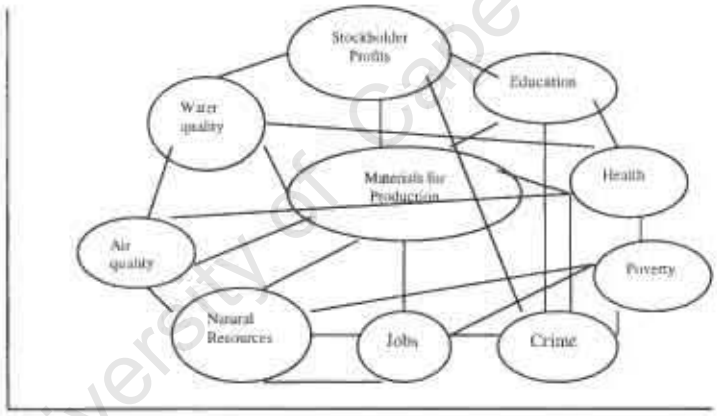


Figure 2: Interconnected Measures

Source: Hart, 1998: 44

- Identify the factors creating the present need to change ones paradigm and the types of capital available. Hart (1998) suggests that there are three types of capital, i.e. natural capital, human capital, and financial capital. All three types of capital are important for the overall wellbeing of the community.
- Develop an extensive list of possible indicators. This list should include indicators even if they are impossible to measure, or if they lack the statistics.

- This is included in the belief that sustainable development is a process that will be achieved, and it is acceptable if the state of sustainability and perfect indicators are not achieved immediately as long as society adopts more sustainable measures and indicators that will put it a step closer to the ultimate state of sustainability.
- Evaluated the list of indicators.
- Identify sources of data for these indicators are. This would identify whether sources would need to be developed.
- Identify how these indicators can be introduced and implemented.
- Write a report on the success of the indicator. This would allow for any problems, shortcomings or need for refinement to be identified. (Hart, 1998 pg. 146 – 148)

b) The Bellagio's Principles also provides a framework for assessing the progress toward sustainable development. It emphasises that it is more important to assess the change in direction towards sustainable development rather that knowing the exact point of sustainability. Therefore, one would aim to always move in a positive direction (Hardi & Zdan, 1998, pg. 11).

Hart (1998) states that indicators are different in various systems, however, there are four common characteristics in effective indicators. These being that they are relevant to the system they measure, they are easily understood by both their developers and users as well as outsiders, they are reliable i.e. the information they are based on is accurate, and lastly, these indicators are all based on accessible data that provides information soon enough to allow one to respond. Hart further highlights that the best indicators one can develop are ironically the indicators without any data or is most difficult to measure (Hart, 1998).

Meadows (1998, pg 17-18) extends this list to 16 qualities. In addition to Hart's 4 common characteristics, Meadows (1998) states that indicators must clearly

convey which direction is toward or away from sustainable development, it should be very persuasive and encourage action, it should be not be too costly to measure, it should give the correct amount of information, it should not be too big or small in scale; other people should be able to measure; it should use what people can measure for themselves; it needs to be hierarchal so that a general overview as well as a detailed view can be assessed; it should use non-monetary units of measurement such as quantity of physical units, size, number of years, it should be compiled as soon as data is collected, and should be a subject for debate and changed if necessary (Meadows, 1998, 98 17-18).

3.5 Developing Countries to adopt their own set of Indicators

As mentioned in the previous chapter, policies for sustainable development incorporate sustainable indicators. As sustainable indicators measure a country's progress toward sustainable development, each country would develop a unique set of indicators which measures its particular policies and implementation strategies for sustainable development.

As developed countries main concerns being the environment's sustainability, many environmental programmes are being implemented thus creating a relatively larger need for the environmental indicators to be developed. Developing countries on the other hand, have to implement a "human framework for analyzing their performance" (ul Haq, 1990). Therefore, their implementation plans will differ from developed countries. As a different process is measured or required, different data will be measured.

The data and indicators that the developed countries build up will not necessarily be adequate for measuring and monitoring the processes undertaken by developing countries. Developing countries should therefore define their own indicators to suit their circumstances and needs. (Hoanh, 2002: electronic source). This therefore creates the need for developing countries to develop indicators that will be able to monitor and measure their strategic. Thus, developing countries are now also faced

with the challenge of developing sustainable indicators for the policies they need to implement.

3.5.1 Types of Indicators for the Built Environment in Developing Countries

Bourdeau (2002) has undertaken the project of developing sustainable indicators for construction industry on the international level. He argues that indicators are needed to establish sustainability criteria as well as assess the performance of construction industry. This approach incorporates sustainable development into performance indicators. He states that sustainability indicators are a necessary part in achieving sustainable construction as they "evaluate economically viable and technically feasible strategies to improve the quality of life, whilst at the same time increasing resource use efficiency" (Luc Bordeau & Huovila, 2003).

Performance indicators are also vitally important in the construction industry so that government and stakeholders have a basis on which to make important development decisions and form policies. Unlike performance indicators for a specific project, performance indicators for the construction industry illustrate trends in the macro-economy with reference to the construction industry (Tindiwensi, electronic source).

Tindiwensi has stated that governments in developing countries have to decide whether to provide the infrastructure immediately by using international contractors or adopt a move holistic approach and embark on local capacity building and thus benefit from the multiplier effect. He then argues that government will have to use the construction industries performance indicators in order to make a responsible decision. In looking at these indicators, they must identify the two different groups of performance indicators for the industry i.e. 'macro-economic indicators' such as 'construction in the economy' which describes the contribution or role construction plays in GDP, and the second type of indicators are 'intra-industry indicators' such as 'level of

implementation, volume of material inputs, level of imports into construction, corporate development, distribution of involvement, affordability and productivity' which illustrates how efficient the industry is (cited in Ofori, 1998) in nurturing and sustaining development (Tindiwensi, electronic source).

Due to developing countries depending on developed countries for funding and developing statistics for the area, the indicators for the industries of developing countries are mainly macro-economic indicators. This is due to due to developed countries purely focusing on GDP levels and economic returns and growth. However, developing countries social and economic policies are more people centred and would therefore need the intra-industry indicators and not only macro-economic indicators. Due to the lack of data collection in developing countries for the development and measurement of indicators of the intra- industry type, there is no database to make informed decisions (Tindiwensi, electronic source).

Tindiwensi categorises the performance indicators that the construction industry use at macro-level, into four groups. These are "economic, quality, environmental and informal" sector performance indicators. Economic performance indicators are the percentage contribution construction makes to GDP; Gross Fixed Capital Formation, the number of people employed in the industry (cited as Hillebrandt, 1984; Wells, 1986; Bjorhlof teal, 1991; Leman & Price, 1998). Quality performance indicators suggested by Rowlison and Walker (1995) is more difficult to measure due to the lack of a set globally accepted standard of quality. These indicators could typically be: the level of standards and growth of subcontractors and contractor development; and trend of quality assurance (Tindiwensi, electronic source).

Environmental performance indicators are typically volume of pollution; resources depleted, decrease in biodiversity etc. Informal sector performance indicators are basically the housing performance indicators since the informal

sector contributes mostly to the housing sector in developing countries (cited in Arimah, 2000).

Therefore, when governments decide on the implementation strategy for providing the countries infrastructure i.e. using international subcontractors and enjoy GDP growth; or build local capacity and realise sustained human development, they would base their decision on these macro-level and intra-industry indicators (Tindiwensi, electronic source). Therefore, indicators are an important tool to aid government in making the correct decisions.

3.5.2 Performance Indicators in South Africa

To bring performance indicators into a South African context, high-level indicators have been developed by the CIDB and CSIR to monitor the progress of the construction industry in achieving its objectives. The construction industry has identified it's weakness in not being able to achieve increase in productivity levels like other industries such as the motor industry. Since it is not impossible for the industry to become more efficient, the industry has accepted the challenge to meet new challenging objectives in order for construction to be a progressive industry (van Huysteen, et al: electronic source).

Construction industry indicators are important for assessing the development towards a sustainable industry. The Construction Industry Development Board Act (38 of 2000) "may develop targets and performance indicators related to those best practice standards and guidelines and establish mechanisms to monitor their implementation and evaluate their impact (Hyssteen et al.: electronic source)." They further state

that it is necessary to have reliable indicators so that the industry's development can be evaluated.

The CIDB has developed a set of indicators for South Africa. They have looked at indicators at the global level and related its usefulness in South Africa. In

selecting indicators, the CIDB had to look at the data available and if the data could be reliably collected through surveys. These indicators were grouped into two sets, i.e.: economic indicators and project indicators (van Huysteen, et al: electronic source).

These indicators were selected with respect to the objectives of the South African construction industry's development. Developers of these indicators made trade-offs between setting ideal but unobtainable indicators and obtainable but challenging indicators. The target and milestones in achieving the target were set as clear measurable objectives. The responsibility was put on the stakeholders to ensure continuous monitoring of these indicators as it is in their interest to keep track on the industry's performance (van Huysteen, et al: electronic source).

Project indicators are: number of accidents on site; the number of projects that previously disadvantaged persons (PDI) participated in; measure of defects at handover time; number of tenders awarded on performance issues and not price; the training budget of firms; cost predictability; time predictability; the use of modern forms of contract; and client satisfaction (van Huysteen, et al: electronic source).

3.5.3 Indicators for South African Human Settlement Areas

With South Africa adopting Habitat Agenda, the South African Department of Housing is responsible for integrating this policy in the country. The Habitat

Agenda is a global policy, which will be used as a benchmark for defining sustainable human settlements in South Africa. In order to assess the sustainability of human settlements the following aspects need to be assessed:

1. The wellbeing of the people;
2. The impact the settlement has on the ecosystem and the impact of the ecosystem or environment on the settlements well being; &
3. The capacity of the local authorities and other government bodies to provide these settlement areas with basin human rights, and services and maintain a decent quality of life (Du Plessis, pg 26: electronic source).

In order to assess the quality of life within these settlement areas, one would need to first establish what determines quality of life. The Habitat Agendas identify these determinants of quality of life and links these to human settlements. These determinants and possible indicators are shown below:

Issue	Determinant	Examples of indicators
Health	Adequate sanitation	• Percentage of people with access to a defined minimum standard of sanitation • Percentage of people affected by gastro-intestinal and other sanitation-related diseases • Percentage of people who have received training on hygiene practices and the use of specific sanitation technology
	Clean water	• Percentage of people with access to clean drinking water and type of access (public tap, /piped water on site or in dwelling) • Percentage of people affected by waterborne diseases • Reliability of service • Percentage awareness of good hygiene practice
	Clean air	• Level of indoor air pollution/ type of energy used for cooking and heating • Level of ambient air pollution/ Percentage of population affected by air pollution • Percentage of people affected by respiratory disease • Affordability of clean energy resources
	Absence of disease	• Coverage of refuse disposal systems/ Percentage of people with adequate refusal removal

	vectors	• Proximity of waste disposal sites to human habitation • Municipal vector management programmes • Percentage of people affected by diseases caused by inadequate waste management
	Access to health care	• No. of clinics/ hospitals per capita • Average distance from health care facilities
Safety	Reduced threat of natural disasters	• Area of settlement within possible disaster areas (flood plains, on dolomitic rock, steep slopes, etc.) • Human and economic loss due to natural disasters • Disaster of management proogrammes
	A secure living environment	• Incidences of crime (number, type and location) • Levels of fear of crime • Community safety programmes
	Reduced threat of man-made disasters	• Percentage of households using hazardous energy sources (e.g. paraffin) • Percentage of people living in informal settlements • Proximity of hazardous industries to residential areas • Space available in hazardous waste disposal facilities • Monitoring of industrial effluent
Shelter	Adequate, affordable housing	• Household density (No of people per dwelling) • Percentage of population living in informal settlements • Floor area per person • House price-to-income ratio • Level of services provided • Cost of services as percentage of household income • Quality of housing provided • Security of tenure
	Special needs housing	• No. of orphanages/ 1 000 people • No. of hospices/ 1 000 people • No. of shelters/ 1 000 people • No. of elderly care facilities/ 1 000 people
Productive life	Access to means of living	• Percentage of people unemployed • Percentage of population in poverty (household subsistence level) • Spatial distribution of employment opportunities • Provision of informal sector and rural subsistence
	Access to education	• Number of schools/ 1 000 people • Spatial distribution of educational facilities • Range of education facilities available (e.g. tertiary, ABET, special needs, etc.)

	Access to economic resources	• Housing finance support • Housing subsidies allocated as percentage of need • SMME development support • Right to own and inherit property
	Mobility	• Functional and affordable public transport • Spatial distribution of transport routes and access nodes • Regulations on disability access enforced • Cares per 1 000 people
Self-determination	Connectivity	• Percentage of households with telephone access • Internet service providers per capita • No. of community media services (radio stations & newspapers
	Access to information	• Accessibility of municipal information • Location of municipal offices • No. of libraries/ 1 000 people
	Participation in democracy	• Level of participation in democratic system • Participatory approach to decision-making and development • Full participation by persons with disabilities in all spheres of human settlements
Quality of built environment	Natural heritage	• Percentage of open green space per capita • No. of protected natural heritage
	Urban decay	• Percentage of derelict area in urban areas • Urban greening initiatives • Maintenance of public open areas • Maintenance of infrastructure
	Supporting community	• Number of entertainment facilities and sports grounds per 1000 and their special distribution • Maintenance and accessibility of cultural heritage sites • Number of cultural facilities (e.g. theatres, churches, mosques, art galleries)

Table 3 continued: Quality of Life Determinants and Indicators

Source: (Du Plessis, electronic source: pg 28)

The interaction between the biophysical environment and the human settlement does impact on sustainability. Access to water, open areas, vegetation etc, can influence where people settle. Should there be a lack of

drinkable water; people may not be able to survive in that area as the quality of life would have deteriorated. It is important to assess the impact of the settlement on the biophysical environment so that these negative impacts can be avoided or reduced so that the quality of life in the area can be sustained (Du Plessis: pg29). Indicators of environmental sustainability have also been developed. These are illustrated on the following page:

Issue	Determinant	Indicators
Resource use	Freshwater use	• Per capita water use/level of water and sanitation services provided • Surface water demand versus available resources • Water-saving programmes
	Land use	• Change of land-use over time • Percentage on non-urban land converted to urban use • Urban vs rural population density • Percentage of growth of urban areas • Permanent loss of agriculturally produced land
	Energy use	• Energy use per urban user • Energy use per rural user • Energy use per sector (transport, residential, industrial) • Renewable vs nonrenewable energy-use
	Waste produced	• Total amount of solid waste produced per capita • General landfill airspace supply vs demand • Percentage of solid waste recycled per year • Proportion of treated effluent re-used
Pollution and degradation	Air quality	• Ambient pollutant conservations • Emissions of greenhouse gases
	Water quality	• Surface water toxicity • Levels of E.coli and other recognized pollutants in ground and surface water • Wetland alteration
Protection of environment	Conservation	• Are of land within municipal area having formal conservation status • Current status of Red data Book species in municipal area • Environmental protection expenditure as percentage of gross city product
	Environmental governance	• Number of EIA applications per year • Number of people committed by local government to environmental management

Table 4 continued: Environmental Determinants and Indicators

Source: (Du Plessis, electronic source : 30)

Table 5 highlights institutional sustainability indicators. It is through these bodies that policies are set and that economic, social and environmental sustainability is achieved. Indicators of institutional sustainability are presented:

Issue	Determinants
Financial capacity	• Payment levels for services, rates and taxes • Ability of local authority, as well as members of the community, to access external funding • Realistic relationship between income (rates, taxes, equitable share of national income) and expected delivery responsibilities
Institutional integration	• Consistency of boundaries • Cooperation between different spheres of government and types of municipalities
Operational efficiency	• Clear allocation of powers and responsibilities • Adequately skilled human resources • Sufficient human resources
Technical capacity	• Ability to operate and maintain physical infrastructure • Knowledge of alternative technology options for service delivery
Political will	• Development of policy that supports sustainability • Adequate regulatory measures to implement policy, including incentive programmes and effective legal remedies

Table 5: Institutional Determinants & Indicators

Source: (Du Plessis, electronic source: pg 31)

3.6 Assessment Framework

Traditionally, the economy, water quality, deforestation, productions of houses, unemployment, etc, was all measured in isolation. With sustainable development the sustainability of human settlements is interrelated with a number of issues such as "special characteristics, geographical location, environmental conditions, economic viability, institutional ability and structure, human development, social relationships and local values and aspirations." (Du Plessis, electronic source, pg. 4) This characteristic of sustainable development makes it impractical to measure one issue in isolation interrelated issues. The traditional analysis of economic and human systems is therefore inappropriate as an assessment framework for indicators of sustainable development.

The "most widely" used and suitable sustainability assessment framework is the PSR framework. (Du Plessis, electronic source, 9g 25). Hart, Du Plessis and Meadows all refer to this sustainability assessment framework.

State Pressure Response framework can be applied at nearly every level from Eco-systems to human activities. Meter, (1999, pg 57-58) refers to two different types of models for this assessment framework. These are: the "One State-Pressure-Response Model" and the "Cyclical" State-Pressure-Response" Model. These two models are illustrated on the following page.

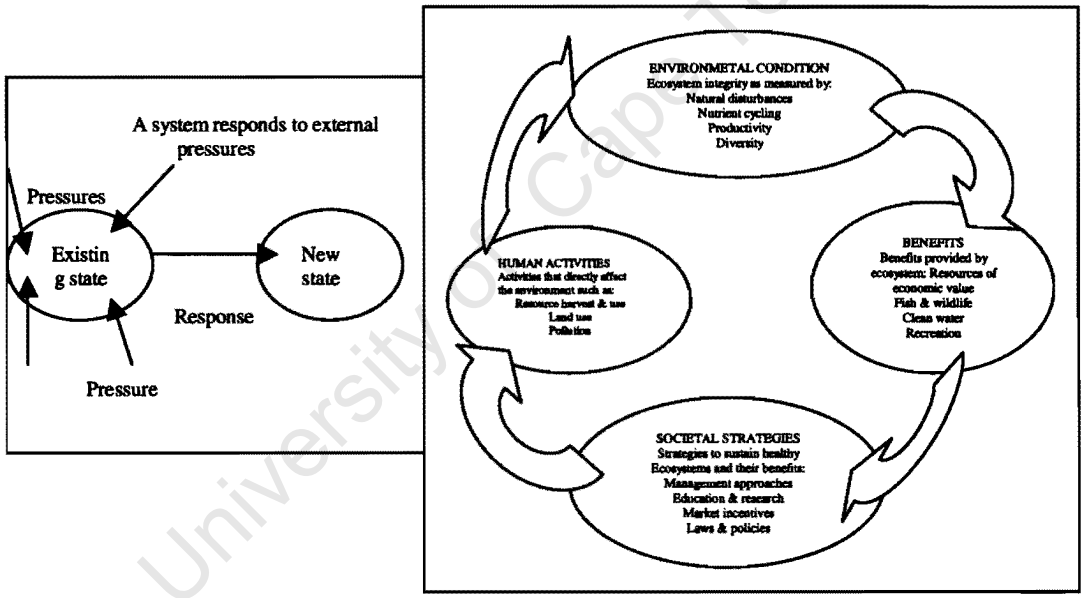


Figure 3: Types Of Assessment Frameworks For Sustainable Development

Source: (Meter, 1999, pg 57-58)

One State-Pressure-Response Model	Cyclical State-Pressure-Response Model
Pressures are external factors being exerted onto the existing state creating the need for the existing state to change. The Response is to change the existing state for the well being of society or the Eco-system. The State is the new state of sustainability / improved well being (Meter, 1999, pg 57-58).	*This model incorporates new pressures placed on the state due to the change introduced into the system. (Meter, 1999, pg 57-58).*

The P-S-R framework was further extended by the United Nations Commission on Sustainable Development (CSD), to the Drivers- Pressures- State-Impact-Response. The DPSIR framework refers to drivers as being human activities and external forces.

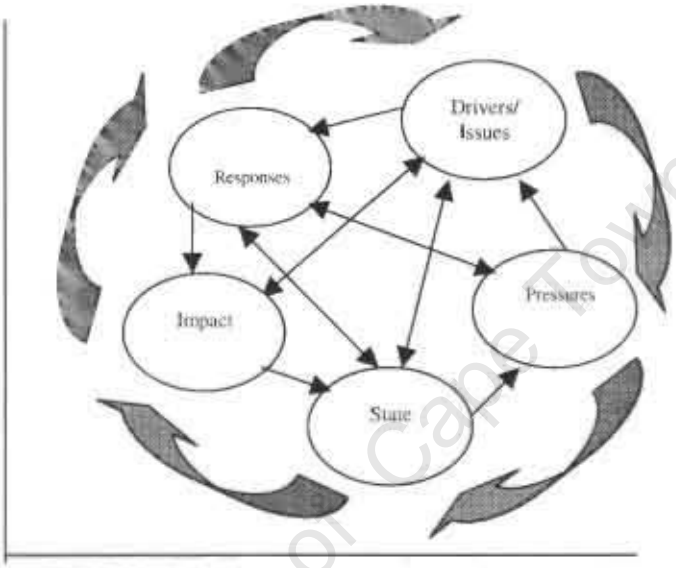


Figure 4: The DPSIR Model
Source: (du Plessis, electronic source, pg 25)

These drivers produce pressures that result on the impact. Impacts are the changes in the state of environmental, social and economic systems relative to the state of human settlements. Due to these negative impacts, society responds to the changes in the state by either preventing or reducing these impacts and pressures. Once the old state changes, new pressures and different impacts are generated leading to new responses and changes thus resulting in a continuous flow of drivers, pressures, states, impacts and responses (Du Plessis, electronic source, pg 25).

In applying the DPSIR framework to the human settlement areas of South Africa:

- Drivers are human activities such as urbanization, economic, activity;
- Pressures are put on the environment and the wellbeing of society;
- States is the current lack of housing, access to clean water and sanitation, state of health facilities;

- Impact poor water quality, poor air quality, and social exclusion; &
- Responses are the policies set to improve these conditions (du Plessis, electronic source: 26).

3.7 Placing Sustainable Indicators within the Context of the DPSIR Framework

The following diagram illustrates the relationship between sustainability indicators and the DPSIR model. This model shows that the environmental, social and institutional sustainability are all interlinked and affect each other. In order to align strategies with sustainable development, the drivers / issues of the human settlement is assessed, the pressures including the impacts on the biophysical environment and quality of life is assessed, and actions are taken.

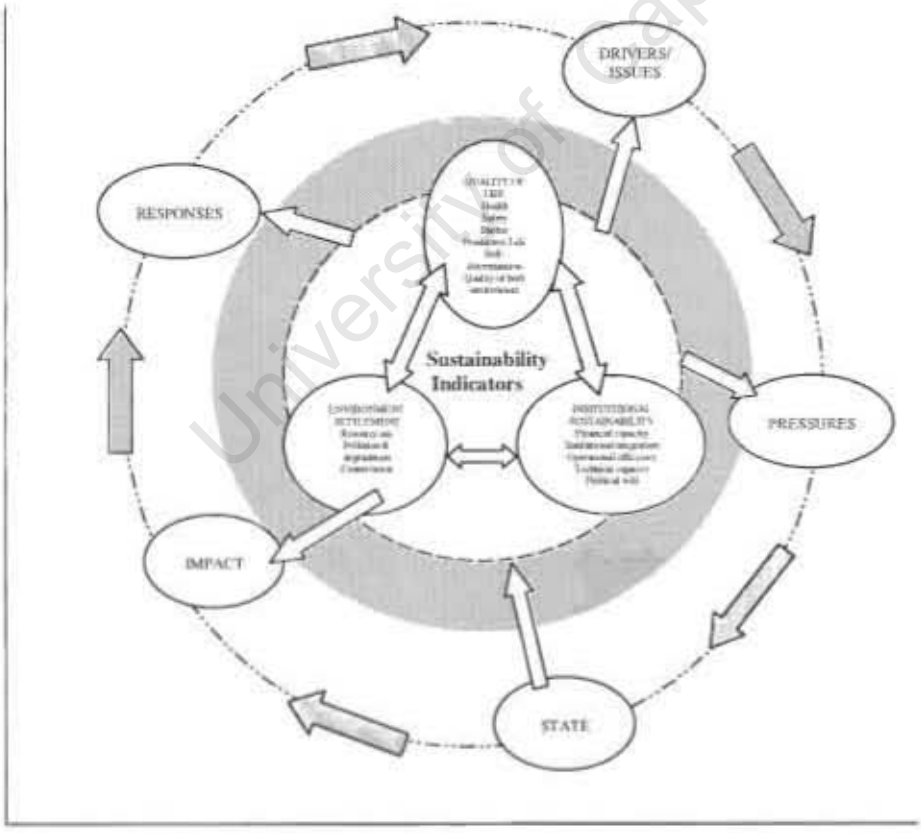


Figure 5: The Methodological Relationships

Source: *(Du Plessis,: electronic source)*

CHAPTER 4: RESEARCH METHODOLOGY

The behind this section is to illustrate the alternative routes in which research can be carried out. Thereafter the chosen research methodology is justified.

4.1 Types Of Research Methods Available

Research plays an important role in adding to human knowledge and for refining existing data and facts. Research is carried out in academic activities as well as in business and is a good tool for discovering or verifying information or an area of interest. The Concise Oxford Dictionary (2001) defines research as "the systematic investigation into a study of materials and sources in order to establish facts and reach new conclusions."

Often, one refers to "doing a study" as carrying out research. A study is described by the Concise Oxford Dictionary (2001) as merely devoting time and attention or learning intensely to acquire knowledge. In contrasting this with research, research goes a step further as far as having to conduct the study out in a manner of enquiry and then draw conclusions at the end of the study.

Research is a process where one sets out the aims, objectives, purpose and hypothesis; conducts an investigation; and concludes the end result of the research. In order to arrive at a conclusion, one similarly goes through a process of selecting the method that will be most efficient in arriving at the conclusion one wishes to make.

There are a number of methodologies in which to carry out an investigation. A methodology is simply a system of methods used in a particular field. In order to execute dissertation research, one chooses a methodological framework in which to achieve the goals set out at the start. These systems or rather research methodologies from which one must select are:

- Quantitative research
- Qualitative research
- Triangulation research

4.1.1 Quantitative Research:

Quantitative research is based on the assumption that an investigation into human's traits, or problems or social facts can be based on formulating and testing a hypothesis which is composed of a generalised statement. When testing a hypothesis, you can either prove or disprove it in order to verify the outcome. It is important to not only justify the hypothesis to the extent in which it is verified, but to also apply the facts acquired through the research.

In acquiring the facts, quantitative data involve:

- gathering data from a large sample of people;
- the type of data is numerical & measurable variables;
- the data is collected in a controlled system; &
- involve a scientific research.

Using the scientific approach generally means addressing a problem in a system and testing if the forecasted outcome will result after rigid objective observations have been made. One will use the results from the observations to prove or disprove the hypothesis.

Typical means of data collection for quantitative research are:

- well structured survey questionnaires;
- well structured interviews;
- postal surveys; &
- direct observation through experiments.

Quantitative research emphasises that the research follows a logical process and the statistics or calculations are used to develop this logic.

4.1.2 Qualitative research

Qualitative research demands the research to be close to the research topic and requires the researcher to have an in depth understanding of the topic. This

research is carried out intensely over a long period of time. The research is usually done through unstructured or semi-structured interviews soliciting qualitative data such as people's perceptions, attitudes, and values.

Qualitative analysis is a soft science which attempts to study human situations which is not conducive to objective measurement. Therefore, one is forced to subjectively evaluate these perceptions, attitudes and values. This research is used in situations where it is not easy to question a large number of people or where the topic area has not been studied in great depth.

When selecting the persons to interview, one would identify and select people and groups with similar backgrounds. The data gathered would be anything observable or that can be captured. In order to extract data, the researcher can take on an interactive role with the person being interviewed so that any information can be extracted. However, the interviewer should always aim for subjectivity and value the data subjectively.

Since qualitative data are perceptions, using rich descriptions and explanations not numbers to describe the system, it is not easy to measure the system being researched. Therefore the goals of the interviews are to understand the interviewer's perspective and "how" and "why" he arrived at this view.

4.1.3 Triangulation

Triangulation is a combination of qualitative and quantitative research designs. It can be useful to first do a quantitative research first to gather scientific data, and then carry out a 2nd phase of surveying in order to gain an

in depth understanding of their responses. This 2nd phase would then be more of a qualitative research study. This would result in a "fuller" data base.

From the following phase to the next it is important to note that there is a link between the respondents from phase 1 to 2. Triangulation would typically collect data using surveys and case studies. In addition to acquiring a fuller data base, the data would also be more reliable and valid (Jacobsen, electronic source).

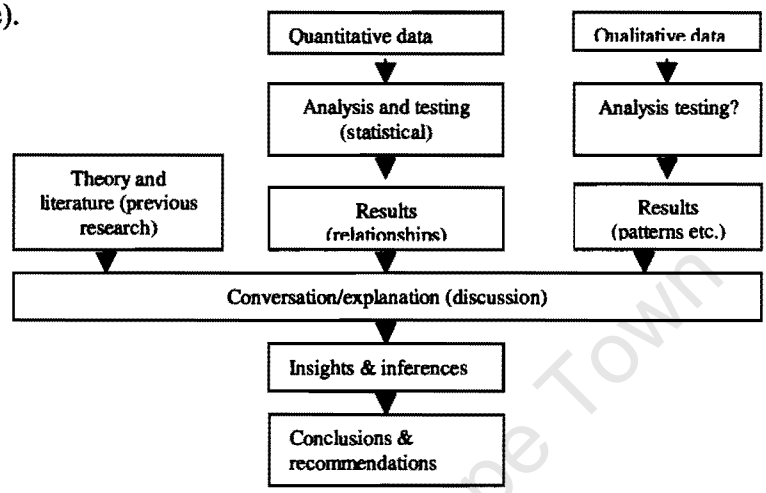


Figure 6: Triangulation

Source: Amaratunga et al, 2002:24

Unlike qualitative and quantitative analysis, triangulation provides a balance between logic and subjective opinions. Chapter 4: Introduction to Qualitative Analysis (electronic source) states that triangulation uses several methods or data to validate outcome. These are:

- data triangulation i.e. testing the theory using a number of different sampling strategies;
- investigator triangulation i.e. having more than one interviewer or data collector in an interview or study;
- theory triangulation i.e. questioning using all different frames of reference;
- methodological triangulation i.e. having more than one method for collecting data in a study; &
- Interdisciplinary triangulation i.e. using more than one approach.

In justifying the use of triangulation, it is important to point out that both quantitative and qualitative research designs have strengths and weaknesses and by combining the two, one can enjoy the strengths of both methods.

4.2 Comparison Between Quantitative Analysis And Qualitative Analysis

Qualitative and quantitative are the two broad categories in which research systems fall into. Even triangulation is designed from these systems.

These two methods are similar in that they both:

- seek reliable and valid results;
- merely on empirical evidence;
- provide useful information for describing, understand, and explaining human communication behaviour; &
- are needed to develop a complete picture of communication.

Comparisons between these two methodologies are tabulated Table 6:

QUANTITATIVE	QUALITATIVE
Starts with a hypothesis	Ends with a number of hypothesis to be investigated in future research.
"Tests hypothesis"	"Researches questions"
Hard Science	Social Science
Scientific Approach	Ethnographic approach
Argument developed from hard facts	Argument developed on a deep understanding of research and
Research far from topic	Research is close with the topic perspectives
Goal - "To predict & Control"	"To Understand & Predict"
Research type – Basic & theoretical	Applied & theoretical
Uses numerical data	Uses descriptive data
Sample is randomly selected	Interviews are strategically selected
Logical process	Process of interpretation

Table 6: Comparison Between Qualitative and Quantitative Analysis

Adapted from Jacobsen (electronic source)

4.3 How to Select the Methodology

It is important to take cognisance of the fact that one research methodology is not better than another as each have its own limitations and weaknesses. When one selects a process, one will select the research methodology that best suites the subject i.e. choose the method that develops the most reliable and valid tests of the hypothesis or research questions.

The process for selecting methodology is as follows:

- Choose the method that answers what you want to know;
- which method will increase the validity, reliability and generalisability of the data; &
- which method will maximize the amount of useful data gathered to answer the question posed (Chapter 4: Introduction; electronic source).

4.4 Data Collection

The numbers of ways available for data collection are case studies; experiments / trials; & surveys. These data collection methods are discussed in more detail in the following sections.

4.4.1 Case Studies

Case studies attempt to gain a deep understanding of all the factors for one particular case. Therefore the goal is to understand and report on the uniqueness of that particular case by drawing on its similarities and differences. Since the investigation is carried out on a single job, single firm, etc, one needs to observe the situation closely. One can used a single case study to disprove a hypothesis but one must be cautious of proving the exception instead of proving the rule. Case studies are similar to qualitative research in that it identifies an important issue as a starting point suitable for further research (Jacobsen, electronic source).

The methods for case studies include:

- "Asking - Interviews;
- Gather narrative and testimony;
- Watching – Observations; &
- Searching – Written records and artifacts (Jacobsen, electronic source).

Jacobsen further states that in reporting case studies one develops a "conceptual structure, looks for patterns, consistencies, repetitions and manifestations pertinent to your research questions."

4.4.2 Surveys

"The word survey means "to look to see over or beyond "the casual glance or the superficial observation (Leedy, 1987)." When conducting surveys with human beings, the main forms of communication mediums for gathering the data are through postal surveys; telephone surveys; direct observation and "face to face interviewing."

4.5 Survey Techniques

There are a number of methods in which surveys are carried out. Some of the most common ones are interviews and questionnaires. One carries out surveys so that data is gathered from a relatively large number of people within a certain time frame. Based on the nature of the research topic and the degree and parameters you need and the resources available to you, one would select the technique that best suits the situation.

Survey techniques are discussed further in the following section:

4.5.1 Questionnaire

Leedy (1987) hold the view that a questionnaire is a "common place instrument for observing data beyond the physical reach of the observer." He bases this statement on the belief that human beings store the data deep within the minds, attitudes, feeling and reactions – Holt (1998) states that a questionnare is a good tool for gathering only certain types of information in a

relatively quick and cost effective way. Holt (1998), further limits this statement to instances where the subjects has been researched sufficiently and the person conducting or drawing up the interview is skilled enough to only ask questions that will support the research objective instead of digressing from the objectives of the research.

It is easy for one to fall into the trap of digressing from the research subject. This makes it necessary to plan the research questionnaire carefully. In planning a research questionnaire one needs to follow the following steps:

- "Consider the advantages and disadvantages of using questionnaires."
- Prepare written objective for the research.
- Have you objectives reviewed by others.
- Review the literature related to the objectives.
- Determine the feasibility of administering your questionnaire to the population of interest.
- Prepare a time-line (Questionnaire design; electronic source).

A questionnaire would comprise of the following :

- A consent form;
- Title for the questionnaire;
- Date;
- An introduction to the questionnaire;
- Questions (Questionnaire design; electronic source).

Questions are grouped by content with each group under a sub-title. At the end of each question indicate what respondents should do next. When asking questions, questions can either be open ended or closed. Open ended questions are likely to get long descriptive responses as respondents are free to go into as much detail, or diverge as far as he or she wants. The problem with open ended questions is that it makes the data collected to be more difficult to

measure. In contrast to open ended questions, closed questions restrict the respondent to the responses the research sets in the questionnaire. This would require the person designing the questionnaire to anticipate the answers to the questions. Closed questions are praised for its characteristics that it can be easily measured or analysed.

As a questionnaire is considered to be associated with impersonality, one would need to follow certain guidelines when employing it as a research tool (Leedy, 1987).

- The language used must be unmistakably clear. It is important to realize that a question that may be clear to you may be unclear to another person. Often one thinks a question is clear without realizing the assumptions on which the question is based is not fitted around the actual reality of life. Therefore, edit each question and inspect if there are any assumptions before setting the question.
- Design the questionnaire to achieve the objectives that were set out.

4.5.2 Interviews

An interview is useful especially with qualitative research as it allows one to collect factual data as well as opinions. The researcher conducts the interview face-to-face allowing him or her to control the discussion to an appropriate level. The interviewer needs to know how much to control the interview as too much control stiffens the discussion and with too little control, the interviewer can diverge from the topic.

Interviews are good survey techniques in the following instances:

- When the research topic is a relevantly new area of interest where not much people can assist in answering the questions, and little literature is available.
- The researcher requires in-depth and lengthy answers.

- The researcher is required to explain the questions before the interviewee can answer.
- People interviewed are selected as their backgrounds are all relevant to the topic being researched.
- When the researcher needs more in-depth understanding of a case study.

In order to carry out a productive interview, the researcher requires the following interview skills:

- "*Listening*: It is important to pick up on the main ideas and the basic facts.
  Be careful not to interrupt the speaker.
  Be sensitive to attitudes, opinions and beliefs.
- *Paraphrasing*: To ensure you understood what was said, repeat their comments in your own words.
  To ensure you are correct, ask the interviewer to clarify what was said.
  A good tool is to summarize the discussion into a flip chart during discussion. The interviewee can check this and elaborate on key ideas linked to the main points.
- *Probing Questions* – Open probe: These are questions typically beginning with What, How, Who, Why, When. These questions are suited for defensive responses from the interviewee.
  Extension: These are questions that build on information already provided.
  Laundry list: This is a technique where the researcher provides a list of options for the interviewee to select from. This helps in covering all ground and in reminding the interviewee of

points he may not be able to recall to memory.

- *Note taking* – One can record notes by writing, video recording and recording with a Dictaphone.

Qualitative Interviews can be carried out in one of the following forms:

- *Structured*: qualitative questions can be included at the bottom of a questionnaire or placed in the margin.
  Structure interviews require the researcher to carefully structure the flow of questions, ensuring that all bases are covered. Structured interviews allow the researcher to have more control over the interview.
  The researcher will ask each interviewee the exact same questions.
  This technique allows for easier comparisons to be drawn between different interviewee.
- *Semi-structured*: The interview questions are more open but this would call for answers to be recorded in more detail. The interviewee would practice less control over the conversation allowing the speaker to direct the conversation and the interviewer making a note of the direction. The researcher would typically be more interested in finding out more about what the researcher of doing.
- *Open-ended*: This allows for lots of probing questions to be asked so that the broader topics are discussed and clarified, but the conversation follows a natural process and questions are asked as the conversation flows.

- *Completely open-ended*: This interview can take place at an early stage of the researchers stage so that he or she can gain some insight or direction in the topic area. Questions for these interviews are not prepared and are generated from the conversation. Conversation is based upon what the interviewee is interested in and is maintained at a general level.

4.6 Method Selected for this research

This dissertation establishes the hypothesis "That Local Authorities in the Western Cape have not formulated, selected, and implemented any indicators of sustainable development for monitoring and measuring South Africa's policies on providing adequate housing to its people."

Due to the nature of the subject, few people who are knowledgeable in this area are easily accessible. As this research required the researcher to gain as much information on what Local Authorities are doing, a qualitative approach is considered to be the most appropriate methodology in researching this particular subject in the field of sustainable development.

A well structured interview was seen to be the most appropriate surveying technique with which to elicit the relevant information. The questions asked were more that mere Yes/No and Agree/Disagree and more along the lines of qualitative data making it more difficult to measure / assess.

All interviews followed the same process. Firstly, a brief background was given into the subject area being researched by defining sustainable development and the need for indicators. Thereafter a list of questions, as detailed below, were asked and answered one by one.

The Questions asked were:

- Have sustainable indicators have been developed and implemented.
- If there were indicators that had been developed:
  - who developed the indicators?
  - how were they developed?
  - what indicators have been developed?
  - what information were they able to draw on for the development of these indicators?
  - what the interviewees consider to be useful in having these indicators at sustainable development?

A set questionnaire was used in each interview to record each respondent's answers. As many of the questions were open ended, a substantial amount of time would be required to transcribe the results. Any additional information volunteered by the respondents was also collected and analysed.

CHAPTER 5: ANALYSIS OF INTERVIEW RESULTS

5.1 Methodology

The previous chapter provided an overview of common research methods available and their advantages and disadvantages. The research survey methods adopted was based on the nature of the subject to be investigated and the limited knowledge available and the limited access to these knowledgeable persons.

The aim of this chapter is to analyse the results of the six interviews conducted. Firstly, the objective of each question will be highlighted and thereafter the analysed.

The purpose of the study was to investigate whether the Local Authorities in Cape Town had completed the development and testing of indicators for sustainable development that which included indicators for monitoring and measuring the actions taken to house the informal settlement areas. Various persons who were involved with the creation of sustainable development in Cape Town were identified and interviewed.

5.2 Procedural Aspects of the Interview

An appointment was set up with various departments, listed below, for the interviews. To keep the presentation of research results as simple and short as possible the following references are made:

Local Authority Representative :	Reference:
• Directorate of Organisational Performance Management	A
• Director of Housing	B
• Directorate For Economic Development & Tourism: Business Development & Support	C
• Directorate of Economic Development & Tourism	D
• Directorate of Environmental Management: Policy, Research & Review	E
• Department of Housing: Project Management in New Housing	F

The structured interview was made up of 13 questions that attempted to cover all aspects of the development of sustainable indicators which were discussed in Chapter 3. (Refer to Appendix A: Copy of Structured Interview questions used in all interviews.)

5.3 Interview Questions & Results

This section will explain objectives and the analysis of interview questions.

5.3.1 Indicators of Sustainable Development

In order to give the interviewee a general feel for the topic area and make the interview a little less awkward, a general description of sustainable indicators was given. This was stated in the interview as follows:
'Indicators are relevant to Local Authority because these indicators are used as monitoring, reporting and management tools to allow information about complex environmental interactions with human society to be compiled,' (Adapted from the CSIR Environment).

The question asked was: "*Has your department or sector developed sustainable indicators?*" This question was asked at the outset to establish whether or not the interviewee had is any knowledge on indicators. This question would set the tone for the balance of the interview.

It has been found that 67% of the respondents states that their department has developed sustainable indicators. The other 33% of the respondents have stated that no set of sustainable indicators have been developed but they have started developing these indicators.

The responses to these questions are presented in Figure7.

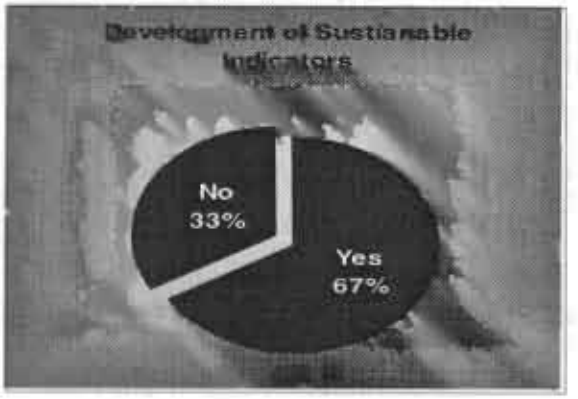


Figure 7: Response To Question 1

From these results, it can be stated that sustainable indicators have been developed at a local level for the City Of Cape Town. These are the National Key Indicators. The Housing sector has not developed a set of indicators as yet.

5.3.2 Sectors from Which Indicators Were Are Developed

There are a number of different sector that plays an important role for the well-being of the City or of the Country. Examples of these sectors would include the following:

- Economic
- Construction
- Agriculture
- Health
- Education
- Security

The question asked was: "*Which sectors have these indicators been developed from?*" This question would give the research insight as to which sectors the Cape Town Local Authorities have identified as important role players in the process toward sustainable development.

This question will also provide perspective into what issues have been interlinked to move toward sustainable development.

Each interviewee gave different examples of various sectors from which these indicators have been developed. These sectors are as follows:

Interviewee	Sectors	
A	City of Cape Town	Health
	City Police	Wards & Councils
	Electricity & Sanitation	Education
	Extensive Financial sectors	Built Environment
	Housing	
B	Housing	
C	Information Technology (IT)	Film & Video
	Manufacturing	Informal Trading
	Tourism	Construction Industry
D & E	Air quality & atmosphere	Inland waters
	Coastal waters	Health
	Biodiversity and soils	Infrastructure
	Transport	Energy
	Waste	Economy
	Education	Safety & Security
	Environmental	Governance
	Urbanisation,	Urban Form and
	Housing	

Table 7: Sectors from which indicators wee developed

From these results, only five out of the six interviews could respond to this section. D and E both responded by stating that all sectors across the city were included to produce the State of the Environment Report for the City of Cape Town. 14 themes were used in developing these indicators. Out of all five responses, the sectors that have been listed by more than one interviewee are represented in the graph below:

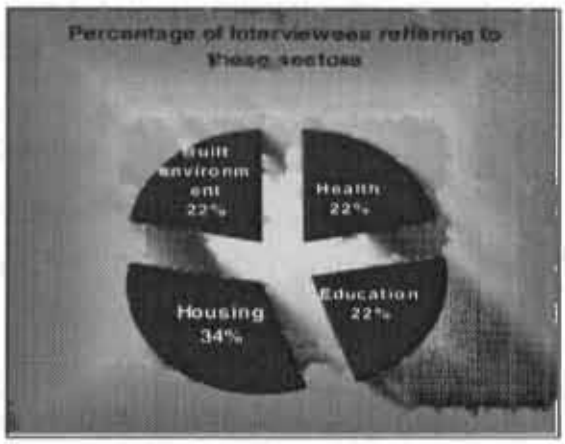


Figure 8: Percentage of interviewees referring to common sectors

5.3.3. Assessment Framework for Sustainable Development

Part of the problem with traditional indicators is that it measures the present state and response only. To overcome this problem, new assessment frameworks should be used when developing sustainable indicators These are:

- One Pressure –State –Response Model
- Cyclical Pressure – State – Response Model
- Driver – Pressures – State – Impact – Response Model

These assessment frameworks for allow for the pressures to be measured in addition to the state and responses. A criterion of an effective indicator of sustainable development is that it measures the pressures in a system as well. Therefore, in order to assess whether the correct development approach was undertaken the question, "*what development approach was used to develop these indicator and give examples?*" was asked. The purpose of this question is to establish whether a set framework was adopted and used for the development of indicators.

From the interviews, the following finding was made:

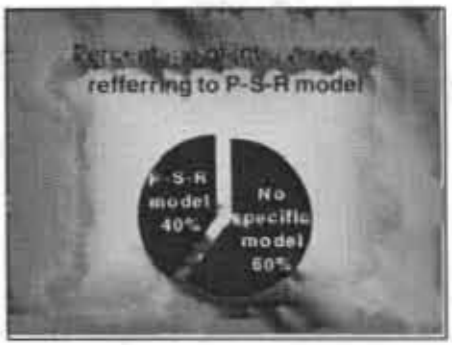


Figure 9: Percentage of interviewees referring to the P-S-R model.

The Directorate of Organisational Performance Management stated that the indicators were developed by means of facilitating various organisations so that public participation was achieved. Surveys were carried out within in the public as well. It was highlighted that in developing these indicators, one has to be realistic about the budget constraints as this limits what can set out achieving. Therefore, when setting targets for these indicators, one needs to also include the aspect of budget constraints.

The Director Of Housing stated earlier that the department is in the process of developing sustainable indicators. So far, they have looked at was has been built and then questioned what has been the improvement in the area. The questions such as: has there been an improvement?; and has the community been developed as a whole?; need to be asked. from this, one would then be able to identify what was lacking in the development plans for the area and use these problems to assist in developing sustainable indicators.

The Directorate of Economic Development & Tourism: Business Development & Support stated that two focus areas were first identified. These were alleviating poverty and making the City of Cape Town a globally competitive city. Sustainable indicators were then developed in accordance with these areas as the guiding vision.

The Directorate of Economic Development & Tourism stated in developing indicators the City had first developed two objectives. These were to spread benefits and make the city globally competitive. Strategies were then adopted to spread benefits and grow the economy. Indicators were then developed to monitor how the City is achieving these objectives.

5.3.4 Participation in Developing Sustainable Indicators

Part of the development process in developing the sustainability indicators is to involve as broad participators as possible. These persons would typically be the following:

- Scientific experts
- Members from local authorities
- Academics
- Community members
- Women
- Professionals from various fields
- Youth
- Disable persons
- Indigenous people

This will result in more sustainable indicators as a broad range of interest can be represented in these indicators. More over, the decision-makers in Local Authorities would gain a more realistic perspective into what policies and actions to take as they would have been able to interact with a broader range of people.

The question, "*who was directly involved in the development for these sustainable indicators?*" *was* asked. This question assesses whether the Local Authorities have indeed implemented this principle of broad participation which is an important criteria for sustainable development.

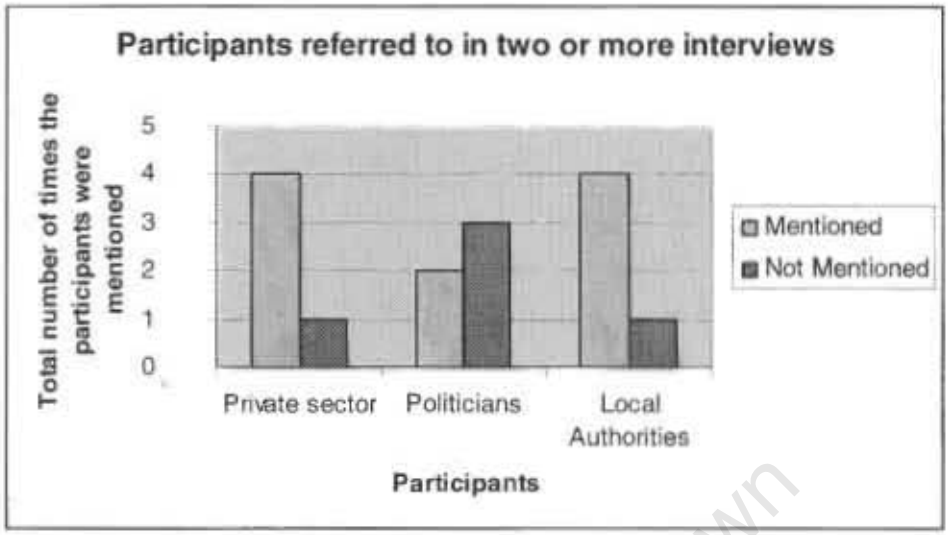
Five out of the six interviewees responded. It is found that a diverse group of people have participated in developing these indicators. No trends could be

identified from the interviewees' responses. However, a list, as seen below, of different types of participants was created.

Interviewee	Participants
A	Previously disadvantaged City managers Strategic executives Executive directors Executive major and her Portfolio committee
B	Directorate of Public Housing Persons with a socio-economic interest Directorate of Economic Development & Tourism
C	Africa Institute for Policy Analysis and Economic Integration Officials from the City of Cape Town: Economic Development, Financial Services, Information Technology and Information Systems Directorates University of the Western Cape Stellenbosch University Universities of Cape Town Organised businesses Private sector Provincial Administration of the Western Cape: Department of Business Promotion and Tourism Western Cape Provincial Trade and Investment Promotion Agency Directorate of Economic Development: Cape Metropolitan Council
D	City Council officials Politicians Community Organisations CSIR Various stakeholders
E	Various stakeholders

Table 8: List of participants involved with developing indicators

From the list developed, the following trends were identified.



Graph 1: Main participants

5.3.5 Stakeholders

In order to elaborate on the previous question, the question, "*what input from stakeholder was drawn in the development of indicators?*" was asked. The purpose of this question was to directly question whether the interests of stakeholders were considered during the development process. A stakeholder is merely any person with an interest or cause of concern in the issues.

Five out of the six interviewees were asked this question, of which all five responded that participation from stakeholders was drawn on in the development of the sustainable indicators.

The Directorate of Organisational Performance Management elaborates in its response by stating that stakeholders' interests were drawn from:

- Academics
- Businesses
- NGO's
- International relations

In addition, reference was made to the Local Government: Municipal Systems Act: 2000. Chapter 4 states that the municipal must seek community participation. Please refer to appendix 2: Municipal Act.

The Directorate of Environmental Management: Policy, Research & Review responded in detail by saying that collaborative input was drawn through workshops but there are no data for these indicators. It was found that an ideal set of indicators could not be implemented due to a lack of finance. It was in the respondent's opinion that political leaders are reluctant to implement the solutions for the country's problems because their budgets do not allow these actions to be taken. Therefore, ideal sustainable indicators were not selected. Also, the respondent stated that an ideal set of indicators is not having the most indicators, but rather to have a minimum number or one indicator of high quality.

5.3.6 Plans for Developing Sustainable Indicators

Question 6 followed on from the first question. This question was asked only if the interviewee answered 'NO' in question #1. The question asked was, "*if no indicators have been developed yet, are there any plans for developing sustainable indicators?*" This question was asked to preempt the remaining questions. Should the interviewer answer "NO" once again the interview structure would have to be abandoned as none of the following questions would be relevant.

This question would also assess whether Local Authorities have abandoned the policy of Sustainable Development since should no attempt be made to develop indicators, then it would seem that Local Authorities are not progressing towards Sustainable Development as they planned regarding Agenda 21.

It was found that the Department of Housing has not developed a set of indicators however is planning to develop sustainable indictors relative to their sector indicators. Therefore, it can be said that Local Authorities have not abandoned their commitment to sustainable development.

5.3.7 Indicators For Specific Sectors

The question, "*if yes (to question #1 or #6), are there any indicators being developed for specific sectors*" was asked. The purpose for this question is to establish a framework for the following questions. In order to avoid an unstructured question in question #8, this question will categorise the following sustainable indicators. 100% interviews responded by saying that indicators developed fall into various categories as detailed in the next section.

5.3.8 Sectors for which indicators have been developed

Sustainable Development is a broad concept and is applied in all aspects of life. Sustainable Development can therefore be looked at in its different components.

Question 8 was asked as follows:

- Which sectors have indicators specifically developed for them?
- How do they relate to the built environment?
- What are these indicators?

To facilitate eliciting the information the following sectors were referred to:

- Economic
- Social
- Environmental
- Technical
- Cultural
- Political
- Construction
- Other

In order to assist the interviewer recall indicators, a guide note was brought into the interview. These notes had examples of indicators which the local authorities could possibly have used.

Examples of these indicators are shown below: (source1: Encyclopedia of Sustainable Development: Electronic source. Source2: UN Division for Sustainable Development)

Category	Indicators
Economic Indicators	GDP Investment in public, business and private assets Social Investments Rate of Inflation Trade/Exports/Imports Annual Energy Consumption Share of natural resource intensive industries in manufacturing value-added Technical Co-Operation grants (Encyclopedia of Sustainable Development; electronic source)
Social Indicators	Standard of living indicators Poverty incidence indicators Poverty depth indication Social indicators (Encyclopedia of Sustainable Development; electronic source)
Environmental Indicators	Domestic consumption of ground and surface water Population growth in coastal area Land-use change Population living below poverty line in dry land area Sustainable use of natural resources in mountainous areas Use of agricultural pesticides Wood harvesting intensity Threatened species as a percent of total native species R&D expenditure for bio technology Emissions of greenhouse gases Household waste disposed per capita Number of chemicals banned or severely restricted Area of land contaminated by wastes (Encyclopedia of Sustainable Development; electronic source)
Housing	Yearly increase in no. of dwellings Population affording median home sale price Median rent as a % of per capita income Occupancy rate of housing units Home ownership rate Rate of real estate development in community (Is development rate outstripping the communities ability to manage growth) Population affording median rental units Housing set-aside for low-to-moderate income (community support

	for low income houses) Distribution of affordable housing throughout community (Is affordable housing concentrated in a certain area) Homeless people per capita (access to shelters) Waiting time for subsidized housing (access to affordable housing) Number of rehabilitated affordable housing units Dwellings in need of major repair (Encyclopedia of Sustainable Development; electronic source)

Table 9: List of Indicators taken from literature survey

No indicators were listed for technical, cultural, political or construction sectors. It was hoped that the interviewees would elaborate on these without any queue points in the interview.

It was found that the city council did not develop indicators for each specific sector but rather for the city as a whole. They first developed high level objectives which were: to adhere to plans, such as providing land; maximize benefits of city aspects; and optimize budget spent. Indicators were then developed in line with these high level objectives. These objectives were set after looking at the infrastructure of world class cities as a benchmark for the City Council to provide its own infrastructure. An example of an indicator being used is number and value of joint ventures with external partners.

From the findings, the following table was created.

Sector	Indicators
a) Economic:	Proportional change in sectoral contribution to real Gross Geographic Product Average Annual Real GDP South Africa and the City of Cape Town: Average annual Real Economic Growth South Africa and the City of Cape Town: Real Growth Rates of Manufacturing Industries South Africa and the City of Cape Town: Average Annual Real Growth Rates per Sector City of Cape Town: Contribution Towards Formal Annual Business Turnover, Employment and Population in Selected Areas City of Cape Town: Selected Major Property and Infrastructure Investments

	City of Cape Town: Selected Current Major Property Investment Projects South Africa: Projected E-Commerce Turnover City of Cape Town: Five Major Export Groups City of Cape Town: Trade Balance Per Capita and Household Income City of Cape Town: Annual Households Income by Population Groups City of Cape Town Forecast: Population, Labour Force, Employment Total output as Gross Geographic Product (GGP) by sector Annual growth in real output by sector Percentage of labour force that are professional, skilled, semi-skills and/or low skilled Percentage of labour force that is unemployed, formally employed or in the informal sector Total number/percentage of people unemployed Percentage of population in poverty (household subsistence level)Employment in formal and informal sectors (number and percentage) Number of New registered businesses Number of International Tourists visiting CCT Vulnerability index (composite of individual indicators relating to infrastructure, poverty welfare, jobs, space and livelihoods) or levels of living per suburbs Average per capita income in the CCT Total value of imported and exported good (trade balance) Number of micro-, small and medium sized businesses
b) Social:	South African and Western Cape: Percentage of Households with Access to Selected Services South Africa: Skills Levels in Selected Economic Sectors City of Cape Town: Projected Changes in Skills Demand South Africa, City of Cape Town, Durban and Johannesburg: Schools Levels of the Labour Force Long-term Skills Profile Changes in South Africa South Africa, Western Cape and Gauteng: Literacy Rates as % of the Population Poverty Index Unemployment Index Number of schools per 1000 Pupil: Teacher Ratios Literacy Rates Expenditure on infrastructure and instructional personnel per student Enrolment rates for primary, secondary and tertiary educational institutions Incidence of violent crime (murder, attempted murder and robbery with aggravating circumstances) Incidence of property related crime (all forms of burglary and theft,

	including stock, theft and car theft) Incidence and social fabric crimes (rape, assault causing grievous bodily harm and common assault) Vehicle theft (including car jacking) Percentage of population earning less than R 15 00 per year Gini co-efficient gap
f) ***Political:***	Total no. of counsellors Percentage of women counsellors No. of registered voters No. of votes poled Number of EIA applications (scoping Reports) per year Number of reports up to full EIA's per year Number of people committed by local government to environmental management Amount allocated by local government to environmental awareness raising (R/annum) Percentage of council's budget allocated to environmental management Total number of people committed (employed) for environmental management purposes
Housing	Percentage of population squatting Average no. of households evicted from dwellings in the past five years Household backlog
Other: Urbanisation, urban form & housing	Percentage population without housing Urban housing type profile Average travel distance for all commuter trips Total person trips in km per day per head of the population Public housing availability (proportion eligible who are not in public housing) Annual population growth (absolute number and percentage) Number of amendments beyond urban edge-change of land use from open space, agricultural rural to other) Expansion of urban edge (in km^2) Number of constructions completed per year Average distance per capita to key amenities and facilities

Table 10: Indicators developed by Cape Town Local Authorities

Environment:

Indicators are being developed by the Housing Department that will measure the use of asbestos in buildings and whether house owners are maintaining their homes. Also, indicators will be developed to monitor the Greening Programme where plant life is being integrated into the development of an area.

The State of the Environment Report has extensive lists of approximately 127 various environmental indicators covering the 14 themes presented in the report as previously discussed.

Technical:

It was found that no technical sustainability indicators were developed. One responded did elaborate a bit more in saying that these indicators would measure the use of materials such as building materials.

Cultural:

No specific indicators for cultural sustainability could be identified. However, it was stated that these indicators would look at how multi-racial a programme is as well as look at the number of different types of tourists attracted to Cape Town. It would also monitor tourist products developed by previously disadvantaged persons such as cultural products and crafts.

Construction:

The Housing Department will use indicators that measures how housing impacts or improves mortality rate. In addition, indicators that measure the increase in income levels after the development, employment creation, increase in spending on households manufacturing goods such as televisions & furniture, increase in education, and lastly, impact of health profile.

5.3.9 Issues the Sustainable Indicators are Addressing

Sustainable Development addresses an almost infinite number of issues since the world is so diverse and complex. However, Local Authorities are firstly to address urgent issues, such as the wellbeing of the people in South Africa.

Therefore, since indicators are monitoring, reporting and measuring policies and actions undertaken, these indicators are representative of the problems or

issues these policies are addressing. The question, *"what are these indicators addressing?"* was asked.

Each issue was categorised according to their indicator category as follows:-

- Economic
- Social
- Environmental
- Technical
- Cultural
- Political
- Construction
- Other

The Economic indicators are addressing issues concerned with wealth, growth and equity. Moreover, they assess the City's global competency, the diversity of the economy and poverty reduction actions. Social sustainability indicators also deal with issues of poverty reduction.

Environmental sustainability indicators are dealing with issues linked to air quality and the atmosphere, inland waters, coastal waters, coastal zoning, biodiversity and soils, waste, urban sprawl and energy. Within each of these themes, there are a number of more specific areas of concern to sustainable development.

Indicators for technical and cultural sustainability were not elaborated on. Construction sustainability indicators are dealing with two types of issues namely general trade and the material supply industry with reference to economic development. These indicators also deal with issues such as changes in education levels, health levels, job creation and the economic position of the people.

Lastly, Council's indicators of sustainable development deal with issues of service delivery, community upliftment, good city governance, economic development and infrastructure development, tourism development, poverty reduction, indirect employment changes, care with people with disability needs, services to the people.

5.3.10 Goals of Indicators of Sustainable Development

Part of the process of developing sustainable indicators is to establish a vision or goal for the future. Indicator targets are set to achieve these goals. Therefore, the target is an important principle in these indicators. The question, *"what are the goals of these indicators?"* was asked. Each goal was linked with each category of indicator, in the same manner as the previous question. These categories, once again are:

- Economic
- Social
- Environmental
- Technical
- Cultural
- Political
- Construction
- Other

The purpose of this question was to link the goals with the issues these indicators are addressing. By linking these goals and issues within the various categories listed above, one will be able to achieve an overall perspective of the sustainability indicators Local Authorities are using or developing.

The following goals have been established for the sustainability indicators:

- To keep the unemployment rate of 19.7% from increasing;
- To achieve an estimated 7% annual gross geographic product growth; &
- To generate 8000 income generating and job opportunities

These are the only quantitative targets for indicators that could be identified in interviews. However, general descriptive aims of the indicators were stated.

5.3.11 Data Collection

Information gathering is an important step in developing and reporting indicators. It has been suggested that developing countries do not have the capacity to gather important data or that there is a lack of the data to report on all the issues that the developed countries have reported on. The question, *"what resources of information are available for data collection?"* was asked. The purpose of this question is to assess whether there are any credible and reliable sources of information. Moreover, accurate and reliable information is required if these sustainability indicators are to be credible.

The following are sources for information used to assist Local Authorities in developing indicators:

- NGO's
- Businesses
- Census
- International resources
- Research institutions
- Internal resources within the Council
- Websites
- Intranet
- Projects
- South African Statistics (website)
- Surveys
- Research done by Local Authorities currently and in the future
- Information produced by the government
- RSC levies data
- Different database within various industries
- Reports produced by various departments

5.3.12 Implementation of These Indicators

Part of the process of developing the indicators is to test-pilot them. Once it has been tested, it can be evaluated and then accepted for final reporting.

The question for this section was asked as follows:
"Where have these indicators been implemented? Example of past projects." The purpose of this question is to ascertain if these indicators are the final indicators that were selected. Also, it would be helpful to ascertain where they have been implemented.

The following responses are represented below:

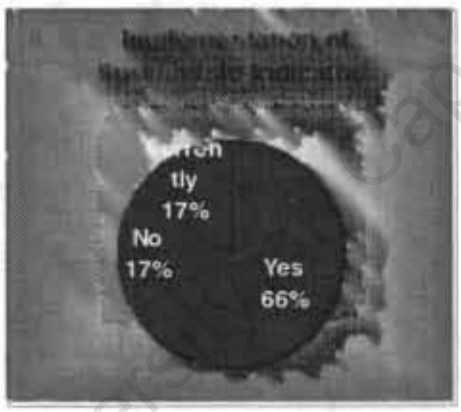


Figure 10: Response To Question 12.

From the above graph, it has been established that 66% interviews said that the indicators have been implemented. 17% said that the indicators have not been implemented. These indicators have been implemented at business and services levels. Small Business Week is currently empowering small businesses in job creation through the tourism sector. The sustainable indicators will be integrated into this process so that the progress of Small Business Week can be monitored. Also, the Cape Film Commission has generated indicators for their own information.

All stakeholders in the departments of the City Of Cape Town are implementing these indicators that were produced in the State of the Environment Report. The Housing department has not developed sustainable indicators yet, but it is in the opinion of the interviewee that these indicators will be generic as the information will be generated while the department builds the houses.

To get an overall understanding of the process of developing indicators and implementing them, the question, *"what do you perceive the shortcoming / or advantages of having this facility (i.e.: sustainable indicators) available?"* was asked. The purpose of this question is to ascertain whether the interviewees can identify any shortcomings of the indicators.

Advantages of having sustainable indicators have been highlighted as allowing one to ensure targets can be set and that realistic projects are implemented. It is a good management tool for setting specific ideals. It measures the impact of development.

The Council finds that by establishing these indicators, one achieves a realistic, transparent alignment throughout the organization. The City Of Cape Town finds it challenging in that it shows the gap from where you are and where you need to be. Moreover, it gives you an idea of the trends and the direction into which you are going. It will inform you as to what money is needed and where it needs to be spent.

It also enhances the institutional knowledge for housing and builds up a database of work on particular projects identifying the problem areas.
The shortcomings of these sustainable indicators are that it is difficult to gather the baseline information. People can fall into the trap of making these indicators determinants for the industry, or sector. It is emphasised that these indicators are not determinants. People also tend to base the indicators on what data is available and not on what the true factors. The Housing

Department finds it disadvantageous to use a set of indicators for all projects as this method is incapable of measuring the uniqueness of each housing project.

5.3.13 Refining Sustainable Indicators

Part of the process of sustainable development is to embark on a process of continuous development and always improve on the present. With the development of sustainable indication being a relatively new practice, we will continue to learn in the process and continue to build our knowledge base. The question, *"how can these indicators or process of developing them be more refined?"* was asked. The purpose of this question is to obtain the opinion of the local authorities as to what could possible be improved on in the future for development of more efficient indicators of sustainable development.

The following considerations are made for refining the process of developing and implementing indicators:
When setting targets for indicators, realistic commitments need to be made so that these commitments are sustainable. One would therefore also have to consider what can be achieved realistically with the financial constraints. Therefore, politicians need to carefully think of the promises they make.

Also, the process of developing these sustainable indicators should be a constant process of refinement so that these indicators can fulfill the criteria or sustainable indicators. Moreover, they need to always be applicable to the situation. Therefore, one needs to be proactive in developing and refining them. Strategies should also be re-adjusted if necessary in order to meet these criteria. This results in the indicators as well as the strategy being refined.

The participation at community meetings need to be improved as not many people are attending resulting in a skewed picture of the reality. Also, the

dissemination of information between the private sector and public sector needs to be improved and refined.

5.4 Conclusion

Overall, various representatives from Local Authority are aware of the development for sustainable indicators. Interviewees, who work within the housing department, stated that sustainable indicators have not been developed as yet but they are in the process of development.

It was found that sectors have drawn input from various sectors. Therefore, these indicators are more prone to represent the well-being of a number of various sectors. It is found that the assessment framework used for developing them is the pressure - state – response model. Only one of the interviewees could refer to this approach using the correct term. However, the other interviewees did state that these indicators were developed by drawing input from a number of diverse groups of people in a well facilitated process.

These people, who were directly involved in the development process ranged from politicians to communities. This meant that the decision-makers were able to gain deeper understanding of the issues of greatest concern to its people.

Input from stakeholders such as academics, businesses and NGOs were drawn as part of the development process. Indicators for various sectors were developed. The majority of the indicators were one of three main components of sustainable development namely economic, social and environmental. Local Authorities have also looked at sustainable indicators for political sustainability but no indicators were developed for technical sustainability.

These indicators are addressing are addressing two main issues. These are to develop the City of Cape Town to be a globally competitive city and to reduce poverty. In achieving these visions, the Local Authorities have integrated principles of

sustainable development into their development strategies. They have developed indicators in line with the sustainability principles. Therefore they have not only developed sustainable indicators to monitor poverty reduction and global competitiveness, but also link environmental interactions into the development strategies to achieve its goals for the City of Cape Town.

Various resources of information were used to assist in developing the sustainable indicators i.e. businesses, research institutions and South African statistics. These indicators are still at the early stages of implementation.

Sustainable indicators are considered to be advantageous as it allows decision-makers to set ideals and then to manage ones progress. This makes the process challenging. It was also found that there are shortcomings of having these indicators. This was that one can fall into the trap of incorrectly setting the indicator as a determinant of the process or a project. Also, the data collected is criticised for not necessarily representing the true population. Finally, it was found that the process of developing these indicators of sustainable development should be a continuous process so that they are always improved on and refined.

From these findings, it can be concluded that Local Authorities have addressed the issues of developing sustainable indicators. Their development approach has been in line with principles of sustainability assessment frameworks such as the Bellagio Principles. However, the Department of Housing has not as yet developed indicators in its sector but they will be embarking on the development process.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

The purpose of this research report was to find whether South Africa has fulfilled it's statement that South Africa will integrate the Agenda 21 sustainable development principles into its development plans and thereby, requiring Local Authorities to have developed and implemented sustainable indicators for monitoring and measuring the adequate provision of housing to the large communities living in informal settlement areas.

Qualitative interviews were carried out with various people working for the City of Cape Town and therefore, the research is limited to be representative of Local Authorities in Cape Town. The results obtained were analysed in the previous chapter.

6.1 Objectives Established At Beginning of This Research Study

The objectives set out to be achieved were:

- To identify strengths and weaknesses of the traditional indicators utilized;
- To identify the need for South Africa to develop its own set of indicators;
- To identify at what stage the Local Authorities in the Western Cape are at in developing and implementing indicators of sustainable development in housing delivery policies;
- To identify what indicators have been developed by these Local Authorities;
- Identify if these indicators have been implemented.

6.2 Conclusions of the Research

Based on the findings of this research report, the following conclusions are drawn:

6.2.1 Traditional Indicators Are Inferior To Sustainable Indicators

It has been established through the literature survey, that traditional indicators have many weaknesses. It's main weakness is that it does not interlink the environment's, the economy's nor society's issues. The most criticised and most used traditional indicator is the GDP. One of its weaknesses was that

countries would use these indicators as a determinant for economic growth. With the countries setting out to achieve high GDP, they implemented strategies at a cost to environmental and social well-being of their countries. It was found that sustainable indicators have been developed to overcome the weaknesses of traditional indicators. Sustainable indicators allow one to monitor policies and strategies by looking at the interrelationships between the economy, the environment and society.

6.2.2 South Africa Needs To Develop Their Own Set Of Indicators

It was found that South Africa's social and economic problems, as a developing country, are more severe than a developed country's problems. It was found that developed countries were developing numerous indicators for environmental sustainability as this was their major focus for sustainable development.

With South Africa facing severe social issues such as extreme poverty and lack of basic human rights, South Africa has to focus also on social and economic issues instead of focusing on environmental issues as intensely as developed countries. Therefore, South Africa can not simply base its sustainable indicators on the indicators developed countries use since developed countries would not have developed adequate indicators for implementing in South Africa.

Therefore, South Africa would need to develop their own set of sustainable indicators in line with their main objectives.

6.2.3 Cape Town Local Authorities Have Completed Developing a Set of Sustainable Indicators for its each Region

This research study has spoken with members of Local Authorities in Cape Town about their development of sustainable indicators. It has been established through the interviews carried out, that the Local Authorities have

embarked on developing a set of sustainable indicators for its region. The outcome of the development process is the State Of Environment Report which illustrates these indicators.

6.2.4 The Sustainable Indicators Address Environmental, Social and Economic Issues

The State Of Environment Report has developed sustainable indicators for 14 different themes. These themes integrate environmental, economic and social issues. Indicators developed include indicators for Urbanisation, Urban Form and Housing. These housing indicators have been developed through interlinking issues with the urbanisation. The Housing Department however, has not specifically developed indicators to measure the progress for their department.

6.2.5 Sustainable Indicators Are Being Implemented

It was found that these indicators have been implemented throughout the department in the City Of Cape Town as well as being implemented by stakeholders. These are also currently being implemented in Small Business Week where local authorities have provided a workshop for empowering small businesses.

6.3 Validation of Hypothesis

The hypothesis *"That Local Authorities in the Western Cape have not developed their own set of indicators as part of assessing their progress in providing adequate shelter."* is not valid. Local Authorities have developed some sustainable indicators for housing within urbanization, urban form and housing theme in their State Of Environment Report.

The problem statement is "Have Local Authorities in Cape Town developed their own set of indicators as part of assessing their progress in providing adequate shelter?" Based on the investigation that was carried out, there has

been a development of sustainable indicators for environmental, economic and social issues. Within these indicators, sustainable indicators for housing have been integrated with urbanization issues.

6.4 Recommendations

Based on the findings and conclusions of this research report, the following recommendations are made:

6.4.1 The Housing Department Should Develop Sustainable Indicators to Monitor Their Progress with Achieving Housing Policies

The South African government has committed itself to provide shelter for the poor. It is important that the Housing Department integrates sustainability principles into their plans as soon as possible. It is also important for the housing department to have these sustainable indicators established quickly so that they can foresee any problems with their policies and strategies in the early stages of their process.

6.4.2 Establish a Centre for Collecting Information for Sustainable Indicators

Local Authorities do not have a central location for data collection. It would be useful and convenient to have one central location where one would find all types of information and reports on sustainable indicators.

6.4.3 Make Information Available to the Public

Indicators are very powerful as a communication tool; however, they can be even more powerful if these indicators are made available to the public in e.g. newspapers. This will make society conscious of their present state. This will hopefully instill in society the need for more sustainable activities. When presenting the indicators to the public, one should do so in a creative manner so that the indicators grab peoples attention and makes society want to change their daily activities in support of sustainable development.

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APPENDIX A: STRUCTURED QUESTIONNAIRE

DATE: _____

COMPANY/ORGANISATIONS: _____

RESPONDANTS NAME: _____

JOB DESCRIPTION: _____

1) Has your department or sector developed sustainable indicators?

   Yes: No:

2) Which sectors have these indicators been developed from?

   _____

   _____

   _____

   _____

   _____

3) What development approach was used to develop these indicators? -examples

   _____

   _____

   _____

   _____

4) Who was directly involved in the development of these sustainable indicators?

   _____

   _____

   _____

   _____

5) What input from stakeholders was drawn in the development of the indicators?

   _____

   _____

   _____

6) If No indicators were developed yet, Are there any plans for developing sustainable indicators?

   Yes: No:

7) If Yes, are there any indicators being developed for specific sectors?

   Yes: No:

8) If Yes, which sectors have indicators specifically developed for them? And how does it relate to the built environment?

   Economic ☐ Name of Indicator (If applicable):

   _____

   _____

   _____

Social ☐

Environment

Technical ☐

Cultural ☐

Political ☐

Construction ☐

Other: _____

9) What issues are these indicators addressing?

Economic :

10) What are the goals of these indicators?

Economic :

Social

Environment

Technical

Cultural

Political

Construction

Other

: _____ : _____

_____ _____

_____ _____

_____ _____

_____ _____

11) What resources of information are available for data collection?

_____

_____

_____

12) Where have these indicators been implemented? e.g. past projects

_____

_____

_____

13) What do you perceive the shortcomings /or advantages of having this facility available?

_____

_____

_____

14) How can these indicators or process of developing them be more refined?

_____

_____

_____

Appendix 2: The Local Government: Municipal Systems Act: 2000 Chapter 4, Clause 16. (1)

"A municipality must develop a culture of municipal governance that complements formal representative government with a system of participatory governance, and must for this purpose-

(a) encourage, and create conditions for, the local community to participate in the affairs of the municipality, including in-

(i) the preparation, implementation and review of its integrated development plan in terms of chapter 5;

(ii) the establishment, implementation and review of its performance management system in terms of Chapter 6;

(iii) the monitoring and review of its performance, including outcomes and the impacts of such performance;

(iv) the preparation of its budget; and

(v) strategic decisions relating to the provision of municipal services in terms of Chapter 8

(b) contribute to the building capacity of

(i) the local community to enable it to participate in the affairs of the municipality; and

(ii) councilors and staff to foster community participation..."