

Chapter One: Introduction

1.1 Background

In South Africa one of the foremost problems the government is facing is the extremely high level of unemployment and its accompanying poverty and social problems. At the same time there are great demands for the construction and maintenance of housing and public works, both urban and rural. These problems are set within a low level of individual and community capacity in both technical and institutional terms. In some Sub-Saharan countries these complex issues have been partly addressed through national programmes of labour-intensive rural road construction. In some cases it has been argued that unemployment (and thus poverty) in South Africa could be alleviated through a well-planned national employment creation programme using labour-intensive methods for the construction and maintenance of public works¹.

In the last forty years international organisations, like the International Labour Office (ILO), World Bank (WB), Development Bank Southern Africa (DBSA), Intermediate Technology (IT) and Western Aid Agencies and Non-Governmental Organisations have been trying to implement labour-intensive construction methods. Not all of these efforts were straightforward successes; some even have been a complete waste of resources². What has happened through the years is that the development in the third world countries resulted in two paradigm shifts. The first one was that aid-financed investment in infrastructure would yield growth, with the focus on how many jobs could be created per unit of expenditure³. The second paradigm-shift was from using the “big yellow machines” towards sustainable development with major involvement of local communities and the use of labour-intensive construction methods. As a result of this involvement there were difficulties between the Western-methods and the Community-methods that generated its own share of problems⁴.

¹ McCutcheon; 1995.

² Easterly; 2001.

³ Easterly; 2001.

⁴ McCutcheon & Taylor Parkins; 2001.

In 1994 South Africa had “The transformation from a totalitarian, non-democratic Government, to a democratic one” which brought enormous changes to the country. Before 1994 South Africa had an Apartheid government that systematically kept a large part of its labour resources away from science and mathematics in the educational system. Oppression and neglect were common and the rural black communities did not have a fair opportunity to develop themselves⁵. As a result of their newly regained freedom, a large part of the South African population is asking the current National Government to start delivering on there promises. One of the major groups is the youth, which is defined as being between 18 and 36 years of age. Youth is a group that has been exposed to all sorts of threats: the biggest being the HIV/AIDS infection, which has dropped the life expectancy below 50⁶.

Given both these threats there is a growing demand for defined project and programme proposals⁷ by Municipalities like Fetakgomo Municipality and also big mining companies⁸, like Anglo Platinum, Anglo Gold and De Beers. Most of these proposals should be outcome-based and should contain both a training component and community involvement. These components educate the local communities and create the necessary capacity and structure for non-governmental organisations to operate in these communities.

1.2 Problem Formulation

The Research Centre for Employment Creation in Construction (WORK) at the University of the Witwatersrand⁹ has been operating since 1992. WORK recognises that there is a great need for successfully implementing a national programme in order to further promote and expand the application of employment-intensive construction and to contribute to the alleviation of poverty on a larger scale in South Africa. In order to achieve its goals in relation to construction of physical infrastructure and the required training, it has engaged an

⁵ Department of Civil Engineering; 2000.

⁶ Fact book CIA.

⁷ B. Donaldson (LITE), M. Joseph (Amplats) and C. Marota (Major Fetakgomo Municipality).

⁸ This new interest stems from changing government policies with regard to mining rights and the use of community resources in the past and future, like labour and land, M. Joseph (Amplats).

⁹ Johannesburg, South Africa.

association-not-for-gain Labour Intensive Training and Engineering (LITE)¹⁰. LITE's objectives follow the same aim as the Research Centre (WORK), which is to explore the potential of national development programmes to address the problems of South Africa. Both organisations are working together in NET-WORK, with Employment Intensive Engineering Consultants (EIEC)¹¹. As the potential of employment-intensive construction is recognised in South Africa and supported by NET-WORK, several national programmes for public works, trying to incorporate employment-intensive methods, have been set up. These efforts have been without clear success to date¹². LITE has also experienced its share of problems, but the Sekhukhuneland Development Programme (SDP) has achieved some success for the parties involved in the project. For the period from 1998 to 2002, the projects undertaken were not evaluated and documented. This has resulted in misunderstandings, a loss of information, communication problems and mistakes in the SDP. As a young company, LITE is currently expanding its operations towards the training side of these projects and programmes. Consequently it is important for LITE to ensure that the experience gained to date is made available for future projects and programmes.

The discussed above leads to the following research objective:

To make recommendations for future development of labour-intensive construction programmes in rural areas of South Africa by evaluating the Sekhukhuneland Development Programme.

Based on the background and the above statement, the problem for this thesis is formulated as follows:

What lessons can be drawn from an evaluation of the Sekhukhuneland Development Programme for future labour-intensive construction development programmes in rural areas like Sekhukhuneland?

¹⁰ This company is a Section 21 Company – an association not for gain – and is based on the Non-Profit principle.

¹¹ EIEC provides the expertise necessary to comply with professional requirements for the provision of infrastructure.

¹² McCutcheon; 1995.

1.3 Research Questions

To manage the problem formulation requires a number of research questions. The first question covers the programme experience and processes. The second question covers the project experience and implementation of the Sekhukhuneland Development Programme (SDP). From these evaluations of the programme and the different projects the third question is answered by way of recommendations and lessons.

The answers to these questions result in recommendations and lessons based on the experience gained from the SDP. The research will use a literature study to select and define relevant theories, models and ideas for this thesis as defined in Chapter Two (Theories). Using these models and theories an evaluation is undertaken of the SDP through analysis of the projects in this programme. This evaluation is split into three chapters to answer the first two questions; namely Chapters Three (Evaluation Model), Four (Programme Evaluation) and Five (Period Evaluation).

Chapter Three discusses the Evaluation Model and the steps in the selection of the Key Performance Indicators. Chapter Four covers the first part of the evaluation model from high level perspective, namely the programme setting and SDP problems. Chapter Five covers the second part of the evaluation model, namely the projects and problems experienced by the SDP. This evaluation of the execution of the SDP forms the basis of recommendations for future programmes.

The research questions are as follows:

I. What were the experiences of the SDP at a programme level?

- 1) Which programme items were considered to be a problem?
- 2) What has been achieved during the construction periods?

II. What were the experiences of the SDP at a project level?

- 1) What types of problems were encountered?
- 2) What has been achieved within the specific periods?

III. What lessons and recommendations can be derived from the SDP and how can these be used in future programmes?

1.4 Research Approach

This section details the research methods and resources used in order to answer to the research questions.

1.4.1 Brief result of Literature Survey

A survey has been made in four main areas which were:

- International: International Labour Office (ILO), World Bank (WB), Development Bank Southern Africa (DBSA), Intermediate Technology (IT) and University of Twente.
- National: University of the Witwatersrand (WITS), Research Centre for Employment Creation in Construction (WORK).
- Sekhukhune Development Programme: records, files, data and interviews from the SDP site office.
- Internet: general investigation in to web-sites related to areas of interest which were mentioned by the organisations above.

From the first two areas this research used books and papers. The books and papers were either published by these organisations or used during classes in case of the organisations WORK and the University of the Witwatersrand. These are used in the first three chapters. The third area is used in the chapters four and five. The fourth area is used throughout the research either to add or support the issues discussed.

1.4.2 Research Defined

The research performed is defined as Exploratory Research. This methodology provides insight into the general nature of a problem, possible decision alternatives, and relevant variables that need to be considered. The research method is highly flexible, unstructured, and

qualitative, for the researcher begins without firm preconceptions as to what will be found¹³. In this research an important component is the data collection as discussed below.

1.4.3 Method of Data Collection

The method of data collection includes the choice between primary and secondary data, the selection of techniques to use data selection and the optional design of these methods. The definitions of primary and secondary data are as follows¹⁴:

- “primary data is data collected to address a specific research objective”
- “secondary data is data collected for some purpose other than the present research purpose”

The purpose of exploratory research is to extract a structure from the source material, which in the best case can be formed as a rule that governs all the observations and was not known earlier (per the definition of exploratory study). Finding the unknown structure may require creative innovation. The answer to the- research questions will be obtained by using an exploratory study.

The collection of secondary data, which is orientated on the topic, creates an impression of the present situation. In particular, earlier research as well as prior project and programme evaluations provided an extensive data base of information. When secondary information was inadequate or additional information was necessary, primary research was conducted. Primary data was collected through research interviews. The group of people interviewed ranged from managers and experts to government bodies. A secondary form of primary data collection is observation that provides detailed and accurate insight into the project conditions and programme environment. These observations were undertaken during the periods spent onsite when working with the SDP.

The research uses an evaluation model described in Chapter Three (Evaluation Model). This Model is split into Programme Evaluation and Period Evaluation. The theory that is used in this research is described in Chapter Two (Theories).

¹³ Aaker, Kumar and Day; 1995.

¹⁴ Aaker, Kumar and Day; 1995.

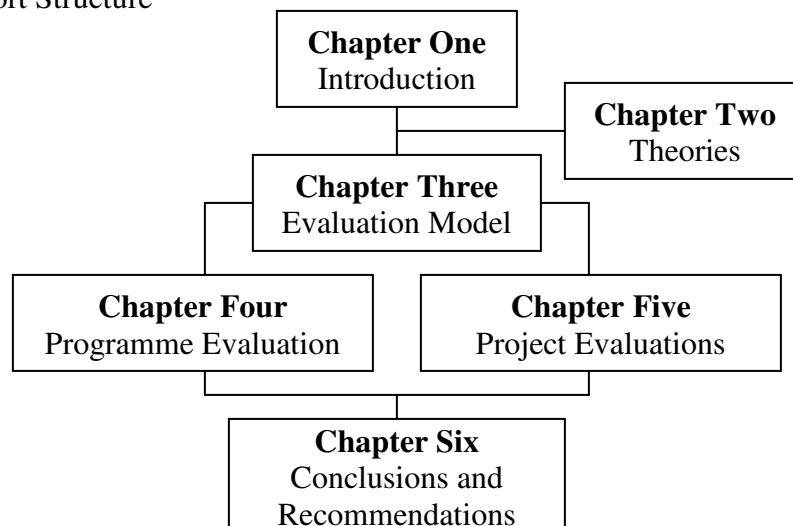
To answer the first research question, regarding the evaluation of the programme setting, the model uses indicators derived from earlier research done in this field. The model is used to evaluate the programme during the full time span of the different construction projects, from 1998 to 2002, these are described in Chapter Four (Programme Evaluation).

The second research question, regarding the evaluation of the projects, is answered with the help of the evaluation model. This model is derived from the labour-intensive construction theory and a stakeholder analysis. From this stakeholder analysis four groups of data indicators are derived, which are used to evaluate the SDP periods. These data indicators are identified through research done on evaluating programmes and projects that used the labour-intensive construction methods. The projects undertaken during the evaluated construction period of the SDP are evaluated with the use of key performance indicators (KPI). The Evaluation Model will be described in Chapter Three (Stakeholder Analysis) and the Period Evaluation will be described in Chapter Five (Period Evaluation).

The third research question is answered by the recommendations and lessons learned in the programme structure evaluated in the SDP. This MSc (Eng.) Investigational Project Report will then conclude with Chapter Six (Conclusions and Recommendations).

1.5 Structure of Report

Figure 1: Report Structure



Chapter Two: Theories

2.1 *Labour-Intensive Construction Method*

The method of construction chosen for the SDP is the Labour-Intensive Construction Method. This method has evolved over the last forty years but has only recently been used in South Africa, but not yet generally accepted by the South African industry, especially not in the earlier years.

During this research the following definition of labour-intensive construction will be used:

“The economically efficient employment of as great a proportion of labour as is technically feasible, to produce as high a standard of construction as demanded by the specification and allowed by the funding available, this results in a significant increase in employment created per unit of expenditure¹⁵.”

A discussion regarding the use of “correct words” such as “Labour Based” or “Employment-Intensive” is not relevant to this research because it only elaborates on the terminology used by Labour-Intensive Construction Methods. The various definitions of this method have been evolving over the years and literature now uses more terms such as: employment-based engineering or employment based projects. The key definition of Labour-Intensive Construction Methods is that the unit expenditure allocated to labour is higher than for an equivalent equipment based operation. The method requires a paradigm shift in thought by the construction industry. Right from the start the industry was sceptical as to whether this construction method would be able to deal with the primary project issues like time, cost and quality. During the last thirty years the World Bank and the International Labour Office have proven the feasibility of this method¹⁶. Not only is the method cost effective but it is also able to produce high quality products and in some cases, better products.

¹⁵ McCutcheon; 1995.

¹⁶ Good examples in Southern Africa are Kenya, Botswana and Lesotho, which have ongoing programmes.

During this research it is acknowledged that the evaluated projects used an extensive range of components from the field of labour-intensive engineering. These components are defined in this next paragraph and discussed further in the Appendix 4.

2.1.1 Factors relevant to Labour-Intensive Construction

2.1.1.1 Training component¹⁷

In the programme set up to use the labour-intensive construction methods, it is emphasised that a training programme is needed. This training programme is needed to allow the local community to become involved in the construction. This should only be done at the rate at which these trained team leaders become available. With training, the team leaders will not only be more valuable to the organisation but they will also be able to produce and control a better quality of product¹⁸.

2.1.1.2 Community involvement¹⁹

Labour-intensive projects and programmes make use of the local communities and their resources. This means that at different levels of the programmes there is interaction with the community, which enables them to set demands and allows them a measure of control. With this in mind it has to be understood that if the community does not want a project or programme, it is difficult to implement²⁰.

As mentioned in the appendix, this process of involving a community at different levels into a programme requires a range of components like time, effort and skill²¹. But if this process is not understood, the programmes have a very low rate of success. Cultural aspects can influence the way the community supports and understands the construction method, and knowledge in this field is required to ensure that this risk is minimised.

¹⁷ McCutcheon & Taylor Parlins; 2003.

¹⁸ McCutcheon; 1995.

¹⁹ See Appendix 4 Labour-intensive Construction Methods.

²⁰ During construction of the SDP in 2002, the Mohlaletse Development Community effectively blocked a proposal brought forward by the District Council involving the upgrading of one of the village roads.

²¹ McCutcheon and Marshall; 1996.

2.1.1.3 *Production*²²

The construction industry has been sceptical about the economic viability of Labour-Intensive Construction Methods. But, as was stated by the ILO, every civil engineering project uses productivity figures as planning, design and control tools. In addition to using productivity figures one has to quantify the scope of work involved. Much study has been conducted in this area, and the ILO has produced guidelines for different types of operations²³. These use task rates, which are used as a tool to assess productivity at an economically feasible rate. Again it has to be stressed that the community's understanding of this task-system²⁴ will take time, effort and skill, but with the correct training programme most of these problems can be overcome.

2.1.1.4 *Design, planning and construction*

During the programme-cycle, but more likely the project-cycle, design, planning and construction are areas of expertise which require special attention. The people involved will have to understand the capabilities of the construction method, and as a result, have to act in accordance with them. Furthermore it has to be stated that equipment can be used during labour-intensive construction²⁵. During the planning stages of construction this method has the potential to reduce the planned construction period by achieving a higher average task rate. This does not lower expenditure of planned labour cost but can shorten the project duration, which could theoretically reduce planned construction costs. Practicalities have to be taken into account when designing and planning these operations.

2.1.1.5 *Simpology*²⁶

Labour-intensive construction aims to use as much labour as is economically feasible per unit of expenditure and involve the local community. This results in a need to keep the main issues simple and clear to avoid misunderstanding by the labourers. Examples used in the SDP include “No Work, No Pay” and “You Break, You Pay”. If labourers do not understand the concepts, construction will not take place or production will decrease (bottom up approach)²⁷.

²² See Appendix 4 Labour-intensive Construction Methods.

²³ ILO; 1996.

²⁴ In the SDP a mixture of task and team tasking is used to ensure productivity.

²⁵ In the areas of compaction and mixing, with specific specification according to the project requirements this should not be avoided.

²⁶ This word was used by the car brand Opel in a commercial, a combination of simple and technology.

²⁷ Oosthuizen, Köster & Ray; 1998.

2.2 Stakeholder Analysis²⁸

In this research the stakeholder is not only the stepping stone towards the Key Performance Indicators, but is also used to identify and support the data indicators. This model is discussed in paragraph 2.3 (Evaluation Model).

2.2.1 Definition of Stakeholder

To ensure successful implementation of a programme or project, it is necessary to identify the relevant stakeholders and the stakeholder expectations, criteria, goals and power. The definition of stakeholders is²⁹:

Stakeholders are those individuals or groups who depend on the organisation to fulfil their own goals and on whom, in turn, the organisation depends.

Stakeholder-mapping identifies stakeholder expectations and power, this helps in establishing political priorities. It consists of making judgements on how interested each stakeholder group is to impress its expectations on the organisation's choice of strategies and whether they have the means to do so. This determines the power of stakeholder groups. Finally, it should be established whether they are in favour or against the planned strategy. The value of stakeholder mapping is in assessing the following:

Whether strategies need to be pursued to reposition certain stakeholders. This could be done by lessening the influence of a key player or, in certain instances, ensuring that there are more key players who will champion the strategy (often critical in the public sector context).

Who are the key blockers and facilitators of change and how should they be managed - for example, by way of education or persuasion?

²⁸ Ref. <http://www.euforic.org>, Further information see Appendix 5 Evaluation Model and Appendix 8 Stakeholder Analysis.

²⁹ Johnson and Scholes; 1999.

The extent to which stakeholders will need to be assisted or encouraged to maintain their level of interest or power to ensure successful implementation of strategies. For example, public 'endorsement' by powerful champions may be critical to the success of a strategy.

Stakeholders are persons, groups or institutions with interests in a project or programme.

Primary stakeholders are those ultimately affected, either positively (beneficiaries) or negatively (for example, those involuntarily resettled), by the project. This includes intended beneficiaries or those negatively affected. In most projects primary stakeholders will be categorised according to demographic analysis. Thus, gender, social or income classes, and occupational or service user groups often divide primary stakeholders. In many projects, categories of primary stakeholders may overlap (e.g. Women and low-income groups; or minor forest users and ethnic minorities).

Secondary stakeholders are the intermediaries in the aid delivery process. This definition of stakeholders includes both winners and losers, and those involved or excluded from decision-making processes. They can be divided into funding, implementing, monitoring and advocacy organisations, or simply governmental, NGO and private sector organisations. In many projects it will also be necessary to consider key individuals as specific stakeholders (e.g. Heads of departments or other agencies, which have personal interests at stake as well as formal institutional objectives). Also note that there may be some informal groups of people who will act as intermediaries. For example, politicians, local leaders, respected persons with social or religious influence.

2.2.2 Information Gathering

The information gathered for the analysis of primary and secondary stakeholders is summarised in the “summary participation matrix” table³⁰. This table indicates which stakeholders are in control, have partnerships or are just consulted or informed during various stages of the project cycle. Data and Key Performance Indicators are derived on the basis of the table. This selection includes Project Management Theory and Labour-Intensive Construction.

³⁰ See Chapter Four Stakeholder Analysis.

2.2.3 Application of the Stakeholder Analysis

The Stakeholder Analysis is used to evaluate the stakeholders in the SDP. Results of the stakeholders and available data indicators are combined to identify Performance Indicators. These Key Performance Indicators are used to evaluate the different periods within the projects during the evaluation period (November 1998 to July 2002).

2.3 Project Management Body of Knowledge³¹

2.3.1 Introduction³²

Project management is an emerging profession. The primary purpose of this paragraph is to identify and describe that subset of the Project Management Body of Knowledge (PMBOK) that is generally accepted. Generally accepted means that the knowledge and practices described are applicable to most projects most of the time, and that there is widespread consensus about their value and usefulness.

2.3.2 The project management knowledge areas

The project management knowledge areas, describes project management knowledge and practice in terms of their component processes. These processes have been organised into knowledge areas, as described below.

Project Integration Management describes the processes required to ensure that the various elements of the project are properly coordinated. It consists of project plan development, project plan execution and integrated change control.

Project Scope Management describes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. It consists of initiation, scope planning, scope definition, scope verification, and scope change control.

³¹ Based upon A guide to the Project Management Body of Knowledge; 2000.

³² See also Appendix 5 Evaluation Model.

Project Time Management describes the processes required to ensure timely completion of the project. It consists of activity definition, activity sequencing, activity duration estimating, schedule development, and schedule control.

Project Cost Management describes the processes required to ensure that the project is completed within the approved budget. It consists of resource planning, cost estimating, cost budgeting, and cost control.

Project Quality Management describes the processes required to ensure that the project will satisfy the needs for which it was undertaken.

Project Human Resources Management describes the processes required to make the most effective use of the people involved with the project.

Project Communication Management describes the processes required to ensure timely and appropriate generation, collection, dissemination, storage, and disposition of project information.

Project Risk Management describes the processes concerned with identifying, analysing and responding to project risk.

Project Procurement Management describes the processes required to acquire goods and services from outside the performing organisation.

2.3.3 Project Management Processes

Project management is an integrative endeavour - an action, or failure to take action, in one area will usually affect other areas. The interactions may be straightforward and well understood, or they may be subtle and uncertain. For example, a scope change will almost always affect project cost, but it may or may not affect team morale or product quality.

These interactions often require tradeoffs among project objectives - performance in one area may be enhanced only by sacrificing performance in another. The specific performance tradeoffs may vary from project to project and organisation to organisation. Successful project management requires actively managing these interactions. Many project management practitioners refer to the project triple constraint as a framework for evaluating competing demands. The project triple constraints are often described as a triangle where either the sides or corners represent one of the parameters being managed by the project team.

2.3.3.1 *Process Groups*

Project management processes can be organised into five groups of one or more processes each;

- **Initiating** processes - authorising the project or phase.
- **Planning** processes - defining and refining objectives and selecting the best of alternative courses of action to attain the objectives that the project was undertaken to address.
- **Executing** processes - coordinating people and other resources to carry out the plan.
- **Controlling** processes - ensuring that project objectives are met by monitoring and measuring progress regularly to identify variances from plan so that corrective action can be taken when necessary.
- **Closing** processes – formalising acceptance of the project or phase and bringing it to an orderly end.

The process groups are linked by the results produced – the results or outcomes of one often become an input to another. Among the central process groups, the links are iterated – planning provides executing with a documented project plan early on, and then provides documented updates to the plan as the project progresses.

Repeating the initiation processes at the start of each phase helps to keep the project focused on the business need that it was undertaken to address. It should also help ensure that the project is halted if the business need no longer exists, or if the project is unlikely to satisfy that need.

It is important to note that the actual inputs and outputs of the processes depend upon the phase in which they are carried out. In an actual project there will be many overlaps. The planning process, for example must not only provide details of work to be done to bring the current phase of the project to successful completion, but must also provide some preliminary description of work to be done on later phases. This progressive detailing of the project plan is often called rolling wave planning; indicating that planning is an interactive and ongoing process.

Involving stakeholders in the project phases generally improves the probability of satisfying customer requirements and activates results in the buy-in or shared ownership of the project by the stakeholders, which is often critical to project success.

The Appendix 5 Table F reflects the mapping of the thirty-nine project management processes to the five project management process groups and the nine project management knowledge areas. This diagram is not meant to be exclusive, but to indicate generally where the project management processes fit into both the project management process groups and the project management knowledge areas.

Chapter Three: Evaluation Model

3.1 Introduction

This chapter will deal with the Evaluation Model. This model can be derived from a combination of the Labour-Intensive Construction Method, Project Management Methodology and Stakeholder Analysis and Data Indicators. It is based on the control aspects of:³³ Time, Quality, Cost, Organisation and Information. This model forms the basis of this research and comprises two components, namely: programme evaluation and period evaluation.

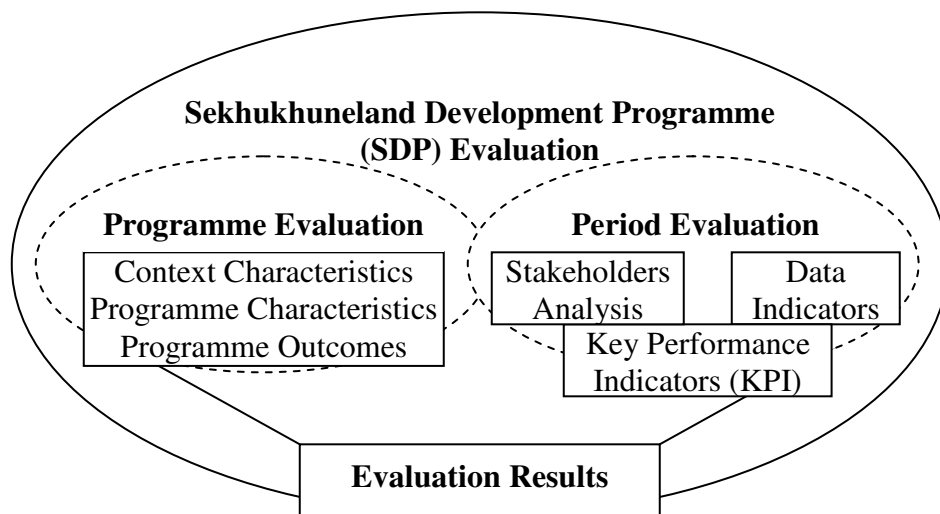
First The Programme Evaluation is discussed and explained. The results of The Programme Evaluation are discussed in Chapter Four (The Programme Evaluation). Second The Period Evaluation is discussed and explained. The results of the Stakeholder Analysis can be seen in the Appendix 8 Stakeholder Analysis. After the analysis, the data indicators are discussed and explained. With both these items defined, the selection of the Key Performance Indicators (KPI) is made in paragraph 3.4. The results of the Period Evaluation are discussed in Chapter Five (The Period Evaluation).

3.1.1 The Model Structure

The Evaluation Model that is used in this research has the following structure, see Figure 3 below. The model has two main parts which are the Programme Evaluation and the Period Evaluation. Both these evaluations consist of different parts that evaluate the data available. The evaluation results are discussed in Chapter Six (Conclusions and Recommendations).

³³ Wijnen, Renes and Storm; 2001.

Figure 2: Evaluation Model SDP



3.2 *First Component: The Programme Evaluation*

During the course of a programme after some work has been carried out, an evaluation can take place. In research³⁴ done by WORK, it was concluded that programme evaluation is often difficult and can have an insignificant effect on the improvement of a programme if it is not well defined and carefully planned. Van Dijk gave several reasons³⁵:

“First, the problem addressed, the programme intervention being made, the expected direct outcome of that intervention, or expected impact on the overall society or on the problem addressed are not sufficiently well defined to be measurable. Second, the logic of assumptions linking expenditure of resources, the implementation of a programme intervention, the immediate outcome to be caused by that intervention, and the resulting impact are not specified or understood clearly enough to permit testing them. And third, those in charge of the programme lack the motivation, understanding, ability, or authority to act on measurement and comparisons of actual intervention activity, actual outcomes and actual impact.”

³⁴ Dijk; 2001.

³⁵ Dijk; 2001.

To formulate a set of guidelines this research will evaluate the programme according to the three general aspects discussed below³⁶. These three aspects can provide comprehensive evidence to document the effect of a programme.

3.2.1 Context Characteristics

Programmes take place within a setting or context – a framework of constraints within which a programme must operate. This includes a description of the background reasons for setting up the programme as this forms part of the setting.

3.2.2 Programme Characteristics

Programme characteristics are the programme's principal activities, services, processes and administrative arrangements. Programme characteristics are the things people do to try to achieve the programme's goals.

3.2.3 Programme Outcomes

In most evaluations, you want to measure or observe the extent to which objectives have been achieved. Also both long- and short-range outcomes must be considered. Evaluation data about programme outcomes is often supposed to support rational planning, decision making and judgements. But knowledge about the effects of the programme provides only part of the information needed to make decisions. These decisions do not only depend on success in terms of outcomes, but also on required resources and on the relative cost-effectiveness of competing alternatives.

In short, the framework for programme evaluation that will be used in this research will consist of three aspects:

- Programme Context;
- Programme Characteristics; and
- Programme Outcomes

³⁶ Based upon; Herman et al; 1987.

3.3 Second Component: The Period Evaluation

The Period Evaluation is based on selected Key Performance Indicators. The amount of data and the different factors involved necessitates a selection of the relevant indicators. These indicators are derived from two sources, the stakeholder analysis and the data indicators. The Period Evaluation uses periods that are identified within the SDP which are the following:

- Pilot Phase:
- Training Phase:
- Construction Phase:
- Period 1999H³⁷
- Period 2000A³⁸
- Period 2001A
- Period 2001H
- Period 2002H

3.3.1 Stakeholder Analysis

This analysis facilitates a selection of parties involved in the SDP. To allow a selection of indicators it has to identify the key players and the extent of their involvement in the programme. To undertake a stakeholder analysis several steps are required. These steps result in several tables which are discussed in this section. The result of each period within the SDP can be seen in the Appendix 9 Period Evaluation. The following steps are involved:

3.3.1.1 Stakeholder Table

To draw up a stakeholder table:

- Identify and list potential stakeholders.
- Identify their interest (overt and hidden) in relation to the problems being addressed by a project and its objectives. Note that each stakeholder may have several interests.
- Briefly assess the likely impact of the project on each of these interests.
- Indicate the relative priority which the project should give to stakeholders in meeting their interests.

Primary Stakeholders are the focus groups who are actual or potential members of a contractor. This group is drawn from the ranks of local households with a preference for

³⁷ H means H. van Zandvoort, manager during that period.

³⁸ A means A. Bouwmeester, manager during that period.

female headed households. Participation of primary stakeholders is essential in projects which are expected to have direct positive impact on defined groups of people.

Secondary Stakeholders include the contractor and its donors, government and local and national organisations. Potential differences between the donors could be minimised through agreements on mutually funding and monitoring the programme.

In the case of primary stakeholders, many of the interests will have to be defined by the persons with the best “on-the-ground” experience. Double-check the interests being ascribed to primary groups, to confirm that they are plausible.

The interest types relate to the achievement of the project objective, which means stakeholders are involved in the project for particular reasons. These reasons result in the following interest types:

- Expectations of achieving project objectives
- Benefits from achieving project objectives

These interest types allocate resources towards achieving the projects’ objectives. Resources are:

- success, status, image
- income, profit, sales volume, data, contacts, construction
- labour, money, time, equipment

Table 1: Proposed Stakeholder

Proposed Stakeholder Table			
Stakeholder Type	Interest	Potential Project Impact	Relative Priorities of Interest
Secondary Stakeholders			
Primary Stakeholders			
“External” Stakeholders			

3.3.1.2 *Assessing the importance of project success*

When assessing the importance of project success, an attempt is made to answer these “checklist” questions with the information contained in stakeholder tables:

- Which problems, affecting which stakeholders, does the project seek to address or alleviate?
- For which stakeholders does the project place a priority on meeting their needs, interests and expectations?
- Which stakeholders' interests converge most closely with policy and project objectives?

The factors of influence and the importance are combined in a matrix diagram. The Matrix-classification of stakeholders is based on their relative influence on, and importance to, a proposed project.

Table 2: Project Matrix

High	Importance	Low	Stakeholders
High Influence Low	A	B	Secondary: Primary: External:
	D	C	

Key stakeholders with high influence and importance to project success are likely to provide the basis of the project “coalition of support”. These stakeholders are potential partners in planning and implementation. Key stakeholders with high influence but low importance to project success may be “managed” by appointing them as consultants or keeping them informed.

3.3.1.3 *Identifying Assumptions and Risks Affecting Project Design and Participation*

Two steps need to be taken to finalise the stakeholder analysis. First identify the assumptions and risk about the stakeholders and second, identify appropriate stakeholders' participation.

This research defines stakeholder participation as a process whereby stakeholders with rights and/or interests play an active role in decision-making and in the consequent activities which affect them. Stakeholders may participate in management or implementation of a project, through active involvement (such as in the operation and maintenance of infrastructure). Stakeholders may also participate in the governance of a programme or project. This could include consultation about objectives and setting the criteria by which project success might be measured.

Within these definitions, greater or lesser participation of the various stakeholders can occur at various over-lapping stages in the delivery of construction. To summarize the above a Participation Matrix table is drawn up of the project period stakeholders. This table is shown below; the result of the SDP periods can be seen in the Appendix 9 Period Evaluation.

Table 3: Summary Participation Matrix

Draft “summary participation matrix” for the proposed project				
Type of participation	Inform	Consult	Partnership	Control
Stage in Cycle				
Identification				
Planning				
Implementation				
Monitoring and Evaluation				

3.4 Data Indicators³⁹

These indicators are available throughout the different periods. Enough data is available to draw comparisons between the periods and evaluate the different Periods. In the following sub-section these Data Indicators will be discussed and defined.

3.4.1 Management Data Indicators

The management dimension of the project sustainability deals mainly with the application of available management theories and practices in order to achieve the objectives and goals. Lack of adequate management at different levels results in failure in the long term and creates tension in the short term. The application of basic management theory ensures that an organisation or site is run in a more effective manner and that it produces better results in the long run. This ensures that potential sponsors can take comfort from the fact that potential changes in the environment are directly investigated and that the approach required is adapted in order to take such changes into account.

³⁹ Based on Global Reporting Initiative, 2002.

The range of literature available on this subject is enormous. Recent research has however resulted in the theory of project management. In the African context project management has to adapt to the working environment of the relevant local community. This requires involving the local community in the approach adopted. The result is that there is often an element of community involvement which is based on the cultural background of Southern Africa. This is quantified in the all-familiar terms of project management.

Management Data Indicators

Institutional Setting:

- A.1 Project Support⁴⁰
- A.2 Project Cycle⁴¹
- A.3 Project Structure
- A.4 Project Scope⁴²
- A.5 Project Procurement, Risk and Administration

3.4.2 Economic Data Indicators

The economic dimension of sustainability concerns an organisation's impacts on the economic circumstances of its stakeholders and on economic systems at the local level. These impacts can be positive or negative. Broadly speaking, economic performance encompasses most aspects of the project's economic interactions. Economic impacts can be divided into direct impacts and indirect impacts.

Direct Impacts The economic indicators on direct impact are organised around stakeholder groups. They are designed to measure the monetary flows between the organisation and its key stakeholders and indicate how the organisation affects the economic circumstances of those stakeholders.

Indirect Impacts The total economic impact of an organisation includes indirect impact stemming from externalities that create impacts on communities, broadly defined. Externalities are those costs or benefits arising from a transaction that are not fully reflected in the monetary amount of the transaction. A community can be considered as anything from a neighbourhood, to a country, or even a community of interest such as a minority group within a society. These indicators are set aside and are not used in this evaluation.

⁴⁰ In the complete project cycle, but with extra attention for planning, design and evaluation.

⁴¹ Project cycle seen as four phases: Definition, Planning, Implementation and Evaluation.

Economic Data Indicators

Economic Impacts:

- A.1 Employees
- A.2 Support
- A.3 Small Contractors
- A.4 Suppliers
- A.5 Providers of Capital

3.4.3 Financial Data Indicators

The financial dimension of sustainability concerns an organisation's impact on the project resources that it uses to construct a project. Financial indicators focus primarily on the profitability of a project for the purpose of informing its management and shareholders. By contrast, economic indicators in the sustainability-reporting context focus more on the manner in which an organisation affects the stakeholders with whom it has direct and indirect economic interaction. Therefore, the focus of economic performance measurement is on how the economic status of the stakeholder changes as a consequence of the organisation's activities, rather than on changes in the financial condition of the organisation itself. In some cases, existing financial indicators can directly inform these assessments. Financial performance indicators are well developed.

Financial Data Indicators

Resources:

- A.1 Work Force
- A.2 Tools
- A.3 Equipment
- A.4 Materials
- A.5 Transportation

3.4.4 Social Data Indicators

The social dimension of sustainability concerns an organisation's impacts on the social system within which it operates. Social indicators can be gauged through analyses to the project's impacts on stakeholders at the local levels. In some cases, social indicators influence the organisation's intangible assets, such as its human capital and reputation. The specific aspects for labour practices and human rights performance⁴³ are based mainly on internationally recognised standards⁴⁴.

⁴² Consisting of Time, Cost, Quality and Targeted Groups.

⁴³ Labour practices should not be simply to protect and respect basic rights; they should also enhance the quality of the working environment and value of the relationship with the worker.

⁴⁴ The Conventions of the International Labour Organisation (ILO) and the United Nations Universal Declaration of Human Rights.

Several of the social performance indicators differ considerably in nature from other economic and financial indicators. Many of the social issues that are the subject of performance measurement are not easily quantifiable, so a number of social indicators are qualitative measures of the organisation's systems and operations, including policies, procedures, and management practices. These indicators relate not to general, overarching policies but to specific, narrowly defined social aspects such as forced or compulsory labour.

Social Data Indicators

<i>Labour Practice:</i>	A.1 Training and Education
	A.2 Health and Safety
	A.3 Communication
	A.4 Diversity and Opportunity
<i>Society:</i>	B.1 Community Participation
	B.2 Tribal Relations
	B.3 Competition and Pricing

3.5 Results

3.5.1 Results of the Stakeholder Analysis

The result of the Stakeholder Analysis for each period of the SDP can be seen in the Appendix 8 Stakeholder Analysis. In this Appendix, the Period Setting is shown first and then the Period Analysis. From the Period Setting it can be seen that certain stakeholders are involved at different organisational levels within the SDP. These duplicated functions resulted in an unclear management approach and the overburdening of labour resources.

During the course of the programme the number of people involved only changed marginally, although the amount of work increased significantly. The difference between the Periods 1999H and 2002H clearly shows the increase in stakeholders, not only internal but also external. These increases focused to a large extent on the management of the Site Office. Although the number of employees employed in the Site Office increased during each period, this did not result in a lessening of the workload imposed on individuals.

The main stakeholder within the organisation is the local community. Not only is the workforce gaining control over the projects, but the community themselves are capable of blocking any proposal placed before the development committee.

Exposure of the project to a national level organisation enhanced its prestige but did not result in the personnel needed to manage the new projects emerging. The complexity of the project's organisational structure increased and resulted in the need for additional personnel at supervisory level. Meeting this demand proved to be a slow process.

3.5.2 Results of the Data Indicators

These Data Indicators are used to generate a comprehensive overview of the necessary available data of each Period within the SDP. All this information is documented in the accompanying Appendix Period Evaluation of Chapter Five.

3.6 Key Performance Indicators

Many who have been involved in a labour-intensive approach have identified certain objectives to be achieved through the use of labour-intensive construction. These objectives, monitored by performance indicators, have largely been random in nature and selected by the promoters for the professionals. As part of the South African Reconstruction and Development Programme (RDP) a series of performance indicators (PI's) have been developed to be a basis for appraisal of RDP projects⁴⁵. Although the core PI's revolve around the more conventional engineering oriented issues there are several "soft" issues introduced which relate to community involvement and social issues.

This research identified similar indicators based on a twofold approach. On the one hand the stakeholder analysis supplies the evaluator with the most likely actor to have power over the programme and on the other hand the data indicators allow the available data to be available for evaluation.

⁴⁵ ILO; 1995.

The Key Performance Indicators (KPI's) selection used in this research is largely based on the stakeholder analysis. The selection uses the primary and secondary stakeholders that have a high influence and high importance on the SDP. The core interest of these stakeholders is success and experience from the SDP. From this the following KPI's are selected: Progress Against Time, Progress Against Cost, Quality, Job Creation, Reaching Targeted Groups, Human Resources Development and Community Participation. All these indicators are briefly discussed below.

3.6.1 Progress Against Time

In any construction it is intended that any project will be preceded by a business plan and that the progress and implementation will be measured against this plan, particularly in regard to time. This is regarded as a vital indicator for one of the fundamental criticism of the labour-intensive approach, it is incapable of incorporating a given time schedule.

3.6.2 Progress Against Cost

Again in terms of the business plan an accurate track of the cost of a project is required. It is important to monitor the cost of a project particularly where the tendency for costs associated with the labour-intensive portion thereof to be regarded as subject to some indeterminate premium. Where a social benefit is identified the cost thereof, if any, is to be budgeted for and monitored independently.

3.6.3 Quality

The third of the performance indicators which could be regarded as technical is that of the maintenance of quality. This will ensure the creation of appropriate assets within the constraints of the specification and budget.

3.6.4 Job Creation

A vital element of the SDP is the creation of employment. This KPI, when properly applied, will provide vital information regarding the increase in the number of people employed per unit of expenditure on a particular project relative to conventional construction. Factors such

as gender and age breakdown are also monitored as this information is required but this depends on scale and scope of the projects or programme.

3.6.5 Reaching Targeted Groups

The intention of the SDP is to benefit the neediest in the first instance. This ‘targeting’ needs to be monitored and reported upon in categories such as rural unemployed, urban youth and residents in informal settlements. The SDP has already set out to target the regions assessed with the greatest need.

3.6.6 Human Resources Development

Reporting is required about the training and capacity building under headings such as construction specific skills, generic training and capacity building of communities. A careful check regarding the usefulness, appropriateness and adequacy of training will be maintained.

3.6.7 Community Participation

Indicators highlighting the level and effectiveness of community participation with regard to decision at all stages of the project are required. The degree to which the decision making structures are representative and transparent is to be monitored.

3.7 Conclusion

The Key Performance Indicators have been selected, based on the Stakeholder Analysis and supported by the Data Indicators. With these KPI's this research will continue with the evaluation of the different periods within the SDP in Chapter Five.

Chapter Four: Programme Evaluation

4.1 Introduction

In this chapter the Programme Evaluation of the SDP will be undertaken. This is done in accordance with the chosen evaluation areas: the Programme Context, the Programme Characteristics and the Programme Outcomes.

4.2 Programme Context

Programmes take place within a setting or context – a framework of constraints within which a programme must operate. This aspect includes a description of the background and reasons for setting up the programme.

4.2.1 Background

The SDP represents the combined effort of four types of key stakeholders since its inception in 1999. These stakeholders are described below in sub-section 4.2.2. Initially it was thought to be short-term, and with two main objectives:

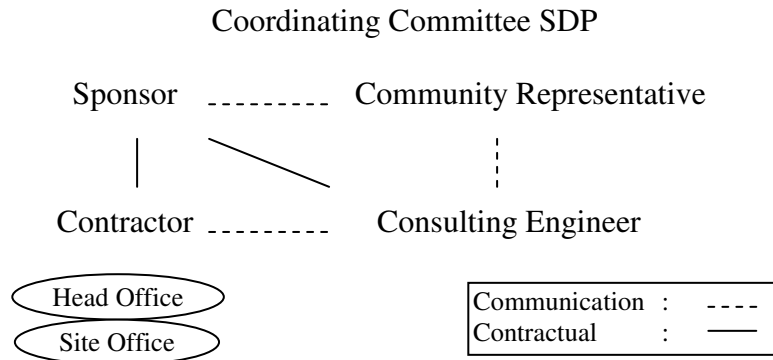
- The development of the area.
- To demonstrate to the government that labour-intensive construction can work.

The programme had a close relationship with the initial contact: The Donaldson Trust. The Trust has been operating within the Sekhukhuneland communities as far back as the late nineteen eighties. When the Trust wanted to expand the scale of its operations it approached the Research Centre WORK to handle the new pilot project. After the initial success of the first pilot, the SDP programme approach was initiated and the planning and design started in 2000.

4.2.2 Organisational Structure⁴⁶

To be able to evaluate the different periods of the programme the organisational structure described below was used.

Figure 3: Organisational Structure



The key stakeholders are detailed below:

- 1) Sponsor:
Name: Donaldson Trust, Anglo Platinum and Umsobomvu
- 2) Community Representative:
Name: (Moh) Road-Committee (1999), (Moh) Development Committee (2000-2002),
(Mon) Youth Committee (2000-2002)
- 3) Contractor (Head Office(HO) and Site Office(SO)):
Name: Research Centre WORK, Point-of-Fact and LITE
- 4) Consultant:
Name: EIEC, (Support: Research Centre WORK)

4.2.3 The Institutional Setting

The Programme Phases are linked to the Head Office that has responsibility for programme strategy and direction. The institutional setting is also used for the financial evaluation, as shown in Appendix 7 Cost Sekhukhuneland Development Programme. The situation is as follows:

⁴⁶McCutcheon (ed), 1993. Proposed and discussed with Consultant EIEC.

- Head Office (HO); Programme Responsibilities
- Site Office (SO); Project Responsibilities

4.2.4 Programme Phases and Phase Periods

The SDP is divided into three main phases:

- Pilot Phase
- Training Phase
- Construction Phase

These phases are derived from the research into other programmes and discussions with the Sponsor, Consultants and Contractor. Based on these phases the following periods are identified and are evaluated in this Chapter: Period Evaluation.

These periods consist of several projects that were undertaken during each period, defined as follows.

SDP Phases	SDP Periods⁴⁷	Organisation	SDP Projects
1) Pilot Phase	: Period 1999H	None	Period Projects
	: Period 2000A	Point-of-fact (Pty) Ltd	Period Projects
2) Training Phase	: Period 2001A	Money-Can't-Buy Section 21	Period Projects Mohlaletse Period Projects Monametse
	: Period 2001H	LITE Section 21	Period Projects Mohlaletse Period Projects Monametse Period Project Compound
3) Construction Phase	: Period 2002H		Period Projects Mohlaletse Period Projects Monametse Period Project LITE House and LITE School

4.3 Programme Characteristics

Programme characteristics are the programme's principal activities, services, processes and administrative arrangements. Programme characteristics are the activities people undertake to try to achieve the programme's goals.

⁴⁷ the H refers to Hubert and the A to Arjen, these were the first names of the managers during that period.

4.3.1 Programme Objective

The Development Objective of the SDP programme is:

To uplift the rural communities in the Sekhukhuneland Area using Labour-Intensive Construction Methods and Local Resources for the able-bodied poor who are willing to work within the constraints of a construction-training programme.

4.3.2 Phase Period Objectives⁴⁸

The general objective of the SDP is broken down into Period objectives. Each period had a specific objective to allow the programme to fulfil its general objective. The pilot phase has been repeated after the prolonged closedown after period 1999H. The training phase was split up into two parts because the transition between the original manager and his replacement took place during the original manager's leave period.

The following objectives were used:

- Pilot Phase, Period 1999H Objective:
To examine and demonstrate the feasibility of Labour-Intensive Construction Methods in Sekhukhuneland.
- Pilot Phase, Period 2000A Objective:
To continue the Sekhukhune Development Programme under the same conditions as the project in 1999, with the aim to establish a firm base for future operations.
- Training Phase, Period 2001A Objective:
To start a Training-Phase of the Sekhukhuneland Development Programme which would result in a number of trained team leader that would be used in the construction undertaken at the two construction sites Mohlaletse and Monametse.
- Training Phase, Period 2001H Objective:
To complete the Training-Phase of the Sekhukhuneland Development Programme that would result in a number of trained team leaders that could be used in the construction undertaken at the two construction sites located in Mohlaletse and Monametse.

- Construction Phase, Period 2002H Objective:

To continue the Sekhukhuneland Development Programme into the Construction-Phase and to target a sponsor for as long as the allocated financial means would permit construction to continue or the situation would change.

4.3.3 Programmes Principle

The programme is described as a construction-training programme. This means that the training component is used to produce the capacity needed to undertake the construction. The construction is the main focus, and the delivery tool to generate employment. The construction is situated within a rural community in Sekhukhuneland and is focused on infrastructure and capacity building (accommodation and labour resources). Fortunately the infrastructure is situated away from the provincial road network, which reduces the amount of traffic. Nonetheless it is important to realize that any expansion of the programme can only be undertaken at the rate that the necessary team leaders can finish their training and become available⁴⁹. The Labour-Intensive Construction Method is used during the delivery periods of the programme (Pilot, Training or Construction) as discussed in Chapter Two.

The data for the programme would, under normal circumstances, be collected on site and sent to Head Office for evaluation. During the construction phase it would have been of great assistance to the site manager. The site management could take appropriate action, especially in the updating and application of task rates, which was fundamental to the site managers' job and to the success of the programme. In addition to the data it was necessary to analyse the productivity figures and compare them to the existing figures from experts such as the International Labour Organization (ILO) so that new task rates would be set if required. In practice however, all this was done at the Site Office.

This was because there was insufficient funding to pay Head Office staff so that, although Head Office was able to exercise an overall control, the only assistance it would give was by courtesy of the Research Centre WORK who seconded an engineer, W. van Steenderen, to

⁴⁸ Based on discussion with CEO, Programme Manager, Project Manager and Directors LITE.

⁴⁹ McCutcheon (ed); 1993.

work practically full-time in the programme. This assistance was invaluable because Van Steenderen was an experienced engineer with a thorough knowledge of labour-intensive methods, but the problem was that he was overcommitted: he still had commitments at the Research Centre WORK and, once LITE started training; he was fully engaged in writing all the training modules. Despite this he shared, with the site manager, the additional responsibility of producing plans and working drawings for the road works, and of compiling all the different forms.

The site manager, apart from the shared responsibility for these forms and working drawings, had to shoulder the responsibility for not only extracting all the data but for administrating it as well. The overall management structure was informal and provided limited guidance to the Site Office. The reasons for this were over commitment and shortage of personnel.

This situation changed during the year 2002 when the new Mohlaletse Youth Service Programme (MYSP) started. This new programme was funded by the Umsobomvu Youth Fund (UYF). The LITE organisation had made sufficient allocation within the programme budget to hire additional staff to meet the requirements of the Head Office and Site Office. This allowed the LITE organisation to professionalize to the required level which was needed to manage this new programme.

4.4 Programme Outcomes⁵⁰

Most evaluations want to measure or observe the extent to which the objectives have been achieved. In these evaluations both long- and short-term outcomes must be considered. Evaluation data about programme outcomes are often supposed to support rational planning, decision-making and judgements. But knowledge about outcomes provides only part of the information needed to make decisions. These decisions also depend on required resources and on the relative cost-effectiveness of competing alternatives.

⁵⁰ Based on Wijnen, Renes and Storm; 2001.

The programme outcomes are based on the project management theory. This allows a high level evaluation without consideration of the stakeholders. In the programme evaluation the following items are focussed on:

- Duration of the programme during each period:
This refers to the length of delivery within the period evaluated
- Cost of the programme during each period:
This refers to the summary Period Cost Table in the Appendix Programme Evaluation. Costs are split between Head Office and Site Office. The Site Office cost is split into two components Indirect and Direct (Overhead and Variable).
- Quality of the programme during each period:
This refers to the quality of the construction delivered, based primarily on SABS 1200 series requirements.
- Information about the programme during each period:
This refers to the main problems encountered during this period

4.4.1 Time of the Programme Phases⁵¹

During the evaluation of the SDP it became clear that no specific stages in the programme were fully documented. This research identified periods that are allocated to general phases in the programme. Each period is then defined according to a particular time period in months.

Table 4: Programme Phases

Phase	Period	Stages	
1) Pilot	1999H	Preparation period	: October 1998 - February 1999
		Delivery period	: March 1999 - July 1999
2) Training	2000A	Preparation period	: August 2000 - September 2000
		Delivery period	: September 2000 - December 2000
	2001A	Preparation period	: January 2001-February 2001
		Delivery period	: March 2001-July 2001
3) Construction	2001H	Preparation period	: August 2001
		Delivery period	: September 2001 - December 2001
	2002H	Preparation period	: January 2002-February 2002
		Delivery period	: March 2002-July 2002

⁵¹ See Appendix 6 Programme Evaluation.

4.4.1.1 Pilot Phase

According to the “rule of thumb” for labour-intensive projects, the preparation period should be as long as or longer than the delivery period⁵². This was adhered to for the first delivery period 1999H, but not for subsequent ones, and the lack of preparation was identified as one of the main problems throughout the programme⁵³. As can be seen in the Appendix Programme Evaluation, a programme setting consists of more stages. A programme is a continuous process that develops along the programme’s time line. In the case of the SDP the initiation stage was influenced by the ever changing situation in Sekhukhuneland⁵⁴. After the decision was taken to start construction, a preliminary report was delivered in December 1998 by the Research Centre WORK. The report was used as a guide to prepare for the four month construction phase that would start around April 1999. The planned construction took longer than expected due to a lack of productivity by the teams; this was resolved by hiring additional labour. The extension was limited to the defined period that personnel would be available to supervise this extra period (two and a half weeks).

The programme entered the second half, 2000A of the Pilot Phase when it restarted with the arrival of the new manager, A. Bouwmeester. Some time had passed (July 1999 to August 2000) and this reaffirmed the commitment of the Donaldson Trust which had been obliged to suspend the programme a year earlier because Van Zandvoort had left to continue his studies. Bouwmeester was a fully qualified engineer and was the first paid manager of the programme. Because of the pressure to start construction as soon as possible, there was very little preparation for this, the second period 2000A, and this was particularly noticeable in the Monametse project. Monametse is the village adjacent to Anglo Platinumm’s Atok Mine, and Anglo Platinum had authorized a grant to the SDP for R600.000 of which an unspecified portion was to be spent on the upgrading of the road from the mine to the village. No preliminary drawings were done and no detailed proposal was submitted. The drawings for the bridges and culverts were done by the Research Centre WORK (Van Steenderen and Students) and the managers on site, not in advance but as the need arose.

⁵² Explained during lectures; Project Management at the University of the Witwatersrand, Faculty of Engineering; 2001.

⁵³ Zandvoort; 1999.

⁵⁴ Appendix 3 Culture.

When at last the SDP announced itself ready to utilize the grant, Anglo Platinum had taken back R60 000. The remaining R540 000 was used for both the Monamtese and Mohlaletse projects, but no further proposal was put forward by Head Office for SDP.

4.4.1.2 Training Phase

During the period 1999H, there was need for training but, apart from providing the explanations necessary for the team leaders to supervise the daily tasks no in-depth training was undertaken. The first period only lasted four months during which time he was expected to construct a road that would demonstrate the viability of labour-intensive construction methods. Because the daily tasks were presumed to be simple enough to understand, the team leaders were chosen not so much for their educational qualifications or their aptitude for the work, but for their leadership qualifications. However, when Bouwmeester began the second period 2000A, the time span had been increased to a year. Also he was faced with two projects Mohlaletse and Monametse, which were forty kilometres apart. Under these circumstances it seemed that not only there was enough time to train leaders, but that the training would be essential for the success of the project.

The Research Centre WORK had always been conscious of the need for training and so the decision was taken not to continue the main construction until basic training had been completed. This decision was indicated in a meeting at Mohlaletse, called shortly afterwards, to explain the reasoning behind it and to provide the opportunity for both workers and management to discuss their problems.

Bouwmeester and Van Zandvoort were present at the meeting and it soon became apparent to them that many of the concerns expressed by the workers revealed a lack of understanding over simple things, like daily task rates, which had been explained at great length to the team leaders. Typical of these complaints was the confusion expressed over the digging of a trench. Two teams had each dug a trench and been paid the same although one trench was twice the length of the other. The explanation was, of course, that the shorter trench was twice the depth of the longer one so that the volume of earth to be removed was the same. But the team leaders, whether or not they understood this, had been unable to explain it to their teams.

The reason that the Research Centre WORK, although conscious of the need for training, had not been able to institute a training programme was that it did not possess any training

material. In making this decision it demonstrated the value of the contribution it could make, as a research centre to the success of the SDP.

Van Steenderen began at once and, as one module was completed it would be sent up to site for comment by the project manager who, for the third period, 2001A, was Bouwmeester. His comments would then be duly incorporated into a revised module which, after final approval by McCutcheon, would be sent back to site for immediate use. At first, while one module was being taught the next one was being written. The most pressing need then became to complete the modules faster than they could be taught so that there would not be any gap in the training modules. Each module finished off with a test which was marked by Bouwmeester, but for which Van Steenderen set the questions. As the training progressed, Bouwmeester asked if he could have written answers to the questions and, as he became more familiar with the capabilities and limitations of the trainees, he obtained from Van Steenderen anything up to three sets of questions and answers for each module. This was in order to give a chance to those who were not able to pass the first time but who had the potential, and had demonstrated the will to succeed and to overcome the limitations imposed by the poor standard of Apartheid education.

This interaction between Head Office and Site Office ensured that the training material was appropriate for the general level of competency within the community, but it placed a heavy responsibility on Van Steenderen and Bouwmeester. Van Steenderen, although giving the module priority, had other commitments at the University of the Witwatersrand while Bouwmeester was completely alone on site and, apart from Van Steenderen, had no one to turn to for support. As a result both of them were over committed and were not in a position to give sufficient attention to other problems within the overall picture.

Typical of these problems was the planning for the Monametse project, but the one that impacted most on Bouwmeester's time was the recurring problem of poor education, and in order to overcome this, he gave extra lessons at night.

The deficiency of the trainees' education was that not only had they not been taught very much, but that what they had been taught seemed to have been taught in a vacuum, so that they were unable to relate it to the world around them. They were supposed to have passed at least grade 10, or preferable grade 12 (matric/university entrance), but their English and

mathematics were bad: in a preliminary test one of the questions that proved to be a stumbling block was “how many centimetres are in a metre?”.

What was noticeable however was that once they started working on site they soon saw the mathematics/arithmetic in a new light as they began to relate it to the task-rates and to the measurements called for by the road-construction. The impetus that these practical demonstrations gave to the lessons was a strong contributing factor in Van Steenderen’s decision taken later on, to alternate each classroom-week with a week of practical work. This applied to every module so that a new module was not started until the full quota of work had been done on the preceding one. The allocated time allowed for the training course remained the same at six months.

In the third period, 2001A, Bouwmeester finished the three month classroom stage in four months and then started the practical training at Mohlaltse and Monametse simultaneously. He had, in the meantime, engaged an assistant, R. Mafiri, who was about to graduate with a diploma in engineering from Technicon North. Anglo Platinum offered accommodation at their Atok Mine next to Monametse but it was declined because the SDP had already decided to build its own accommodation at Mohlaletse where it wished to be based. This practical stage lasted two months during which Bouwmeester started construction on an existing bridge that needed to be enlarged in order to cater for a fifty year flood. He then left for Europe and the project was suspended for a month pending the arrival of Van Zandvoort. Before leaving, Bouwmeester stressed the need for responsibilities to be allocated clearly and in writing and for better communication in general.

In the fourth period, 2001H, Van Zandvoort restarted the construction work on both sites which he used as a testing ground to see how well the trainees were able to implement what they had learnt. They already received two months practice with Bouwmeester but now the emphasis was on the improvement of quality, the productivity and the setting and reassessing the task rates. He engaged another student of the Technicon North, so that with this new assistant, S. Mello Tlou, and the first one, R. Mariri, he now had two supervisors, one for each site. He also engaged a store man and a wage clerk. During this third period, a third project was started, the building of accommodation for SDP staff. It was called the “Compound” and

was nearly finished by the end of the period. There was no finished proposal by Head Office for any of the three projects, Monametse, Mohlaletse or the Compound. Although meetings were held with the client and the Research Centre WORK, they were inconclusive and the bulk of the planning and the responsibility continued to rest with the Site Office. This lack of clear direction caused delays and frustrations but it was compensated to some extent by the support given by students from the Research Centre WORK who continued to visit the site and do useful supplementary work. This second half, the fourth period, ended in December 2001 with the start of the Christmass break.

The period 2001H was used to complete the practical training of the team leaders and several new projects were initiated. Although preparations had been made, all the projects lacked completed proposals. During this period it also became clear that most of the responsibilities would be transferred to the Site Office. The meetings with Head Office that were requested by the Site Office resulted in a discussion on how to continue the programme, but no final agreement was reached about the SDP. The programme would continue with the projects it had started but it was missing a clear direction. The Research Centre WORK was responsible for the delivery of research, design, drawings and planning for most of the projects. These responsibilities involved many discussions with the Site-Office, the Donaldson Trust, and Consultant EIEC which were scheduled once every two weeks. The lack of a clearly defined structure and strategy resulted in significant amount of time and effort to be spent on resolving issues⁵⁵. Nevertheless, towards the end of this period a new Programme, the Mohlaletse Youth Service Programme (MYSP), was introduced by EIEC as an option to expand the site operation during the year 2002.

4.4.1.3 Construction Phase

The construction phase occupied the whole of the fifth period 2002H, after which the SDP was no longer able to continue as an employment-creation programme because the original funding from the Donaldson Trust and Anglo Platinum had been used up, and the new funder, the Umsobomvu Youth Fund, wanted to expand the training programme but was only prepared to fund construction in so far as it provided a training site for the practical work. Therefor LITE build a school with funds from Umsobomvu for the training. In total there

were four projects in progress during this period: the school, the LITE House and the road constructions at Mohlaletse and Monametse. The new programme for Umsobomvu was called the Mohlaletse Youth Service Programme (MYSP) and it required additional staff. On site two more potential engineering graduates from the Technicon North were engaged, plus teachers for sixty trainees. Also needed, more than anything else, was an assistant/understudy to the project manager in the form of a recently qualified engineer from the University of Twente. Staff were also engaged at Head Office but this did not result in better communication between Head Office and Site Office because the attention of Head Office was concentrated on the educational aspects so that engineering plans or any other matters relating to construction were still left to Van Steenderen and the programme manager.

This period was also used to consolidate the management on site. If possible, improvements were introduced to the construction, typical items that had been overlooked during the training phase. Realistic task rates were agreed upon, more responsibility was given to the team leaders, and some work which was not up to standard was redone. Safety boots and overalls were handed out to the labourers.

Towards the end of this period, the project to upgrade the Monametse Road was discontinued: the bridge had been completed and all the culverts lengthened to accommodate the increase in the width of the road to 2.4 metres. Anglo Platinum was happy with the work done and included a picture of the completed bridge in one of their publications on community upliftment. Later on they tarred the road at the new width of 2.4 metres but, although this gave prominence to the work that the SDP had completed, it precluded any proposals for further construction.

Where necessary, the other projects were either scaled down or modified to comply with the requirements of the MYSP.

The productivity of Period 2002H was compromised by a lack of resources but progress was made in the several areas. The Site Office made arrangements with the Alliance Church to rent office space. The issue of providing safety boots and overalls to all the labourers improved the Labour Safety.

⁵⁵ One example was the discussion about the proposed mud-bricks for the Compound, LITE House and LITE School.

During this period, the available resources needed to be distributed between: the two programmes SDP and MYSP⁵⁶, the two construction locations, Mohlaletse and Monametse and the various projects (LITE House/School, Mohlaletse Road, Umsobomvu Trainees and Monametse Road)⁵⁷. It became clear that it was impossible to continue all these operations without extra personnel and funding. During this period the SDP was discontinued at both locations and most resources transferred to the MYSP.

4.4.2 Cost of the Programme Phases⁵⁸

During the first three periods the SDP did well on remaining within the budget. The sponsor hoped that more could be achieved if additional sponsors could be sourced. The table below details the allocation of Head Office (HO) Indirect Cost and Site Office (SO) Direct Cost. During the course of the SDP the largest part of the budget had been spent on the Site Office. 24% of Site expenditure was sunk cost that was invested to create capacity.

Table 5: SDP Phase Cost

Phase	Period	Budget	Cost	%	HO	%	SO	%
1) Pilot	1999H	R 250 000	R 232 941	100	R 27 198	12	R 205 743	88
	2000A	R 200 000	R 176 731	100	R 14 421	8	R 162 310	92
2) Training	2001A	R 200 000	R 178 597	100	R 7 162	4	R 171 435	96
	2001H	R 540 000	R 506 076	100	R 25 306	5	R 480 770	95
3) Construction	2002H	R 510 000	R 605 455	100	R 23 467	5	R 581 988	95
Total		R 1 700 000	R 1 699 800	100	R 97 554	6	R 1 602 246	94
Total Sunk Cost SDP							R413 903	24

HO = Head Office, SO = Site Office; Sunk cost is percentages of total cost SDP

The SDP had no clear budget allocated to each period. The combination of a lack of planning and poor communication posed the risk that the costs could exceed the budget available. Three sponsors funded the budget. The table below details the budget for the respective periods. The SDP was a programme primarily funded by the Donaldson Trust.

⁵⁶ This is the Second Programme that started during 2002, the Mohlaletse Youth Service Programme.

⁵⁷ See Appendix 2 Map.

⁵⁸ See also Appendix 6 Programme Evaluation.

Table 6: SDP Budget

Table 1: SDP Budget			
Sponsor	Period	Amount	
Donaldson Trust	Period 1999H	R 250 000	
	Period 2000A	R 200 000	
	Period 2001A	R 100 000	
	Period 2001H	R 200 000	
	Period 2002H	R 300 000	
Total Donaldson Trust			R 1 050 000
Anglo Platinum	Period 2001A	R 540 000	
	Period 2001H		
	Period 2002H		
Total Anglo Platinum			R 540 000
Umsobomvu	Period 2002H	R 110 000	
Total Umsobomvu			R 110 000
Total SDP			R1.700.000

The sponsor, the Donaldson Trust, was satisfied with the results achieved during the First Pilot Period 1999H. The sponsor hoped to be able to continue the relationship with the Research Centre WORK and extend the SDP for as long as possible.

The Second Pilot Phase's approach was based on the methodology employed in first Pilot Period. During this period it soon became clear that the Project Manager needed qualified support on site and the team leaders needed education and training. To facilitate all these activities a Section 21 company was created by the name Labour Intensive Training and Engineering. Although the wage payment process had improved late payments remained an issue in the Construction Phase.

The cost evaluation of the Construction Period 2002H provided an unclear picture. Expenditure was not split between the SDP and the MYSP but the introduction of an accountant during July 2002 finally resulted in in-time wage payments⁵⁹.

4.4.3 Quality of the Programme Phases

In the Preparation Stage the design team recognised that the construction had to be simple to ensure quality and ease of maintenance. These criteria resulted in the use of the Arch Culvert, Drifts, Gabions and the use of grouted stone pitching as inlets and outlets at drainage structures. All these techniques had already proven their ability to fulfil these criteria as they

⁵⁹ The payments could now be made by electronic banking.

had been successfully used in Labour-Intensive Construction Sites under supervision of either the International Labour Office or the Development Bank of South Africa.

A large drift was designed to allow water to cross the road between the intersection and the Post Office⁶⁰. This particular drift became an obstacle for the team leaders and supervisors who were supposed to build it. The design allowed for a 45 degree angle in the stream bed to cross the road which was not understood by the team leaders and supervisor. The construction manager set-out the construction on several occasions but the result was disappointing and required many subsequent alterations.

Additional constructions were designed during the Training and Construction Phase of the SDP. The design of the First Phase (the Compound) took longer than expected and this part was not completed by December 2001. During construction of the Second Phase (the LITE House/School), the re-designing of the blocks optimised the construction process.

At Monametse the design of the Bridge had to be changed because the Programme Manager, A. Bouwmeester allowed for a fourth channel to enlarge the total capacity to handle the volume of the 50 year flood cycle. Both Supervisor and the Programme Manager checked the quality of the deck before each slab was poured. The bridge was designed with extra safety measures to enlarge the safety of the construction.

At Mohlaletse, the entrances and turnoffs over the road drainage were designed upon the principle of a box culvert but the proper application of reinforcing and the scaffolding proved a problem for the team leaders and supervisors. They cut the reinforcing the wrong way resulting in the main bars lying in the wrong direction. Fortunately the error has been detected and the slabs have been rebuilt correctly. This example of having culverts constructed in the incorrect position is a “terrible sue-able” event.

⁶⁰ See Appendix 2 Map, Map Mohlaletse

4.4.4 Problems encountered during each period of the Programme

In the report dated September 1999, three main items were identified as problems that should be investigated before the next period commenced. Other problems were encountered but the important ones related to the Programme Management as viewed by Head Office.

The first problem was poor communication. The construction site was 370 kilometres away from Johannesburg and had no direct telephone line. As a result the programme management was 'thrown into the deep end' by the Contractor. Although the Programme Manager had been involved in the design and planning, he had limited site-management experience and practical knowledge of Labour-Intensive Construction Methods. The Programme Manager was the only contractor's representative on site and would only be assisted by an Engineer from the Research Centre WORK during the first two weeks of the project. This clearly called for defined job descriptions from Head Office confirming the Key Performance Areas of each person involved in the programme.

The second problem was a lack of documentation. The agreement between the sponsors and the contractor was never documented in the programme approach. As a result the Head Office relied on verbal communication with the Site Office. Weekly reports were delivered by the Site Office but these reports were never evaluated during the delivery stage. During the preparation stages, the design and planning were documented but the link between the plan and the implementation was not documented.

During the delivery stage Head Office stressed that task rates were to be kept high early on, given that task rates could always be reduced but increasing them would be more difficult. What was lacking during the delivery stage was a document that clearly informed the labourers what was meant by a particular task and what task rate was expected. The manager worked around this by setting out daily tasks every morning for each team. This proved time consuming and required additional preparation by the manager.

The third problem was that the team leaders required training in order to be effective. A training course was needed to explain what was expected of team leaders, how they should run their teams, set-out tasks and interpret the construction drawings.

Subsequent to Period 1999H only the training course problem received attention and the other two problems were not resolved. During the hand over in September 2001, the departing manager stressed the need for improved communication and documentation. These proved to be persistent problems throughout the SDP and although research was performed to resolve them, it was not implemented. The management of the SDP relied heavily on students from the Research Centre WORK, in order to address the problem of insufficient staffing and the resultant over-burdening of personnel. The budget allocated to the programme was spent in full and negotiations for new funding were entered into with Anglo Platinum and the district council and municipalities. These opportunities were never realised, which resulted in the transition from the SDP by July 2002 to the MYSP, from a small pilot to a larger training and construction programme.

During the two Periods 2000A and 2001A two reports were written by the Site Manager. The first report investigated the possible extension of the programme to the surrounding villages. Although a report was filed nothing was undertaken. The second report discussed transition and was never filed beyond the Draft version.

4.5 Conclusion

Programme Context: The programme operated from within the community. The organisational structure that was used during the delivery was a labour-intensive contract with a contractor which also incorporated the community into the formal management structure. The programme is divided into three phases covering several periods.

Programme Characteristics: The programme operated on the principle of using a training component to train the needed capacity to run the programme. Data was collected but not evaluated. Furthermore the inexperience of the Site Management coupled with the lack of resources, resulted in an ad-hoc site-management approach.

Programme Outcomes: The SDP had no designed or planned budget, but after the decision was taken to end the programme it was found that the total expenditure was within the budget limits. A large portion of the budget that was spent to generate capacity within the company resulted in the large sum allocated to the category Sunk Cost. Programme quality improved during the delivery periods, but still was not a controlled process. The project cycle methodology that is known within project management theory could only be applied to a

limited extent. The overstretching of resources and the use of students resulted in tensions and delays.

One of the main achievements of the SDP is that it created a development programme that went from:

- Research Programme funded by the Donaldson Trust and WORK.
- Pilot Programme funded by the Donaldson Trust.
- Extended Programme funded by the Donaldson Trust, Anglo Platinum.
- Youth Service Programme funded by Umsobomvu Youth Fund.

As a result of the SDP a new programme was started, the MYSP. This programme used resources and knowledge from the SDP. Some of the problems encountered with the SDP were no longer present in the MYSP. Especially the uncertainty around funding, planning, communication and training were resolved.

Chapter Five: Period Evaluation

5.1 *Introduction*

This chapter will discuss every period in the Sekhukhuneland Development Programme (SDP) according to the Key Performance Indicators (KPI). The selected KPI are: Progress Against Time, Progress Against Cost, Quality, Job Creation, Reaching Targeted Groups and Human Resource Development. Some of these indicators are split into different areas that are evaluated.

5.2 *Progress Against Time*

The different phases identified in the project cycle, could suggest that a construction plan was conceived on the bases of a delivery date. This was not the case. So to address this indicator another option is chosen to evaluate the period, namely the production or task sizes. These task sizes were given to the team leader of these teams on the task forms. These task forms represented a weekly task for the whole team and consisted usually out of more then just one task. (See also paragraph 5.4.4 Tasking)

In the project structure, teams are identified, according to these teams an evaluation is made of their production or task sizes used during the period. During the SDP a return of four items is seen. These are: *Excavation* of medium Soil, *Rock Collection*, *Rock Masonry* and *Grouted Stone Pitching*. To be able to compare these numbers with other programmes we use the ILO production figures. These figures are the result of 20 years of research by the ILO throughout the world.

5.2.1 **The Sekhukhuneland Development Programme Production Figures**

The SDP always experienced problems in the setting of task sizes. During the construction the site management, more than once, tried to produce a task manual to assist the supervisor and

team leaders with the tasking. But this only resulted in a draft version that needed finalization. The data below was collected from the task sheets and documentation done at the Site-Office during the periods the SDP operated. The period 2001A did not have sufficient retrievable data that could be incorporated into the table below. For this reason the table shows no figures for that period.

Table 7: Production Task Sizes SDP⁶¹

Period	ILO		1999H		2000A		2001A		2001H		2002H	
Unit		m ³		m ³		m ³		m ³		m ³		m ³
<i>Excavation</i>	p.p.	3.0	p.p.	1.0	p.p.	2	-	-	p.p.	3.0	p.p.	3.0
<i>Collection</i>	p.p.	1.0	p.p.	0.2	p.p.	0.4	-	-	p.p.	0.8	p.p.	0.8
<i>Masonry</i>	p.p.	1.0	p.p.	0.4	p.p.	0.4	-	-	p.p.	0.6	p.p.	0.6
<i>Pitching</i>	p.p.	1.0	p.p.	0.4	p.p.	0.5	-	-	p.p.	0.8	p.p.	1.2

p.p. = per person

Against the production figures of the ILO the production figures of the SDP are, for most of the time, lower. But on the other hand as can be seen from the table, there is an increase in production over time. The reason for this improvement is the clarification provided at team leader meetings; a recurring question by the team leaders was what exactly was meant by these tasks, and this uncertainty resulted in misunderstanding on site. Below is an example of the progress made on one item of construction; the arch culvert.

Figure 4: Construction Example

Construction Example

The only construction that has data that can be evaluated in the SDP is the Arch Culvert. Two Arch Culverts were completed. The first was built during the 1999H period and the second during the 2000A period.

The following data will be evaluated: Task Total and the construction time in weeks.

- Period 1999H: Construction Arch Culvert: task total 732, time 16 weeks
- Period 2000A: Construction Arch Culvert: task total 540, time 13 weeks.

This indicates that there was improvement in the construction time for a particular construction by reducing the number of tasks and time needed to finish construction.

⁶¹ Data Collected from task-forms and site reports of SDP.

5.3 Progress Against Cost

The construction industry in general uses three items of cost calculation during construction: Labour, Material and Equipment. The construction cost within the SDP is evaluated on two main items, namely task (labour) and material. Because the SDP does not use a system that recoups the invested cost of equipment⁶² or tools: this is not evaluated.

The materials identified and evaluated in the SDP are: Rock, Water, Building Sand and Cement. These items are reported at cost price and as a percentage of period cost.

5.3.1 Sekhukhuneland Development Programme

The table below shows these selected materials during each period and the task price per period.

Table 8: Cost SDP⁶³

Period	1999H		2000A		2001A		2001H		2002H	
Task										
<i>Cost T</i>	R53		R49				R172		R79	
<i>Cost TL</i>					R10.506					
Unit	cost	D	cost	D	cost	D	cost	D	cost	D
	R	km	R	km	R	km	R	km	R	km
<i>Rock</i>	45,-	3.5	20,-	3	25,-	3	25,-	3	25,-	3
<i>Water</i>	5,-	1.2	5,-	1.2	5,-	1.5	6,-	1.5	6,-	1.5
<i>Sand</i>	140,-	6	160,-	6	160,-	6	160,-	6	160,-	6
<i>Cement</i>	24,50		28,-		31,-		33,-		34,50	

Cost = total cost period / T or TL, T= task, TL= team leader Task Wages '99/('00-'02) (Team Leader R35/R45, Builder R30/35 and Labourer R20/R25); Rock per m³, Water per drum (200 litre), Sand per load (minimum 4m³) and cement per bag (50kg). D = Distance (collecting distance A to B)

More than half of the public works projects in the Western Cape pay daily wages between R20 and R30 as determined as part of the SALDRU (1999) study. R33.20 is the minimum statutory wage for civil engineering in the Limpopo (Northern) Province (based on an 8 hour

⁶² This is also known as Sunk Cost.

⁶³ See Appendix 9 Period Evaluation.

day)⁶⁴. The SDP used fair task wages during the delivery periods of the programme compared with the wages in the Western Cape and Limpopo Province.

From the above it can be seen that the cost of production went up, particularly in the period 2001H (R172,-) when the cost of labour per task went up by over 300%. One reason for this is that this was the initial period after the training, and was essentially a learning period when the site management was experimenting with task sizes and with task rates. In addition to this large investments were made in new tools, like a generator and electric tools, and labour-intensive equipment, like a pedestrian roller, hand operated mixers and a tipper-trailer. In essence this was a capacity building period.

Another interesting increase was that of the price of a cement bag which went up 40%. This had no influence on the choice of any of the structures build. In this research no adjustment for inflation has been made because there are no specific inflation figures for the rural areas of South Africa.

During each period, budget was spent on a variety of items relating to construction. The table below reports on a selection of Site Office costs, these shown as percentages of total cost for each period.

Table 9: Cost SDP per Period⁶⁵

Period	1999H		2000A		2001A		2001H		2002H	
Total Cost 100 %	R232 941		R176 731		R178 597		R506 076		R605 455	
	Rand	%	Rand	%	Rand	%	Rand	%	Rand	%
Head Office	27 198	12	14 421	8	7 162	4	25 306	5	23 467	4
Site Office	205 743	88	162 310	92	171 435	96	480 770	95	581 989	96
Direct Overhead	62 098	26	40 376	23	149 799	84	292 068	58	250 904	41
Tools & Equipment	24 177	10	4 098	2	25 918	15	208 613	41	80 532	13
Direct Variable	143 646	62	121 934	69	21 636	12	188 702	37	331 085	55
Labour	100 511	43	99 647	56	10 961	6	114 702	22	145 132	24
Small-Contractor	18 525	8	9 668	6	1 858	1	15 568	3	38 723	6
Material	24 609	10	12 620	7	8 817	5	58 432	12	147 230	24

% is taken from total cost in period, Site Office = Direct Variable + Direct Overhead

The largest part of the budget was spent by the Site Office. A substantial portion of these funds was used to build the compound. This is shown by the increased percentage of Site

⁶⁴ Limpopo (Northern) Road Agency and DFID; 2001.

Office Direct Overheads for the last two periods. The third period budget is allocated completely to the training part of the SDP. During the fourth period a significant increase can be seen in the Direct Overhead, the tools and equipment⁶⁶. These percentages and figures should only be used as indicators for comparison as the SDP did not make use of official rates for consulting fees or tests undertaken by either EIEC or WORK.

5.4 Quality

The quality of the construction depended upon the site manager who instituted design and standards based upon figures of the South Africa Bureau of Standards⁶⁷, which includes construction processes, and control mechanisms. The site manager exercised control of quality in the same way that the site manager exercised control over the other aspects of the construction, through the supervisor and team leader responsible for the particular tasks.

Components of quality that are evaluated are Surveying, Materials (Mixing, Storage) and Labour (Tasking). These components are selected and based on the control systems used during construction which are based on project management theory.

5.4.1 Surveying

The surveying and setting out was done mainly through the use of a level but also with the aid of a table measure. During the first three periods the team leaders had no personal gear or tools, but in the last two periods they were each provided with a 2m tape measure and a hammer. This ensured that the team leader had the tools to set out the tasks for his team. Although the use of the level had been explained to the team leaders as part of the team leader course they experienced difficulties in practice and their work had to be checked by the site manager. This was time consuming but sometimes the manager was assisted by the students who were on site, and who, in a supervisory capacity would check the team leaders setting out. Mistakes did occur and the problem of checking was only solved finally by employing supervisors to assist the manager. As the team leaders became more conversant with level

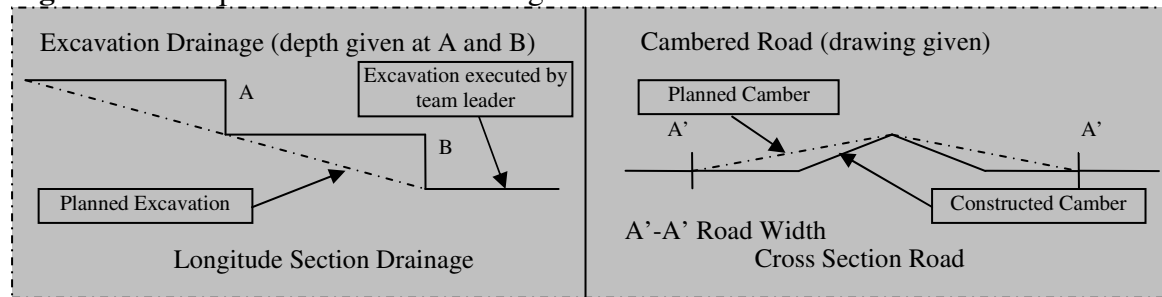
⁶⁵ See also Appendix 7 Cost Sekhukhuneland Development Programme

⁶⁶ See Table 8: Cost SDP.

⁶⁷ Example SABS 1200.

they were able to do setting out with the use of pegs, but they could only do so if they could read the drawings. Below are two diagrams which illustrate the sort of misunderstanding to which the team leaders were prone.

Figure 5: Examples of Misunderstanding



This meant that a particular construction could only commence once the supervisor and the project manager had made a final check to ensure the correct dimensions. Unfortunately this control sometimes failed because the students that filled in at a supervisory level, from time to time also made mistakes. The underlying problem was that the construction manager did not have enough time available to prepare the constructions up to the required detail. This problem was solved with the introduction of additional supervisors that were employed by the LITE.

5.4.2 Materials

5.4.2.1 *Mixing*

The mixing of mortar or cement by the builders proved to be a process that resulted in many discussions. The builders did not believe that the mixed mortar, or cement with water added, became weaker if the mixed substance was not used in construction within 30 minutes. The builders did not realize that the chemical process had already started when you added water. In their opinion a stock pile of mixed cement should be ready in case they needed extra. This problem was solved with the introduction of a hand-turned mixer.

After the construction of a wall or concrete slab, the construction needed to be kept wet for a number of days⁶⁸. This was something the work force did not know at first. The introduction of covering the construction with a layer of wet soil or wet paper cement bags was new. After the explanation of why the construction needed to be kept wet for a number of days this concept became more familiar, but only after the team leaders were trained did they really take notice.

In order to backfill properly, the soil needed to be at optimum moisture content for the duration of the task. In the beginning of the SDP this was not understood, luckily no large backfilling was undertaken during the first three periods. Only after the team leaders had completed the training course did the road construction start. By then the team leaders were familiar with the hand-test to control this optimum.

The hand-test can be easily applied by the work force to estimate the needed amount of water to reach this optimum. This is done by taking a handful of material and squeezing the material into a ball. If the hand is opened and the ball created keeps its form and some material sticks to the hand the optimum is reached. By applying the test the optimum can be estimated with a fair amount of accuracy without the need of time consuming testing.

Only during the first months of the 2001H period did the team leaders really see why. After this, they understood the reason and there were no more discussions.

5.4.2.2 Storage Mohlaletse

The use of the storage room was not properly implemented during the first three periods. The community was as kind as to lend the organisation a room at the Post Office. This room was modified to the required specifications and has been in use ever since.

One item particularly to which this was applicable was cement. Cement needs to be kept off the ground to keep it dry. Only in the last two periods did the storekeeper understand why cement needed to be kept off the ground. The storage room was overfull most of the time, no clarity could be given of what was available and what not. This improved when a storekeeper was assigned at the end of 2001.

⁶⁸ Usually between 5-7 days.

Monametse

The construction sites were forty kilometres apart and the organisation was not as familiar with the Monametse community. Because of these reasons the organisation rented a container from the community church to store its tools and equipment. During the 2000A period the organisation experienced a break-in. Most of the stolen goods were returned and the issue was resolved with the community to the satisfaction of all involved. After this there were no incidents.

At both sites the organisation used the hospitality of families within the communities to store tools during the week. This did increase the acceptance and understanding of the projects within the community and generated the needed support. This does require a level of trust, effort and understanding of the community before this can be applied within development programmes. An important factor is taking time to establish a relationship with each other.

5.4.3 Labour

The task-system was introduced with the idea to control productivity. If a task was not completed, the labourers would not receive their pay. To complete a task it needed to be checked on completion by a team leader, supervisor, assistant manager or the project manager. The system functioned well, although some explanation was required to have it generally accepted by the communities. A weak point in the SDP was that no particular task production manual existed. This created tension and needless discussion between the project management and the work force. What became obvious was that the work force needed to be reassured that the task was not out of proportion and the task was understood. The work force had experienced the insecurity displayed by the supervisor and project manager about certain task sizes and they started to question these sizes. Most of these issues were due to difference in time and effort that was needed to finish these tasks. A difference in opinions on what was involved in, for example excavation or compaction, not only on how the task needed to be done but also what needed to be done.

The training did resolve some of these issues and in time when the team leaders had more experience most of these issues were resolved by the lower management. These differences might have been resolved more easily if the organisation could have referred to a manual.

In regard of the work force the SDP had a clear objective to generate job opportunities within the community. The creation of these job opportunities within the community was based on two main types, namely, Labourers and Small Sub-Contractors. These types were divided into several options which are discussed below.

5.4.3.1 Labourers

The Labourers consisted of four basic types; Team Leader (TL), Labourer (L), Builder (B) and Assistant Builder (AB). In addition a Storekeeper was hired during the last two periods. The team leaders were selected by the Road Committee (Mohlaletse) and the Youth Committee (Monametse) using the following prerequisites: the ability to speak and understand the English language and a school diploma at level grade twelve (Standard 10 or matric). The gender issue was resolved by employing a fifty-fifty ratio of females and males. For future discussion of selection see paragraph 5.5 Reaching Targeted Groups. Labourers work with the team leader to complete the assigned tasks and build the programmes' constructions.

5.4.3.2 Small Sub-Contractor

The Small Sub-Contractors consisted of two types; Bulk Sub-Contractors and Once-Off Sub-Contractors. Both groups could take part if they had the required equipment and had the required personnel to load and off-load the transported materials and to handle the job. In addition to this, both groups could hire equipment from the organisation when this was needed or available. The bulk group used tipper trailers from LITE to transport materials. This had two reasons first the amount of transported material was known and second the equipment fulfilled the required safety standard because it was looked after. This could not always be said about the trailers used from the community.

For the once-off group some expensive tools which they did not possess could be rented from LITE when this was needed.

5.4.3.3 SDP Job Creation Result

In the first two periods of the SDP no standardised forms existed. During the Period 2001A new administration forms⁶⁹ were introduced at the site office but unfortunately not all of these

⁶⁹ These forms were designed with the help of University Students from The University of Twente.

records could be retrieved. This resulted in loss of the data to calculate the number of task completed during that period. The team leaders indicated in these forms can only be compared on the basis of the position as team leader not in their capacity as team leader. The reason for this was that prior to Period 2001A the team leaders had not received any significant training, but by the end of Period 2001A they were considered as qualified team leaders.

Data retrieved from Site Office documents did not include the number of task produced or sub-contractors used during the Period 2001A. The table below shows the results of Job Creation within the SDP during the different periods.

Table 10: Job Creation SDP⁷⁰

Period	1999H	2000A	2001A	2001H	2002H
<i>Delivery Time (weeks)</i>	16	13	6	15	22
Work Force	B	B/C	C	C	B/C
<i>Team Leader (amount)</i>	6	10	17	12	12
<i>Team (amount)</i>	6	10	2	6	12
<i>Labour (amount)</i>	90	70	35	55	82
<i>Task Total (amount)</i>	4427	3618	-	2948	7569
Sub-Contractor					
<i>Rock (amount)</i>	3	1	-	2	3
<i>Water (amount)</i>	1	2	-	1	2
<i>Sand (amount)</i>	3	2	-	1	2
<i>Hire (amount)</i>			-	1	3

B = Gradual Build-up Work Force; C = Constant Work Force

5.5 Reaching Targeted Groups

The objectives changed during the SDP, but the central objective did not, namely: reaching the able bodied poor that were willing to work. This group, as was stated in the programme objective, would be targeted with the hiring of local labour. The Mhlaletse Community was asked to assist in this aim to create job opportunities.

⁷⁰ Data collected from task-sheets and pay-slips.

5.5.1 Selection of Work Force

5.5.1.1 Labour

During the Period 1999H when the first selection of labour was made, a lottery system was used. Through this lottery system six persons were selected out of 383 numbers handed out. Although the gender ratio of the people attending was 80% female and 20% male, the women believed that the men would be offered more job opportunities. During the draw four men and two women were selected, this was a very big surprise. As a result of it the community suggested splitting the available opportunities equally between men and women. This proposal resulted in the agreement that whenever the contractor needed labour, the selection would be made out of two groups, namely female and male. This solution was used throughout the different periods of the SDP.

5.5.1.2 Builder

Selection of builders was based on the community knowledge of a person being a builder and if they had any references, like a house built by them. Due to earlier construction undertaking within the community, the building of the Tribal Hall⁷¹, the community wanted to use their own builders from within their community.

A pool of builders was generated from builders who came forward and applied at the selection dates. From this pool a selection was made through a similar lottery system as used with the selection of labour. This system worked well. During the last two phases only a limited number of builders came forward. After investigation it became clear that, in the builders' opinion, LITE was paying enough per tasks for the work required per task. This became more obvious later in the SDP because in the last period 2002H only four builders came forward for the positions offered.

5.5.1.3 Team Leader

During the first period the organisation only had limited criteria to select team leaders. The committee active at the time selected the team leaders for the organisation on the following criteria: they had to speak and understand the English language. They were given a short exam, which would indicate if they could understand English and had some calculating skills.

⁷¹ The Tribal Hall was built by builders from outside the Mhlaletse community; this resulted in tension and an unwillingness to accept the hall as a community building.

During the training phase the organisation set up a number of selection dates. These dates were announced to the community and any one that wanted to partake in these tests was free to do so. From the people who attended a selection was made based on their results. After a interview with each selected person, ten trainees were chosen from each construction site, Monametse and Mohlaletse. The trainee would only be offered a position as team leader after graduating with a good result.

5.5.1.4 Small Sub-Contractor

The selection of small sub-contractors was not restricted in any way. There was little competition for the sub-contractor positions as the community took some time to realize that these positions were open to anyone who had the necessary tools or equipment. The Contractor Organisation supplied some of the necessary equipment, like trailers, and started to rent tractors on a regular basis for bulk transport⁷².

During the second period 2000A, the sub-contractors employed during the first period 1999H tried to obtain a monopoly over the sub-contracting process by attempting to limit the type of haulage used. This problem was resolved by contracting both methods of haulage, namely: Donkey- and Tractor-trailer.

5.6 Human Resources Development

The organisation did not have enough time to create opportunities to develop the work force. During construction it became clear that the English communication skills were not nearly as good as hoped. This resulted in delays although the teams' English did improve over time. The "Experience curve" proved to be a limiting phenomenon because when the teams began a new task the team needed to adjust. But when they reverted to the old task again it seemed that the team had forgotten what the team needed to do. Some improvement was seen upon completion of the training course⁷³, although the practical application of the theoretical knowledge was still problematic.

⁷² The trailers that were available were in poor condition and correct pricing or tasking would become a problem.

⁷³ During July 2002 a re-exam was taken from the team leaders at Mohlaletse, one team leader failed these tests. (Team leader P. Sepadi had left LITE).

The supervisors did not have any particular background or knowledge of Labour-intensive Construction Methods. The supervisor's knowledge was accumulated from the hands-on experience gained during the construction periods. No specific construction course was provided but the team leaders were given reading materials and encouraged to ask questions during meetings if they did not understand the tasking forms. The accumulation of knowledge was of vital importance to the continuation of the programme and also improved the relationships between supervisor, project manager and programme manager during the Period 2002H.

When the new programme, the Mohlaletse Youth Service Programme, was initiated the team leaders and supervisors from the SDP were transformed to support and uplift this new programme. The accumulated knowledge from the past three years was used to generate and support the new programme which has produced 59 trained youth.

5.7 Conclusion

From the discussed material and data overall two types of problems were highlight:

- Labour-Intensive Construction related problems; examples are the training, tasking and designs.
- Project Management related problems; examples are the communication, administration, preparation and planning.

The Site Management dealt with these problems on a day-to-day basis but due to lack of resources it was only partly successful. The lack of resources at head office was acutely felt by the staff and management on-site, but it must be realized that there was no real Head Office as such for the simple reason that there was not sufficient funding to pay for Head Office personnel. The most that Head Office, or Johannesburg, could do was to second Van Steenderen practically full time to the project in different ways. Particularly in the writing of the training modules, without which the project would never have development into what it eventually became: a training-construction organization with trained personnel capable of constructing quality, rural roads using labour-intensive methods; and capable of training

further personnel at the same time. Regardless of all these problems, the client and donor were satisfied with the results.

During the several periods the contracting organisation evolved into the LITE Section-21 Company. The company used the experience and knowledge gained during the SDP periods to start a new programme: the Mohlaetse Youth Service Programme. The team leaders trained during the SDP were incorporated into this new programme to support and strengthen this MYSP. In addition LITE already had supervisors who had experience with labour-intensive construction methods and were familiar with potential issues. Because LITE had previous experience within the Mohlaetse and Monamtese communities it could offer any potential client an actual construction site that could provide hands-on experience to the work force and physical examples of what could be achieved to the client.

Chapter Six Conclusions and Recommendations

6.1 Introduction

Within the boundaries of this research, the questions are answered in this chapter. After discussion of the questions further conclusions are drawn and recommendations are made.

6.2 Conclusions

6.2.1 First Research Question

I. What were the experiences of the SDP at a programme level?

- 1) Which programme items were considered to be a problem?
- 2) What has been achieved during the construction periods?

In Chapter Four an extensive evaluation was made of the Sekhukhuneland Development Programme from a programme prospective. The experience gained during the SDP supported and strengthened the new MYSP. This was achieved with broad community support and involvement. From this evaluation it can be concluded that the main problem areas were as follows:

- *Funds* have and will be a problem, partly because no document exists that clearly shows what the SDP offers potential sponsors.
- *Communication* between Head-Office and Site-Office.
- *Preparation* for the projects.
- *Definition of stakeholder* responsibilities within the programme.

Achievements of the SDP from a programme prospective are as follows:

- The creating of a Section-21 Company named LITE.
- The creating of a training programme to produce team leaders.

- The evolvement of the programme from a seed funded construction-training programme with limited resources to a properly staffed fully funded training-construction programme.
- The programme had limited resources and still managed to produce growth and progress in a short space of time.
- The programme used and implemented local resources to the full benefit and satisfaction of the stakeholders involved.

6.2.2 Second Research Question

II. What were the experiences of the SDP at a project level?

- 1) What types of problems were encountered?
- 2) What has been achieved within the specific periods?

In Chapter Five an extensive evaluation was made of the periods within the Sekhukhuneland Development Programme from a project prospective. From this evaluation it can be concluded that:

Two main types of problems were encountered:

- Labour-Intensive Construction related problems
- Project Management related problems

6.2.2.1 Labour-Intensive Construction

The resources that were used during this programme for the different projects were related to the Labour-Intensive Construction Components. These were:

- Money

The on time payment of labour and contractors has proved problematic which has been resolved by the appointment of an accountant. Part of the problem is that wage payments requires the opening of bank-accounts which is not a straight forward process given the labourers' low levels of literacy and the distance between the project location and the nearest bank.

All investments made prior to July 2002 are listed as Sunk Cost which represents money that cannot be retrieved over the designated period.

- Equipment and Tools

The purchasing of expensive equipment without a plan to manage the return on these investments⁷⁴ can result in bad investments and a loss of money. The savings that can be achieved by purchasing equipment and tools at discounted factory outlets will reduce costs considerably and improve equipment quality.

- Materials

Transportation and purchasing of local materials also proved problematic. Most problems arose due to misunderstandings and uncertainty as to what needed to be done. This could be resolved by improved communication and application of standard transportation equipment like the tipper-trailer. As with equipment, purchasing materials in bulk at discounted factory outlets would result in considerable savings. Cement accounted for considerable portion of the budget that could be reduced.

- Labour

The training course resolved some of the labour problems but the entire organisational structure needs to understand the basic principles of Labour-Intensive Construction Methods. In addition to this, special attention should be given to the connection between the task-system and productivity at supervisory and work force level.

To date Student Personnel have and probably will continue to constitute a considerable portion of the organisational structure and given their inexperience, a document needs to be written to define their roles and responsibilities on site. The students would have proved more effective if such a framework had existed.

The documents required include construction manuals, operating manuals, drawings and task descriptions.

6.2.2.2 *Project Management*

The SDP was the first programme undertaken by the contracting organisation. The following picture enfolded.

- Management Style⁷⁵

Based on the Project Essence three management styles are identified, namely:

- Improvise: Ad hoc, Process Approach, Uncertain, Vague and New.

⁷⁴ See Appendix 7 Cost Sekhukhuneland Development Programme.

⁷⁵ Groote, Slikkes and Hugenholtz, 1998.

- Project Approach: Foreseen, Planned Approach, Fairly Certain, Gradually Clearer, Needed.
- Routine: Continuous, Standard Approach, Certain, Clear and Known.

Within these definitions an increased probability is shown of the project results and the project direction. A familiar feature of routine is repeatability and an important positive feature is efficiency. When the management style is to improvise, this efficiency will probably not be reached. With flexibility the opposite seems to be the case. Flexibility is a prime feature of improvising. The Management Style on site had the following description: Ad hoc, Flexible, Uncertain, Vague and New. According to this description the management on site can be identified as an Improvised Management Style.

The next step in the process is to apply the project management areas of knowledge. The application of these areas results in a Project Approach Management Style. During the evaluation the following project management areas of knowledge were identified as problematic: Planning, Delivery, Training, Procurement, Payments, Documentation and Reporting. This supports the overall conclusion of inconclusive preparation and insufficient application of the project management methodology.

- Quality

Within the programme the quality control options were limited. The introduction of the hand-mixer and the roller did increase the quality of construction but this could only be sustained if the person responsible for quality control understood what was required. Simple controls and effective training could sustain and increase construction quality. The basic rule is that if the persons doing the work do not understand what they are doing, how can you expect a good result? The SDP implemented basic controls but did not have the capacity to ensure that these controls proved completely effective. Nevertheless the controls implemented improved the quality of construction significantly.

- Communication

The poor communication between Head Office and Site Office will also have to be resolved. Clear agreements need to be drafted to define the responsibilities of the respective offices. In summary the organisation has to adopt a Project Approach to meet the needs of the programme. A task-manual will provide the Work Force with a tool that elaborates and

explains what is needed and expected under defined circumstances. A business plan will enable the organisation to sell the programme to sponsors and improve decision making. A basic management structure needs to be implemented across the organisation.

6.2.3 Third Research Question

III. What lessons and recommendations can be derived from the SDP and how can these be used in future programmes?

Further research is necessary to facilitate a more effective application of the Labour-Intensive Philosophy and a revision of this method should be undertaken to include new management ideas. The revision should also include the use of technology especially with regard to design and for the use of equipment for specific applications. Furthermore the use of Logical Framework Analysis should be applied with every project. This method of analysis will assist with project planning and design.

To put this research within a larger context, for instance the start of a programme in different province or country some of the recommendations should be taken into account.

“A chain is no stronger than its weakest link, and life is after all a chain [W. James, 1842-1910].” To elaborate on this saying in context of this research, when the work force within the organisation does not understand what is expected of them the programme will have a very low level of success. And for that reason, simplicity and clarity need to prevail over any other item involved in the programme management structure.

The main players are The Client, The Contractor and The Community. A contract with the Client over what, how and when the programme is expected, should be linked to performance indicators. These indicators should be communicated with the delivery mechanism, the site-management and community. The community has a two-fold function, that of user and of producer. This means that the community needs to have a clear understanding of what is expected of them. This will require a proper preparation; which will take up resources like effort, time and money. A preferred tool for this is the logical framework analysis⁷⁶, when

⁷⁶ This Logical Framework Analyses is discussed by Boer, Reitjes and Vis, 2000, University of Twente.

systematically applied to programmes and projects it will minimise the effort and maximise the result.

When involving a community within the process of construction an effort will be required to allow the understanding of each other. Listening, communicating and understanding between the contractor and the community is essential. The contractor needs to understand that the communities want to be taken seriously and will want to have control over what is happening within their community. A structure has to be in place within the contractor and the community which allows for this communication. Ideal would be a representative⁷⁷ who is recognised by both parties and operates with the consensus of both actors.

A second structure will have to be in place that addresses the identifiable performance indicators to the community. For instance the task rates, the community needs to understand that these task rates need a certain quality and size in order to be acceptable to the contractor. In addition to this the community will have to have the necessary resources⁷⁸ to produce these task rates. If the community lacks this capacity a training programme should be introduced to generate this capacity. During the design stage all these items need to be incorporated into the programme design⁷⁹ but also into structural design criteria⁸⁰.

This process of coming to a mutual agreement will take up resources which the contractor also needs for other project management knowledge areas. Therefore site management team consisting of two persons is suggested. This team will have the flexibility to negotiate and prepare the programme according to the contractual agreements. During this phase the identification of the availability of local resources and requirements need to be undertaken. After these preparations have been evaluated the programme can start with the training and negotiations with the local sub-contractors about price agreements and conditions of operating within the programme. After this training stage the construction stage can get underway. With the prerequisites addressed the availability of the trained team leaders and the community agreements about the task rates and sub-contractor contracts. After the delivery phase has ended the programme can be terminated or continue under new conditions. Towards the

⁷⁷ Preferably from within the community

⁷⁸ Labour, tools, equipment, materials and capacity manage team and perform tasks to design standards.

⁷⁹ The use of a training component and what the programme produces team leaders or infrastructure.

community a clear picture should be presented of what is going to happen during and after the programme. False hope or suggestions should be avoided and it is better to have a limited programme with potential extension after the delivery period but not told, than suggesting that there is a possibility of extension after the programme and not starting this extension. When suggestions⁸¹ are made by high management personnel, these often turn into promises in the views of the community even though this was never the intention of the contractor⁸².

To close this research I would like to finish with the conclusion that the success of the programme depended largely on the two involved communities of Mohlaletse and Monametse and the students from the Universities of Twente and Witwatersrand. Although difficulties arose, the complete experience of the SDP has been overwhelming; particularly the fact that the people involved achieved so much in such uncertain circumstances.

⁸⁰ Is the design based on concrete or masonry, do the buildings use mud bricks or cement bricks, etcetera.

⁸¹ Suggestions about project duration, wage payment, task rates and number of labourers

⁸² Both construction locations, Mohlaletse and Monametse, made these assumptions repeatedly during the SDP delivery periods.

Bibliography

Books

- Aaker, David A., Kumar, V. and Day, George S.;** *Essentials of Marketing Research*; Wiley, 1999; ISBN: 0471170682
- Andrief, J., Waddock, B., Husted, B. and Sutherland Rahman, S.;** *Unfolding Stakeholder thinking*; Greenleaf Publishing, 2002; ISBN: 1-874719-52-7
- Barwell, I.;** *Transport and the Village*; World Bank, 1996; ISBN: 0-8213-3747-5
- Boon, M.;** *The African Way*; Zebra Press, 1998; ISBN: 1-86872-220-1
- Dawson, J. and Barwell, I.;** *Roads are not Enough*; Intermediate Technology, 1993; ISBN: 1-85339-191-3
- Delius, P.;** *A Lion Amongst the Cattle*; Ravan Press, 1996; ISBN: 0-86975-489-0
- Different Authors;** *Human Resource Management*; Oxford University Press, 2001; ISBN: 0-19-571853-4
- Different Authors;** *Labour Based Road Construction*; Intermediate Technology, 1998; ISBN: 1-85339-416-5
- Easterly, W.;** *The Elusive Quest for Growth*; Massachusetts Institute of Technology, 2001; ISBN: 0-262-05065-X
- Groote, G.P., Slikker, P. and Hugenholtz-Sasse, C.J.;** *Projecten Leiden*; Het Spectrum, 1998; ISBN: 90-274-4513-3
- Herman, J.L., et all,** *Evaluator's Handbook*, Sage Publications, United States of America, 1987
- Howe, J. and Richards, P.;** *Rural Roads and poverty Alleviation*; Intermediate Technology, 1984; ISBN 0-946688-052-hb
- International Labour Office;** *ILO activities in Africa: 1994-99*; International Labour Office, 1999; ISBN: 92-2-111841-X
- International Labour Office;** *Productivity Norms for Labour Based Construction*; International Labour Office, 1998
- IT Transport Ltd;** *Effects of Worn Hand tools on Worker Productivity in Labour-Based Road works*; Institute of Development Engineering, Loughborough University; ISBN: 1-900930-15-3
- Johnson, G. and Scholes, K.;** *Exploring Corporate Strategy*; FT Prentice Hall, Londen; 1999; ISBN: 0130807400
- McCutcheon, R.T. (ed);** *Interim Guidelines for Labour-Based Construction Projects*; Development Bank of Southern Africa, 1993
- McCutcheon, R.T.;** *Employment creation in public works: labour-intensive construction in Sub-Sahara Africa – the implications for South Africa*; Habitat International, 1995
- McCutcheon, R.T. and Marshall, J.;** *Labour-Intensive Construction and maintenance of Rural Roads: Guidelines for the training of Road Builders*; Midrand, Development Bank of Southern Africa, 1996; ISBN: 1-874878-59-5
- McCutcheon, R.T. and Marshall, J.;** *Institution, Organisation and Management for Large-scale, Employment-Intensive Road Construction and Maintenance Programmes*; Development Bank of Southern Africa, 1998; ISBN: 1-919692-29-0
- McCutcheon, R.T. & Taylor Parkins, F.L.M. (edited by);** *WORK 2001, Conference Proceedings*; Central Printing, University of Witwatersrand; 2001

McCutcheon, R.T. and Taylor Parkins, F.L.M.; *Employment and High Standard Infrastructure*; WORK Research Centre; 2003; ISBN: 0-620-28756-X

Newman, D.G., Lavelle, J.P. and Eschenbach, T.G.; *Essentials of Engineering Economic Analysis Second Edition*; Oxford University Press, 2002; ISBN: 0-19-515001-5

Oosthuizen, P., Köster, M. and Ray, P. de la; *Goodbye MBA*; International Thomson Publishing, 1998; ISBN: 1-86864-073-6

Project Management Institute; *A Guide to the Project Management Body of Knowledge*; Project Management Institute, 2000; ISBN: 1-880410-23-2

Ross, R.; *A Concise History of South Africa*; Cambridge University Press, 1999; ISBN: 0-521-57578-8

Stock, E.A. and Veen, J. van; *Expanding Labor-based methods for Road Works in Africa*; World Bank, 1996; 0-8213-3819-6

Verschuren, P. and Doorewaard, H.; *Het Ontwerpen van een Onderzoek, Derde Druk*; Lemma, 2000; ISBN: 90-5189-886-X

Wijnen, G., Renes, W. and Storm, P.; *Projectmatig Werken*; Het Spectrum, 2001; ISBN: 90-274-6905-9

Wheelen, T.L. and Hunger, J.D.; *Strategic Management Business Policy, Seventh Edition*; Prentice Hall, 2000; ISBN: 0-201-61543-6

World Bank; *Expanding the Measure of Wealth*; World Bank, 1997; ISBN: 0-8213-3956-7

Papers

Different Authors; *Assist Bulletin*; International Labour Office

Global Reporting Initiative; *Sustainable Reporting Guidelines*; Global Reporting Initiative, 2002

International Labour Office Assist; *Regional Papers 1995*; International Labour Office Assits, 1996

McCutcheon, R.T.; *Development: The Need for Programmes for Success in Projects*; University of the Witwatersrand, 1999

Office of the Reconstruction and Development Programme; *Key Indicators of Poverty in South Africa*; University of Cape Town, 1995

Rogerson, C.; *Road Construction and Small Enterprise Development*; Africa Insight, 2000

World Bank; *Partnership for Development*; World Bank, 2002

Readers

Al-Jiburi, Dr. S.H.; *Planning, Beheersing en Risicomanagement*; University of Twente, 2000; -

Boer, S.J. de, Mosch, L.P.J., Rietjens, S.J.H. and Vis, D. van de; *Employment-Based Civil Engineering*; University of Twente, 2000

Department of Civil Engineering; *Project Management in Development Areas (1 and 2)*; University of the Witwatersrand, 2000

Department of Civil Engineering; *Employment Creation in Construction and Maintenance (1 and 2)*; University of the Witwatersrand, 2000

Jong, L. de; *Labour Based Road Engineering (Part I, II and III)*; University of Twente, 1995

Research Reports

Beuken, E.F.H. van den and Hoeven, J.G.J van der; *Compound Project Johannesburg-Mohlaletse, South Africa*; Research Centre for Employment Creation in Construction, South Africa and University of Twente, Netherlands, 2002

Dijk, W. van; *National Programmes using Employment Intensive Construction Methods in South Africa*; Research Centre for Employment Creation in Construction, South Africa, and University of Twente, Netherlands, 2001

Groot, A. de; *Development of a training strategy for the Sekhukhuneland Development Programme*; Research Centre for Employment Creation in Construction, South Africa and University of Twente, Netherlands, 2001

Janssen, H and Trienekens, G.; *Improving the Building Process in a Rural Area*; Research Centre for Employment Creation in Construction, South Africa and University of Twente, Netherlands, 2002

Netten, C.M. and Schaijk, P.J. van; *Arbeids Intensieve Constructie Methode in de Militaire Wegenbouw*; Wijchen, 1999

Oel, C. van; *Analysis of the Training of the Mohlaletse Youth Service Programme*; Research Centre for Employment Creation in Construction, South Africa and Hanzehogeschool, Netherlands, 2002

Poodt, E.; *Research of the socio-economic profile of the unemployed in Mohlaletse and opinion of the women in this area regarding employment*; Research Centre for Employment Creation in Construction, South Africa and Hanzehogeschool, Netherlands, 2002

Pool, L.M.M.; *Development of a Programme Strategy and Project Manual*; Research Centre for Employment Creation in Construction, South Africa and University of Twente, Netherlands, 2001

Zandvoort, H.E. van; *Sekhukhuneland Development Project, Mohlaletse 1999*; University of the Witwatersrand, Department of Civil engineering, Johannesburg, 2000

Websites

CIA/ World Fact book/ 2003 websites/ Country data / South Africa

<http://www.odci.gov/publications/factbook/>

Economist/ Website/ Country Fact sheet/ South Africa

<http://www.economist.com/countries/southafrica/>

Euforic

<http://www.euforic.org/>

Fetakgomo Municipality

<http://www.fetakgomo.co.za/>

International Labour Organisation

<http://www.ilo.org/public/>

Intermediate Technology

<http://www.itdg.org/>

New Dawn Engineering

<http://www.newdawn-engineering.com/>

United Nations

<http://www.un.org/esa/>

WORK/ Research Centre for Employment Creation in Construction

<http://www.civil.wits.ac.za/fac/engineering/civil/rmc/rcindex.htm>

Appendices