

**AGRICULTURAL PUBLIC SPENDING, GROWTH AND POVERTY LINKAGE  
HYPOTHESES IN THE EASTERN CAPE PROVINCE OF SOUTH AFRICA**

**By**

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## DECLARATION

I, Simbarashe Ndhleve, hereby declare that the work contained in this thesis is my own work and that other scholars' works referred to here have been duly acknowledged. I also declare that this thesis is original and has not been submitted elsewhere for a degree.

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Ndhleve Simbarashe

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Date

## **DEDICATION**

**Dedicated to my parents, the reason for my existence;  
my two brothers Leonard & Martin and two sisters Vimbai & Nilet.**

## ABSTRACT

The adoption of the Millennium Development Goal 1 (MDG1) of reducing the rate of poverty to half of the 1990-level by 2015, the advent of democracy in South Africa, among other things, have raised concerns over the potential role of the agricultural sector. There is a belief that the sector has the capacity to successfully reduce poverty among the rural masses and contribute to addressing the problem of inequality in South Africa. In line with that thinking, South Africa's agricultural sector has attracted considerable fiscal policy interest. For instance, South Africa's statistics show that public investments in agricultural development programmes have been growing. In spite of this, rural poverty is still a major concern on an overall basis. However, this might not be the case in the Eastern Cape Province and the situation might be different for each district municipality. This study assesses the linkages between public agricultural investment, agricultural growth and poverty reduction in the Eastern Cape Province. The study also addresses the question whether Eastern Cape Province is on course to meet several regional development targets. The study also aims to provide an estimate of the amount of agricultural investment required to attain the agricultural productivity growth rate which is sufficient to meet MDG1.

The study reviewed the various theories of public spending, linkages between public investment and agricultural growth and how these components affect the incidence of poverty. The conventional wisdom that public expenditure in agriculture positively affects economic growth and this growth consequently reduces poverty was noted. The reviews also revealed that in many developing countries, the current level of public agricultural investment needs to be increased significantly for countries to meet the MDG1. This study employed the decomposition technique and growth elasticity of poverty concept to estimate the response of poverty to its key determinants.

The size of public spending, prioritization of public spending and the intensity in the use of public funds emerged as important in increasing agricultural production. The relationship between government investment in agriculture and agricultural GDP shows

that public funds were largely behind the province's success in increasing agricultural production throughout the period from 1990s to 2010. Agricultural spending went to sustainable resource management, administrative functions and then farmer support programme. Exceptional growth in the size of spending was recorded in respect to agricultural economic function, structured agricultural training, sustainable resource management and veterinary services.

Overall output from the agricultural sector fluctuated, and the sector contributed less than 5 per cent to the total provincial GDP. Correlations between growth in agricultural sector and changes in the incidence of poverty in Eastern Cape show that during the period 1995 to 2000, increases in the agricultural GDP per capita may have failed to benefit the poor as poverty increased in all the reported cases.–However, for the period between 2005 and 2010, the situation was different and it was observed that increases in agricultural GDP per capita and were associated with reduction in the incidence of poverty. Growth elasticity of poverty (GEP) estimates reveal that agricultural GDP per capita was more important in reducing poverty in 5 out of the 7 district municipalities. Non-agricultural GDP per capita was only important in two district municipalities. It emerged that most of the district municipalities are not in a position to meet any of the regional set goals. This situation is largely attributable to the province's failure to boost agricultural production which is an outcome of low and inefficient public expenditure management, inconsistent and misaligned policies and failure to fully embrace the concept of pro-poor growth. Varied provisional estimates for the required agricultural growth rate and the increase in public spending on agriculture required in order to reach MDG1 were calculated for each district municipalities. All the district municipalities of Eastern Cape will need to increase public investment in agriculture for them to achieve MDG1.

**Key words:** Agricultural growth, public agricultural expenditure, rural development, growth, poverty

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## ACRONYMS

AGDP	Agricultural Gross Domestic Product
AgriBEE	Agricultural Black Economic Empowerment
ASI	Agricultural Spending Intensity
ANC	African National Congress
ASGISA	Accelerated and Shared Growth Initiative for South Africa
AU/NEPAD	African Union/New Partnership for Africa's Development
BAU	Business as Usual
BEE	Black Economic Empowerment
CAADP	Comprehensive Africa Agriculture Development Programme
CASP	Comprehensive Agricultural Support Programme
DFID	Department for International Development
DM	District Municipality
DoA	Department of Agriculture
ECDC	Eastern Cape Development Corporation
ECSECC	Eastern Cape Socio-Economic Consultative Council
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution
GEP	Growth Elasticity of Poverty
GVA	Gross Value Added
HIPPs	High Impact Priority Projects
IFPRI	International Food Policy Research Institute
LRAD	Land Distribution for Agricultural Development
MDG	Millennium Development Goals
OECD	Organisation for Economic Co-operation and Development
PGDP	Provincial Growth and Development Plan.
R&D	Research and Development
RDP	Rural Development Programme

SADC RISDP	Southern African Development Community Regional Indicative Strategic Development Plan
SAIRR	South African Institute of Racial Relations
SLAGs	Settlement Land Acquisition Grants
UN	United Nations

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the study

The United Nations (UN) Millennium Development Project emphasised the need for a comprehensive strategy in improving agricultural development to help poor countries break out of their poverty trap and meet the Millennium Development Goal 1 (MDG1) challenge of reducing by half the proportion of the population living below the poverty line by 2015 (UNDP, 2010). This important goal was first agreed in 1990 at a summit of world leaders at the UN. Agriculture has since occupied the centre-stage in discussions on the implementation of programmes to achieve rural development and poverty reduction. This sector makes a major contribution to the economies of many developing countries through poverty reduction and improving the general welfare of the poor. In their studies, Haggblade (2007) in Uganda; Govereh, Malawo, Lungu, Jayne, Chinyama and Chilonda (2009) in Zambia; Fan, Zhang, and Zhang (2002) in China; and Akroyd and Smith (2007) in six developing countries, strongly agree that rural economic growth and wide-spread poverty reduction require increased production in agriculture. Explanations have been put forward by Machethe (2004), Fan *et al.* (2002), Organisation for Economic Co-operation and Development (2006), and Van Zyl (2009), to provide evidence that buttress this important linkage between agriculture, income growth and poverty. Van Zyl (2009) goes a step further by quantifying both the direct and indirect impacts of agricultural sector growth on economic development.

Agriculture, according to the Organisation for Economic Co-operation and Development (OECD) (2006), connects economic growth and the rural poor through their participation in either input or output market or both. The sector is particularly important as it benefits the poor through increased incomes when they sell their produce; stabilisation of food prices; improving employment for poor rural people; increasing demand for consumer

goods and services, and stimulating growth in the nonfarm economy. This is historically true in developed countries but increasingly so in developing countries (OECD, 2006).

In China, large increases in output from agriculture yielded important results. According to Fan *et al.* (2002), it was agricultural growth that enabled significant reduction in poverty for China during the period 1978 to 1997. China saw an unprecedented reduction in the number of the poor which fell from 260 million in 1978 to 50 million in 1997 (Fan *et al.* 2002). China is one of the few countries in the developing world that have made progress in reducing the total number of poor people during the past two decades and this was mainly due to growth in the agricultural sector (World Bank, 2005). Fan *et al.* (2002) attributed China's success in reducing poverty to efficient policy reforms and increased public investments in agriculture. The International Poverty Reduction Centre in China (IPRCC) (2010) wrote that smallholder agriculture drove China's agricultural revolution, which provided the basis for China's dramatic economic transformation and poverty reduction in the last 30 years.

The importance of the agricultural sector goes well beyond its direct impact on rural incomes as it has both upstream or backward linkages on the supply side and downstream or forward linkages on the manufacturing side (Hirschman, 1958 and 1977; Machethe, 2002 and Van Zyl, 2009). Inter-industry linkages as put forward by Hirschman (1958) have been studied since the late 1950's with the purpose of identifying the sectors that are central to economic development (Drejer, 2003). As one of the first to recognize the inter-industry linkages, Hirschman (1958), coined the phrase "Hirschman linkage". According to Hirschman (1958), a Hirschman linkage is at play when on-going activities induce agents to take up new activities either as suppliers of inputs or as markets for output. Backward linkages effects are related to derived demand, while forward linkages effects are related to output utilisation. The agricultural sector has a high degree of interrelatedness with the other sectors that emerges as a consequence of both the demand and supply effects of inputs and outputs. Recently, in South Africa, inter-industry relations have gained new attention as Van Zyl (2009) confirms that the agricultural

sector have several important linkages with other sectors which are crucial for poverty reduction.

Growth in agriculture does not only benefit the rural folks, increased output in the rural areas have a direct bearing on the urban sector through its food price decreasing effect, creation of employment and several other benefits. Summing both the direct and indirect effects of agricultural growth, Van Zyl (2009) revealed that the relative contribution of agriculture to South Africa's Gross Domestic Product (GDP) is only about 4 per cent to 5 per cent. Considering the associated multiplier effects, this sector contributes much larger share than it directly provides. Van Zyl (2009) mentioned that in 1994, agricultural exports resulted in foreign exchange to the tune of R7 240 million. During that same year, the manufacturing industry contributed about 37% to the GDP, of which 25 per cent from agro-processing. This thread of literature reinforces the importance of inter-industrial linkages in South Africa. This indirect effect on the other sectors reduces poverty by creating employment in those sectors. This therefore emphasize the development of agriculture as the main option for promoting pro-poor growth (Fan *et al.*, 2002 and Govereh *et al.*, 2009). In many rural economies agriculture has a direct bearing on income growth, poverty reduction and overall economic growth. The sector's real contribution is far more substantial and crucial for sustained wealth creation, poverty alleviation, and welfare generation.

Past studies strongly confirm the agriculture sector's role in poverty reduction (Perret, 2002; Machethe, 2004; World Bank, 2006; Edmeades, 2007 and Cervantes-Godoy and Dewbre, 2010) . Its presumed link with food prices stresses the growing evidence today of the crucial role of agriculture. In an era where food prices are sky-rocketing, agricultural production growth is vital for price stabilisation as well and this is of economy-wide significance. The development of agriculture remains crucial for poverty reduction and it will remain the main option for promoting pro-poor growth.

Following the above discussion, it is logical to assume that economic growth in the former homelands of South Africa, where more than 70 per cent of the population is

regarded as poor, will definitely require significant improvements in agricultural production. The former homelands are areas that were allocated to the “Bantustans<sup>1</sup>” following the 1913 Native Land Act and the Native Trust and Land Act of 1936. Agriculture in these areas is an outcome of the legacy of Apartheid (Rwelamira, 2008). In these areas, African communities were deprived of the means of subsistence and set aside as labour reserves from which to draw cheap labour and this made Africans totally dependent on transfer income and wage earnings (Rwelamira, 2008). Owing to this, many find it hard to practise any form of subsistence farming. The majority of households in the former homelands are surviving on social grants and income from non-farm activities. Rural households in the former homelands still face challenges although these are much different from those faced during the Apartheid era.

Perpetual poverty and insignificant changes in the structure of agriculture in the former homelands even after institutional and policy reforms addressing Apartheid rule triggered studies analysing the linkages between public spending in agriculture and agricultural growth and consequent reductions in poverty. Significant work on this matter has been done by Perret (2002); Chakwizira, Mashiri and Nhemachena (2008) and Department of Social Development (2009). According to Perret (2002), about 72 per cent of the population of South Africa is poor, with the bulk of these persons residing in the Eastern Cape. The province is one of the poorest along with KwaZulu Natal and Limpopo (Department of Social Development, 2009). Despite a noticeable fall in poverty in 2003 and 2006, the figure for poverty remains sticky downward during the period 2007 to 2009, generally averaging 3.6 million.

Table 1.1 below shows the size of poverty according to district for the Eastern Cape Province. There is a noticeable decrease in poverty levels across all the district municipalities but the poverty figures remain high. This decrease is highly noticeable for the years 2005 – 2009, a lesser decrease was however noticed for the years 1995 – 2000. With such disturbing trends, the Province’s ability to meet the Millennium Development

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<sup>1</sup>Black African homeland or simply homeland set aside for black inhabitants of South Africa of the policy of Apartheid

Goal (MDG) of halving poverty by 2015 is in serious doubt as progress towards the Millennium Development Goals seems slowest in this province (Alemu, 2010). The most disappointing aspect of post-apartheid economic performance is the emergence and persistence of extreme levels of poverty. Despite adopting development strategies oriented towards improving the lives of the historically disadvantaged majority black population, poverty remains dominant in rural Eastern Cape. In this same province, agriculture is the main livelihood strategy practised and affecting more than 65 per cent of the population in all the rural districts.

**Table 1.1: The incidence of poverty across Eastern Cape**

District municipality	Year			
	1995 (%)	2000 (%)	2005 (%)	2009 (%)
Amatole district	53.1	63.0	64.98	55.1
Chris Hani district municipality	62.0	75.8	82.0	74.3
Alfred Nzo district municipality	67.4	81.9	88.9	72.7
Cacadu District Municipality	62.0	75.8	82.0	74.3
Nelson Mandela Metropolitan	62.0	75.8	82.0	74.3
O. R. Tambo District Municipality	65.5	74.1	76.1	63.3
UKhahlamba District	63.8	76.4	79.0	62.8

Source: Eastern Cape's Socio-Economic Consultative Council (ECSECC), (2010).

At the centre of Eastern Cape's government efforts in reducing poverty has been the effort to improve agricultural production. Several studies find an important association between public agricultural expenditure, agricultural growth and poverty reduction (Govereh *et al.*, 2009 and Hall and Aliber, 2010). Public agricultural expenditure is expected to increase agricultural production and this increase can lead to a considerable decrease in poverty. Significant increases in public agricultural expenditure have been noted in Eastern Cape since 1994. The province saw a public agricultural investment increase of approximately more than 100 per cent to date. The impact of public

agricultural expenditure levels and composition on sector growth and welfare outcomes remain inadequately understood in South Africa. Despite revelations to policies supporting agriculture, it is still not unusual to find that those who make decisions about financial allocation to agriculture at the national level think of agriculture in general terms only as a source of livelihood for the rural people but not grasping the importance of investing in this sector as a mechanism for stimulating or maintaining economic growth. The clear demonstration that agriculture is the asset that people value most highly does not always translate into budgetary allocations. In the light of this background, it is the researcher's intention to present evidence that the agricultural sector contributes to and is a major determinant of economic growth and could reduce poverty.

## **1.2 Problem statement**

Efforts to tackle poverty in South Africa after 1994 have attracted much policy interest but many argue that reform policies directed at poverty reduction have brought little change as the picture of rural impoverishment and pauperization persists. Both policy reforms and public investment programmes implemented since 1994 have not had the desired impact on poverty but many still argue that these two components have a direct bearing on poverty and inequality in Eastern Cape Province and South Africa as a nation.

Government expenditure is recognised as the most important determinant of rural transformation and economic growth (Fan *et al.*, 2002). Ahead of all the poverty reducing programmes, the South African government introduced a welfare redistribution scheme in the form of social assistance. Social assistance takes the form of public spending on social grants to people who cannot work for an income. This was meant to solve poverty and inequality problems by taxing the rich and transferring income directly to the poor. However, experiences from many developing countries show that welfare redistribution has not successfully solved poverty and inequality problems (Fan *et. al*, 2002). Van Zyl (2010) noted that government's responsibilities such as poverty reduction through increased public expenditure on welfare and income transfer creates work disincentives

thus retarding economic growth. Work disincentives affect agricultural labour supply so that the overall outcome is reduced output from the agricultural sector.

To address the problem of poverty and inequality, the South African government also adopted several programmes like land reform, Black Economic Empowerment (BEE), Growth Employment and Redistribution (GEAR), Provincial Growth and Development Plan (PGDP) and Accelerated and Shared Growth Initiative for South Africa (ASIGISA), among others (Manona, 2008). These programmes promote increased public expenditure on rural economic growth, increased agriculture-specific investment such as agricultural Research and Development (R&D), education and infrastructural development in rural areas. Besides national programmes, efforts to tackle poverty and inequality are also being implemented at provincial level. The Eastern Cape Province adopted the Provincial Poverty Eradication Strategy in 2007 with an integrated, sustainable and targeted approach to poverty eradication (Department of Social Development, 2009).

Poverty may be more effectively reduced by promoting the income-generation capacity of the poor (Perret, Anseeuw and Mathebula, 2005). Several attempts were made by the government to increase public-sector investment, especially in the realm of agriculture and rural development. According to the Presidency (2004), the proportion of public expenditure to GDP rose from a figure less than 4 per cent in 1994 to 6 per cent of GDP in 2004. Accelerated and Shared Growth Initiative for South Africa (ASGISA) policy document states that public investment was planned to be between 10 per cent and 15 per cent of GDP per year (The Presidency, 2004). This was unprecedented in South African history. The period following 2004 saw some important elements of recapitalization which has important practical implications on poverty reduction. Several projects were distributed to provincial and local government through the municipal and provincial infrastructure grant programmes, while provinces and most municipalities have further funds collected from their own revenue sources for capital expenditure (The Presidency, 2004). Positive agricultural growth and poverty reduction effects are associated with increased public agricultural expenditures and this has been the case in several Asian countries (Govereh *et al.*, 2009).



The role of public investment in economic development was also emphasised by the Comprehensive Africa Agriculture Development Programme (CAADP) under the Africa Union's New Partnership for Africa's Development (AU/NePAD)'s which recognised the importance of increased agricultural spending on sustained agricultural growth and poverty reduction (African Union, 2003). The African Heads of State in Maputo (10-12 July 2003) agreed to implement the CAADP with the main goal of enhancing agriculture-led economic growth. In partnerships with AU/NEPAD, South Africa is mandated to achieve at least a 6% agricultural growth rate per annum by investing at least 10 per cent of national budgets in agriculture under the Maputo Declaration by 2008 (African Union, 2003). This has important implications for rural economic development and the effect of increased public investment.

The argument presented in the above section strongly argues that increased agricultural spending is complemented by increase in agricultural production and consequential reduction in poverty. Efforts to develop agriculture through increased spending in Eastern Cape were not significantly complemented by reduction in poverty (Perret, 2002; Netshitenzhe and Chikane, 2003; and Hall and Aliber, 2010). According to Perret (2002), even after a series of policy shifts designed to spur development in rural areas, poverty persists in the former homelands. Following an analysis of trends in agricultural public spending and economic growth in Eastern Cape and Limpopo, Hall and Aliber (2010) concluded that it is not clear whether public spending by the South African government is effectively impacting on agricultural productivity and poverty because many are remaining poor in the face of increasing public spending in the sector. In an earlier study, Netshitenzhe and Chikane (2003) raised similar arguments by questioning the impact of public spending on infrastructure on economic development in rural South Africa. They argued that the observed decreases in the incidence of poverty recorded in South Africa was largely due to increases in social grants rather than increased public investment in agriculture as expected. These findings from South Africa seem to have greater inconsistencies with theory. The former homelands are receiving substantial public funds

and other forms of government assistance but agriculture continued to be an uneven producer in these areas where more than half the population is supposed to be relying on the sector agriculture for their livelihood. The last 16 years have witnessed steep increase in the availability of public resources for agriculture and rural development, variable increase in agricultural production and unimpressive trend in the level of poverty.

For South Africa to reduce poverty, priority should be given to public investments options that empower poor people. Efforts to tackle poverty should be built into strategies anchoring the scaling-up of public investments, capacity-building, resource mobilisation, and development assistance that benefit the poor (Anderson, de Renzio and Levy, 2006). The uninviting economic picture of growing poverty and inequality in rural South Africa in the face of increased public spending directly reveal gross misallocation of resources especially in the agricultural sector.

The South African government has been spending on agriculture but poverty persists. Past research has made a clear link between agricultural growth and poverty reduction elsewhere and there is substantial body of evidence to support the relationship. If agricultural spending in South Africa is not leading to poverty reduction it might mean that there are things obstructing that link. Alemu (2010) also noted that there are conflicting results on whether fewer South Africans are poorer now than they were some years back. Inefficiencies and disparities in the impact of public agricultural expenditure across may negatively affect this important linkage between public agricultural expenditure, agricultural growth and poverty reduction. From the above point of view of public policy to ameliorate the situation must draw from an understanding of the precise relationships which will show how much poverty falls or rises when public expenditure changes, hence the need to examine poverty elasticities of agricultural growth and agricultural growth elasticities of public spending. It is therefore important to undertake an ex-post analysis, pulling the basic expenditure data together for the most recent fifteen years, providing an assessment of expenditure levels, trends and composition, as well as comparing these with the required agricultural growth plans and priorities and identifying inefficiencies.

### **1.3 Objectives**

This study presents an analysis of public investment flows, agricultural growth, rural income levels and the level of poverty in Eastern Cape Province of South Africa. It intends to examine the nature and dimensions of poverty in the province and how the two relates to public spending and the state of agriculture since the dawn of democracy. More specifically, this study aims:

- (a) To analyse and establish the influence of public investment in agricultural production in Eastern Cape,
- (b) To analyse the empirical relationship between agricultural growth and poverty in Eastern Cape Province
- (c) To determine whether the impact of agricultural production on poverty is compatible with the regional goals and set targets,
- (d) To estimate the agricultural investment growth rate required to reach MDG 1 of reducing by half the level of 1990 poverty in Eastern Cape.

### **1.4 Justification of the study**

This study is based on the premise that agricultural spending across Eastern Cape's district municipalities has the largest impact on agricultural production growth. This growth in agricultural production is very much needed to reduce poverty and promote rural economic growth in the former homelands. Fan *et al.* (2002) argue that the rationale behind most literature on public investment is to achieve growth in the modern economy by correcting market failures. Less attention is paid to the role of public investment in pursuing rural income equality or poverty alleviation objectives. This study links public investment to poverty and inequality using data from Eastern Cape, one of South Africa's poorest provinces. Since governments frequently face budget constraints, Fan *et al.* (2002) argue that enquiries of this nature help them map out whether the government should spend more on infrastructure, education, or agricultural R&D, and in which

region. The findings of the analysis will rationalise government spending by providing lessons regarding the level and composition of public spending that can be useful for economic development. There is more evidence to support the notion that increased public expenditure is productive, in the sense that it complements private capital and other factors of production. But, there is a clear need for caution with the choice of the optimal investment level and allocation across sectors (Anderson *et al.*, 2006). The case for an increase in public investment needs to be assessed with specific reference to South Africa according to the structure of its economy and its unique trends in public investment. Countries differ, and there is no presumption about South Africa's relative position vis-a-vis other countries and entities.

Assessing what role public spending has played since 1994 may indeed be enlightening for the development of rural areas. This will generate appropriate interventions to engender both agricultural and rural development in present-day South Africa (Chakwizira *et al.*, 2008). Insufficient clarity on the optimum composition and returns to various components of public expenditure exist in South Africa. It is every government's desire to have spending that produces the highest impact on GDP growth. Populists advocate for increase in public spending, but simply increasing the level of spending is unsustainable and will not grow incomes and reduce poverty. The World Bank developed a macroeconomic model that has applications in the sphere of public investment, growth and poverty reduction for South Africa (Jerome, 2004). This model evolved from the World Bank's 1991 study of the impact of post-Apartheid policies in South Africa. Using time series data, the World Bank simulated the macroeconomic impact of public investment on GDP. More gains can be achieved by using similar macro-economic models to analyze and address misallocation of resources across subsectors without necessarily increasing total government spending (Govereh *et al.*, 2009).

## **1.5 Hypotheses**

There are several views regarding how public expenditure affects rural growth. The "Green revolution" in Asian countries provides enough evidence to confirm that

increased public expenditure on small scale agriculture reduces poverty. Much of the literature reviewed from both developing and developed countries showed that increased public expenditure on agriculture reduces rural poverty. Notwithstanding this, there are cases where pro-poor policies and public spending have failed to reduce the number of the poor. Anderson *et al.* (2006) pointed out that increased spending on every type of expenditure may crowd out important private capital thus negatively impacting on agricultural growth. With the above background in mind, the following two hypotheses were formulated as:

- Increased agricultural spending results in increased agricultural production;
- Agricultural growth results in poverty reduction.

## **1.6 Study Outline**

The thesis is organized as follows: The literature review is presented in two chapters. Chapter two reviews a set of policies used to promote rural economic development in South Africa with special attention to those policies that directly and indirectly affect the growth of agriculture and the reduction of poverty. Chapter three reviews the linkages and concepts surrounding public investment, agricultural growth and the incidence of poverty. The approach adopted in Chapter three involves the review of both theoretical and empirical studies to better inform the debate on the linkages between the three variables. In this same chapter, several past methodologies and techniques related to this study are reviewed. Chapter four discusses the study area noting the trends in agricultural GDP and level of poverty since 1994. Chapter five presents the model employed in the study. Chapters six and seven provide the results of the analyses. Chapter six provides findings on the impact of public investment in agriculture on growth in agricultural production. This same chapter provides information on the trends in agricultural growth and the incidence of poverty since 1994. Lastly, Chapter seven evaluates the province's progress towards set regional goals, estimating the required agricultural growth rate and expected rate of increase in public spending required to meet MDG1. Several outcomes

emerged from these findings and they were discussed under the respective chapters. Chapter eight concludes and offers recommendations.

## **CHAPTER TWO**

### **A REVIEW OF REGIONAL AND NATIONAL POLICIES RELEVANT TO AGRICULTURAL DEVELOPMENT**

#### **2.1 Introduction**

Since the development of agriculture and the associated linkages with poverty reduction is the subject matter of this thesis, it will be useful if some light is thrown at the outset on types of policies that have featured in the agriculture and rural development programme following the attainment of independence in South Africa. In that regard, this chapter provides a detailed review of the set of policies adopted by the South Africa government to address the problems of poverty and inequality. However, the review will concurrently examine how these policies affected poverty in South Africa. Most of the discussed policies have contributed to the establishment of the current system of South African agriculture from a system that endowed the white farmers with substantial privileges and subsidies which gave them an undue advantage over the black farmers.

#### **2.2 State of Agriculture and rural development**

The agricultural sector in South Africa has been dualistic, comprising a large-scale commercial farming sub-sector and a smallholder communal sub-sector. At independence in 1994, South Africa inherited an agricultural base characterized by a high degree of government intervention that tended to exhibit a bias towards large scale white commercial farmers and neglect of small scale and communal agricultural development. According to Mukumbi (2008), the large-scale commercial farming sub-sector in South Africa is made up of sixty thousand producers who occupy 87 per cent of the total agricultural land. The small-scale, previously disadvantaged farming sub-sector is made up of nearly three million households that occupy the remaining 13 per cent of the agricultural land (Mukumbi, 2008). The development of agriculture in South Africa, both during Apartheid and post-Apartheid era, is an outcome of concerted government effort

with very little input by the private sector. Thus, the current nature of the agricultural sector cannot be separated from the political heritage of South Africa.

The large-scale commercial farmers are well financed and have many years of experience in production and marketing of agricultural produce. Small scale farmers face many challenges and many even fail to produce enough to feed themselves. The commercial farmers in South Africa, as opposed to smallholder farmers, are reported to have large endowments in terms of productive resources, a long history of financial success, high turnover and economic viability, good socio-economic standing and practise capital intensive agricultural production (Van Schalkwyk, Groenewald and Jooste, 2003).

The communal farmers, on the other hand, constitute the bulk of the agricultural producers in South Africa yet lack farming resources and struggle to produce viably. They lack in land; farming experience; marketing platforms and finance. Generally, their production and management abilities are not up to standard. Due to these and several other reasons, their scope of operation is confined to unproductive subsistence farming and this has been the case since 1994. From 1994 until now, the state of communal and small scale agriculture in the Eastern Cape Province remains varied. In some cases there is improved agricultural infrastructure that shows government's renewed efforts to sustain rural agriculture. In some areas, there is little to show that there have been any changes in the state of rural agriculture in comparison to that of the Apartheid era. This indicates irregularities in the government's effort to reverse past injustices inflicted by the apartheid regime policies across the province.

### **2.3 Rural Development Policies and the Development of South African Agriculture**

South African agriculture was born out of a series of policy manipulations dating back as early as 1900. These policies can be categorized into two major categories by time, being those developed prior to 1994 and those of after 1994. Vink & Kirsten (2003), argue that different contexts in the formulation and implementation of policies in support of agriculture during these two periods have led to the dual nature of South African



agriculture. Hendricks and Fraser (2003) described South African agriculture as being divided into two categories, the commercial farming sector and the communal areas of the former reserves or Bantustans of Ciskei and Transkei. The latter being the areas allocated to the “Bantustans” or homelands following the 1913 Native Land Act and the Native Trust and Land Act (Bembridge, 1987). Agriculture in these areas is an outcome of the Apartheid legacy when African communities were deprived of the means of subsistence and set aside as cheap labour reserves and this made Africans totally dependent on transfer income and wage earnings (Rwelamira, 2008).

According to Vink and Kirsten (2003), an important dimension of the new context for agricultural policy in South Africa is the special focus on the development of the former homelands and the improvement of the lives of the poor through the promotion of agriculture in communal areas. The 1995 White Paper on Agriculture and the 1998 Discussion Document on Agricultural Policy in South Africa spelled out the new agricultural policy. The paper recognizes the central role of agriculture in building a strong economy and reducing inequalities by increasing incomes and employment opportunities for the poor, while nurturing natural resources (Van Schalkwyk *et al.*, 2003). As a way of restructuring agriculture, the New Agricultural policy adopted three major goals: to build an efficient and internationally competitive agricultural sector, to support the emergence of a more diverse structure of production with a large increase in the numbers of successful smallholder farming enterprises, and to conserve agricultural natural resources and establish policies and institutions for sustainable resource use. Unlike previous Apartheid policies, the current policy aims to redress the past injustices inflicted by the apartheid policies that favoured large-scale commercial farmers and deprived the communal areas of resources (both fertile land and labour) necessary for agricultural development. This new development in policy in 1994 therefore saw the provision of the New Constitution that relates to agricultural development and the development of previously marginalised communal areas. This new policy dimension plays an important role in describing the current nature of agriculture in South Africa. The employed policies range from the Reconstruction and Development Programme

(RDP), GEAR and ASIGISA and more recently PGDP. This section gives an account of these various policies and their impact on agricultural growth in South Africa.

### **2.3.1 South African Government Constitution**

The Constitution (Act 108, 1996) of South Africa, in its foundation demonstrated in all regards the will to address past injustices in a way that reduces both poverty and the overarching problem of inequality in South Africa (Momoniat, 1998). Democracy triggered several policies and institutional reforms with a unified goal of restructuring agriculture in communal areas. When the new government led by the African National Congress (ANC) came to power in 1994, it made no secret of its intention to alter the distribution of productive assets in favour of the poor with large bias towards access to land for agricultural purposes. During the post-Apartheid era, the South African government adopted a constitution which lay the basis for the approach to the battle against poverty (South Africa Constitution (Act 108, 1996)). To reverse the injustices associated with the country's history, the constitution accords various rights to the general populace which include the right to equality, human dignity, life, political rights, freedom of trade, a healthy environment, adequate housing, and a right to property. Of most importance, the constitution aimed to address skewed land ownership patterns as a way of improving the lives of the marginalized communities. The constitution lay the basis for a land reform program stating in section 25 (5) that,

*“The state must take reasonable legislative and other measures, within its resources, to foster conditions which enable citizens to gain access to land on an equitable basis.”*

The constitutional provisions embedded in the Bill of Rights reflect a multidimensional approach to dealing with the country's challenge of transformation. This approach to poverty reduction reflect Chamber's (1983) notion of five clusters of poverty in South Africa. Therefore, the constitution was the first document to foster the agenda of agricultural development thus arresting the frontiers of poverty across all South African communities.

This same constitution addressed past problems on budget allocation across South Africa. The budget of the Apartheid government focused spending on white residents, with very little expenditure directed towards education, health, housing and other basic needs of black residents (Momoniat, 1998). Poverty and unemployment were characteristic of life for most black South Africans. The adopted constitution established three spheres of government namely; national, provincial and local government. The National sphere's responsibilities are policy development, overall coordination of services in the country, and equitable distribution of resources, particularly financial resources. In practice this means that the national government determines the policy, and provincial governments are responsible for implementation. Provincial governments are responsible for the implementation of the most important social services, including school education, health (including quaternary, academic and regional hospitals, as well as primary health care), welfare grants and services, housing and provincial roads. The provincial governments' roles included monitoring and evaluating the implementation of national policy. As a plan for development, the adaptation of the national policies is based on the needs of the province. The third sphere of government, the Local Government is responsible for providing basic services, such as water, sanitation and electricity and is the level of implementation of policy (Hall & Roberts, 2006; Manona, 2005). This was a role that entailed giving priority to the basic needs and promoting social and economic development. The local government's role, according to Momoniat (1998), was of creating employment and economic growth in their areas and reducing poverty amongst their local residents. This role aspired to be democratic and participatory, to be oriented to redress and accountability, and to holism and integration (Momoniat, 1998). These three spheres of government work together as a cooperative government.

This development agenda has an important bearing on the budgeting process by local municipalities and thus has important implications for the pace of rural development in South Africa. According to Momoniat (1998), most provinces struggled with administrative issues, budgeting problems because of lack of expertise and information on spending prior to 1994. Summarising their problems, Manona (2005) and Cousins and Kepe (2004), noted that their problems largely emanated from rapid institutional change,

lack of experience with democracy, and general lack of confidence and experience and skills. Municipalities in the poverty-stricken former “homelands” had a small or non-existent revenue base, resulting in unfunded mandates alongside disputes over roles to play with the traditional leaders (Manona, 2005; Manor, 2000). In order to enable the local government to achieve the post-apartheid objectives of restitution, redevelopment, and growth at a local level, the government introduced new tools. These include the Land Development Objectives (LDOs) and Integrated Development Plans (IDPs). These new tools were used in providing support services for development of land reform beneficiaries. The action plan was based on the needs of the province. The provided services such as irrigation facilities, credit facilities and play a crucial role in the implementation of policies promoting social and economic development.

### **2.3.2 Reconstruction and Development Programme (RDP)**

To embrace its first Constitution, the South Africa’s transition to democracy was ushered by the RDP. In 1994, South Africa’s New Democratic Government of National Unity adopted the Reconstruction and Development Programme (RDP) as its key economic policy position. The central theme of the RDP was the need to reduce poverty afflicting the country’s 40 million people, by redressing inequalities and injustices of the past (Manona, 2005). The RDP aims to set the economy on an employment-creating path through government investment in poor communities. Secondly, the RDP gives attention to land and asset redistribution to poor rural households as a way of empowering the previously disadvantaged households. It advocated for the removal of apartheid constraints on black people’s access to land.

The National Institute for Economic Policy Model was employed **to** simulate the requirements of the RDP in terms of employment generation, changing patterns of income distribution, balance of payments sustainability and the government deficit. According to the projections from this macroeconomic model, for the RDP to succeed given the rate of population growth, living standards of the top 20 per cent of households need to remain constant or improve marginally over the next four to five years after

which it can improve in line with the growth rate. Fiscal expansion must be targeted at activities which will increase the stock of physical infrastructure, skill formation and physical capital formation. Furthermore, the reform of the tariff system must be gradual enough to encourage enterprises to adjust to international competition and enhance their export capabilities. Over the medium term, it will be necessary to adopt export oriented incentives for strategic industries in order to partly offset the anti-export bias as a result of tariff reduction and rising imports.

Furthermore, the RDP emphasizes the need for state intervention in supporting poor rural households in all the aspects of production (May, 2010). It was set to increase productivity of resources owned by the poor through promoting less capital-intensive growth that creates employment. The RDP was applauded for recognizing the importance of pro-poor. This programme was set to reduce poverty as the adopted policies seem to channel a progressively proportionate share of resources to the poor. Most remarkably, it promotes poverty reduction by promoting rural agricultural growth, improving access to land and redistribution of both residential and productive land. The programme was meant to benefit the poor. It targets those in need of land but unable to pay for it and offers restitution to those who lost land because of apartheid laws.

Besides meeting some notable strides in achieving selected goals, the RDP was marred with its own problems. The RDP faced problems stemming from its bureaucratic nature and the increasing pressure to spell out more explicitly its macroeconomic policy. Furthermore, as noted by Knight (2001), the number of families settled on land under the RDP differed from the Programme's goal to a greater extent. The Programme had aimed to resettle families on 300,000 square kilometers of land but only just over 1 per cent of this goal was achieved. The RDP brought with it huge job losses in the agricultural sector. As mentioned by Van Schalkwyk *et al.*, (2003), between 1994 and 1998 the number of workers on commercial farms declined from 1.4 million to just 637,000. No records were available to confirm that these individuals joined the sector as newly resettled farmers. This clearly shows the number of people employed in the agricultural sector actually declined substantially under the RDP.

### **2.3.3 Growth, Employment and Reconstruction Programme (GEAR)**

To amend the problems of RDP, 1996, the South African government embarked on a macroeconomic policy named the Growth, Employment and Reconstruction Programme (GEAR) that aimed at providing a coherent framework for addressing issues that bear heavily on rural poverty. This, according to Manona (2005), constituted the third key government policy document providing an approach to addressing poverty. GEAR was positioned as the macroeconomic policy framework for the RDP based on a specific set of desired economic outcomes. Natress (1996) presented an intensive review of GEAR's macro-economic model, the economic theory and assumptions on which the policy was based. According to Natress (1996), the intellectual roots of the GEAR's macroeconomic model was the neoclassical economic growth theory, however, its vision moves beyond this by including a Keynesian concern for investor confidence, and through positing an active and redistributive role for the state. The model sees the world economy as an integrated capitalist system where market forces reign supreme, punishing countries which do not obey the unwritten code of 'sound' fiscal, monetary and labour-market policies. The policy documents stress the need for privatization in order to reduce debt and to signal government's clear commitment to market-oriented policies and recognize the role in promoting redistribution. The GEAR policy regard job creation through greater labour-market flexibility as the most sustainable and effective means of lowering inequality. The economic logic of GEAR as presented by Natrass (1996) was to introduce a set of orthodox, outward-oriented, investor-friendly stabilization and adjustment policies; make the labour market more flexible, cut government-consumption spending, and boost investment by the government and the parastatals. This was presumed as important in sending positive signals to the market and thus will boost investor confidence. Private investment will rise as business confidence increases, and as exports rise. Once investment occurs, a rapid expansion in output and employment will soon follow. As more currently unemployed people obtain jobs (even at relatively low wages), the economy-wide income distribution will narrow. We thus get the result that promoting the interests of capital (in the sense of creating an 'investor friendly'

environment) is necessary for growth, and ultimately also good for the poor and unemployed - and hence will promote equity in the longer run.

The key outcomes of the policy as originally outlined were economic growth of 6 per cent by the year 2000, inflation of less than 10 per cent, employment growth above the increase in economically active population, deficit on the current account and the balance of payments between 2 and 3 per cent, a ratio of gross domestic savings to GDP of 21.5 per cent by the year 2000, improvement in income distribution, relaxation of exchange controls and reduction of the budget deficit to below 4 percent of GDP (Knight, 2001). At its core, the Programme envisaged the achievement of a sustained real economic growth rate target (revised annually) as well as job creation. These targets were to be achieved by following a set of policy and institutional reforms. The framework employed some fiscal measures such as redistribution of spending, lowering the budget deficit, privatization of state assets and increased infrastructure spending. Labour market reforms and international trade reforms aimed at creating more flexible labour markets and lowering and simplifying the tariff structure, respectively, were also put in place.

In retrospect, GEAR has failed to deliver the promised economic and job growth or significant redistribution of income and socio-economic opportunities in favour of the poor. Sustainable employment growth and low unemployment as a macroeconomic policy fundamental was not achieved. South Africa achieved its first positive (albeit modest) economic growth rates, averaging 2.8 per cent per annum, between 1995 and 2002. Yet, over this period high rates of inequality did not appear to have reduced and official unemployment actually rose to over 30 per cent. Knight (2001), wrote that GEAR, with its focus on stringent monetary and fiscal targets, conflicts with the goal of the RDP. Unlike RDP, GEAR did not mainly focus on growth based on job creation, meeting people's needs, poverty reduction and a more equitable distribution of wealth. Critics of GEAR have spelt out that the programme was not intrinsically incompatible with the goals of the previous policy, the RDP (Aliber, 2003). GEAR, according to Aliber (2003), failed to address the problems of the poor as it places higher priority on debt reduction and reducing social spending. Aliber (2003) noted that GEAR was considered

an inappropriate approach to solving the country's most pressing economic problems such as unemployment and poverty. Seventer (2002) blamed the failure on the programme's macroeconomic framework. The model fails to give certainty and internal coherence. It fails to determine the net effects of the implemented policies.

Despite sharp criticism of the RDP and GEAR, there are signs that the government made some inroads in denting poverty in its broad sense through these two policies. After implementing both RDP and GEAR, South Africa experienced its first positive economic growth. But the rates were too low to sufficiently absorb its labour force because of insufficient expansion of capital, skills formation, and the accumulation of technology as these, according to Alemu, Roe and Smith (2005), are the key factors that determine growth in South Africa. Furthermore, low levels of private and public investment during that same period resulted in growing levels of household poverty, mainly due to exclusion from sources of livelihoods, including formal and non-formal employment and other forms of economic participation (Alemu *et al.*, 2005). During the same period, 1991-2000, exports grew at an average of 5.5 per cent per annum but a disaggregation of this data reveals that exports emanating from the primary sector (agriculture and minerals) declined by 1.5 per cent per annum. This represents a significant downfall of the agricultural sector.

#### **2.3.4 South Africa's Pro-Poor Growth Strategy**

The principal component of ASGISA follows the same concept as that of the RDP and GEAR, that of pro-poor growth. In adopting ASGISA, the government of South Africa acknowledged that sustained poverty reduction is not possible without sustainable growth and rapid economic growth. An important principle of ASGISA is that economic growth should not come about at any cost: it must be sustainable and must be shared among all South Africans. Under ASGISA, the government adopted a set of programmes whose primary goal is to halve poverty and unemployment by 2014. Both the RDP and the GEAR correctly prioritised the importance of achieving growth through redistribution and the facilitative role of the government of investing in social services and



infrastructure to eradicate poverty. This framework follows the pro-poor growth strategy but tends to emphasise stabilisation of the economy. ASGISA sets GDP growth targets of at least 4.5% between 2005 and 2009, and at least 6% between 2010 and 2014 (Tregana, 2011).

ASGISA became the vehicle for identification and addressing growth barriers (The Presidency, 2004). ASGISA contains a set of specified government priority programmes and projects focused on speeding up and promoting equitable economic growth. This was to be possible through creating an environment where firms will increase investment. The programme was aimed at solving six binding limitations in the economy namely:

- volatile currency,
- the cost, efficiency and capacity of the national logistics system,
- shortage of suitable skilled labour and the spatial distortions of Apartheid affecting low-skilled labour costs,
- barriers to entry, limits to competition and new investments,
- deficiencies in state organisation, capacity and leadership and
- the regulatory environment and the impact on small and medium enterprises.

The ideology of ASGISA programme shifted towards a state-led approach to development growth as the state indicated that it would take the lead role in investing in the economy. The government was to provide “the necessary infrastructure, such as transport, energy and communication infrastructure, for the private sector to expand and to facilitate private investment” (Rivett-Carnac, 2008).

In South Africa, the ASIGISA policy adopted the framework of a National System of Innovation for the first time (Jafta and Boshoff, 2008). The framework considers whether the ASGISA policy proposals adequately address these “binding constraints” on innovation. There is enormous amount of work has been done to build and benchmark the NSI, as well as measure the performance of the system over time. Several policy and strategy documents aimed at supporting innovative activities in order to improve the country's chances of achieving sustainable economic development have been produced.

The government based its analysis of ASGISA on the New System of Innovation analytical framework. The perspective of this framework is that successful NSI would succeed in generating variety (e.g. in physical and social technologies), effective selection mechanisms (e.g. a well-functioning financial system and product markets), as well as maintaining a stable core of interactions in the system to ensure continuity in the face of changes in the environment (Metcalf, 2007). An efficient system is dynamic and should allow interaction by the actors and institutions in the system, generating patterns and structure of the system over time. In the case of ASGISA, the policy was expected to be the driving force which combines physical technologies and resources to generate new products and services (product innovation) or cheaper, better quality products and services (through process innovations) (Jafta and Boshoff, 2008). One general finding from the NSI framework of analysis by Jafta and Bishoff (2008) concerns the importance of understanding innovation as a multi-scalar process, involving both the micro-activities and decisions of individual firms and larger institutional structures. Such a complex system requires a coherent policy framework, where policymakers carefully consider the links between various policies.

Although it was a national initiative, ASGISA adopted different programmes for each province. Eastern Cape's Provincial government established and various policy documents abbreviate the programme as ASGISA Eastern Cape (ASGISA EC). In Eastern Cape Province, ASGISA played an important role in developing small farmers and provinces adopted a development programmes. ASGISA EC was established with the intention of accelerating agrarian transformation through the so called high impact priority projects (HIPPs) and has an initial focus on the three million inhabitants of the Mzimvubu Development Zone. A 2008/2009 review by ASGISA EC shows that it has succeeded to initiate and fast-track programmes on agriculture, agro-processing and forestry in the province. The programme also managed to address rural-urban divide (ASGISA EC, 2009). During the time of the review, over 6 700 hectares (ha) of dry-land cropping had been planted. This land supported about 2 200 households and 11 000 beneficiaries in villages stretching from the Amatole district municipality to the Alfred Nzo district municipalities, specifically, villages in the Butterworth, Willowvale,

Matatiele, Qumbu, Mount Frere and Mzimvubu areas. ASGISA EC injected R60 million into the pilot integrated-cropping programme starting with maize, beans and canola. The programme helped to address food security issues and the creation of sustainable livelihoods. Furthermore, the programme undertook some market support initiatives in the form of securing off-take agreements with large retail chains as well as other services and products, ranging from finance, agricultural services such as milling and packaging to sourcing agricultural materials such as fertilisers and livestock supplies.

### **2.3.5 Eastern Cape's Provincial Growth and Development Plan (PGDP) 2004-2014**

Scourged by continued poverty even after the democratic elections in 1994, the Eastern Cape Province finally adopted the PGDP in 2004. As a way of strengthening its compliance to the MDGs, in 2004, Eastern Cape adopted the Provincial Growth and Development Plan (2004-2014) which contains almost similar goals as the MDGs. A PGDP blue print by the office of the Premier of Eastern Cape (2009) target to reduce 2004's level of poverty by 50 per cent by 2014. The PGDP was designed to deal with the continuing spread and increase in the incidence of poverty and unemployment, as well as spatial inequality between different regions. The plan provides a strategic framework centered on improving the quality of life for the Province's poorest through interventions in three industrial sectors namely manufacturing, agriculture and tourism.

The PGDP was built on previous programmes which already existed. The main aim of this programme was to fight continued poverty by formulating a provincial framework of development which is in line with the national policy framework for socio-economic planning. Its adopted framework has sector specific strategies and programmes aimed at a rapid improvement in the quality of life for the poorest people of the Province. The programme prioritizes important factors in rural development like improving service delivery, crowding in investment into rural economy and to creation of jobs at the same time redirecting government plans and spending on addressing fundamental problems in the economy. This PGDP's broad plan was summarised into three main objectives as presented below.

- Systematic poverty eradication through a holistic, integrated and multi dimensional approach to pro-poor programming
- Agrarian transformation and strengthening of household food security
- Consolidation, development and diversification of the manufacturing base and tourism potential

Core objective 1 presented as “Systematic poverty eradication through a holistic, integrated and multi-dimensional approach to the pro-poor programming” was mainly centred at addressing the problem of poverty in the province by increasing the asset base of the poor. The approach included mobilising social partnerships in fighting poverty and working through local government. The following projects were implemented under objective 1: Vukuzhake Labour Based Infrastructure Programme, Water and Sanitation Programme, Housing programme and the Comprehensive HIV/AIDS Treatment Plan. The Comprehensive HIV/AIDS Treatment Plan was incorporated into the development plan because the HIV/AIDS epidemic proved to be a deterrent to the reduction of poverty across the province.

Core Objective 2 presented as “Agrarian transformation and strengthening of household food security” recognised the importance of agricultural development in addressing the problem of poverty in the province. Buthelezi (2007) pointed out that the keys to attaining the growth of the agrarian economy in the former homelands includes stimulating agriculture growth and integrating the agrarian economy in the former homeland into provincial, national and even global economies. Measures to address the problem of food security were cash transfers in the form of social assistance grants; the Expanded Public Works Programme; the establishment of the Agricultural Starter Pack Programme and the Comprehensive Agricultural Support Programme. The programme also has several flagship programmes focused on farmer support and agricultural development in the province. The Eastern Cape Department of Agriculture conceded with the exclusive mandate of agrarian transformation and food security through the six pillars of the PGDP. These were aimed at increasing agricultural production, incomes and

employment among the poorest households, particularly in the former homelands. A number of food security programmes were implemented in pursuance of this objective, including the Massive Food Production Initiative, Siyazondla Homestead Food Production, Integrated Agricultural Infrastructure Programme and the Land Reform Programme. Both the Massive Food Production Initiative and the Siyazondla Homestead Food Production were aimed at developing agricultural production around homesteads thus laying foundations for emergence of small-scale farming entrepreneurs. These programmes also address the problem of market access faced by emerging farmers by building farmers' capacity to enter markets (Buthelezi, 2007). Agrarian transformation under the Massive Food Programme also aims to develop emerging farmers into commercial through improving to optimum level the usage of high potential agricultural land in the province (Balindlela, 2006). Land was therefore allocated through both the land redistribution and the land tenure reform to poor households for them to develop new commercial farming enterprises. Industrial crops, such as cotton, hemp and sugar beet were produced and these also simulate the agro-industry (Balindlela, 2006).

Core Objective 3 presented as "Consolidation, development and diversification of the manufacturing base and tourism potential" was meant to address the problem of unemployment in the problem through growth in the industrial area, diversification into markets and the promotion of local inter-industrial linkages in the province. The RDP was very emphatic on the need to use land productively for agricultural and other productive pursuits. According to the RDP, the land reform programme was to be a mechanism for building "the economy by generating large-scale employment, increasing rural incomes and eliminating overcrowding" (Obi, 2006).

In order to monitor and evaluate progress, a number of quantifiable targets were set and these are presented in box 2.1 below.

Box 2. 1: The PGDP quantified objectives

1. To maintain an economic growth rate of between 5% and 8% per annum.
2. To halve the unemployment rate by 2014.
3. To reduce by 50% the number of households living below the poverty line by 2014.
4. To reduce by between 60% and 80% the proportion of people suffering from hunger by 2014.
5. To establish food self-sufficiency in the Province by 2014.
6. To ensure universal primary education (UPE) by 2014, with all children proceeding to the first exit point in a secondary education.
7. To improve the literacy rate in the Province by 50% by 2014.
8. To eliminate gender disparity in education and employment by 2014.
9. To reduce by two-thirds the under-five mortality rate by 2014.
10. To reduce by three-quarters the maternal mortality rate by 2014.
11. To halt and begin to reverse the spread of HIV/AIDS by 2014.
12. To halt and begin to reverse the spread of tuberculosis by 2014.
13. To provide clean water to all in the Province by 2014.
14. To eliminate sanitation problems by 2014.

Source: UNDP Special Service Agreement No: 461/2003

According to Buthelezi ( 2007), the PGDP intends to redirect government planning and spending towards addressing key problems in the economy. There are many on-going programmes and new ones that are aimed at improving the profile of South Africans.

Although these food security programmes have been successful, they did not make much impact on the income and food security level of the intended recipients. Agricultural output fell after the implementation of these programmes. The PGDP report by the Eastern Cape's Office of the Premier (2009), the PGDP is yet to achieve its desired impact on the lives and wellbeing of people in the Eastern Cape. The report recommended a need to increase pace and scope since the recorded growth has not benefited the poor. The same report shows that almost half of the population of the Eastern Cape have no income and a further 22 per cent live on less than R800/month.

### **2.3.6 Land Reform Policy**

In 1994, the South African government implemented land reform programmes aimed at transferring a total of 30 per cent of white-owned land to black ownership by 2014 (DoA, 2005). The land reform programme aims to address the inequitable distribution of access to land. The implementation of the land reform processes started as early as 1994 (Vink and Kirsten, 2003). Following the attainment of democracy in South Africa, the main challenge for the new democratic government lay in putting in place appropriate policies which would address the most real pressing problem, that of eradicating poverty, and the associated food insecurity. Large-scale land reform was one of the first priorities of the newly formed democratic government in South Africa. According to Van Zyl and Binswanger (1995), the system of racial discrimination was clearly unsustainable and was hurting the economy in very fundamental respects. For one thing, the exclusion of a large segment of the population from meaningful economic participation was preventing the emergence of entrepreneurship in the small scale sector and within the rural economy. The development of such entrepreneurship would go a long way in addressing employment creation and stimulation of the rural economy. In the views of Van Zyl and Binswanger (1995), the political consequences would be quite catastrophic if not addressed decisively and with the minimum delay. An urgent need to restructure the agricultural sector and embark on a redistribution of land was identified and seen as the way to avoid an imminent and “debilitating pattern of civil disorder and violence...” (Binswanger, Deininger and Fedder, 1993). The urgent need for land reform was also emphasised by Obi (2006) who argues that in a system characterized by land scarcity due to inequitable sharing of a limited supply of land, economic opportunities are severely limited for those whose livelihoods depend almost exclusively on the agricultural sector. The adopted land reform policy consists of three programmes; land restitution, land redistribution and tenure reform.

The land redistribution programme was adopted with the aim of transferring 30% of the nation’s land and this programme was expected to benefit 3 million people. The programme aims to redistribute land to those who wish to own land, develop it or provide in their housing needs, but lack the means to do so; and the provision of tenure security.

This programme aims to redistribute land under commercial large-scale agriculture dominated by the white population and state land taken over during the period of Apartheid rule for various state programme including military and conservation programmes (DLA, 2000 and Obi, 2006). This programme took note of the new constitution that provided a democratic alternative for South Africa recognized existing property rights (the so-called ‘property clause’). According to this clause, the current owners of the redistributed land would have to be compensated for the land that would be taken from them. A market-related price would have to be paid for the land, on a willing-buyer-willing-seller basis (DoA/DLA, 2005). Land redistribution grants are proposed in the RDP to facilitate the transfer of ownership to those who were disadvantaged.

The land restitution programme is the second component of the land reform programme. This programme was implemented to address the problem of dispossessed individuals and groups that could establish pre-1913 ownership of land. According to the restitution programme, these individuals and/or groups can have their ownership restored (Obi, 2006). The White Paper on the Land Reform Programme (DLA, 2000) states that Land Restitution involves “returning land, or compensating victims for land rights lost because of racially discriminatory laws passed since 19 June 1913”. Official estimates put the number of affected persons at more than 3.5 million. This figure includes persons who were forced out of their original land and compelled to settle in “scheduled” areas which were later designated “homelands”. The land restitution programme provided the legal backing for the previous actions passed during the Apartheid regime, namely:

- Native Land Act No. 27 of 1913;
- The Development Trust and Land Act No. 18 of 1936; and
- The Prevention of Illegal Squatting Act No. 52 of 1951.

To implement this, a body known as the Commission on the Restitution of Land Rights was established to:



- promote equity for persons or groups dispossessed by the policies of the past, especially those who are as a result landless and can be classified as poor, including the rural poor;
- facilitate a developmental orientation to the solution of the problem by encouraging the relevant stakeholders to organize in the framework of viable development initiatives;
- implement the restitution process in a manner that would promote reconciliation within the country;
- contribute towards an equitable redistribution of land rights in the country.

The third key component of the land reform programme, the land tenure systems was implemented to enhance the accessibility of land in the communal areas including the Eastern Cape Province, KwaZulu Natal and North West Province. These areas were known as Ciskei, Transkei and KwaZulu. These areas were administered during the Apartheid era and were named the former independent homelands. Today, communal agricultural production still occurs in these designated areas and the traditional authorities remain the trustees in land matters and wield considerable powers (Obi, 2006). This same policy also focused on mobilizing communities to access government settlement/land acquisition grants (SLAGs) to acquire land.

The first phase of the land reform programme had a wide range of problems. The number of resettled farmers was so small such that the programme even failed to benefit those willing to practice as full time farmers. The other coherent problem was the slow pace of implementation of the whole process. These problems resulted in a new approach to land reform, which was implemented in 2001 (Vink and Kirsten, 2003). One of the key strategies of the LRAD was the provision of cash grants designed to enable black emerging farmers acquire land and establish commercial farm enterprises. The LRAD programme provided for an extended scale of grants and made it possible for aspiring commercial farmers who were excluded under the SLAG programme to access LRAD grants. The success of this new programme of land reform, according to Hall and Aliber

(2010), rests on both the efficiency of its implementation and the new farmers' access to support services.

Therefore, the introduction of both the SLAG and LRAD played an important role in the lives of the beneficiaries as it addressed the consequences of the history of extreme deprivation of the black population and the importance of agriculture to the poor (Obi, 2006). The degree to which agricultural growth reduces poverty is usually conditional upon the initial distribution of assets (in particular land) and the initial level of inequality. A prominent goal of the government's policy has been to empower rural people, especially those in the former homelands, primarily through land reform. There is no doubt that empowering rural people through land reform programme affects every dimension of economic growth in the post-Apartheid South Africa since the distribution of land has both the inequality addressing impact and the poverty reducing effect (Obi, 2006). According to Obi (2006), the redistribution of land is synonymous to the promotion of agriculture. Therefore, by redistributing land, the democratic government tries to address poverty and inequality through explicit "affirmative action" principles where the poor and land-less are explicitly targeted with measures that move them more towards the mainstream economic life of the country. Improving access to land in a poor agrarian economy, especially that of the former homelands of the Eastern Cape Province, lifts the poor out of poverty. Land is the asset base of the poor; therefore access to land means an improvement of the poor's income through the production of food and sale of produce. Better land redistribution through land reform helps agricultural growth, consequently improving income distribution and poverty reduction. Poverty reduction and the future growth of all the rural communities can only be achieved through redistributing land to the landless or marginal landholding farmers as the majority of the poor in Eastern Cape are still either landless labourers or smallholders (Hall and Aliber, 2010).

### **2.3.7 Economic Empowerment in Agriculture (AgriBEE)**

To reverse past injustices that plagued the development of small scale farmers during the apartheid era, The South African government, in 2007, adopted the AgriBEE policy. The

main objective of the policy was to set important guidelines to promote the participation of the previously disadvantaged black producers in the mainstream agricultural economy through the redistribution of economic opportunities which were largely skewed in favor of the commercial farmers. According to Mukumbi (2008), the BEE policy was broad based, including all economic sectors in South Africa and sought to correct economic injustices from the apartheid era. AgriBEE entails to merge these two separate agricultural economies into one. As stated by the Department of Agriculture South Africa (2005):

*“Economic empowerment of previously disadvantaged people will be facilitated through: increasing the number of people that manage, own and control agricultural enterprises; facilitating ownership and management of agricultural enterprises by communities, workers cooperatives and other collective enterprises; human resource and skills development; achieving equitable representation in all occupational categories and levels in the agricultural workforce, preferential procurement, and investment in enterprises that are owned or managed by blacks.”*

One of the main objectives of the AgriBEE policy is the economic empowerment of previously disadvantaged people through preferential procurement. This aspect of the AgriBEE policy has important implications on poverty reduction since the previously disadvantaged farmers make up the bulk of the poor across South Africa. The AgriBEE policy has a target whereby it seeks to achieve that at least 50 per cent of the volume or value of agricultural produce that is sold by a retailer be procured from previously disadvantaged producers. The policy has set to achieve this 50 per cent preferential procurement target by the year 2017.

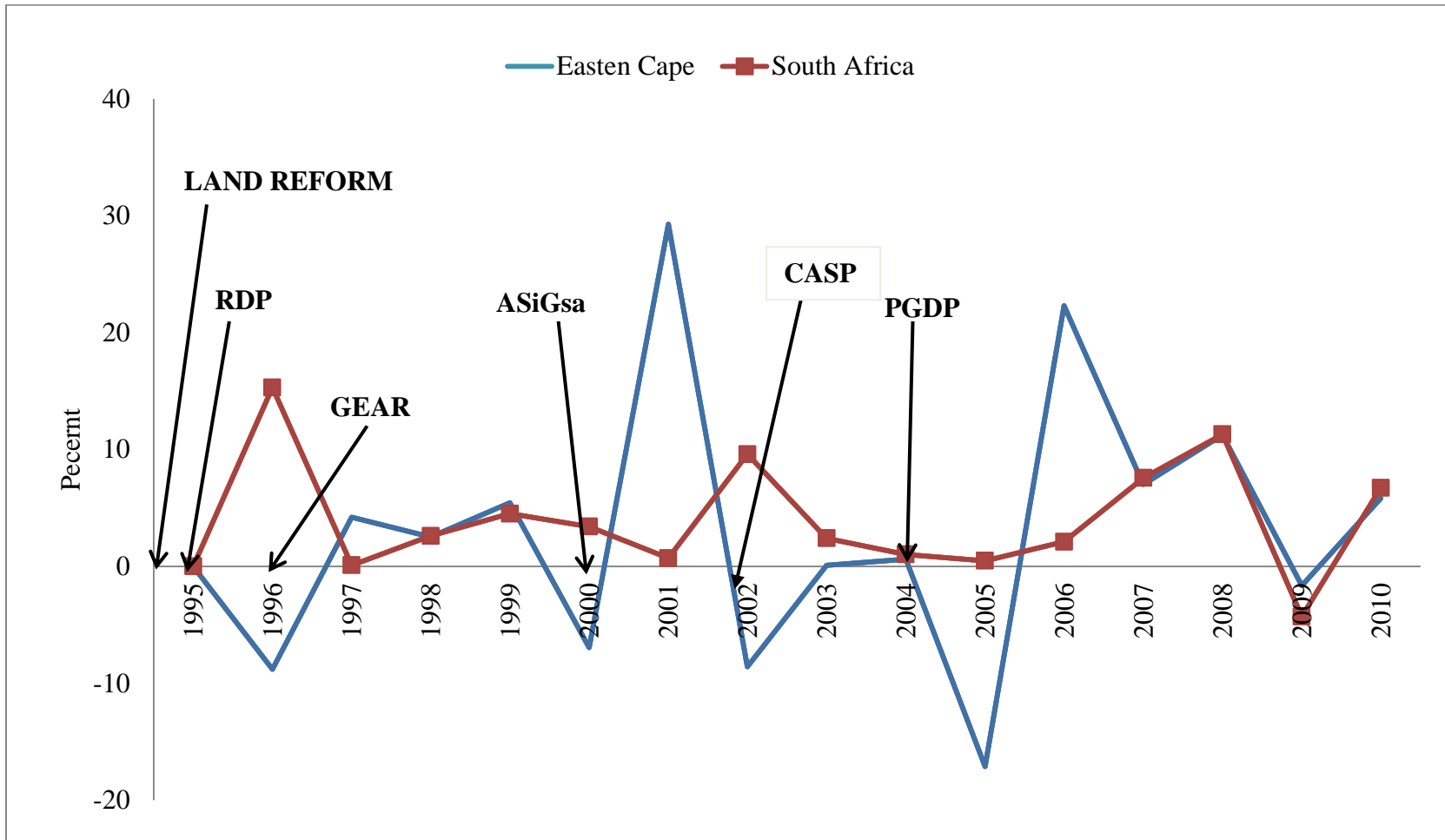
## **2.4 Rural development and the Growth of Agriculture in South Africa**

South Africa's agricultural sector performance and the development of rural areas is absolutely linked to the government, such that the ability of an agricultural sector to sustain broad-based, pro-poor development and income growth largely depends on government's stated priorities and actions (Van Schalkwyk *et al.*, 2003 and Hall and Aliber, 2010). Since the dawn of democracy, the goal of the new government and all the stated priorities moved to improve agricultural productivity, increase rural incomes and address the problem of inequality through public policy and rural financing. The post-independence government's agricultural policies focused on increasing productivity while improving the welfare of the long marginalized rural population at the same time. Before 1994, government's recognition of smallholder and communal farm sector and their contribution to total national production and marketed output was insignificant due to colonial era discriminatory practices. Post-Apartheid government policies sought to make agricultural output growth a pillar to rural development. The prevailing policies aimed to enhance land and labour productivity in the sector and promote the participation of small-scale in the mainstream economy. In this regard, the post-Apartheid South African government seemed very enthusiastic to promote small-scale and communal agriculture. In pursuit of these objectives, direct effort was aimed at stimulating agricultural production by way of policies and measures on land, water, infrastructure, credit and technology. Indirect support to the sector also appeared in the form of subsidies, farmer support programmes, social grants and income policies.

To resource- poor rural dwellers, agriculture is seen as the main driver of development or the engine for growth to reverse years of marginalization which have given rise to some of the most cases of poverty and destitution in the region. Thus, the current policy issues in South African agriculture, as in the case for much of Southern Africa, are rooted in a historical context (Tembo, Chapoto, Jayne and Weber, 2009). The average agricultural growth rate and participation of small-scale farmers and communal farmers since the dawn of democracy have been inadequate to address the problem of poverty and inequality especially in the former homelands of South Africa. Whether the nature of

these policies or their sequencing is responsible for the weak growth of agriculture over the past 17 years is difficult to address empirically.

Years following the dawn of democracy in South Africa have seen dramatic shifts in policy and practice both in the area of agriculture and rural development. The set of policies and ideas adopted by the new government have managed to reshape the structure of agriculture in South Africa. A review of all the policies in the area of agriculture and rural development above shows that the government has the intention of improving the welfare of the previously marginalised farmers as well as improving the overall agricultural output. It is therefore expected that this set of policy reforms brought some marginal increases in agricultural production. This insight is based on the argument that the set of policies obviously brought more land into productive use, especially through the land reform; improved the state of infrastructure, improved financing of the marginalised farmers; and changed the level of agricultural resource use. Positive fiscal policy and increased expenditure in support of agriculture lead to increased agricultural productivity (Fan, Johnson, Saurkar and Makombe, 2008). Trends in agricultural productivity during the Apartheid era show that agriculture's share of GDP followed a declining trend (Rita, 1996). According to Rita (1996) agriculture's share of GDP declined from about 20 per cent in the 1930s to about 12 per cent in the 1960s and to less than 7 per cent in the 1990s. The post-Apartheid trend in agricultural growth rate is therefore expected increase to reflect the effect of the post-Apartheid government's endeavour to expand the farming community and production by promoting the previously marginalised communal and smallholder farmers into the mainstream economy.



**Figure 2.1: Rate of per Capita Growth from Agriculture and the Incidence of policy in South Africa**  
 Source: Modified data from ECSECC (2010) and various government documents

The above discussed policies are still at play in South Africa. The hypothesized link between agricultural growth rate and poverty reduction and the level of bias of these policies towards promoting agriculture suggests that poverty will fall significantly in the Eastern Cape Province. Figure 2.1 provides a summary of trends in agricultural growth rate and the incidence of policies supporting the sector since 1995. However, these policies have had a mixed effect on the economy as others had a positive and other policies are having a negative effect. Portrayed in a trend form, the effect is highly variable as shown by the above graph. Following the context of these policies and the discussion on their outcomes above, the general impression given is that they had a positive impact although less than the expected impact. The policies failed to smooth the trends in both poverty and agricultural growth rate besides showing a strong bias towards the promotion of agriculture.

The advent of democracy brought with it a variety of policies, but most of them had limited impact on agricultural growth in the Eastern Cape Province and South Africa in general. Generally, all the policies displayed in Figure 2.1 above try to address poverty and inequality by redistributing resources to the poor through, mainly, the promotion of agriculture. The graph above shows that the sector's growth rate continues to experience secular decline in and out. Furthermore, the sector is currently contributing less than 5 per cent of the national GDP. This figure is less than the 12 per cent during the 1960's and 30 per cent during the 1930's (Rita, 1996). Analysis of Figure 2.1 above shows that South Africa's agricultural GDP growth rate is highly variable with some standoff figures of more than 30 per cent increase in 2000/2001 and almost a similar decrease in the following year. In 1995 South Africa saw its lowest growth rate from the agricultural sector of 2.7 per cent; this was almost 2 per cent lower than its highest yearly growth rate of 4.6 per cent in 1994.

## 2.5 Regional Initiatives

The recognition of the contribution of agriculture to the economies of many developing countries has brought about a number of policy targets under different initiatives to harness its roles in reducing poverty and enhancing economic growth in Africa. These initiatives include targets set in the Africa Union New Partnership for Africa's Development (AU/NePAD)'s Comprehensive Africa Agriculture Development Programme (CAADP) of achieving at least a 6 per cent agricultural growth rate per annum and investing at least 10 per cent of national budgets in agriculture under the Maputo Declaration (African Union, 2003). Another initiative, specific to Southern Africa, is the Southern African Development Community (SADC)'s Regional Indicative Strategic Development Plan (RISDP), which includes regional integration and other national agricultural growth targets. All these initiatives endorse the first Millennium Development Goal (MDG1) of halving hunger and poverty by 2015. It is unavoidable that regional initiatives will have an impact on the national or even provincial developmental initiatives considering the nature of agriculture and its assumed relationship with poverty reduction in Southern Africa.

The South African agriculture is facing considerable challenges in terms of growth and improving its capacity to reduce poverty. The above mentioned initiatives agree that increased budget allocations to the agricultural sector (CAADP goal), will result in increased output from the sector (CAADP target5), which will subsequently lead to poverty reduction (MDG1 and the SADC RISPD goal). Thus productivity growth in the agricultural sector assumes a central role in meeting the MDG1, CAADP and the SADC RISDP goals. The ultimate purpose of the above initiatives is to reduce poverty through investment in agriculture. Benin *et al.* (2010) notes that whenever targets are set, it is important to regularly assess whether the imputed actions are having the desired impact. Given the above mentioned goals, it is therefore important to assume that all the investments made to achieve these goals should be continuously assessed to check if they are having the desired impact on raising growth and reducing poverty.



### **2.5.1 AU/NEPAD's Comprehensive Africa Agriculture Development Programme (CAADP)**

In 2001, the New Partnership for Africa's Development (NEPAD) was formed by the Assembly of Heads of State in Africa as part of an explicit political and resource commitment to foster growth and development and addresses the challenges facing the African continent. The Comprehensive Africa Agriculture Development Programme (CAADP) under the Africa Union New Partnership for Africa's Development (AU/NEPAD) recognised the importance of agriculture as the cornerstone of sustained growth and poverty reduction. The African heads of state in Maputo (10-12 July 2003), agreed to implement the CAADP with the main goal being to enhance agriculture-led economic growth, eliminate hunger, reduce poverty, eliminate food and nutrition insecurities, and enable the expansion of exports. In partnerships with AU/NEPAD, South Africa is mandated to achieve at least a 6 per cent agricultural growth rate per annum through investing at least 10% of national budgets in agriculture under the Maputo Declaration by 2008 (African Union, 2003). As targets for a successful implementation, the CAADP employs the Millennium Development Goal (MDG) of reducing poverty and hunger by half by 2015, through the pursuit of a 6 per cent average annual growth in the agriculture sector and allocating an average of 10 per cent of national budgets to the sector (Benin *et al.*, 2010). Africa has renewed its commitment to advancing agriculture as the driver for economic growth, poverty reduction and food self-sufficiency. In summary, CAADP has the mandate to increase investment in the agricultural sector and also aims to increase returns from these investments in terms of development impact.

Somma (2008) assessed progress towards this goal and concluded that after five years, only a handful of Africa's 53 nations have reached the designated 10percent target. According to NEPAD's 2007 tally, thirteen countries managed to spend from 5 to less than 10 per cent on agriculture, and 15 more invested less than 5 per cent. The remaining 18 countries, South Africa included, did not report. According to Mwape (2009), the number of countries spending more than 10 per cent increased from 11 per cent in 2003 to 22 per cent in 2006.

### **2.5.2 SADC's Regional Indicative Strategic Development Plan (RISDP)**

The SADC Regional Indicative Strategic Development Plan (RISDP) is a 15 year regional integration development framework, setting the priorities, policies and strategies for achieving the long-term goals of the SADC. It is intended to guide member states, SADC Institutions, regional stakeholders, international cooperating partners in the process of deepening integration to turn the Community's vision into reality. Many developing countries have also adopted the concept of the Poverty Reduction Strategy Papers (PRSPs) in order to formulate strategic plans and earmark financial resources for achieving their poverty reduction goals. South Africa is a SADC member and also part of the Southern African Development Community (SADC)'s Regional Indicative Strategic Development Plan (RISDP). Among other goals, under the SADC RISDP target 1 for food security, the objective is to achieve a GDP growth of at least 7 per cent per year and halve the proportion of the population that lives below the poverty line between 1990 and 2015 (SADC, 2008).

SADC (2008) proposed that eradicating poverty require that opportunities be created for the poor by building capital assets, redistributing natural assets, constructing and maintaining infrastructure and promoting knowledge and health in poor areas, protecting the environment and reducing economic inequalities. The RISDP also entails expanding and promoting investment to stimulate economic growth and employment creation for the poor. Agriculture is a major player in the SADC regional economy, contributing 35 per cent to its gross domestic product (SADC, 2008). About 70 per cent of its people depend on it for food, income and employment (SADC, 2008). In addition, agriculture is a dominant source of exports in many countries, on average contributing about 13 per cent to total export earnings and about 66 per cent to the value of intra-regional trade. For these reasons, the performance of agriculture has a strong influence on the rate of economic growth, the level of employment; demand for other goods, economic stability and on food security and overall poverty eradication. Growth performance of the SADC region is driven by South Africa. South Africa is the largest economy in the region in

terms of GDP. Using 2002 data, output in SADC was extremely uneven, reflecting mainly differences in resource endowment and economic size of the different Member States. The average regional GDP growth rate during the 1990s and beginning of the 2000s was significantly positive despite a slow start in 1990-1992. Strong signs of economic recovery in the region started showing in 1993 and gained momentum in 1996 with a SADC average GDP growth rate of 5 per cent. However, in the following years, the growth pattern fluctuated considerably from year to year and reached 3.2 in 2002. Improvement in economic performance is largely attributed to positive political developments in the region as well as to introduction of macroeconomic reforms in most Member States, which occurred at the end of the 1980s and beginning of the 1990s. However, economic performance on the whole has remained fragile and most SADC countries continue to be exposed to natural disasters and adverse external shocks.

There is potential for increasing agricultural production and reduce the level of poverty in SADC region through intensification and expansion of hectarage under cultivation. A note by SADC (2008) stated that intensification through the use of fertiliser, improved seed, irrigation, mechanisation and other technologies can marginally increase the level of agricultural output across the SADC region while expansion of land under cultivation was recommended for countries such as Angola, the Democratic Republic of Congo, Mozambique, Tanzania and Zambia. The entire land mass of the region comprises 906,324,000 square kilometres or 30.9 percent of the total African land mass. Of this, 226,581,000 hectares (25%) is arable and 48,653,300 hectares is under cultivation. This large land mass implies that Member States are endowed with diverse soil and climatic characteristics; hence, they can grow a variety of crops and rear a range of animals. However, this potential is limited by the susceptibility of the region to droughts, floods, plant pests and animal diseases, the vulnerability of the agricultural population to HIV and AIDS infection, and inadequacy of irrigation and transport infrastructure, constraints that the RISDP will need to address. The main intervention areas of the RISDP are divided into two main groups namely, cross-sectoral intervention and sectoral intervention. These interventions were selected according to their potential contribution to:

- Poverty eradication;
- Regional development integration;
- Regionally balanced and equitable development;
- Integration into the continental and global economies;
- Sustainable development and;
- Gender equality.

Building viable structures advocating for regional economic development has a long history especially in several European regions. While there are many good arguments for regional intervention like SADC RISDP programme in providing crucial development strategies, its intervention should aim to enhance efficiency through supporting local policies, rather than obstructing it or seeking to replace it. There is a question of whether regional policies are the most effective means of achieving economic growth and social aims. If for instance a set of regional policies is used to channel development plans to a particular group for social reasons, it will not achieve its goals without support from the local authorities.

### **2.5.3 Millennium Development Goal (MDG1)**

The Millennium Declaration adopted by all 191 member states of the United Nations commits them to put in place measures necessary to attain certain developmental goals. This declaration was further elaborated in the subsequent UN Secretary General's report entitled "A Road Map Towards the Implementation of the UN Millennium Declaration" (GA Resolution A/56/326). Arising out of these two declarations and on the basis of further consultations and agreement reached between the UN, OECD/DAC, World Bank and IMF, eight target-oriented Millennium Development Goals (MDGs) were formulated as a set of quantifiable and time-bound goals for significantly improving human lives by 2015 (UNDP, 2010). This commitment by the international community to improve human lives was re-affirmed at the Conference on Financing for Development held in Monterrey, and World Summit on Sustainable Development held in Johannesburg in 2002. The reduction of poverty and hunger figures was the first goal of the MDG agenda.

South Africa is committed to achieve the MDGs within stipulated time, i.e. by 2015. The MDG1 targets to halve the proportion of the population living on less than US\$1 per day between 1990 and 2015. South Africa's MDG's Country Report (2010) clearly indicated that the country is well on course to meet all the MDGs. The MDGs Country Report for South Africa wrote that national estimates of poverty have been decreasing since 1994. In 2005, South Africa's performance shows that it has achieved some of the MDGs. This performance might be accredited to the adoption of similar targets to those articulated in the MDGs by the new democratic government in 1994.

In South Africa, the MDG number 1 is being effectively integrated into the national development planning process. Provincial policies are increasingly used as a vehicle through which governments seek to operationalise their agriculture and rural development strategies. The PGDP shared similar goals with regional policies like the SADC RISDP and the MDGs and this relationship should always be emphasized. The contents of the national strategies relative to the MDGs will determine the contents of all the adopted initiatives for agricultural development. There is, therefore a two way relationship between the PGDP for agriculture and other regional strategies as the PGDP is expected to inform the preparation and revision of MDG strategies for South Africa. All the above initiatives concede that growth in the agricultural sector is required to reduce poverty and address the problem of inequality. Therefore, achieving these shared goals and targets in Eastern Cape necessitates development in the agricultural sector.

## **2.6 Challenges of Agricultural Development in South Africa**

Despite efforts to turn the face of agriculture in the former homelands and improve the livelihoods of many rural farmers, output in this sector and rural income remains low (Hendricks and Fraser, 2003). Many agree that the achievement of a productive and profitable agricultural / agro-industrial sector will require nations to address a complex set of challenges faced by the agricultural sector (Hendricks and Fraser, 2003; NEPAD,

2003 and Fatunmbi, 2011). Thus, agriculture can only take its proper place in South Africa's rural development if the challenges that face the sector are addressed. According to Obi (2006), a review done by the Department of Agricultural and Rural development in South Africa suggests that there are serious production problems associated with communal land use. Provincial departments deploy a large part of their budgets and human resources towards agricultural development in the communal areas but production falls far short of potential (Obi, 2006 and Hall and Aliber, 2010). Findings reported by the Eastern Cape Department of Agriculture show that out of a potential maize yield of over 4 tonnes per ha, farmers realize only about 200 kg per ha. In Kwazulu-Natal, the actual production is about one-sixth the proven potential. While as much as 38% of the national beef herd is kept in the communal areas where crop production remains an adjunct to livestock production, extremely low animal off-take denies both farmers and consumers the benefits of this important sub-sector.

Obi (2006) notes some of the challenges that contributes to poor production performance in communal areas of South Africa and summarized them as:

- Continuous shallow ploughing of the same land creates an impermeable layer of soil which hampers the flow of moisture to crops grown under rain-fed conditions;
- Forced fallowing of large tracts of land as a result of inadequate supply of labour, inputs and equipment;
- Sub-optimal resource use as a result of over- or under-investment of resources which leads to low productivity;
- The use of community-based models of empowerment which lead to serious internal conflicts that consume an inordinate amount of resources and time and contribute to low production and productivity.

To ensure the best contribution from this sector, it is important to identify and address these challenges. Obi (2006) put forward the same proposition as he suggest that any

agricultural reform programme meant to develop agriculture, including the integration of the black population to the country’s agricultural economy should take a holistic view of the problem. Fatunmbi (2011) also made an important development in categorising these challenges into old challenges and new additional challenges. This type of classification has an important implication on understating the dynamics of the sector with regards to challenges, as this will assist in policy formulation and addressing the challenges. Table 2.1 below presents the major challenges in South African agricultural sector as depicted by Hendricks and Fraser (2003), NEPAD (2003) and Fatunmbi (2011).

**Table 2.1: Challenges of Agricultural Development in South Africa**

Old Challenges	New Challenges
<ul style="list-style-type: none"> <li>• Population growth against economic and agricultural productivity growth.</li> <li>• Low internal effective demand due to poverty.</li> <li>• Environmental degradation and natural resource management.</li> <li>• Institutional weaknesses for service provision to the entire agricultural chain from farm to market. Low levels of past investments in rural infrastructure (such as roads, markets, storage, rural electrification, etc.) essential for reducing transaction costs in farming and thereby increasing its competitiveness in serving production, processing and trade</li> </ul>	<ul style="list-style-type: none"> <li>• Poor and un-remunerative external markets (with declining and unstable world commodity prices and severe competition from the subsidised farm products of industrial countries).</li> <li>• Globalization.</li> <li>• Increasing protectionism of the West.</li> <li>• Rising energy costs.</li> <li>• Challenges of new waves of technology and low human capacity to adopt new skills.</li> <li>• Vagaries of climate and consequent risk that deters investment.</li> <li>• Traceability.</li> </ul>

Sources: Hendricks and Fraser, 2003; NEPAD, 2003 and Fatunmbi, 2011.

In addition to those mentioned in Table 2.2, there are many other challenges faced by the agricultural sector in Southern Africa. Chilonda and Minde (2007), identify insufficient investment in agriculture, poor access to agricultural inputs and to markets, and low

levels of technology development and dissemination as being the most significant. These factors have resulted in limited growth in productivity from the sector and low income per capita. To ensure the best contribution from the agricultural sector, it is important that the development initiatives adopted for the former homelands should address the above mentioned challenges. NEPAD's activities all help to create an enabling environment for farmers to contribute more to rural economic development, for example, NEPAD's activities on good governance, infrastructure, policy reform, and human resources development (NEPAD, 2003). Agriculture must be the engine for economic growth and poverty reduction in rural South Africa; therefore activities aimed at improving productivity from this sector should not falter in addressing the above mentioned challenges. Easing these constraints through a combination of actions and policies can result in increased productivity and reduction of poverty as some of the issues highlighted above will certainly be crucial. Therefore, detailed studies to ascertain the problems and what strategies are need to contain them, necessary.

In order to improve agricultural productivity, NEPAD (2003) recommends that Africa needs to improve the policy and regulatory framework for agriculture to make it more supportive of local community participation in rural areas and commercial private sector operations; South Africa should do the same. To promote farming in the former homelands, it needs to improve governance in terms of giving a voice to communal farmers. Fortunately, the past decades have revealed that South Africa's government pays more attention to agriculture and rural development. The country has been reported to have come up with a series of poverty reduction policies and spending that allocates more to the development of rural areas.

## **2.7 Chapter Summary**

South Africa has adopted a high number of indefinite and sometimes distinct policies aimed at improving the nature of rural communities and the state of agriculture. This shows that the post-Apartheid government is conscious of the fact that agriculture is the



central productive resource and the sector is crucial in the former homelands where incomes need to be increased or equalized. The forces of both the local policies and regional policies makes it inevitable that the previous level of poverty and deprivation seen during the Apartheid era in South Africa will remain an important feature for some time to come. Throughout the course of the period after 1994, several new economic and social initiatives are continuously being designed with an important rural dimension, with some programmes abandoned or restructured. The policies represent determination by the government to create an environment at provincial and national level, which is conducive to development and elimination of poverty. These programmes reflects the general understanding that rural areas suffer most from poverty and have the most underdeveloped social and economic infrastructure and the human development indices. The recent programmes, specifically the land reform programme, the PGDP and the CASP have put forward goals of eradicating extreme poverty and hunger and ensuring environmental sustainability. These goals are crucial to the MDG goal of reducing poverty. South Africa should expect all its agricultural development interventions to fall within the framework of the MDGs and contribute to their achievement.

Unfortunately, the level of production from the agricultural sector has failed to increase consistently. Rural incomes in the former homelands remain low with poor living standards still persisting. This may imply that the set of policies implemented after 1994 were misaligned with the sector's requirements as they failed to make an impact on productivity.

## **CHAPTER THREE**

### **PUBLIC INVESTMENT, AGRICULTURAL GROWTH AND THE INCIDENCE OF POVERTY**

#### **3.1 Introduction**

The other important subject-matter addressed by this thesis is the estimation of the amount of agricultural spending required to reach MDG1 in Eastern Cape using the linkages between public agricultural spending, agricultural production and poverty reduction. This draws from the theoretical link that has been made by past research among agricultural spending, agricultural growth and poverty reduction. In this regard, this chapter starts by reviewing the theories underpinning these three components. These theories are then corroborated by a formal review of literature on the observed relationships between public agricultural spending, agricultural production growth and poverty reduction. The last section reviews the various methodologies available in the literature discussing the linkages between the three variables. Efforts are made throughout the review process to observe how growth in agricultural production translates into poverty reduction using several case studies. Drawing literature from other countries helps to provide a framework for broader experiences, lessons and affords room for comparison. This chapter, therefore, makes a major contribution to the crucial debate on the aspect of public agricultural spending, agricultural growth and poverty reduction.

#### **3.2 Public Investment for rural development**

Public investment plays an important role on the rate of economic growth, particularly the rate of growth in the agricultural sector (Jha and Palanivel, 2007). Several aspects can be mentioned about the nature of poverty in areas that reflect important arguments that challenge the encouragement of public investment in rural areas. Firstly, relative to urban areas, rural areas are often poorly endowed in terms of roads, telecommunications and other forms of state-provided endowments (Fan, Nyange, and Rao, 2005 and Lipton,

1979). Secondly, rural areas tend to be physically, politically and economically isolated from the areas in which inhabitants obtain most of their value and where political decisions – governing policy and development planning – are typically made (Lipton, 1979). Lastly, rural areas tend to be characterised by high levels of poverty such that the livelihoods pursued by poor people are often disproportionately dependent on natural resources (particularly ones with weak or non-existent property rights).

The above described aspects concerning the requirement for provision of public goods and services and rural development raise a number of questions about the ways in which states intervene in rural society, and how this affects economic opportunity. Although there is of course great variation among cultures, countries and regions, a number of roles that governments typically play in poor and predominantly rural areas to reduce the problem faced by rural inhabitants can be identified:

1. One is the provision of public goods, such as universal education and healthcare.
2. A second is the provision of divisible goods, such as irrigation, agricultural extension and credit.
3. A third is the determination and enforcement of laws regulating key economic inputs, such as land, labour and capital.
4. A fourth and critical element is the recognition and protection of rights allowing for organisation, association and entitlement in the eyes of the state.

Many theories and important arguments have been raised in support of public expenditure and important lessons can be drawn from them.

### 3.2.1 Public Expenditure Theories

The relationship between public investment and growth has always been complex. Several views have been put forward to explain these relationships. According to Anderson *et al.* (2006), the Keynesians and the neo-classicals hold two completely different views regarding government expenditure and economic growth. The former argues that an increase in government expenditure (on agriculture) leads to higher economic growth whilst the later accepts as true that, government fiscal policy does not have any effect on national output growth.

The Keynesians propose that public investment have a greater multiplier effect on national income through its effect on aggregate demand. This model assume that an increase in public investment would have a positive impact on the level of national income, followed by a successively smaller positive impact in a limited number of subsequent years (Anderson *et al.*, 2006; Cukierman, 2009 and Cwik and Wieland, 2010). South Africa has its macroeconomic model development for similar policy analysis. The World Bank macroeconomic model has applications in the sphere of public investment, growth and poverty reduction (Jerome, 2004). The World Bank's macroeconomic model that evolved from the World Bank's 1991 study of the post-Apartheid policies simulated the macroeconomic impact of public investment in South Africa. This model and several other studies emphasize the Keynesian multiplier effect.

There are, in fact, many examples of such growth accelerations models in South Africa and several countries in recent decades, Barack Obama's administration advocates for massive U.S. government spending in order to boost national output. The recent American Recovery and Reinvestment Act (ARRA) perhaps the largest fiscal stimulus plan in U.S. history was motivated by a relatively high estimate of the multiplier of 1.6 (Cwik and Wieland, 2009). The effect of government spending on output is often summarized by a multiplier-the percentage increase in output that results when government spending is increased by 1% of GDP. Numerical estimates of the impact of an increase in government spending on GDP and employment in the United States

estimate that an increase in government purchases of 1 per cent of GDP would induce an increase in real GDP of 1.6 per cent compared to what it otherwise would be (Cwik and Wieland, 2009). In 1989, Aschauer hypothesized that the decrease in productive government services in the US may be crucial in explaining the general decline in productivity growth in that country. Based on his results, a 1 per cent increase in the public capital stock might raise total factor productivity by 0.4 per cent. The implications of these results for policymakers seem to be clear: public investment should go up to give a boost to the economy.

The standard neo-classical "source of growth" approach uses a simple production function to explain growth in real output. As specified by Smith and Wahba (1995), the growth rate of real output  $y$  is specified as follows:

$$Y = \lambda + \alpha + \beta k + (1 - \beta)h \dots\dots\dots (3.1)$$

where  $\lambda$  is efficiency in the use of resources,  $\alpha$  is the change in technology,  $\beta$  is the coefficient,  $k$  is physical capital growth and  $h$  is human capital growth. This expression emphasised the role of capital accumulation and labour growth as determinants of growth and several studies do the same (Mphuka, 2005, Smith and Wahba, 1995; Tanzi, 2008; Minea, 2008 and Hall and Aliber, 2010). Alemu, Roe and Smith (2005) employed similar model when estimating the impact of HIV on total factor productivity in South Africa and Lesotho. Although the neo-classical argues that government fiscal policy does not lead to economic growth, Smith and Wahba (2005) argued that the above identity revealed the potential importance of government expenditure. This is partly because government capital spending can contribute directly to physical capital, and may enable an increase in human capital formation through spending on education among other types of spending. In addition, government expenditure on research and development could influence technological change.

Evidence collected by Edmeades (2007) across developing countries strongly supports that Keynesian's idea that there is a positive relationship between public investment and growth in productivity in the agricultural sector. Echoing studies by Fan, Zhang and Rao (2004); Fan *et al.* (2005); Fan, Zhang, Zhang (2002); Fan, Hazell and Thorat (2000); Fan, Jitsuchon and Methakunnavut (2004); Edmeades (2007) argues that investments in infrastructure and education in Asia and Africa are complementary to direct investments in agriculture in fostering agricultural income growth. This same argument by Edmeades (2007) is strongly supported by estimations of agricultural growth elasticity of public agricultural investment in Latin America made by Loez (2005) and Lopez and Galanato (2007). They estimate that a 10 per cent increase in government spending in rural areas leads to an increase of 0.6 per cent of per capita agricultural income, on average. Furthermore, Valdes and Jara (2007) noted that large injections of government funds into the agricultural sector, including a large public investment program and subsidies on credit and input use led to a large scale gains in production value and labor productivity in Chile during the Frei-Montava and Allende years. Most of unprecedented growth recorded in most countries is correlated with increased use of fertilizers per hectare, an expansion of irrigated land area, increased machinery, and an introduction of new varieties and the adoption of non-traditional crops (Foster and Valdes, 2006). All these factors are largely financed by the state.

The theory of public economics can help divide agricultural investment outlays into two categories; public agricultural goods and private agricultural goods. A public agricultural good is a good that is non-rival in that consumption of the good by one farmer does not reduce availability of the good for consumption by others and it is non-excludable in that no one can be effectively excluded from using the good (Black, Calitz and Steenekamp, 2000). Given their nature, public goods can only be supplied efficiently by the public sector (and at adequate amounts) because the market will always under-provide public goods (Armas, Osorio and Moreno-Dodson, 2010). Agricultural research and development and infrastructural development are perfect examples of a good that can be efficiently provided by the state. When supplied in a cost-effective manner, public agricultural goods like R&D can generate higher returns than investments in the private

sector because they create positive externalities for the economy as a whole. Public goods are efficiently supplied by the government because they have the capacity to collect contributions from individuals through taxes to provide public goods. Most governments are allocating considerable amount of resources for the provision of public goods. The need to finance various types of public goods have resulted in many governments instituting various programmes aimed at improving the state of infrastructure like roads, irrigation infrastructure and various other types of public goods.

With the help of these theories and economics concepts, various theoretical economic models explaining how public spending affects economic growth by increasing production in the agricultural sector. According to Anderson *et al.* (2006), there are five channels through which public investment affects economic growth in the agricultural sector. Theoretical reasons advanced by economists to justify the public spending role of the state in the economy include (a) the social or redistributive function of democratic governments, (b) correct market failures, (c) curb externalities, (d) arrest information asymmetries, and (e) curb imperfect competition (Anderson *et al.*, 2006). These factors are discussed in detail below with a macro-economic perspective. These models have their own limitations and a fair discussion of these limitations is provided at a later stage.

### **3.2.1.1 Relationship between public and private capital**

The effects of public investment on economic growth depend on whether public and private goods are treated as substitutes or complements (Aschauer, 1998) and their effect on economic growth depends on the strength of each of the two. Public capital crowds out or crowds in private capital depending on the relative strength of the two opposing forces (Aschauer, 1989). As substitutes, public capital tends to crowd out private capital. Public and private capital can be used in the same line of production as complements. This will raise the return to private capital thus crowding in private investment. Thus on balance, public capital will crowd in private capital depending on whether public and private capital are gross substitutes or gross complements. Anderson *et al.* (2006), holds a slightly different view of the two as they assume that public and private capital are complements. This is justified on the grounds that public and private capital are made up

of quite different things, with public capital consisting mainly of public goods (e.g. research and development, roads, electricity supply) and private capital consisting of private goods (e.g. irrigation equipment, machinery). Agricultural production depends on both (private) machinery and transport services, which however depend upon the flow of services provided by the aggregate stock of government capital like roads. Understanding the relationship between public and private goods has got important implication on financing agricultural development.

When public and private capital are complements, an increase in public investment will raise a country's rate of growth, at least, up to a point (Barro, 1990). Assuming that the rate of private savings is unaffected by the return to private investment, the prediction is that, in the long run, countries with higher rates of public investment will have higher levels of output per worker, *ceteris paribus*. In the short- to medium term-run, as they approach their long-run steady-state level of output per worker, countries with higher rates of public investment will have higher rates of economic growth, *ceteris paribus*. The same can be applied to public investment in agriculture with different effects on the long-run output and economic growth (Anderson *et al.*, 2006).

### **3.2.1.2 Crowding-in private investment**

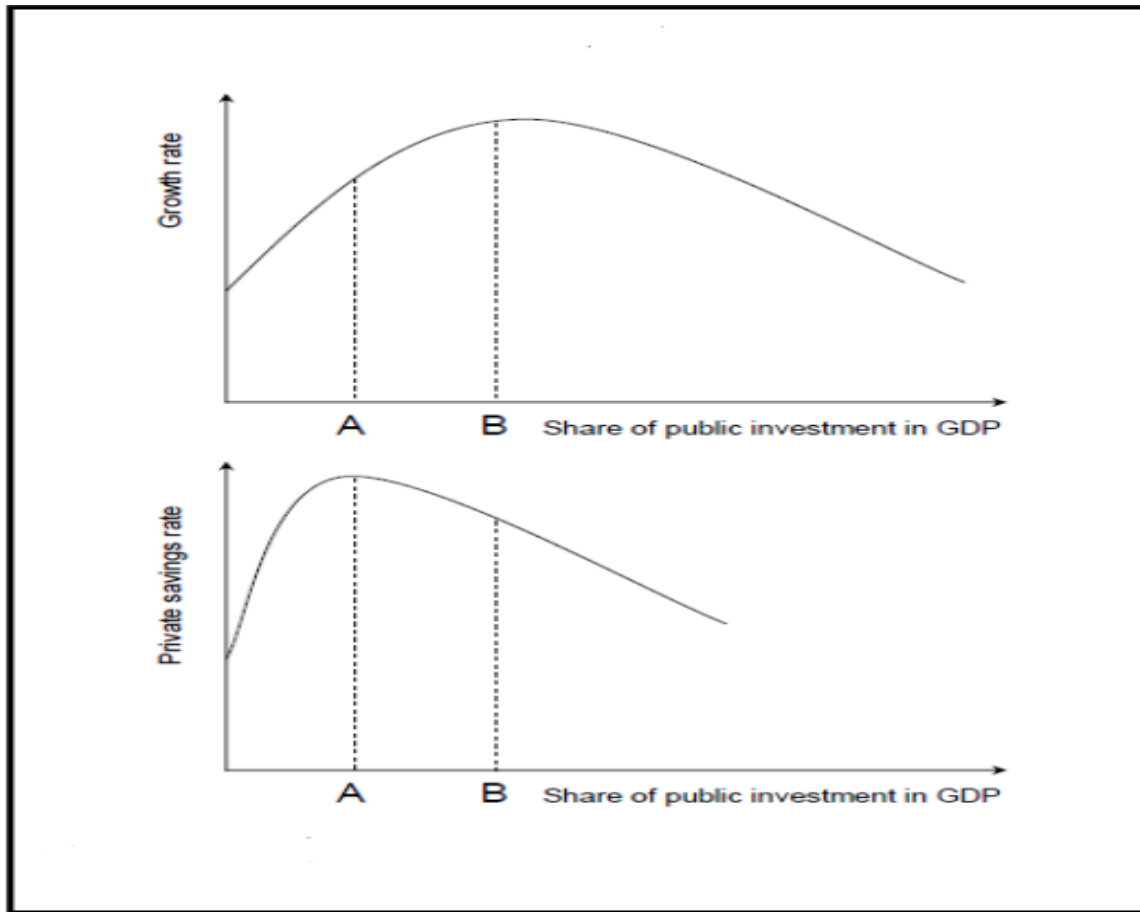
Private savings make a major contribution to economic growth and are controlled mainly by changes in returns to private investments (Aschauer, 1998 and Anderson *et al.*, 2006). When public and private capitals are complementary, public investment raises the marginal productivity of private capital. This in turn raises the returns to private investment and, if private savings are flexible, the amount of private investment increases. This 'crowding-in' of private investment in turn increases the rate of economic growth.

However, although public investment is almost certain to crowd in private investment when starting from low levels, it is unlikely to do so at all the levels (Cwik and Wieland, 2010). This is because increases in public investment have successively smaller positive



impact on the returns to private investment, while taxes required to finance have a constant negative impact. At some stage, therefore, it is inevitable for increases in public investment to ‘crowd-out’ private investment. Nevertheless, South Africa is in all likelihood, a long way from this point, given its low level of tax revenue relative to GDP of 25.2 per cent for 2010/11 (South African Revenue Services, 2011).

Following the model presented by Barro (1990), three stages in public investment can in fact, be distinguished as shown in Figure 3.1. For levels of public investment up to point A, public investment increases the returns to private investment, the rate of private savings and the growth rate. This is the ‘crowding-in’ phase. After point A, the (negative) effects of higher taxes offset the (positive) effects of increased public capital on returns to private investment, and thus, further increases in public investment lower the private savings rate. Nevertheless, between points A and B, increases in public investment still raise the growth rate, because public investment remains highly productive. This can therefore be described as the ‘efficient crowding-out’ phase. Past point B, public investment is less productive, and further increases lower both the savings rate and the growth rate. This is the ‘inefficient crowding-out’ phase. The optimal level of public investment as a share of GDP is therefore, point B.



**Figure 3. 1: Stages in Public Investment in relation to GDP**

Source: Barro (1990).

The Barro (1990) model assumes that public investment is financed through taxation. Varied outcomes are expected on the effect of public investment on growth depending on whether public investment is financed through borrowing, through aid or several other ways. Besides, the effects of public investment on growth are complicated and depend on assumptions made about time horizons and inter-generational altruism (Anderson *et al.* 2006). This therefore is more of a subjective matter that can only be analysed empirically.

### 3.2.1.3 Market accessibility

Important aspects regarding accessibility were raised in both the “New Institutional Theory” postulated by North (1989), and ‘New Economic Geography’ models studied by Krugman since 1990’s. These two schools of thoughts advocate that improvements in domestic transport and communications infrastructure can have significant effects on

growth. The former theory is supported by the fact that, by lowering transactional costs, farm margins are raised. Reductions in transactional costs boost average income from farming activities. The later theories postulate that, by driving a cumulative process by which labour and other resources can be easily moved to a small number of core regions and/or cities in which (because of increasing returns) levels of labour productivity is high, an acceleration in a country's rate of growth is caused, which may well persist over several years if not decades (Krugman, 1991 and Anderson *et al.*, 2006). Agricultural commodities are bulk and perishable. The application of these models in the agricultural sector suggests that the government should intervene in the intergration of markets for agricultural produce as a way of reducing transaction costs and thus improve farm margins. Market accessibility can be made improved increased public spending on transport infrastructure and improved communication infrastructure.

#### **3.2.1.4 Increased aggregate demand**

In Keynesian economic models, public investment affects the level of national income through its effect on aggregate demand (Cwik and Wieland, 2010). Such models assume that, because of inflexible wages and/or prices, economies sometimes operate at less than full employment. In such cases, an increase in public investment would have an immediate positive impact on the level of national income, followed by a successively smaller positive impact in a limited number of subsequent years (Anderson *et al.*, 2006).

Aggregate demand curve is the sum of individual demand curves for different sectors of the economy. The aggregate demand is usually described as a linear sum of four separable demand sources and the Keynesian mathematical model is specified as:

$$AD = C + I + G + (X-M) \text{-----} 3.2$$

Where C is consumption (may also be known as consumer spending, I is investment, G is governemnet spending,  $NX = X - M$  is the net export, X is total export and M is total imports  $= a_m + b_m(Y - T)$ .

In Keynesian economics, investment is affected by the output and the interest rate ( $i$ ). Consequently, we can write it as  $I(Y,i)$ . Investment has positive relationship with the output and negative relationship with the interest rate. For example, an increase in the interest rate will cause aggregate demand to decline. Interest costs are part of the cost of borrowing and as they rise, both firms and households will cut back on spending. This shifts the aggregate demand curve to the left. This lowers equilibrium GDP below potential GDP. As production falls for many firms, they begin to lay off workers, and unemployment rises. The declining demand also lowers the price level. The economy is in recession. In sum, for a single country at a given time, aggregate demand ( $D$  or  $AD$ ) =  $C + I_p + G + (X-M)$ . These macro variables are constructed.

Alternatively, for economies with some positive underlying rate of growth, a rise in public investment should initially cause growth to accelerate, followed by a gradual deceleration back to that underlying rate. There, in fact, have been many examples of such growth accelerations in developing countries in recent decades, as shown by Edmeades (2007), although it is not known what proportion can be attributed to increases in public investment.

### **3.2.1.5 Increased national savings**

It is also possible that public investment will increase economic growth simply by raising the rate of national savings (Black *et al.*, 2000). Put simply, a government can in some circumstances, increase the share of national income that is saved by taxing consumption and investing the revenues it generates (South African Revenue Services, 2011). In the national income accounting identity, saving refers to cash income saved and investment refers to expenditure on real capital goods (but could arguably include intangibles like human capital). The identity derives from the fact that any expenditure on investment must be financed by saving somewhere in the system, and any income saved must be invested somewhere in the system. The financial system operates as the intermediary by channelling savings (e.g. bank deposits, purchases of equity, purchases on bonds, etc.)

into investment (e.g. expenditure on buildings, employee training, stockpiles of goods, knowledge). It is important also to realize that the identity is between both planned and unplanned savings and investment. For example, if a firm purchases a stock of goods it intends to sell, but is unable to do so, then this would be counted an unplanned inventory investment.

Assuming a constant proportional income tax at rate  $t$ , and that a constant average proportion of pre-tax income  $c$ , is consumed, and a constant average proportion of pre-tax income  $s = I - c - t$  is saved (so that  $c + s + t = I$ ), and let  $G$  be government expenditure on all goods (both services and investment) and  $I$  be private investment expenditure. The national income accounting identity can then be expressed as:

$$C + I + G = cY + I + G = Y \text{-----} 3.3$$

$$cY + I + G = Y(c + s + t) \text{-----} 3.4$$

The government budget surplus  $B$  is:

$$B = tY - G \text{-----} 3.5$$

Combining these two equations gives us:

$$I = sY + B \text{-----} 3.6$$

This identity tells us that private sector investment is equal to private saving plus government saving. A budget surplus implies government saving because the government is raising more in tax revenue than it is spending. For this particular effect to occur, the rate of private saving must not fall significantly as public investment reduces the returns to private investment. However, whether a government can raise national savings in this way is of course, contested. Most notable, is the argument referred to as the ‘Ricardian equivalence’ associated most usually with Barro (1974), that current generations will in response to a tax rise (fall), adjust their own savings downwards (upwards) by an amount that leaves the national savings rate unchanged.

### **3.2.1.6 Effects on employment, interest rates and exchange rate.**

Public investment is likely to affect not only the rate of economic growth, but also a range of other key macro-economic variables. Firstly, in countries operating at less than full employment, public investment tends to increase the level of employment, at least in the short-term, by stimulating aggregate demand (Cwik and Wieland, 2010). Secondly, when public investment is financed from domestic borrowing, it will tend to increase domestic interest rates which, like tax-financed public investment, may ‘crowd-out’ private investment. This need not be the case, however, since public investment can also raise returns to private investment. Furthermore, from the point of view of maximising economic growth, a certain amount of crowding-out of private investment can still be efficient.

Finally, when public investment is financed from external borrowing, or aid, it will tend to appreciate the real exchange rate, and reduce the competitiveness of tradable sectors of the economy (the ‘Dutch disease’ phenomenon). It is often argued that this has an adverse effect on growth, since (it is argued) tradable sectors are typically the engine for productivity growth and ‘learning-by-doing’ effects (Anderson *et al.*, 2006). Nevertheless, Adam and Bevan (2006) show that the tendency for externally financed public investment to appreciate the real exchange rate is reduced, and may even be reversed, when taking into account the ‘supply-side’ effects of public investment on productivity in the tradable and non-tradable sectors.

These theories explain clearly the overall impact of public investment on economic growth and even further explained that their effects are derived and subjected to empirical testing. Public expenditure remains an important input when promoting economic development. These theories seem to have strong implications for overall rural development and increased agricultural production. They illustrate the need to be cautious when investing in growth. The different types of investment have either a direct or an indirect effect on the growth rate. At the same time, of course, all the different categories of investment affect production in a different manner. This therefore implies

that the relative magnitude of these effects depends among other things, on the nature of investment, nature of the production process, source of financing and the efficiency with which the finances are provided. Nevertheless, according to Anderson *et al.* (2006) the above explanations possess important drawbacks as they fail to explain the effect of public investment on the distribution of income and welfare. Public investment has important implications on relative prices of goods and services, but all the above theories fail to capture that. This relationship has strong implications on rural poverty dynamics across many countries. The following subject-matter therefore tracks both the challenges in the provision of public goods and the economics of public investment in agriculture development.

### **3.3 Factors Influencing Government Spending in the Agricultural Sector**

Effective public investment positively affect economic, particularly the rate of growth in the agricultural sector. The following is an explanation of the reasons for government's spending on agriculture and worldwide experiences related to the reasons for public spending discussed above. Several explanations have been advanced by economists. Most of these explanations are supported by the above discussed theories. According to Anderson *et al.* (2006), the role of the state in the economy includes:(a)correction of market failures, (b) the social or redistributive function of democratic governments, (c) curb externalities, (d) arrest information asymmetries, and (e) curb imperfect competition. These roles are discussed below in the context of government spending in rural agricultural development.

#### **3.3.1 Correction of market failures**

Governments play an important role in addressing the problem of externalities in the agricultural sector (Smith and Wehba, 1995 and Armars *et al.*, 2010). The existence of externalities in the agricultural sector necessitates public spending. Armas *et al.* (2010) wrote that if social costs or benefits are not fully reflected in agricultural market prices,

then the laissez-faire outcome will be sub-optimal for the sector at large. In order to correct this sort of market failure, Smith and Wehba (1995), suggest that the state needs to intervene. For instance, to ensure the provision of research and development, the state has to intervene by rewarding with patent advances in research and development for agricultural development. Smith and Wehba (1995) wrote that there are circumstances where markets may fail to efficiently and sufficiently produce goods. This may be an outcome of an imperfection in a particular market and/or may reflect the absence of markets for some commodities. Public investment helps correct these market failures through financing the provision of goods that are not efficiently and sufficiently produced by the market.

Alston, Dehmer and Pardey (2006) and Karbasi and Mojarad (2008) also discussed this nature of market failures in agricultural research and the roles for government intervention. Alston *et al.* (2006) noted that individuals will under invest, hoping to catch a free ride on the efforts of others. Countries may under invest in R&D if the results can be adopted and applied elsewhere so that the researcher will capture only a fraction of the benefits from investing in invention. These domestic and international market failures of these types have led to a large, persistent gap between the socially desirable rates of investment in agricultural R&D and actual investments. Poorly functioning markets for inputs and products have been a major challenge to agricultural development (DFID, 2005). Some Asian governments successfully addressed this market failure by assuming a central role in markets themselves, albeit at substantial public cost and often inefficiently. Attempts to replicate these systems in Africa in the 1970s and 1980s largely failed. State owned agencies proved unable to provide reliable services and inputs to needy farmers, despite the huge investments involved (DFID, 2005).

### **3.3.2 Social or redistributive function**

The government may promote equity by using expenditure programs to redistribute income toward particular groups. They can redistribute income via: taxation , aid for the elderly, blind, and disabled and for those with dependent children, unemployment



insurance for the jobless, the last one is subsidize consumption of low-income groups by providing food stamps, subsidized medical care, and low-cost housing. Growth in the popularity of democratic- government- influenced public attitudes has led to the evolvement of the economic role of the state necessitating contributions for public investment (Tanzi, 2008). In most developing countries, governments are pressured by their citizens to widen their economic role to include some social and/or redistributive functions. In such cases, governments rope in several programmes including subsidies on agricultural inputs, provision of credit schemes, public pensions, free public schools, and subsidies. These programmes are financed by public investment funds. This was noticed in European countries during the period between 1960 and 1990 and it is currently a common practice amongst many African countries. Several countries have created public spending programmes aimed at the economic protection of the poor and in most cases these are in the agricultural sector and financed by public funds.

It is also worth mentioning that these programmes are financed with revenue generated from taxes. Because of pressures to deliver such services within a tight budget constraint many governments adopts revenue maximization behaviour and this may hurt rather than help the investment climate. For instance, too high a tax rate may lead to investors leaving the particular local area in favour of areas with more favourable tax regimes. Conversely, too low a rate may put the local area at a serious disadvantage in terms of revenue maximization. Governments should therefore consider all these factors when setting the broad band of tax rates with the local authorities.

### **3.3.3 Curbing externalities**

Public investment may be invoked by poor information flows to stakeholders in the agricultural sector, especially the encouragement of good farming practices. The importance of agricultural extension officers and knowledge of farming systems is now, thus far, widely accepted. Addressing information asymmetries and eliminating information gaps so that farmers can make informed decisions on what to produce, with what level of inputs, and at what prices requires public spending. There may also be

externalities associated with investment projects, with implications for addressing poverty, creating employment and improving the pattern of production. All these aspects are financed by government. The Coase Theorem according to Smith and Wehba (1995) assert that whenever there are externalities, the parties involved can get together and make some set of arrangements by which the externality is internalized and efficiency is ensured.

Imperfect markets are a characteristic feature of the agricultural sector, especially those in developing countries. The existence of imperfect competition may require a different sort of intervention and in most cases government financing. Smith and Wehba (1995), argue that when a natural monopoly emanates either in the input or output market for agricultural products, nationalisation is the only option that can rescue the poor stakeholders in this sector. Besides, there is a growing strand of literature which argues that this argument may be over-regarded before the growing wave of privatisation around the world and suggests that some sort of competition policy may be required to curb imperfect competition through market regulation. Public spending may therefore be employed to finance activities that regulate against monopolistic behaviour which reduces social welfare.

### **3.3.4 Changes in the supply and demand for agricultural research and development**

Research and development financing is an important feature of agricultural development in several rural areas. Government revenues are still the predominant source of support for agricultural research in many less-developed countries (Beintema, Romano and Pardey, 2006). The literature strongly argues that state investment in agricultural research and development helps increase agricultural productivity. Pardey, Alston, and Piggott (2006) thus propose that the issue of financing research and development demand serious attention in many developing countries. According to Pardey *et al.* (2006), there are observed changes in the supply and demand for agricultural technologies in the world's richest countries, which have been the main producers of agricultural technologies. These countries are no longer providing the same levels of productivity-enhancing technologies,

suitable for adaptation and adoption in food-deficit countries, as they did in the past. This therefore calls for increased public spending on agricultural research and development by poor countries. These changes mean that the developing countries will have to become more self-reliant in the development of applicable agricultural technologies.

The following review provides information on the link between public investment and growth in the agricultural sector and how this leads to a reduction in poverty. The review starts by describing the role of public investment in the economy and then provides a link between public spending in agriculture and growth in agricultural production. Following this, a description of the linkages between increased agricultural production and the incidence of poverty is provided. Throughout the review, some light will be thrown on broad worldwide experiences as frameworks for examining the chain of causality between the above mentioned variables.

### **3.4 Public Investment, Agricultural Growth and Poverty**

Public spending is one of the most important policy instruments governments use to promote economic growth, especially in the agricultural sector. Several aspects of the relationship between economic growth and public investment have been explored by economists. This section reviews the empirical relationship between similar variables in two stages. In the first stage, the review examines the chain of causality from public investment to agricultural growth. Explanations are provided for how different components of public spending on agriculture affect productivity in the sector. The second stage examines the relationship between growth in agricultural productivity and the incidence of poverty. The focus of the review reflects doubt and controversy surrounding the role of agricultural development on poverty reduction. Attempts are made to explain whether agricultural productivity is important in influencing the reduction of poverty. Preceding the chain of causality, it is presumed that an estimate of the total public investment required to reduce poverty can be established. The third thread of literature gives a review the cost of reducing poverty as provided in literature.

### 3.4.1 Public investment in agriculture and agricultural growth

Public investment for agricultural development is particularly important given the pressure for substantial increases in agricultural production in poor countries and the role played by public expenditure in agriculturally-led structural transformations in Asia and other countries, and the slow rates of progress towards the reduction of poverty by 2015 as stated by the MDGs in Africa. The trade-off between public spending in rural areas and poverty has been an area of interest for many researchers all over the world (Fozzard, 2001; Fan *et al.*, 2002; Perret, 2002; Anderson *et al.*, 2006; and Chakwizira *et al.*, 2008). Though with unusual outcomes, the overall conclusion reached in contemporary literature is that public investment in agriculture promotes future agricultural growth. Besides the direct impact, public agricultural investment has several multiplier effects on other economic components. Both direct impact and the multiplier effects make public spending on agriculture a powerful determinant of rural transformation and economic growth but mainly through its impact on agricultural output (Mwape, 2009 and Fan *et al.*, 2002). A meta-analysis that summarises the relationship between public agricultural expenditure and its influence on agricultural GDP is presented in the table below.

**Table 3. 1: Elasticity of Agricultural GDP and GDP growth with respect to agricultural expenditure**

Region	Value for Elasticity	Source and Period
43 Developing countries: Elasticity of agricultural GDP growth w.r.t government agricultural spending	0.052	Fan and Rao (2003)
43 Developing countries: Elasticity of agricultural Output w.r.t government agricultural spending	0.037	Fan and Rao (2003)
South Africa's elasticity of real GDP w.r.t real public expenditure	0.0157	Ashipala, J. and N. Haimbodi. 2003
98 Developing countries: Elasticity of agricultural GDP w.r.t ODA	0.03	Schuh, G. E., and G. W. Norton. 1991

Although the impact of public agricultural expenditure on agricultural GDP growth and the real output is positive, the impact is not uniform across nations. The impact ranges from approximately 0.02 to a maximum of 0.05. From the summarised results above, it is accepted as true that a change public agricultural expenditure impact more on agricultural GDP growth rate relative to the impact it have on agricultural output.

The importance of public investment on agricultural production varies depending mainly on the type of investment. Governments may directly finance agricultural production through the provision of inputs. Governments may also influence private agricultural activity through subsidies and/or taxes, or indirectly control activities in the agricultural sector through the provision of infrastructure. Minia (2008) notes that, by allowing for productive public spending, for example, public investment on infrastructure or property rights, results in long-run economic growth. Agricultural development is essential for economic growth, rural development, and poverty alleviation but many agree that this growth comes at a cost – “public investment”. Public spending increases private marginal capital. A number of studies analyze the linkages between public investment and agricultural growth (Fan *et al.*, 2002; Anderson *et al.*, 2006 and Chakwizira *et al.*, 2008) with most providing important information concerning these linkages. Using these and several other studies, this section explores linkages between public expenditure and agricultural productivity.

Strategic public investment in agriculture, particularly in rural infrastructure, irrigation, agricultural research, availability of well-functioning domestic markets, appropriate institutions and access to appropriate technology is highly effective in increasing agricultural production and reducing poverty (DFID, 2005; Pinstруп-Andersen and Shimokawa, 2006; Chakwizira *et al.*, 2008). Private economic activity is likely to be undermined in an environment lacking in physical infrastructure (Smith and Wahba, 1995). The availability of good transportation links and communications systems in particular may be seen as being crucial if a country is to undergo structural transformation in its agricultural sector. Transformations in infrastructure, mostly through public financing, were the core of agricultural growth seen in China between 1978 and

1984 (Fan *et al.*, 2002). Fan *et al.* (2002) made a case for public spending on research and development noting that government has intensified financing this component of agricultural investment because of the great difficulty faced by the private sector in providing an efficient market for it.

The work of Aschauer (1989) is amongst the most important works on public investment and growth in agricultural productivity as the author clarifies the relationship between a decrease in public investment and productivity from agriculture. Aschauer (1989) identified the decline in infrastructure investment as an important factor underlying the U.S. productivity slowdown during the 1970s and 1980s. This suggests that public investment in infrastructure should be an essential component when planning development strategy and predicting agricultural growth performance.

The endorsement and compliance with CAADP as a framework for contribution to increased agricultural productivity provides evidence to support the strong link between the level of public investment in agriculture and agricultural growth. The same linkage is further depicted by reports from different country evaluations on the progress towards the CAADP target. Mwape (2009) notes that of the nine countries that have thus far achieved 6 per cent agriculture sector growth, four of these countries allocated more than 5 per cent of national expenditure to agriculture development in 2006. Angola, Eritrea, Ethiopia, Burkina Faso, Nigeria and Senegal were given as specific examples (Mwape, 2009). This implies that failure to accelerate investments in agriculture will make a mockery of efforts to achieve the CAADP goals, MDGs and many regional goals while at the same time severely limiting opportunities for countries to improve agricultural production. To attract an increase in agricultural production, countries need to finance agricultural development with great attention put on improving the quality and distribution of funds.

Chakwizira *et al.* (2008) comprehensively reviewed government spending in rural South Africa and found that government spending affected economic growth in various ways. The authors submitted that access to roads, markets for produce, credit, electricity, water and education reduced poverty in South African rural areas. Their analysis revealed a unidirectional relationship in all of the above components, where causality ran from government expenditures to growth. The results also illustrated a significant positive effect of government spending on economic growth.

Public agricultural investment affects the poor in an important way. It plays an important role in curbing food price increase and meeting food demand and reducing poverty (Fan *et al.*, 2002). Statistics for South Africa indicate that the overall global food price index increased by 33 per cent from January 2010 to January 2011, reaching its highest level since January 2008 (National Agricultural Marketing Council, 2011). Food price increases, unstable food supply and the existence of large numbers of poor people remain thorny problems that require much government attention in many developing countries. As a result governments are asked to do finance agricultural development.

In a completely different critical analysis of the link between public investment and economic growth, Tanzi (2008) argues that not all countries that allow their public spending to grow significantly score better quantitative results. If increased investment in agriculture is set on past political trends and policies rather than on informed decisions based on the best evidence of the day, the likely outcome will be unfavourable. For agricultural production to increase, the level of public spending should depend on well-thought-out analyses and considerations of what the state could or should do in a modern and more sophisticated market economy.

On the contrary, Nurudeen and Usman (2010) examined the effect of government development expenditure on economic growth during the period 1970-2008 in Nigeria. Their results reveal that government total capital expenditure, total recurrent

expenditures, and government expenditure on education had a negative effect on economic growth.

An important aspect was also raised in literature regarding the provision of public goods (Johnson, 2001). He argued that the public goods and services by the government will only impact positively on poverty if these goods reach the targeted population. Democratic institutions entail particular challenges when allocating public goods. When providing public goods, governments require systems of administration which ensure that public resources are being delivered efficiently and effectively (Johnson, 2001). Misallocation or “corruption” of these services often results in unnecessary inefficiencies which finally results in high inequality and this has got a high positive correlation with the incidence of poverty (World Bank, 2000; the Economist, 2001). To curb this problem, in their discussion of intergovernmental fiscal relations and poverty alleviation in Vietnam, Bird, Jennie, and Govinda Rao (1995) argue for greater decentralisation of spending and revenue decisions to make sure those pro-poor expenditures (such as local infrastructure, health care and education) reflect the preferences, needs and fiscal abilities of different localities.

Gunatilako (2001) proposed that useful insights on the institutional constraints faced by governments in the provision of public goods can be solved by fiscal decentralisation. This theory, according to Momoniat (1998), addresses the vertical structure of the public sector, the assignment of functions and various instruments to different levels of government. It helps in clarifying the ways in which different levels of government relate to one another through instruments such as intergovernmental transfers (Gunatilako, 2001). By so doing, the theory offers useful insights to policy makers intending on targeting agricultural rural infrastructure programmes to reduce poverty. Momoniat (1998) argues that the South African experience indicates that no system, whether centralised or decentralised, will work well in the provision of public goods if basic budget and financial reforms (together with good governance measures to promote transparency and accountability) are not in place. To some extent, South Africa has benefited greatly from the implementation of a multi-year budget framework, where



budgets are set at realistic levels and they are supported by effective monitoring and auditing systems, including in-year management. Public investment can only be effective if the financial statements are submitted on time, with audit opinion and financial statements submitted to the legislature within a specified period (say 6 months) after the end of the financial year.

All the above cases present a strong case for public investment for agricultural development by giving a clear impression of the extent to which public spending can affect agricultural production, especially in developing countries. The importance of public investment in improving agricultural productivity is widely recognised mostly in rural areas where infrastructure is poor (Chakwizira *et al.*, 2008). The development of agriculture requires appropriate infrastructure as deficiencies in transportation, energy, telecommunication, and related infrastructure translate to poorly functioning domestic markets with little spatial and temporal integration, low price transmission, and weak international competitiveness (Krugman, 1991). An investment in agriculture through the provision of better infrastructure improves farm margins, consequently increasing farm investment opportunities and overall income. Agricultural research and development falls in public goods category.

### **3.4.2 Agricultural growth and the incidence of poverty**

Agricultural productivity growth in rural areas is synonymous to poverty reduction (Fan *et al.*, 2002 and DFID, 2005). Several findings emerge clearly from literature specifying that large reductions in poverty at regional level or country level starts with increased agricultural output. Historical experience and economic theory show that positive agricultural growth is a panacea to poverty and this trend has been widely reported in Asia, North America and Europe. In the 20th century, massive public investments in modern scientific research for agriculture led to dramatic yield breakthroughs and poverty reduction in the industrial countries. The breeding of improved varieties, combined with the expanded use of fertilizers, other chemical inputs, and irrigation, led to dramatic yield increases in Asia and Latin America, beginning in the late 1960s (Hazell and Ramasamy, 1999). In 2005, Lipton wrote that poverty decreases recorded in the modern history of

England, India and China started with increased productivity amongst smallholder farmers (Lipton, 2005). These interesting trends were not only observed in the above mentioned regions, recent reports by Mwape (2009) in Africa came up with almost similar findings. A meta-analysis with illustrations of the relationship between agricultural growth and the incidence of poverty is presented in the following table.

**Table 3. 2: Elasticity of poverty with respect to agricultural GDP**

Country	Value for Elasticity	Source
Ghana	-1.78	Diao et al., 2007
Kenya	-1.25	
Uganda	-1.58	
Zambia	-0.58	
Ethiopia	-1.66	

The trade-off between growth in agricultural productivity and the incidence of poverty were found to be favourable in most countries, as increased agricultural production is found to be reducing poverty. This relationship is more prominent especially in those countries that managed to meet the CAADP target of 10 per cent growth in agricultural productivity (Mwape, 2009). Structural transformation processes in England, India and China motivate the examinations of the linkages between agricultural production and poverty reduction. A number of studies have attempted to analyze the relationship between growth in agricultural productivity and the poverty incidence across many countries and time periods. In South Africa, Machethe (2004) noted that growth in agriculture contributes to poverty reduction through increased wages, non-farm employment and low food prices for the general populace, but no exact estimates of elasticity were given. There is strong evidence to explain agricultural growth's conduciveness to poverty reduction. Moyo (2007) propose that the promotion of agriculture is the pathway out of poverty and inequality in rural South Africa. It is agricultural productivity that has allowed the poor countries to prosper. Almost none of the poor countries have achieved economic prosperity without first increasing agricultural production (DFID, 2005).

### **3.4.2.1 Key elements of agricultural transformation and poverty reduction in developing nations**

The experiences of China are always referred to when explaining the transformative effect of agricultural development on poverty levels. Agricultural growth in China over the past three decades significantly contributed to the reduction of the number of poor from 260 million in 1978 to 26 million in 2004 (Fan *et al.*, 2002). Fan (2002), notes that the highest productivity growth in China took place during the initial phase of rural reforms from 1978 to 1984 and this growth was highly correlated with agricultural growth stemming from institutional and agricultural production changes. The study by Fan *et al.* (2008) clearly shows that agricultural productivity gains led to a rapid fall in poverty in China between 1980 and 2000. Strong performance in the agricultural sector proves to be a precursor to poverty reduction. Poverty fell from as high as 27 per cent to 5 per cent between 1980 and year 2000. This implies that what is required to reduce poverty in Africa and any other region is to get agriculture moving. Agriculturally led growth in areas inhabited by the poor provides more benefits to the poorest members of the population.

Mozambique has also experienced substantial economic growth since the mid-1990s with the main dynamic for poverty reduction being increased production in agriculture, the main economic activity for the country. The agricultural sector is the second largest contributor to GDP growth by sector (after manufacturing), between 1996 and 2003, accounting for 1.7 per cent out of 8.6 percentage points. Statistics by the World Bank (2005) show that agriculture's contribution to poverty reduction in Mozambique has been the largest with no less than 11 of the 15 percentage points in total poverty reduction being due to households whose heads worked in agriculture. Overall, agricultural growth experienced in China and Mozambique was a major achievement and gave these two countries an unprecedented level of poverty reduction. It represented the successful adaptation and transfer of the same scientific revolution in agriculture that the industrial countries had already appropriated for themselves.

### **3.4.2.2 Lessons from the linkages between agricultural growth and poverty reduction**

In Africa, where 70 per cent of the poor work primarily in agriculture, acceleration of agricultural productivity growth offers a potentially tool for income growth among the rural poor(Christiansen and Demery, 2006). Agriculture remains the most effective engine for growth and poverty reduction and investing in the small-scale farm sector represents the most effective way for stimulating growth and reducing poverty. These linkages and the composition of people practising agriculture make agriculturally led growth pro-poor.

Increased agricultural productivity does not automatically lead to poverty reduction (DFID, 2005). Cases have been noted in literature where increased agricultural productivity did not bring the required reductions in poverty. Pasha and Palanivel (2004), mention that the growth must be pro-poor in order to have a positive effect on poverty reduction. Therefore, for agricultural productivity to impact positively on poverty, an analysis should be made on who benefits from that current increase in agricultural productivity and regional disparities in the distribution of benefits should be accounted for.

For agriculture to effectively reduce poverty and contribute to income growth, Govereh *et al.* (2009), suggests that the agricultural system should move away from subsistence orientation to an integrated system based on inordinate specialisation and exchange. This avenue is yet to be explored in most of the regions where poverty is still unbridled. This therefore points to a lucrative opportunity for reducing poverty in those areas that are still subsistence oriented.

It is important to note that the role and impact of agriculture in the process of poverty reduction is not uniform across countries. As low income countries successfully develop, the contribution of agriculture in poverty reduction is thought to be getting smaller (Thirlwall, 1995). As economies grow, the contribution of the agricultural sector to

poverty reduction is reduced. Poverty reduction will be largely an outcome of increased output in the non-agricultural sector. This only implies to the direct impact, the agricultural sector will however continuously contribute in terms of provision of industrial inputs. The role of agriculture in reducing poverty should not be underestimated as reductions in poverty witnessed across several regions are an outcome of the complementary effects of both the agricultural and non-agricultural sector. Poverty reduction over the past 40 years has been closely related to both agricultural growth and the country's agricultural performance (Thirlwall, 1995).

The strong links between agricultural production, increasing rural income and reductions in poverty remain central to the policies of many countries that have successfully reduced poverty levels. It is important to understand whether these linkages remain influential in areas that are still recording high poverty rates as were during the Green Revolution. Unlike the Green Revolution era, modern agricultural development is challenged by various factors (DFID, 2005). Such factors limit the impact of agricultural growth on the rate of poverty reduction and the rest of the economy. Limited access to finance, inequitable access to productive resources, poorly functioning markets, poorly developed infrastructure and the risk associated with adverse weather and prices are on-going challenges in many sections in the developing world (DFID, 2005). Favourable growth trends in any region can only be achieved by addressing these factors. Furthermore, it is important to note that growth cannot happen in an environment characterized by limited support in terms of public investment and infrastructural development.

Replicating growth similar to that of the Green Revolution might not be difficult in any region (Mwape, 2009 and Fan *et al.*, 2002). Furthermore, the same developments can be replicated in Southern Africa given the large number of poor farmers and the nature of agriculture. Mwape (2009) recommends that countries in Africa need to accelerate economic growth, particularly in the agricultural sector to achieve the Millennium Development Goal 1 (MDG1). Countries across Africa need to score significant increase in agricultural productivity but of different magnitudes for them to meet the MDG1. This

implies that the associated linkages between agricultural growth and reductions in poverty are not particular to selected countries.

### **3.4.3 Agricultural production and the incidence of poverty in South Africa**

For the sake of this study it is relatively important to present a review of work carried out for South Africa and Eastern Cape in order to assess whether the acquired lessons from worldwide experience can be replicated in South Africa, chiefly in the Eastern Cape Province. Poverty is indeed widespread in Eastern Cape Province as a whole. It is worst in the former homelands where more than 50 per cent of the population is classified as poor (Perret, 2002). In Africa, Gallup, Radelet and Warner (1997) reported that every 1 per cent increase in per capita agricultural output led to a 1.61 per cent increase in the incomes of the poorest 20 per cent of the population. Thirtle *et al.* (2001) confirms the same results by asserting that the same increase can reduce the number of people living below the poverty line by 0.83 per cent.

In South Africa, majority of the poor live in rural areas and their income come from both agricultural and non- agricultural activities (Ndhleve and Obi, 2011) and strong linkages are always reported between agricultural growth and reduction in income poverty (Machethe, 2004). Thus agricultural growth can have the same poverty reducing effect as that recorded in the Asian countries here. Moreover, the magnitude of poverty in the former homelands, the numbers of people involved in agriculture and the millions of lives in rural areas confirms that transformation of rural South Africa requires nothing short of a radical change in the agricultural sector.

In South Africa, agriculture has several growth linkages with the non-agricultural sector. These same classic links between agriculture and the wider economy that worked so well in Asia can work elsewhere today (Machethe, 2004 and DFID, 2005). The same type of development if adopted by poor countries, with the same bias towards the poor will definitely have a huge positive impact on poverty. The results of many case studies offer more support for the notion that the development of agriculture reduces poverty.

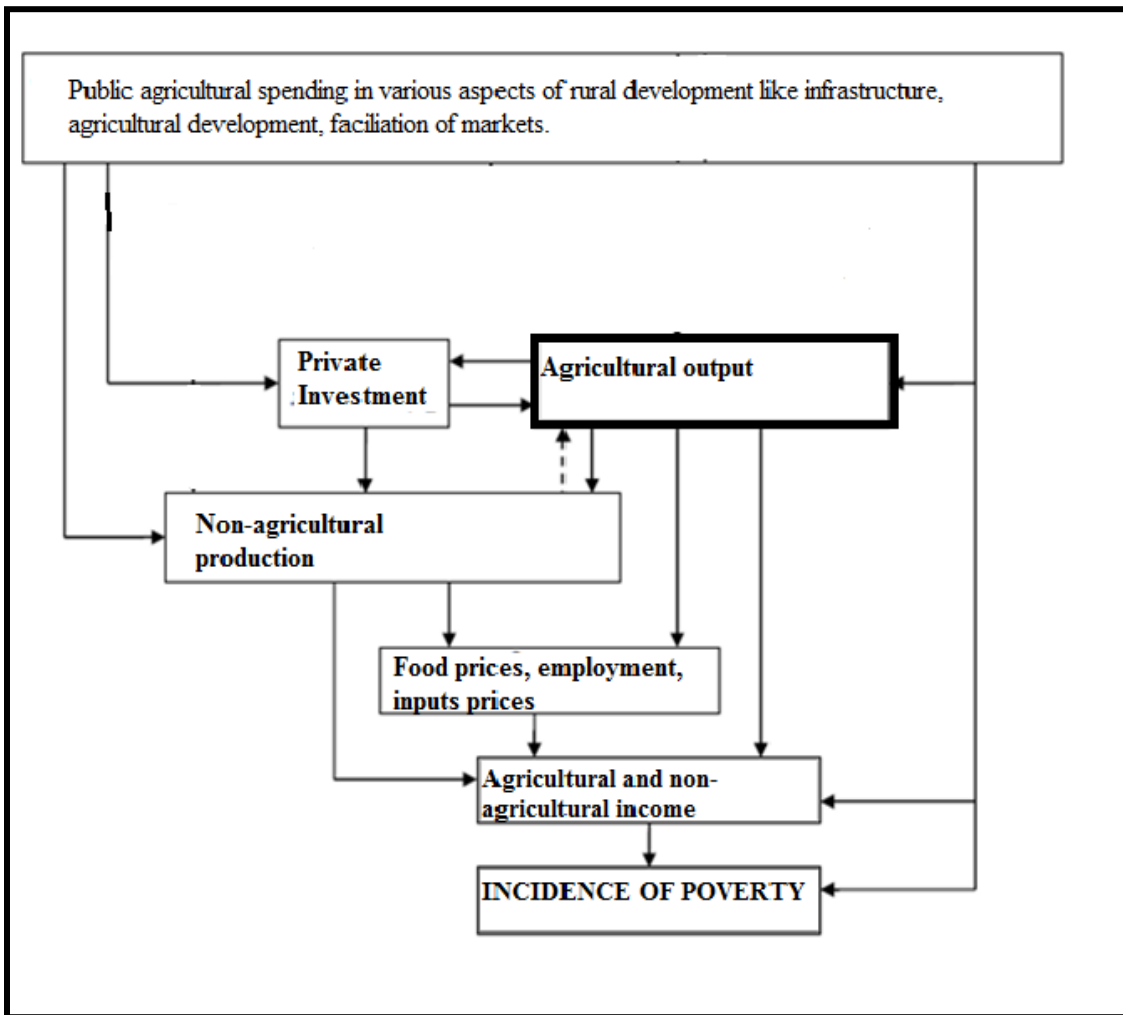
For various developing countries, agriculture is the largest sector in terms of its share in GDP and employment (DFID, 2005). More importantly, majority of the world's poor live in rural areas and depend upon agriculture for their livelihood (NEPAD, 2003). Agriculture is therefore critical both for economic development and poverty reduction. It follows that spending on agriculture is one of the most important instruments for promoting economic growth and alleviating poverty in the rural areas of South Africa. Govereh *et al.* (2006) posits that economic development in Asia, North America and Europe was primed by transformations in their agricultural systems. Developments in the agricultural sector result in increased incomes of the poor and therefore improve living standards.

### **3.5 Theoretical Framework**

The bulk of the foregoing discussion dwells much upon the linkages among public investment, economic growth and poverty reduction and how these are linked to various economy-wide variables. They explain factors linking public investment to economic growth, individual households and the economy as a whole. This background information can be used to develop crucial methodologies that can be used in any study of this nature. To prompt empirical analysis, Fan *et al.* (2002) proposes that a simple diagrammatic framework showing the linkages between the variables under study can help in drawing the several pathways through which public investment in agriculture results in changes in the incidence of poverty.

Clear channels can be drawn from the above review. Public expenditure positively affects agricultural production. In addition to the impact of agricultural production, public investment in agriculture directly creates non-farm rural employment opportunities, thereby directly augmenting rural wages and incomes and thus reducing rural poverty. Public investments indirectly affect poverty as they affect income, production, wages and employment. Following these channels, this study is therefore designed around the conceptual principles relating to the two sources of rural income, agricultural income and non-agricultural income. Part of the framework was adapted from Fan *et al.*, 2008 and

some modifications were done so that the framework fits the current analysis. Figure 3.2, below, portrays the theoretical framework. This framework will be used to prompt the analysis as it lays the basis for the selection of the equations that will be developed to estimate the relationships among the variables under study. It builds a picture of the aggregate impact of public investment by incorporating a wider range of direct and indirect effects of public investment as presented in the literature. The framework represents a static model that assumes that prices of inputs, wages and level of employment do not change in the short run. The framework can more relevant for predicting the impact of public investment on the poor (Fan *et al.*, 2002).



**Figure 3. 2: Linkages between public spending and rural poverty**

Source: Fan *et al.* (2002)



Many researchers who analyse the linkages between public investment and economic development have come up with an almost similar framework with the arrows pointing to the direction of linkage. In their analysis of public investment in China, Fan *et al.* (2002) developed a framework with slight differences. The current model acknowledges the existence of backward linkages in the economy as shown by arrows pointing backwards. The model by Fan *et al.* (2002) does not portray the existence of backward linkages between agriculture and other sectors. Their model rather shows a direct link between agriculture and rural poverty, implying that agricultural income has a direct effect on rural poverty. They further explain that the development of agriculture is key to rural social and economic life. The framework by Fan *et al.* (2002) tallies very well with the outcome of their research. After disaggregating agricultural spending into its various function, Fan *et al.* (2002) found that government spending in rural infrastructure, technology and education reduces poverty significantly. They stressed that developments arising from public investment in roads, transport and telecommunications, and market infrastructure result in integrated markets thereby reducing transportation and transactions costs. This implies that the variables displayed in their framework can further be disintegrated into different factors. This model is a modification of the one proposed by Fan *et al.* (2002) because it is a static model that assumes no change in climatic conditions, wages and market prices.

The arrows in Figure 3.2 show the direction of the effect and the factors behind the effect. Figure 2 can also be presented mathematically as:

$$P = f(AGDP \text{ per capita}, NGDP \text{ per capita}, \varepsilon) \text{-----} (3.8)$$

$$AGDP = f(\text{Public investment}, \text{Private investment}, \text{food prices}, \text{wages}, \text{input prices}) (3.9)$$

Where  $P$  is the incidence of poverty and  $AGDP$  is the agricultural gross domestic product and  $NGDP$  is the non-agricultural gross domestic production. The novelty in the model presented above is that it tries to make it clear that besides the direct effects of agricultural development, there are the multiplier effects as shown by the arrow pointing

to non-agricultural income and the poverty reduction. The effects of agricultural development are also linked to decreases in commodity prices, changes in wages and several other economic variables. Furthermore, the framework above does not neglect the effects of exogenous variables like population growth, agro ecological conditions, urban growth, institutional and policies. Fan *et al.* (2006) emphasized that the omission of one variable will result in biased estimates.

### **3.6 Cost of reducing poverty to MDG1 level**

The above arguments present definite channels through which increased public investment in agriculture can lead to increased productivity from the sector and consequently to a decrease in poverty. Mindful of these linkages, the arguments presented in this section follow research on estimating the required public investment to reduce poverty. Accurate and realistic estimates of the resources required to meet the MDGs are assumed to lead to coherent plans government departments and countries can use for planning resource allocations and effective use of scarce public resources. According to Mphuka (2005), calculating the cost of reducing by half the proportion of the poor by 2015 is a key step in helping regions to deduce the financial demands for reaching the set goal. This section provides a review of various estimates of investments requirements for different countries. This therefore sheds light on financing gaps across different regions in achieving the MDGs and also highlights the role of public investment in filling in that gap.

Several studies have provided insights on costing different sets of MDGs with different outcomes (Mphuka, 2005 for Zambia, Fan *et al.*, 2008 in Africa). Summing all the previous studies, a recent report by *IFPRI* mentions that the total cost of halving poverty by 2015 (the MDG1) could range from between \$8.5 billion to \$62 billion per year (Fan *et al.*, 2008). The variation in these estimates calls for immediate inquiry as Fan *et al.* (2008), attributed the wide variation in cost estimates to differences in methodological approaches, data quality and sources, underlying assumptions about future population

growth, target interpretation, countries covered, unit costs of investments, and the parameters used in linking investment to growth and poverty reduction.

The resource requirements for achieving MDG1 in Africa were also provided by Devarajan *et al.* (2002) in the Zedillo Report<sup>2</sup>. Their study estimates that an additional \$10 billion per year over current spending will be needed to achieve a 6 percent economic growth rate and meet the MDG1 in Africa. In their World Bank study, Devarajan *et al.* (2002) estimated that Africa will need additional investment ranging from \$54 to \$62 billion per year. This value was reached by first estimating the additional income growth required to meet the MDG1, and then estimate the resources needed to achieve this growth. Most recent studies by Fan *et al.* (2008) show a lower figure for Africa as a whole with an estimated required investment ranging from \$32-\$39 billion per annum. A comparison of estimated costs by Fan *et al.* (2008) with previous studies by Devarajan *et al.* (2002) shows that the estimates have decreased significantly. This implies that Africa as a whole may be making good progress towards achieving the MDG1.

Country-specific studies have been carried out for Ghana, Tanzania and Uganda, yielding estimates that the total annual public investments needed in these countries to achieve the MDGs would be \$80 billion, \$96 billion and \$92 billion in 2006, respectively, and increased to \$124 billion, \$161 billion and \$143 billion by 2015 (UNDP, 2005). In a similar study, Mphuka (2005), found that Zambia will need to invest on average of US\$110 per capita per year in capital and operating expenditures towards meeting the MDGs. This same study estimated that development finance needs to be scaled up from US\$87.8 per capita in 2005 to US\$129.5 per capita by 2015. Mphuka (2005), citing the UN's Millennium Project report, state that a typical low income country in 2006 will need to invest around US\$70-US\$80 per capita in capital and operating expenditures to reach the MDGs. These figures have an important implication for the amount of resources required to meet the MDG1.

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<sup>2</sup>Estimates based on the Latin American experience suggest that in order to sustain 6 per cent growth, an investment rate of 28 per cent of GDP is needed. The Zedillo Report assumes that similar rates of investment will be required for other less developed economies

Recent estimates are likely to provide more accurate information on these estimates. In 2008, Fan *et al.* provided the required percentage increases in needed to meet MDG1 in Africa and that for sub-Saharan Africa. According to Fan *et al.* (2008), Africa needs to increase their annual agricultural spending by 20 per cent annually to achieve MDG1. Country level required annual increases ranges from 9.5 per cent to 50 per cent per annum. The worst estimate was that of Zimbabwe where the worsening situation during those years required a 50 per cent annual growth rate in spending in agriculture for MDG1 to be achieved. Sub-Saharan countries needs to increase its annual agricultural spending by US\$3.8 billion to achieve MDG1 (Fan and Rosegrant, 2008). The amount allocated to agriculture by various countries should be increased since countries are spending less than the estimated figures. A huge agricultural financing gap exists in Africa and this gap is seemingly high in sub-Saharan Africa. This implies that governments in this region will need to consider increasing their agricultural spending in order to achieve MDG1. These governments should put the funding process in place to attain this global goal of reducing poverty. Country estimates remains necessary as tools for planning. Table 3.3 provides a meta-analysis of the cost of reducing poverty in selected regions and the sources of these estimates.

**Table 3. 3: Estimates of the costs of meeting MDG1**

Author	Estimates
Zedillo Report	\$20 billion per year
Devarajan (2002)	\$54-62 billion per year
Hunger Model (UN)	No estimates provided
UN Reports (2005)	a) Ghana, \$80 per capita in 2006; b) Tanzania, \$96 per capita in 2006; c) Uganda, \$92 per capita in 2006
Rosegrant et al. (2005)	\$238 billion from 1997-2025
Besley and Burgess (2003)	5.6 percent
Hanmer and Naschold (2001)	2.4 percent
UNDP (2003)	a) Cameroon, 7 percent; b) Malawi, 6 percent; c) Tanzania, 5 percent; d) Uganda, 5 percent
Kakwani and Son (2006)	Growth rate varies at 1.5, 5.4 and 2.4 percent for pro-poor, anti-poor and neutral distributions, respectively

Following several works on costing of poverty reduction and the cost of achieving MDGs it is important to note that countries cannot reach these goals by increasing public investment only. From a policy perspective, Cabral *et al.* (2006) advises that escalating public investment in agriculture will need careful sequencing. Although information on the magnitude of spending required to achieve MDG1 is available, Cabral *et al.* (2006) notes that there are several challenges that emerge with increased investment which should be noted. Therefore, scaling up public investment should be supported by interventions aimed at improving government institutional and operational capacity on adjustments to national policy priorities. All the economic opportunities in every setting should be observed including those beyond agriculture and the rural space. The third issue mentioned by Cabral *et al.* (2006) was the political perspective of increasing public investment for the purpose of poverty reduction. Incremental public investment requires strong ownership of development interventions, whether at continental (e.g. via NEPAD), national or local levels (Cabral *et al.*, 2006). According to Hall and Aliber (2010), all

development process has to build on existing governance systems and institutions in ways that address threats such as the elite capture, social and economic exclusion.

Increase in investments in smallholder-led and diversified agricultural development will result in significant increases in per capita income and this can provide an engine for broad based equitable growth with positive spill over effects on the poorest and most vulnerable (Chilonda and Minde, 2007). Having come up with different estimates, it is essential to direct these investments to priority areas, particularly into growth enhancing investments if agricultural growth is to be accelerated as countries increase their budget allocations to the agriculture sector. Given the prevalence of limited budgets against the required expanded public spending across nations, it is quite obvious that increasing public rural investment is significantly difficult. Therefore, according to Chilonda and Minde (2007), countries must use their public investment resources more efficiently by allocating to functions that boost agricultural production and benefiting the poor. In Southern Africa, Chilonda and Minde (2007) recommend that increased investments need to be directed to priority areas such as market related infrastructure and research and technology developments in order to speed up agricultural growth is to be sped up. Improved efficiency in the use of public funds can also be achieved by improving efficiency within the agencies that provide public goods and services, like government departments of agriculture (Govereh *et al.*, 2009).

The foregoing review provides reliable information on the marginal effects of public spending in agriculture and various types of government spending. These estimates are crucial as they help governments in making sound investment decisions (Fan *et al.*, 2008). Despite various differences in economic systems, natural resource endowments, socio-economic conditions, and size across all the discussed studies, a decision can be made on the type of investment to prioritise when reducing poverty is intended. Lessons can be drawn especially on the idea of careful targeting of investment. The diversified impacts of different types of public spending on the poor across different countries are also informative. They provide information on linkages between the actual public

spending and the institutional and operational capacity of any given country (Fan and Rosegrant, 2008).

### **3.7 Methodological Issues**

A number of methodologies have been applied in trying to understand the process of the linkages between agricultural public spending and agricultural growth, and between agricultural growth and poverty reduction. Many of these methodologies have involved descriptive, theoretical, philosophical and analytical approaches (Fan *et al.*, 2008). Three models that estimate the relationship between public agricultural spending, growth in agricultural production, and that make use of non-parametric statistics are particularly familiar. Various macroeconomic models, econometric estimations and mathematical modelling techniques have featured quite prominently in works that attempt to estimate the amount of resources required to meet MDG1 (Fan and Rosegrant, 2006; Fan *et al.*, 2008 and Devarajan *et al.*, 2002). There are about nine main methods described in the literature on costing poverty reduction to meet the MDG1 (Fan *et al.*, 2008). This chapter starts off by undertaking a review of macroeconomic models for policy analysis and forecasting in South Africa, especially those that are related to this study.

#### **3.7.1 Macroeconomic models for policy analysis and forecasting in South Africa**

The study aims to understand the effect of public spending on agricultural growth and determine what the net effect will be on poverty. This set of occurrence can be addressed through the development of an economy-wide modelling framework. Jerome (2004) noted that policy formulation on complicated chains of cause and effect, and influence between the numerous interacting variables should rely on models that provide a logical abstract. Models have logical consistence framework that provide analysts and policymakers with a valuable presentation of the sector and a laboratory for testing ideas and policy proposals. These same models can be used for forecasting, consistence checking and optimization. Jan Tinbergen formulated the first structural macroeconomic model for the Dutch economy in 1936. The first model proposed by Tinbergen can be

characterized by planning stages and has important implications on total investment and saving requirements. Since then considerable progress and use of these models has been an important feature of every macroeconomic analysis. A wide spectrum of choice is currently available, ranging from sectoral to economy wide models, static to dynamic and short and long term incorporating insights of many theoretical approaches including Keynesian, neoclassical, monetarist, supply side, and rational expectations. A number of macroeconomic models have been developed for economic policymaking in South Africa and these models according to Jerome (2004) have found applications in various spheres including trade liberalization, green trade restrictions, currency devaluation, government expenditure and restructuring. Seventer (2002) and Jerome (2004) distinguish among several types of macroeconomic analysis available for policy making in South Africa as follows:

- (i) Macroeconomic models/Fore casting models
  - The National Institute for Economic Policy Model
  - The World Bank Macroeconomic model
  - The Industrial Development Corporation's CGE model
  - The Development Bank of Southern Africa (DBSA) Model
  - International Food Policy and Trade and Industrial Policy Models
- (ii) Macro-econometric Model
  - University of Pretoria Macro-econometric Model
  - The Reserve Bank Econometric Model
  - The modelling of Inflation Expectations
  - Gross Fixed Investment in the Macro-econometric Model of the Reserve Bank Investment
  - Exchange Rate Adjustment as an element of Development Strategy in South Africa
- (iii) Sectoral Policy Models
  - Trade Policy Reform
  - Monetary Policy
  - Poverty and Income Distribution
  - Military Expenditure and Growth in South Africa



- The Macroeconomic Impact of HIV/AIDS
- ING Barings
- The World Bank: Computable General Equilibrium (CGE) model
- The Bureau of Economic Research (BER)

The purpose of this study is to provide an overview of some of the recent research on the macroeconomics of public investment, agricultural growth and poverty reduction and a discussion on what may constitute fruitful research directions on these concepts. The following is a brief discussion of the typologies of these models, their policy focus and application as presented by Jerome (2004) and Seventer (2002).

The first model to be discussed in this study is the National Institute for Economic policy model. According to Jerome (2004), this model was developed to simulate the requirements of the Reconstruction and Development programme (RDP) in terms of its components like employment creation, changing patterns of income distribution, balance of payments sustainability and the government deficit. This model was an outgrowth of the Macroeconomic Research Group (MERG). It is a development of the structuralist-CGE model, which was later on restructured into a structuralist-macroeconomic model with 1534 endogenous variables and 60 exogenous variables which was used extensively to formulate MERG's quantitative policy recommendations. This same method was used to simulate and plan the requirements for developing the South Africa's infrastructure and the impacts of implementing the tariff reduction schedule under the General Agreement on Trade and Tariff (GATT). According to the projections made by the National Institute for Economic policy model, for the RDP to succeed given the rate of population growth, living standards of the top 20 per cent of households need to remain constant or improve marginally over the next four to five years after which it can improve in line with the growth rate. Fiscal expansion must be targeted at activities which will increase the stock of physical infrastructure, skill formation and physical capital formation. Furthermore, the reform of the tariff system must be gradual enough to encourage enterprises to adjust to international competition and enhance their export capabilities. Over the medium term,

it will be necessary to adopt export oriented incentives for strategic industries in order to partly offset the anti –export bias as a result of tariff reduction and rising imports.

The second type of model was a development of the World Bank and it's a macro-econometric model. This model evolved from the Bank's 1991 study on post-apartheid policy options for the new South Africa. It was used to simulate the macroeconomic consequences of increased public expenditure, provide indications on the sources of growth and mechanisms to reduce unemployment and income inequalities with emphasis on three main areas; macroeconomic policy, industrial policy and public expenditure alternatives. It quantified the effects of different public programmes of varying sizes; the implications of a shift towards more labour intensive investment, improvement in the international environment for South Africa goods and the impact of excessive wage increases. The theoretical underpinning is the mainstream IS-LM model. The dynamic of short run economic activity is determined using the Keynesian aggregate demand model under excess capacity, while the long term activity is determined by neoclassical equilibrium market clearing conditions. In each period, the model calculates the GDP from the national account identity and neoclassical production function and then takes whichever value is lower. The neoclassical production function used captured factor demand, investment and capital stocks, and the model has 300 endogenous variables and 60 exogenous variables. The recommendations from the projections made by the model are: increased public investment will lead to GDP growth, higher employment, an increase in the fiscal deficit, a deterioration of the current account, an increase in wages and possibly a higher inflation rate; without supply-enhancing policies, the sustainability of economic growth will be threatened by rapidly rising foreign debt arising from high current account deficits; without a healthy climate for private investment, sustainable growth will not take place; and a sustainable high growth path revolves around a targeted real growth rate of 5 per cent per year, with a maximum current account deficit of about 1 per cent and fiscal deficit of about 5-6 percent of GDP in the medium to long term (Jerome, 2004) .

The Industrial Development Corporation model developed in 1993 with the assistance of the Impact Research Group of Monash University in Australia. The stated objective of the modeling effort is to assist policy-makers in quantifying the impacts of proposed economic policy measures. Information of computable general equilibrium model and a prototype of the Australian ORANI-F model (Jerome, 2004) and its theoretical underpinnings are provided by the Neoclassical Walrasian general equilibrium theory. The model assumes an optimizing behaviour for individual actors and firms in the economy. It assumes that all industries have a constant elasticity of substitution technology, although input proportions and behavioural parameters may vary between industries. The model is calibrated to a SAM which is disaggregated into 103 single-product industries, 2 classes of commodities, 65 categories of labour and 24 households. The IDC model evaluated the effects of increase in government spending under different financing methods; the implications of capital flows and trade policy on the industrial sector of the economy; the effects of an increase in government spending on provincial gross products; and the implication of the adoption of Uruguay Round trade liberalisation measures.

The other model developed in South Africa that has important implications for the current study is the Gross Fixed Investment in the Macro-econometric Model of the Reserve Bank. This model was used to estimate two investment equations, the gross fixed investment equation of the private business sector and the inventory investment for South Africa. Its modelling and estimation is largely based on the Jorgenson's neoclassical fixed investment theory. This model uses the cost of capital to estimate the impacts of changes in interest rate, the prices of capital and tax rates in a single variable (Jerome, 2004). Gross fixed capital is treated against desired capital stock, capacity utilization rate in the manufacturing sector and capital stock.

Poverty and Income Distribution model is probably the most important contribution made to explicitly analyze the problem of poverty in South Africa. This was proposed by Humphreys in 2000. The model appraised the impact of liberalization on poverty in South Africa using a CGE model of a small open economy. The model is classifies goods

into just three types; primary goods including mining and agriculture; industrial goods and services. Furthermore, it considered only three types of consumers - non poor, poor and very poor; three factors capital, skilled and unskilled labour; and nine goods non traded, import and export variety from each of the three sectors. The model is essentially Walrasian except that it allows for unemployment. It is based on a simplified version of the 1992 SAM with supplemented by labour market and tariff rate data from other sources. Most of the parameters are borrowed from Devarajan and Van de Mensbrugge (1991) and labour market information from Kingdom and Knight (1999).

Applied quantitative macroeconomic analyses can improve policy decisions when combined with sound economic principles. Literature strongly emphasizes the use of analyses that is beyond general principles. Theory often suggests that a policy may have ambiguous effects. Empirical analysis of the specific circumstances is then necessary to determine what the net effect will be. This is especially so when the economy-wide impact of a policy operates through many channels. In a wide range of cases, the intended outcome somehow needs to be measured. In this study, a simple public investment increase maybe proposed in order to increase agricultural output. Applied quantitative analysis is necessary to determine the amount by which public agricultural investment needs to be changed. In South Africa, macroeconomic models have contributed significantly to the solution of many problems including those that are out of context of the current study. These models will continuously be used in the development of policy, and in the search for feasible solutions to the economic policy problems regions. It is in this capacity that they are reviewed in this study.

### **3.7.2 Measuring Agricultural productivity**

Fan *et al.* (2002) and Benin *et al.* (2008), reviewed several approaches that can be used to evaluate the impact of public agricultural investment on poverty and economic growth. Benin *et al.* (2008) state that the role of public investment in agriculture and its effect on overall output can be analysed either by *ex post* analysis or by *ex-ante* analysis. In *ex-post* analysis, Benin *et al.* (2008) and Gujarati (1995) state that econometric methods focus on estimating the relationship between the dependent variable and a set of other

explanatory variables to determine how change in the explanatory variable affects the dependent variable. Rao (2007) further distinguishes between *ex-post* and *ex-ante* analysis by putting them into specific categories. For the *ex-post* analysis, Rao (2007) states that these studies fall into two categories namely, (a) consumer and producer surplus analyses, estimating average returns to research, and (b) production function analyses, estimating marginal rates of return to research. *Ex-ante* studies, according to Rao (2007), fall into four groups, (a) those using scoring models to rank different types of public investment, (b) those employing cost-benefit analysis to establish rates of return to a specific type of public investment, (c) those using simulation models, and (d) those using mathematical programming to select an optimal mix of public investments. In the following section, various models are going to be reviewed for the current analysis, paying attention to the classifications mentioned above.

The literature points to a number of methodologies that explore the relationship between production growth and public investment in agriculture. This section starts by reviewing two main measures of returns to investment. These equations estimate the relationship between public agricultural investment and output from the sector. The frequently used equations in this regard capture the Total Factor Productivity (TFP) and the intensity of public agricultural expenditure (Saboor, Hussain and Munir, 2009; Edmeades, 2007 and Govereh *et al.*, 2009). TFP is a key determinant of country's accumulation of capital and long run growth (Alemu, Roe and Smith, 2005) and the intensity public capital measures the quality of spending (Govereh *et al.*, 2009). Both these measures are manipulated by employing an indexing procedure.

### **3.7.2.1 Total Factor Productivity**

With regards to Total Factor Productivity indices, Saboor *et al.* (2009) state that there are several approaches but the most commonly used is the computation of indices of total output and input factors. This method uses arithmetic indices to compute input and output aggregates. For this purpose, both the Laspeyers index (on the basis of base - year weights) and the Paasche index (taking current year weights) are used. These methods are mainly used when the objective is to explore the growth trend of productivity and its

subsequent trickling-down impact on the economy (Saboor *et al.*, 2009). In simple terms, it is a ratio of the total output index to total input index. This index can easily be derived, given a homogenous production function of a linear nature and of purely competitive labor markets.

Following literature, the overall aggregate production function of any enterprise is affected by the availability of private capital, public capital, natural resources, labour force and the level of technology. This method was also used by Alemu *et al.* (2005) using data from South Africa and Lesotho. Therefore the aggregate production function for any economy takes the form:

$$Y = Af(K, G, N, L) \text{ ----- } -3.10$$

Where  $Y$  is the aggregate output,  $K$  is private capital (human and/or physical),  $G$  is public capital,  $N$  is natural resources,  $L$  is the labour force, and  $A$  is the level of technology, or total factor productivity. Following the above model, an increase in public investment raises aggregate output also raising the productivity of all the other factors of production including labour and it is a static model that assumes that the wages and prices do not change in the short run.

Therefore, the expression for the TFP Index can be stated as:

$$TFPI = \frac{100*(Yindex)}{\alpha + \beta + \delta + \Phi} \text{ ----- } (3.11)$$

Where,  $Y$  stands for gross Value of Agricultural Output

$\alpha$  = private capital Index

$\beta$  = public capital Index

$\delta$  = Labour Index

$\Phi$  = Natural resources Index

$\alpha$ ,  $\beta$ ,  $\delta$ , and  $\Phi$  expressions show proportionate contribution by each factor input to total input cost in the base year. All the four variables, private capital, public capital, labour

and natural resources are important inputs in the agricultural production process. Therefore increase in any of the four indices will positively affect the gross value of agricultural output which in turn implies a higher Total Factor Productivity Index.

### 3.7.2.2 Public agricultural intensity

The quality of investment in agriculture as mentioned by Govereh *et al.* (2009) is an important aspect unlike the size itself. Edmeades (2007) suggest that the main concern for public expenditure analysis is the efficiency in the use of scarce public resources in agriculture. There is wide ranging evidence of inefficient public investments across countries, with funds being allocated to subsidies, or to expensive new capital expenditures rather than for maintenance of existing investments. This method encompasses the issue of efficiency in the use of public funds. It was explored by Edmeades (2007), and later used by Govereh *et al.* (2009). It measures the efficiency of the allocation of public funds by governments. This method measures the quality of public spending by indexing public agricultural expenditure to agricultural GDP to get the measure of intensity of public agricultural spending. Agricultural spending intensity is measured as the share of agricultural expenditure in agricultural GDP. The expression of Agricultural Spending Index (*ASI*) can be stated as:

$$ASI = \frac{PAE}{AGDP} * 100 \text{-----} (3.11)$$

Where:

*ASI* is the agricultural spending intensity expressed as a percentage,

*PAE* is the public agricultural expenditure and

*AGDP* is the agricultural gross domestic product.

### 3.7.3 Agriculture and economic growth

Several methodologies exist in the literature that explores both the contribution of agriculture to economic development and the responsiveness of poverty to increased

agricultural production. This section reviews these methodologies following these two categories as they are classified in the literature. Several authors have tried to analyse these relationships between the rate of economic growth and the growth of agriculture using different methodologies (Anderson et al, 2006; Machethe, 2004; Foster and Valdés, 2005). The following section provides an account of these methods.

### 3.7.3.1 Contribution of Agriculture to Income Growth

The method explained below follows analysis by Valdés and Foster (2005). This method is of interest because it captures both the multiplier effects of agriculture on non-agricultural GDP and externalities that otherwise would not be revealed by input-output coefficients and other methods in the literature. The method, as put forward by Foster and Valdés (2005), uses the reduced form approach to estimate the aggregate effect of agriculture on growth without directly specifying the mechanisms and interactions between agricultural production and other industries.

$$\frac{dY}{dG_a} = \frac{d \frac{(G_a + G_{na})}{P}}{dG_a} = \frac{1}{P} \left( 1 + \frac{\partial G_{na}}{\partial G_a} \right) \text{-----}(3.12)$$

Where:

$Y$  is the sum of agricultural and non-agricultural GDP,

$G_a$  is the agricultural GDP and,

$G_{na}$  is the non-agricultural GDP.

The final term in brackets captures multipliers and externalities, an estimate of which would measure the impact at the margin of the additional contribution of agricultural growth to national growth beyond simply, its share. It captures the direct impact on growth of agriculture and an indirect effect through spill-over effects to the rest of the economy (Foster and Valdes, 2005).



Equation (3.12) can be rewritten as:

$$\frac{d \ln Y}{d \ln G_a} = \left( S_a + S_{na} * \frac{\partial \ln G_{na}}{\partial \ln G_a} \right) \text{-----}(3.13)$$

$S_a$  and  $S_{na}$  are the sectorial shares for agricultural and non-agricultural income. The above expression can be used to assess the share of agriculture in the national economy ( $S_a$ ) and the externalities and multipliers which could be positive, zero, or negative.

### **3.7.3.2 Contribution of Agriculture Growth to poverty reduction**

For long, time series data have been used to determine the responsiveness of poverty to economic growth (Bourguignon, 2003; Chibber and Nayyar, 2007; Pauw and Thurlow, 2010; and Adigun, Awoyemi and Omonona, 2011). A review of studies on the statistical relationships between economic growth and poverty reduction presents several ways of estimating sectoral contributions to economic growth. These methods can be summarised into three categories; (a) running regressions on the log variables of GDP per capita and poverty levels, (b) use of the ratios of changes in poverty to changes in growth over a given period and, (c) use of the decomposition technique that breaks down poverty reduction into growth and inequality components. All three methods measure the Growth Elasticity of Poverty (GEP) as coined by Bourguignon (2003). GEP is used to quantify the contribution of growth to poverty reduction. The concept of growth elasticity of poverty is well established in the literature (Chibber and Nayyar, 2007; Pauw and Thurlow, 2010). GEP is defined as the percentage decline in poverty caused by a 1 percent increase in per capita GDP. Discussions about the sensitivity of the incidence of poverty to poverty reduction have been going on for a number of years (e.g. World Bank, 2000; and Bourguignon, 2003).

### 3.7.3.3 Use of Direct Ratios in estimating Elasticity

For a variety of reasons, estimating a relationship between agricultural GDP and rate of poverty reduction is complex. Poverty reduction in a given year does not depend directly on the current level of agricultural GDP, but rather on past output, prices of commodities, income generated from the sale of output (Van Zyl, 2009; Fan *et al.*, 2002 and Machethe, 2003). In these matters, economic theory does not suggest an obvious estimation strategy, although past empirical studies do provide some guidance. The basic econometric equation for calculating GEP expression that summarises the ratio of annual percentage fall in poverty rate to annual percentage increase in real GDP per capita is expressed as follows:

$$GEP_{ijt} = \frac{d(PR_{ijt})}{d(RYPC_{jt})} \text{-----} (3.14)$$

Where  $d(PR_{ijt})$  is the annual percentage rate of decline in poverty line  $i$  in region (area)  $j$  over the period  $t$ , and  $d(RYPC_{jt})$  denotes the annual rate of increase of gross domestic product (GDP) per capita in region (area)  $j$  during the period  $t$ .

This expression was used to obtain GEP by many researchers (Adams, 2004; Ram, 2010; Lenagala and Ram, 2010). The same method used by Ram (2010) and recently used by Lenagala and Ram (2010) using World Bank data from all developing countries, less-developed countries (LDCs); South Asia; and India. This method according to Ram (2010) is the most direct approach to the estimation of growth elasticities.

### 3.7.3.4 Regression on the log variables of GDP and poverty levels

Many argue that the above equation can lead to biased estimates as they argue that growth in the agricultural sector will not automatically translate into benefits for

the poor (Cervantes-Godoy and Dewbre (2010); Klasen and Misselhorn (2005) and Nurudeen and Usman, 2010). The relationship between agricultural GDP growth and poverty reduction depend on the sectoral allocation of the poor, inter-industrial linkages, level of inequality, initial level of poverty, policy and institutions controlling various sectors. Therefore the method employed should follow the decomposition by sector technique defined as:

$$Pov_{it} = \beta_0 + \beta_1 G_{it} + \beta_2 X_{it} + \varepsilon_{it} \text{ --- (3.14)}$$

Where  $Pov$  is the incidence of poverty,  $B_0$  in a constant;  $G$  is the agricultural GDP per capita,  $B_1$  is the coefficient of agricultural income and  $B_2$  can be any source that contributes to poverty reduction,  $\varepsilon$  is the error or disturbance term and,  $i$  is the region and  $t$  is time (in years). The pattern of income in every source, sector's level of employment and sectoral productivity matters for poverty reduction. The application of this methodology of course requires several data. This same method can be used to decompose poverty reduction into growth and inequality components.

### 3.7.3.5 Growth Semi-Elasticity of Poverty

In 2005, Klasen and Misselhorn proposed the growth semi-elasticity of poverty as the best alternative method for estimating GEP. This procedure was further developed in Klasen and Misselhorn (2006). After arguing that the impact of growth and distributional change on poverty will depend on a number of factors, including the location of the poverty line and the initial level of inequality they proposed a mathematical relationship between growth and poverty reduction using log-normal distribution. This method according to Klasen and Misselhorn (2006), tests the empirical relationship of the derived semi-elasticities of growth and distributional change of poverty. The method provides better estimates than the above listed studies that use direct estimates. It allows the researcher to estimate where the growth and the distributional change will have the largest (absolute) impact on poverty reduction and this is very useful for predicting and

analysing progress towards the MDG1. Klasen and Misselhorn (2006) strongly argue that this method is more appropriate since the impact of growth and distributional change on poverty will depend on a number of factors, including the location of the poverty line and the initial level of inequality.

The following description reviews the mathematical relationships between growth, distributional change, and poverty reduction under the log-normal assumption, using both the proportionate as well as the absolute change in poverty provided by Klasen and Misselborn (2006). According to Klasen and Misselhorn (2006), the formal change in the headcount poverty can be explained by the following decomposition identity:

$$\Delta H = H_{t'} - H_t = \left[ F_t\left(\frac{z}{y_{t'}}\right) - F_t\left(\frac{z}{y_t}\right) \right] + \left[ F_{t'}\left(\frac{z}{y_t}\right) - F_t\left(\frac{z}{y_t}\right) \right] \dots\dots\dots (3.15)$$

Where  $H$  is the headcount poverty,  $z$  is the poverty line and  $y$  is the mean income. Following the assumption that incomes are log-normally distributed, Klasen and Misselhorn (2006) noted that there is no need to know the total distribution of individual incomes to calculate headcount poverty. The only information necessary is the mean income  $y_t$ , the constant international poverty line  $z$  (e.g. the \$1 a day criterion) and the standard deviation of the lognormal distribution:

$$H_t = F_t\left(\log \frac{z}{y_t}\right) = \Pi \left[ \frac{\log(z/y_t)}{\sigma} + \frac{1}{2}\sigma \right] \dots\dots\dots (3.16)$$

Where  $\Pi$  is the cumulative distribution function of the standard normal. The standard deviation of the lognormal distribution can be calculated from the Gini coefficient by the following equation:

$$\sigma = \sqrt{2 \left[ \Pi^{-1} \left( \frac{G+1}{2} \right) \right]} \dots\dots\dots(3.17)$$

Besides the headcount poverty ratio at a certain point in time, relative and absolute changes in poverty due to "growth effects" and "distributional effects" can be generated on the basis of changes in mean income and changes in the Gini coefficient. When considering relative changes in the headcount poverty ratio, the growth elasticity of poverty reduction is given by the following equation:

$$\epsilon_y^H = \frac{\Delta H}{\Delta \log(y) H_t} = \frac{1}{\sigma} \lambda \left[ \frac{\log(z/y_t)}{\sigma} + \frac{1}{2} \sigma \right] \dots\dots\dots(3.18)$$

where  $\lambda$  is the hazard rate, which is the ratio of density function to the cumulative density function of the standard normal. Unlike previous methodologies in literature, this method calculate absolute (i.e. percentage point) changes in the headcount poverty ratio and therefore on semi-elasticities. This is a less misleading measure than elasticities. Using equation (3.15) the growth semi-elasticity of poverty reduction is given by:

$$k_y = \frac{1}{\sigma} \pi \left[ \frac{\log(z/y_t)}{\sigma} \right] + \frac{1}{2} \sigma \dots\dots\dots(3.19)$$

and the semi-elasticity due to distributional changes in relative incomes is given by

$$k_\sigma = \pi \left[ \frac{\log(z/y_t)}{\sigma} + \frac{1}{2} \sigma \right] \left[ \frac{1}{2} - \frac{\log(z/y_t)}{\sigma^2} \right] \dots\dots\dots(3.20)$$

where  $\pi$  is the density function of the standard normal.

When combined with the growth rate and the percentage change in the standard deviation, respectively these theoretical values of the semi-elasticities will identify the percentage point changes in the headcount poverty ratio either due to growth in mean

income or due to changes in the distribution of relative incomes depending on the level of development and the existing distribution of incomes.

As mentioned before, it is also possible to calculate the elasticities and semi-elasticities for the other FGT-measures. According to formulas derived by Kakwani (1993) the elasticity  $\eta P_\alpha$  of the FGT-measure  $P_\alpha$  with respect to changes in mean income is

$$\eta P_\alpha = \frac{\delta P_\alpha}{\delta \mu} \frac{\mu}{P_\alpha} = \frac{\alpha [P_{\alpha-1} - P_\alpha]}{P_\alpha} \text{-----}(3.21)$$

The elasticity  $\epsilon P_\alpha$  of a FGT-measure with respect to a change in the distribution leaving the mean income unaffected can be denoted by the following equation:

$$\epsilon P_\alpha = \eta P_\alpha + \frac{\alpha \mu P_{\alpha-1}}{z P_\alpha} \text{-----}(3.22)$$

In combination with the assumption of lognormally distributed incomes mentioned above, Klasen and Misselbon (2006) noted argues that this means that the elasticity of the poverty gap with respect to changes in mean come is the following and depends partly on the mean income of the poor  $y_i$ .

$$\epsilon_y^{PG} = - \frac{\Pi \left[ \frac{\log(z/y_i)}{\sigma} + \frac{1}{2} \sigma \right]}{\left( \frac{z}{-} \right) \cdot \Pi \left[ \frac{\log(z/y_i)}{\sigma} + \frac{1}{2} \sigma \right] - \Pi \left[ \frac{\log(z/y_i)}{\sigma} + \frac{1}{2} \sigma \right]} \text{-----}(3.23)$$

Combining Kikwani (1993)'s ideas into the above formula, we can also generate values for the semi-elasticities of the FGT-measures, which are with respect to income and these are represented by the following equation:

$$K_y^{P_\alpha} = \epsilon_y^{P_\alpha} * P_\alpha = -\alpha [P_{\alpha-1} - P_\alpha] \text{-----}(3.24)$$

and with respect to changes in distribution

$$K_\sigma^{P_\alpha} = \alpha P_\alpha + \alpha \left( \frac{\mu}{2} - 1 \right) P_{\alpha-1} \text{-----}(3.25)$$

This method has its own advantages. It provides the percentage point changes in poverty by comparing two different points rather than per cent changes which do not consider the initial level of poverty. When the poverty incidence becomes small, large percentage changes in poverty incidence are easily achieved. The percentage point is more informative and it differentiates between poverty reduction from an incidence of 2 to 1 per cent with that from an incidence of 80 to 40 per cent. This method is more informative as unlike the growth elasticity of poverty which shows that the growth elasticity of poverty reduction will keep going up for growing countries, giving the misleading impression of growth not only being ‘good for the poor’, but becoming ever better for them over time. The mathematical expressions for the Semi-growth elasticity of poverty are well presented in Klasen and Misselhorn (2006).

### 3.8 Review of Forecasting Methods

Forecasting models replicate the past trends and tendencies in the variables and use that information to predict their future behaviour. These are the so-called time-series models which allow for sophisticated extrapolation as well as serve as effective instruments for forecasting. To this extent, they are important tools for policy formulation and analysis especially where a dynamic system is involved and change is a regular feature. Two models, the ARIMA model and Hodrick Prescott model are reviewed in the following sections and the other methods are summarised in a tabular form.

### 3.8.1 ARIMA forecasting model

ARIMA models are, in theory, the most general class of models for forecasting a time series which can be stationarized by transformations such as differencing and logging. In fact, the easiest way to think of ARIMA models is as fine-tuned versions of random-walk and random-trend models: the fine-tuning consists of adding lags of the differenced series and/or lags of the forecast errors to the prediction equation, as needed to remove any last traces of autocorrelation from the forecast errors.

The acronym ARIMA stands for "Auto-Regressive Integrated Moving Average." Lags of the differenced series appearing in the forecasting equation are called "auto-regressive" terms, lags of the forecast errors are called "moving average" terms, and a time series which needs to be differenced to be made stationary is said to be an "integrated" version of a stationary series. Random-walk and random-trend models, autoregressive models, and exponential smoothing models (i.e., exponential weighted moving averages) are all special cases of ARIMA models.

A non-seasonal ARIMA model is classified as an "ARIMA( $p,d,q$ )" model, where:

$p$  is the number of autoregressive terms,

$d$  is the number of nonseasonal differences, and

$q$  is the number of lagged forecast errors in the prediction equation.

An ARIMA estimation consists of four steps or the so called Box Jenkins methodology for ARIMA models (Madsen, 1992 and Maddala, 1992). The steps are:

- 1) Identification



- 2) Estimations
- 3) Diagnosis
- 4) Forecast

To identify the model you compare the estimated autocorrelations for the residuals with the theoretic autocorrelations, which normally arise in a given ARIMA model. If there are any autocorrelations between the residuals, it is possible to set up an ARIMA model. Examining the nature of the correlation between the residuals is useful in determining  $p$  and  $q$  in the AR (autoregressive) and MA (moving average) components. To identify the appropriate ARIMA model for a time series, you begin by identifying the order(s) of differencing needed to stationarize the series and remove the gross features of seasonality, perhaps in conjunction with a variance-stabilizing transformation such as logging or deflating. If you stop at this point and predict that the differenced series is constant, you have merely fitted a random walk or random trend model. (Recall that the random walk model predicts the first difference of the series to be constant, the seasonal random walk model predicts the seasonal difference to be constant, and the seasonal random trend model predicts the first difference of the seasonal difference to be constant-usually zero.) However, the best random walk or random trend model may still have auto-correlated errors, suggesting that additional factors of some kind are needed in the prediction equation.

### **3.8.2 Hodrick-Prescott Filter**

The Hodrick-Prescott Filter is used to obtain smooth estimate of trend component of a series. It is widely used among macroeconomists to obtain a smooth estimate of the long-

term trend component of a series. The same method was used by Cogley and Nason, (1995) and Bardsen, Fisher and Nymoen (1995), in a working paper which analysed business cycles. Technically, the Hodrick-Prescott Filter (HP) is a two-sided filter that computes the smoothed series of  $s$  of  $y$  by minimizing the variance of  $y$  around  $s$ , subject to a penalty that constrains the second difference of  $s$ . That is, the HP filter chooses  $s$  to minimise:

$$\sum_{t=1}^T (y_t - s_t)^2 + \lambda \sum_{t=2}^{T-1} ((s_{t+1} - s_t) - (s_t - s_{t-1}))^2 \text{-----(2.26)}$$

Let  $y_t$  for  $t = 1, 2, \dots, T$  denotes the logarithms of a time series variable. The series  $y_t$  is made up of a trend component, denoted by  $s$  and a cyclical component, denoted by  $c$  such that  $y_t = s_t + c_t$ . The penalty parameter  $\lambda$  controls the smoothness of the series  $\sigma$ . The larger  $\lambda$  is, the smoother the  $\sigma$ . As  $\lambda$  approaches infinity, a linear trend emerges from the  $s$ . However, HP has the following weaknesses; it lacks rigorous economic motivation, especially the time-varying trends. A HP filter can help to overcome the problems of time changing in the incidence of poverty and indeed McMorro and Roeger (2001) favour the HP filter over a linear time trend for it allows for a partial correlation of cycle and trend. Also, it could help to overcome the potential measurement bias introduced by the possibly inflated figures. Generally, the HP filter has an endpoint problem, the identification of an output gap is difficult as potentially an ‘outlier’ can have big effects on the output gap estimate.

However, there several other methods available in literature and these models are presented in Table 3.4 below.

**Table 3. 4: Overview of forecasting methods**

Forecasting methods	Description/Preferred use
Simple moving average	This method averages the last n observations of a time series. It is appropriate only for very short or very irregular data sets, where features like trend and seasonality cannot be meaningfully determined, and where the mean changes slowly.
MAMS (Maquette for MDG Simulations);	This method is a dynamic-recursive CGE Model. Initially developed for country-level MDG strategies addressing how should government and aid policies be designed to achieve the MDGs. The models have different versions ranging from aggregated macro version to disaggregated MDG version. In addition to major non-monetary MDGs, MAMS covers monetary poverty, like other CGE models using two alternative approaches: representative household (RH) and microsimulation (MS).
Exponential smoothing, such as the Holt-Winters method	A more complex moving average method, involving parameters reflecting the level, trend and seasonality of historical data, usually giving more weight to recent data. Widely used in general business because of its simplicity, accuracy and ease of use. This method's robustness makes it useful even when historic data are few or volatile. It is a frequent winner in forecasting competitions.
Autoregressive moving average (ARMA)—aka Box-Jenkins	An even more complex class of moving average models, capable of reflecting autocorrelations inherent in data. It can outperform exponential smoothing when the historical data period is long and data are nonvolatile.
Regression analysis	Fitting a curve to historical data using a formula based on independent variables (explanatory variables) and an error term. Although these methods are relatively simple, and are helpful both in analyzing patterns of historical data and for correlation analysis, they are not generally recommended for forecasting. They have performed poorly in forecasting competitions.
Predictive modelling	Deals with extracting information from data and using it to predict future behavior patterns or other results. A predictive model is made up of a number of predictors, variables that are likely to influence future behavior.
Econometric modelling	Systems of simultaneous equations to represent economic relationships.

However, a number of economic relationships can be best understood within a historical context. In order to predict the future behaviour of the concerned variables, we need to examine their past behaviour (Obi, 2006). It is for this reason that time series models become extremely important.

### **3.8.3 Costing poverty reduction**

It is important from a public policy perspective to project the impact of public agricultural spending and understand if the projected impacts are compatible with achieving the development goals and targets set both by Eastern Cape Province and those set in the MDGs. It is important to know the total agricultural investment required to reach agricultural productivity which is enough reduce poverty to at least half the 1990 level. This can be achieved by estimating the investment needs of agriculture. The relationship between the government's public investment in agricultural sector and the productivity of agriculture and poverty is well documented. This section undertakes an in-depth analysis of past methodologies focusing on the relationship between the government's public investment in agriculture and the productivity of agriculture, while taking into consideration its effect on poverty. The choice of the past methodologies are based on the works of Fan *et al.*, (2002) in China, Mphuka (2005) in Zambia and Fan *et al.* 2008, when doing work for IFPRI on estimating cost for reducing poverty by 2015, just to name a few.

The adoption of Millennium Development Goals brought in the idea of costing poverty reduction. Most of the researches on costing poverty reduction with respect to public spending have been carried out by the UN, UNDP, and IFPRI (Fan *et al.*, 2008). There are wide variations among the methodologies used in these studies. Most of the variations, as pointed out by Fan *et al.* (2008), arise from differences in methodological approach, data quality and sources, underlying assumptions about future population growth, interpretation of set goals, countries covered, unit costs of investments, and the parameters used in linking investment to growth and poverty reduction. This has resulted in a wide variation in the cost estimates.

Empirical work on costing poverty reduction was commissioned by the “Zedillo Report” in 2002. This, according to Fan *et al.* (2008), was one of the earliest studies on costing MDGs published by the United Nations. The Zedillo Report’s estimate of this estimate derives from adding the costs of achieving individual goals as identified in other sources (typically produced for previous international conferences on sectoral goals) and as produced by its own ad hoc calculations. This method had its weakness as where cost estimates for specific goals were altogether unavailable or infeasible to produce; the cost of achieving these goals was not included in the analysis. Accordingly, the figures provided in the Zedillo Report are represented as merely indicating “the order of magnitude” of the additional funds required to achieve the Millennium Development Goals. The “Zedillo Report” presents a simple model for estimating the resources required to achieve growth in Africa. The resources were calculated from capital account deficits. Using this approach, the study estimates that an additional \$10 billion per year over current spending will be needed to achieve a 6 per cent economic growth rate to meet the MDG1 in Africa. Subsequently, the other actors, including the World Bank, the UNDP and various other authors have attempted to assess the cost of achieving the MDGs in greater detail.

A second model was proposed by Hanmer and Naschold (1999). The model estimates costs using different growth scenarios of the elasticity of income poverty with respect to real per capita GDP growth and government policy. They concluded that under a high growth rate scenario the poverty rate can only be met if income inequality is low. Using historical trends, the models postulate that halving poverty by 2015 can only be met by East Asian countries. Several short falls were noted concerning this model. Firstly, it was criticized for assuming sustained growth rate which does not take variability and external shocks into account. The model is also criticised for failure to factor in both the impact of public investment and the multi-dimensional nature of poverty. Furthermore, the Gini coefficients were assumed to be constant thus invalidating the most important variable.

The World Bank introduced a third model in the study by Devarajan *et al.*, (2002). The model developed by Devarajan *et al.* (2002) estimates the average rate of growth required to reach the income poverty goal based on existing poverty levels and income distribution and then estimates the resources needed to achieve this growth. This is done using a “two gap” model in which growth in mean income depends on the level of investment and the rate with which investment is turned into output, the Incremental Capital Output Requirement (ICOR). ICOR assesses the marginal amount of investment capital necessary for an entity to generate the next unit of production. The growth in mean income is calculated using a Lorenz curve estimated for each country, based on current poverty levels and income distribution. The estimates for Africa range from \$54 to \$62 billion per year. This model has its own shortcomings. The data used on income growth and poverty reduction were weak and the model also assumed that the poor share equally the benefits from growth and that trading systems and private capital flows remain unchanged.

IFPRI’s International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) employs unit costs to estimate global and regional level requirements necessary to meet the MDGs. For example, total irrigation investments are calculated by multiplying the estimated increase in irrigation area, and then adjusting for cropping areas by the average cost of irrigation per hectare. Similarly, rural road investments are calculated by multiplying the incremental road length by road investment costs per unit. The model projects a total required investment of \$238 billion for the period from 1997 to 2025 for Africa (Rosegrant, Ringler and Benson, 2005). The total agricultural investments, that is, the sum of the estimated costs for irrigation, rural roads and agricultural research, amounted to roughly \$140 billion, translating to an average of \$5 billion a year. Achieving these projections would demand a 94 per cent increase in total investments for Africa over the ‘Business As Usual (BAU) scenario’; rural road investments would have to rise 56 per cent above the BAU levels of \$95 billion, while irrigation and agricultural research investments would have to increase by 141 per cent and 44 per cent above the BAU estimates of \$49 billion and \$28 billion, respectively. The model does not share the time horizon and targets of the MDG, which makes it difficult

to draw any practical lessons. Besides the comprehensiveness of the model, which includes other sectors such as education, water and infrastructure, any comparison with other studies or estimates is particularly irrelevant.

Another UN effort, the Millennium Project, developed a Hunger Model that uses the unit cost approach to estimate country-specific resources needed to achieve the MDG1 through agricultural productivity growth, rural income generation and nutrition improvements. The Hunger Model is one of only a few efforts that have attempted to generate cost estimates at the level of individual countries. The model allows users to calculate inputs, the per capita and total costs of providing interventions, and the human resources and physical infrastructures required to achieve the targets. These parameters are projected based on the change in coverage required and unit cost. Country-level studies have been carried out for Ghana, Tanzania and Uganda, yielding estimates that the annual public investments needed per capita in these countries to achieve the MDGs would be \$80 billion, \$96 billion and \$92 billion in 2006 respectively, and increase to \$124 billion, \$161 billion and \$143 billion, respectively, by 2015 (UNDP, 2005). The model has its own limitation as it is not explicit tending to be mainly descriptive.

The South African government uses that simple trend analysis, to explore progress towards set MDGs. A simple trend is assumed for each variable. This approach is provided by the United Nation's Development Programme's (UNDP) 2010 Human Development Report (UNDP 2010). Using national data, the report presents estimated values in 2015 for child mortality, school enrolment, gender parity in education, access to water and sanitation, income poverty, and malnutrition. This same method can produce projections for later years for selected indicators. Literature recognises the limitations of this approach, noting that trends can be improved—or worsened—through public policy choices, as well as by external factors over which governments have limited influence. But projecting the past into the future can help to focus public attention by providing one possible version of the future. However, they also acknowledge the multiplier effects across goals and the potential effects of system risks on trends.

The existence of a number of techniques with some that are flawed, point to a need for techniques and methodologies that bring the types of evaluations that would benefit the policy process and have adequate influence on key policy decision-making processes (Fan *et al.*, 2002). A variety of studies estimate the growth rates needed to lift people out of poverty in order to meet the MDG1, but fail to estimate the cost required to achieve the necessary growth. Table 3.2 below provides a summary of the different approaches for analyzing required resources to meet the MDG1 available in literature.



**Table 3. 5: Different approaches for analyzing required resources to meet the MDG1**

Author	Method Used	Estimates
Zedillo Report	Simulation based on investment required to achieve 6 percent growth	\$20 billion per year
Devarajan (2002)	Estimates required aid by calculating the average growth rate to reach MDG1 using a two gap growth model which depends upon level of investment and incremental input output ratio (ICOR)	\$54-62 billion per year
Hunger Model (UN)	Unit cost method	No estimates provided
UN Reports (2005)	Unit cost method	a) Ghana, \$80 per capita in 2006; b) Tanzania, \$96 per capita in 2006; c) Uganda, \$92 per capita in 2006
Rosegrant et al. (2005)	Unit cost method	\$238 billion from 1997-2025
Besley and Burgess (2003)	Estimates growth rate required to reach MDG1	5.6 percent
Hanmer and Naschold (2001)	Estimates growth rate required to reach MDG1 under pro-poor policies	2.4 percent
UNDP (2003)	Estimates at country level of growth required to meet MDG1	a) Cameroon, 7 percent; b) Malawi, 6 percent; c) Tanzania, 5 percent; d) Uganda, 5 percent
Kakwani and Son (2006)	Estimates required aid and growth at the country level to reach the MDG1	Growth rate varies at 1.5, 5.4 and 2.4 percent for pro-poor, anti-poor and neutral distributions, respectively

Countries have at their disposal multiple actions that they can undertake to get closer to meeting the MDG1 of reducing poverty. As shown above, costing tools related with the MDG1 have been designed by different authors and institutions to estimate the costs of these actions. Countries use costing tools in their planning and budgeting processes to assess the resource needs associated with specific actions. Countries also use costing tools for other purposes, such as for allocating resources for different district municipalities, for planning various development programmes, and for contracting out the delivery of services relevant to poverty reduction. Costing tools can also help countries estimate the potential impact on poverty and agriculture of those actions and, thus, the potential progress towards reaching the MDG1. Therefore, every regions' demand for costing tools is based on their need to measure the immediate and future financial needs for reaching the MDG1; when the current effort will not suffice to reach the goal. These costing method can also first to estimate and then to negotiate for additional resources from Ministries of Finance (MOFs) or to request additional external aid.

### **3.9 Stationarity and Non-Stationarity of Time Series**

Various methodologies discussed above make use of time series data and according to Granger and Newbold (1973 and 1974), time series variables might have some that violate the Gaussian assumptions of regression analysis. This violation of the Gaussian, or normal distribution, assumption, namely the tendency for the means and variances to constantly vary, is termed non-stationarity which means that predictions based on them have little stability over time and therefore of little predictive value. According to theory, a standard normal distribution is one that has a zero mean and variance of one (Davidson and MacKinnon, 2004). The violations of this normality condition identified as non-stationary series are purely random series. Khatri (1994) considers that the two most important questions to ask when working with time series data that are prone to the non-stationarity are; what is their order of integration, and what is the required transformation for stationarity.

Non-stationary series come in various forms. There are those which have no mean value and have variances that trend to infinity as the period of observation lengthens. This type of non-stationary series is termed a random walk, because the variances are constantly changing. Hendry and Juselius (2000) have studied economic time series that exhibit these properties and come to the conclusion that they are the rule rather than the exception in terms of their predominance. The closest illustration of the random walk is the movement of a person who has had too much to drink (Gujarati, 2003). To illustrate this, we have:

$$X_t = X_{t-1} + \varepsilon_t, \text{ where } \varepsilon \sim \text{NID}(0, \sigma^2)$$

that is, the error term  $\varepsilon$  is normally distributed and independently distributed with a zero mean and a finite variance,  $\sigma^2$ . The variance of the dependent variable in this situation,  $X_t$ , will however tend towards infinity.

$$\text{Thus, } X_t = \sum_{j=0}^{t-1} e_{t-j}, \text{ given } X_0=0.$$

Literature on stationarity provides a full account on its phenomenon, the theory and mechanisms of transforming data to achieve stationarity. In some cases simplifying assumptions that are made to keep control over the data are also available (Engle and Granger, 1987; Mehra, 1991; Traill, 1979; Hallam, Machado and Rapsomanikis, 1992 and Lloyd and Rayner, 1993; Davidson and MacKinnon, 2004). Explicit treatment of procedures for testing for stationarity has also been elaborately discussed in the literature (see for example Pindyck and Rubinfeld, 1991 and Gujarati, 2003) which have described the use of autocorrelation functions, among others. Maddala and Kim (1998); Nelson and Plosser (1982), Durlauf and Phillips (1986), and Stock and Watson (1988), have cautioned that analysts must pay attention to the distinction between differencing and trend stationarity. Banerjee *et al.* (1993) have also demonstrated the procedure for detecting a white noise process which they describe as a second-order stationary process. Kuiper *et al.* (2003) agree with Banerjee *et al.*

(1993) that “stochastic trend” is what determines the level and direction of changes of variables included in a modelling procedure.

Stationarity is defined in the following terms:

$$\begin{aligned}\text{Mean:} & E(Y_t) = \mu \\ \text{Variance:} & E(Y_t - \mu)^2 = \sigma^2 \\ \text{Covariance:} & E(Y_t - \mu)(Y_{t+k} - \mu)\end{aligned}$$

The Durbin-Watson (DW) static was proposed by between 1950 and 1951 to test for stationarity. This static is determined by the least squares residuals of the model being tested. The Durbin-Watson statistic of the value 2 indicates the absence of serial correlation. If the value is below 2, then there is positive serial correlation. Negative serial correlation will be indicated by values above 2 and up to 4.

### **3.9.1 Existence of Structural Breaks and Policy Effects**

The three variables, agricultural production, non-agricultural production and the incidence of poverty are affected by the introduction of new fiscal policy such that the trend has inborn structural breaks due to these policies and various other factors. This possibility was seen following the dawn of democracy in South Africa which saw the new government ushering new laws that address the past injustices in the distribution of productive assets. During that time, the government provides support to farmers or put in place a policy that positively affect the productivity of farmers like that the provision of cash grants to households in addition to other forms of support as part of a Comprehensive Agricultural Support Programme (CASP) or land reform programme. This will obviously lead to increase in the overall output from the agricultural sector and this provides strong justification for the perception that a stochastic trend may affect agricultural GDP and therefore warrant the use of the foregoing methodologies to analyze the trend and conclude on the factors that influence these tendencies in order to make valid contributions to policy.

South Africa saw a period of rapid change in the field of agricultural and rural development policy as the government put forward various strategies aimed at promoting growth in the agricultural sector and reducing poverty. These policies have net positive implications on agricultural production and reduction of poverty. Chapter two provides a detailed description of all the policy developments in South Africa that are relevant to the agricultural sector and poverty reduction. These policies are therefore anticipated to have brought some structural breaks in the variables and literature on cointegration theory recognizes structural change as an important factor in the reliability of the models constructed to predict key relationships in the economic system. The majority of econometric models assume that the variables are continuous so that changes in one affect the other variables in a definite and predictable way (Pindyck and Rubinfeld, 1991). But when the underlying data for the model are associated with significant events in the system, the slopes or intercepts, or both, are likely to shift and this will affect the results we obtain from the estimation of the models (Pindyck and Rubinfeld, 1991). Maddala and Kim (1998) identify such events as the Great Depression, a war, a piece of legislation, oil price shocks, etc as examples of structural breaks which influence the validity of models using time series data. According to them, such breaks affect the usefulness of the models for purposes of forecasting and analyzing the effects of changes in policy (Maddala and Kim, 1998).

In fact, the existence of structural breaks in a data series have been found to constitute a major source of error (Perron, 1989; Balke, 1991; Hendry & Massmann, 2005; and Gutierrez, Erickson and Westerlund, 2005). The conventional and also convenient assumption of constant coefficients and cointegrating vectors has been established to be quite restrictive. In the face of a structural break, these are the models that exhibit the worst performance and weakest predictive power (Maddala and Kim, 1998). Most significantly, the effect of structural break on time series data can affect judgment about the statistical properties of the data which has implications for the usefulness of the results when they are employed in estimation procedures. According to Perron (1989) and others, one problem is that if structural breaks are not taken into account before testing for unit root, the tendency is for the result to incorrectly lead

to the acceptance of the null hypothesis of the existence of unit root when the true situation is that the data series is subject to trend stationarity.

Econometric literature has provided useful insights into how the presence of structural breaks can be detected in a data series. A number of highly precise tests for this purpose has been reviewed by Obi (2006). The tests depend on the nature of the data and model, and the amount of prior information the analyst has regarding the series, especially with respect to the precise time of the structural break.

There are four types of tests according to Obi (2006). They are distinguished as follows:

- (i) tests specific to situations in which the break points are known versus those situations in which the break points are unknown.
- (ii) tests for single break versus those for multiple breaks.
- (iii) tests for univariate versus multivariate relationships.
- (iv) Tests for stationary versus non-stationary variables.

Maddala and Kim (1998) consider that appropriate solutions to the defective performance of models when structural breaks are present can be remedied by a number of procedures which are only effective when the existence of the structural change is ascertained.

### **3.9.2 Tests with known break points**

There are situations where it will be known with some certainty that there is a break point in a given trend. Analysis of variance can be used to establish the fact (Obi, 2006). The Chow tests according to Obi (2006) can be used to test the appropriate for stationary variables where a single break point may have occurred. To illustrate this, Obi (2006) noted that in a linear regression model with  $k$  variables and two regimes, implying a single break point, two sub-samples can be defined with their number of observations identified as  $n_1$  and  $n_2$ .

Thus, the number of observations within each of the sub-samples must not be less than  $k$ , or the number of variables (or parameters) estimated, such that:

$$n_1 \Rightarrow k \text{ and}$$

$$n_2 \Rightarrow k.$$

This test will examine the estimated parameters of the model to determine whether they are stable across the two sub-samples of the series or not. The E-Views econometric programme is a convenient tool for carrying out this test which involves the calculation of an F-statistic by the following relationship:

$$F = \frac{(RSS_0 - RSS_T)/(n - k_1 + rk)}{RSS_T/(n_1 - rk)} \text{-----}(3.27)$$

Where

$RSS_0$  = restricted sum of squares residuals

$RSS_T$  = sum of squared residuals from sub-sample

$n$  = the total number of observations

$k$  = the number of parameters in the estimated equation

$r$  = the number of sets of models

In the E-Views programme, the Chow test is applied by first running the single equation regression. When the regression results are displayed and reviewed, the stability test is then run by opening the equation toolbar and entering the break year in the dialogue box that appears. Taking the example of the present study where the sample is for the period 1995 to 2010, by examining the relevant literature the actual breakpoints can be determined as specific year when new policy that affect agricultural production or poverty was put in place, for example the Eastern Cape's PGDP of 2004. The year 2004 should be typed in the dialogue box and should specify two sub-samples on the data for each municipality, one starting from 1995 to 2004 and

the other starting from 2004 to 2010. It is possible to extend the above approach to cases where multiple regimes can be defined and more than two sub-samples can be described.

### 3.9.3 Tests with unknown break points

There are some case where the date of the break is not known with any certainty and the test is run to determine the particular point at which a switch occurs in the values of the relevant coefficients (Obi, 2006). This test will find the time associated with such regime switch. The phenomenon of the regime switching in the series was first studied by Quandt (1960) and appropriate tests have since been developed to provide insights into this phenomenon. The cumulative sum test of structural stability (CUSUM test) was proposed by Brown, Durbin and Evans (1975). Brown et al., (1975). This test detect systematic changes in the regression coefficient by calculating a statistic based on recursive residuals which is graphed as a pair of straight lines drawn at 5% level of significance. If either of the lines is crossed, it is necessary to reject the null hypothesis of correct specification of the regression equation at the 5% level of significance. According to Maddala and Kim (1998), the CUSUM test calculates the statistic:

$$W_m = \frac{1}{\sigma} \sum_{t=k+1}^m w_t, \text{ where } m = k + 1, \dots, T \text{-----}(3.28)$$

The stability of the regression model is measured by the location of the statistic  $W_m$ . When it remains within the boundary associated with the level of the significance, the null hypothesis is accepted. Otherwise, the null hypothesis is rejected, that is when the statistic crosses the boundary. This test is sensitive to a number of parameters being under estimation.

An alternative test related to the CUSUM test is concerned with haphazard, as against systematic, changes in the coefficients. This test, denoted as CUSUMSQ, uses the squared recursive residuals and plots quantities in much the same way as



the CUSUM, and tracks the location of the test statistic within boundaries drawn at 5% level of significance.

Alemu's (2003) approach, following Balke (1991), was to apply a recursive analysis using the Dickey-Fuller regression procedure. In that instance, a test procedure with the following layout was specified:

$$Y_t = \mu + \theta DU_t + \beta t + \gamma DT + dD(T_B)_t + \alpha y_{t-1} + \sum_{i=1}^k c_i \Delta y_{t-i} + e_t \text{-----}(3.29)$$

Where

$\mu$  = the intercept term;

$T_B$  = time of break

$d(T_B)$  = value of 1 if  $t = T_B + 1$ , and 0 otherwise;

$DU_t$  = value of 1 if  $t > T_B$ , and otherwise

$DT = t$  if  $t > T_B$ , and 0 otherwise.

### 3.10 Chapter Summary

The economic arguments presented throughout the reviewed literature are that public expenditure in agriculture positively affects growth in production and this increase consequently reduces poverty. These results have been consistent dating as far back as the Green Revolution and with the same evidence still being found across African states. Without public investment, agricultural and rural economic growth will be much slower, and more rural people in developing countries will remain poor. A conclusion reached by many is that the current level of public investment requires to be increased significantly for countries to meet the MDG1 of reducing by half the proportion of the poor by 2015. Although the required growth and financial resources founded by literature vary across countries, the overall outcome is that a financing gap exists which is very high across developing countries. It is highest across countries facing severe budget constraints.

Finding the estimate of the required public spending to achieve MDG1 of reducing poverty is particularly important. Many countries have committed themselves to achieve the MDG1; therefore its achievement can be made possible by making specific increases in budget allocations to the agricultural sector among other types of spending. All these viewed models use econometric applications to estimate the relationships between variables but have variations mostly in the variables used. Rural income growth is a factor of both agricultural and non-agricultural income. Recognizing the inherent non-stationarity of economic variables under study, of which agricultural GDP, non-agricultural GDP and poverty are identified as important variables, the review examined the statistical process to understand their theoretical underpinnings and then to see how they have been applied and how relevant they are in studying the linkages between the mentioned variables. These reviewed methodologies address a key knowledge gap by improving estimation of cost of poverty reduction.

## CHAPTER FOUR

### SELECTION OF THE STUDY AREA

#### 4.1 Introduction

The Eastern Cape Province came into effect following the 1994 post-Apartheid system which created three tiers ("spheres") of government: national, provincial and local government (Momoniat, 1998). Following the new constitution in 1994, nine provinces replaced the previous 4 white provinces and 9 black homelands and the local governments largely integrated adjoining racially segregated black and white local areas. All the nine provinces and their municipalities were founded in 1994. They were created in April 1994, only 4 months after their conception at the negotiation table.

Following provincial demarcations, 284 new integrated municipalities also took effect in November 1995. The local government has undergone a two-phase transformation. The initial transformation in 1995 created 843 transitional municipalities, combining adjoining white and black areas. The second phase in December 2000, significantly changed boundaries by incorporating urban and rural areas, and reduced this number to 284. The new system consists of 6 one tiered urban metropolitan governments or metros (Johannesburg, Cape Town, Durban, Pretoria, East Rand and Port Elizabeth) and 232 two-tiered primary municipalities falling under 46 district municipalities.

The Eastern Cape Province lies on the south eastern seaboard of South Africa. It is the second largest Province with an area of 169 580 km<sup>2</sup>, representing 13.9 per cent of South Africa's total land mass (ECDC, 2008). There are six district municipalities in the Eastern Cape Province, and one metropolitan area. The district municipalities are named Cacadu, Amatole, Chris Hani, Ukhahlamba, O.R. Tambo and Alfred Nzo; and the metropolitan area known as the Nelson Mandela Metropolitan Municipality. This study was conducted in the Eastern Cape Eastern. In that regard, this chapter provides a detailed description of the entire above mentioned district municipalities and one metropolitan area. After a brief

description of Eastern Cape Province, the following descriptions will continuously provide detailed information on trends in both agricultural production and the trends in the incidence of poverty in all the district municipalities.

#### **4.2 Description of Eastern Cape**

The Province is highly rural and essentially agrarian in nature. It is richly endowed with farming land. It produces about 70 per cent of the world's mohair (ECDC, 2007). Households share some common village resources and using communal land, as a similar situation to all the other rural areas in South Africa inhabited by black South Africans. Communal land tenure is mainly practised in all the former homelands. Land is under the control of local and district authorities (headmen and tribal authorities) or residents allocated by means certificates called '*Permission to occupy*' (PTOs), which are approved by the headmen and the magistrates. As land and other resources in the rural areas are scarce, the size and the distribution of land and other productive assets among households are not the same. The climate varies according to the distance from the ocean. Coastal areas enjoy mild temperate conditions ranging between 14 and 23°C, while the inland areas experience slightly more extreme conditions with temperatures of 5 to 35° C. Inland mountain areas experience winter snows and summer rainfalls (ECDC, 2007). The Eastern Cape is the only one of South Africa's nine provinces to have all seven of its biomes, or ecological zones and 29 Acocks veld types within its boundaries (ECDC, 2007). This gives it a tremendous diversity of climates, allowing for a vast range of activities. The Eastern Cape has always been a livestock farming area. It is the country's premier livestock region and presents excellent opportunities for meat, leather and wool processing. Figure 4.1 below shows all the districts of Eastern Cape and the Metropolitan area.



#### 4.2.1 Description of Amatole district municipality

Amatole is the most diverse district municipality in the Eastern Cape. The Amatole District Municipality is situated on the Eastern Cape coast side of South Africa. The district has eight local municipalities, each containing at least one urban service centre. It also shares a border with the following district municipalities: Chris Hani, O.R. Tambo and Cacadu. The district covers 23 594 square kilometres. About 60 per cent of the district is urban, while 40 per cent is rural. In 2009, the Amatole DM had an estimated population of 1.7 million people. About 93 per cent of the population was African, 3.4 per cent Coloured, 0.3 per cent Asian and 3.5 per cent White. Males constituted 46 per cent of the population, while females were 54 per cent. Two-thirds of the district is made up of communal areas. The terrain of the district is equally diverse. The climate is moderate for most of the year, but with hot periods from December to February. Although the area receives rainfall throughout the year, it is primarily a summer rainfall region, with the months of June and July being the driest and coldest. The mean annual precipitation varies from 1 000 mm along the coast to 700 mm inland above Butterworth and 1200 mm in the Amatole mountains (ECDC, 2007).

Table 4.1 below shows the distribution of the poor and agricultural GDP for Amatole between 1995 and 2010.

**Table 4. 1: Trends in the incidence of poverty and agricultural GDP for Amatole District Municipality (1995-2010)**

	1995	2000	2005	2009	2010
% Poverty	53.1	63.0	64.98	55.1	
Agric GDP (million Rands)	899	816	844	1223	1304

Source: ECDC (2008)

Following the figures above, it is reasonable to conclude that Amatole is following an impressive path of growth in the agricultural sector. Agricultural GDP rose from R899 million to a highest figure of R1304 million. Despite positive growth in the agricultural

sector, the district saw a rise in the number of people living in poverty between 1995 and 2005.

Amatole is the second-largest contributor to the primary sector, with only 18.3 per cent of the total sector in the province. The total Gross Value Added (GVA) for 2008 was R22.4 billion in 2008, a growth rate of 1 per cent from 2007. The primary sector's contribution in the district economy has been less than 2 per cent on average, with agriculture holding an average of 94.2 per cent of this sector in the entire district. Agriculture is mostly small scale crop farming and open grazed livestock. Farming is largely for subsistence rather than commercial sale, although some black commercial farmers are present. The share of both primary and secondary sectors in the district economy has decreased over the years.

Amatole faces challenges of developing the natural resource potential of the ex-homeland areas through livestock farming. The district contains the best grazing lands suitable for livestock production in the province. Community private partnerships and improved farming methods can transform communal livestock production into commercial livestock farming. Expanded livestock production in Amatole holds potential for small-scale tanneries and leather craft industries.

#### **4.2.2 Description of Chris Hani district municipality**

Chris Hani District municipality is the second largest of the six districts ranging across the centre of the province, covering a range of terrain from semi-arid Karoo in the west to the hills of the OR Tambo district municipality in the east. It lies in the heart of Eastern Cape, between the coastline and the Drakensberg Mountains, and consists of eight local municipalities. Chris Hani is surrounded by Amatole DM, O.R Tambo DM, Ukhahlamba DM and Cacadu DM. The district covers 37 294 square kilometers of land, 67 per cent of which is rural and 33 per cent urban. The total population of Chris Hani was 783 652 in 2008, and increased to 786 637. Africans were 94.2 per cent of the total, Coloureds 3.9 per cent, Whites 1.8 per cent and Asians 0.1 per cent. About 46 per cent of this population was male and 54 per cent female.

Table 4.2 below shows the distribution of the poor and agricultural GDP in Chris Hani district Municipality between 1995 and 2010.

**Table 4. 2: Trends in the incidence of poverty and agricultural GDP for Chris Hani district municipality (1995-2010)**

	1995	2000	2005	2009	2010
% Poverty	62.0	75.8	82.0	74.3	
Agric GDP (million Rands)	764	715	545	545	562

Source: ECDC (2008)

Table 4.2 above shows increasing poverty and an overall decrease in agricultural production between 1995 and 2010. The number of people in poverty grew by about 12% points between 1995 and 2009 to slightly more than 74% of the total population in the district. Chris Hani district municipality is the fifth-largest economy in the region and has a base in agriculture with limited agro-processing industries. It is experiencing decline in agricultural production, primarily through increased livestock production in the ex-homeland districts and limited investment in agro-processing industries. Cattle farming have a base in the district and still have a room for expansion through improved production techniques which may include adoption of indigenous breed like the Nguni cattle found to be resistant to tick borne diseases and can produce equally good quality meat as of the established exotic beef breeds, such as the Aberdeen Angus under natural pastures. The district encompasses both large commercial livestock farms and communal areas. Agriculture is the largest private sector activity in Chris Hani, providing 13% of value added and 21 per cent of employment. Livestock farming is the predominant activity in the agricultural sector of Chris Hani district municipality (ECDC, 2008). Queenstown is a centre for the cattle trade, drawing from surrounding areas and the district.

The total Gross Value Added for 2008 was about R8 billion, a growth rate of 6 per cent. Growth in the Chris Hani District Municipality's primary sector has improved when



compared to the declines experienced during the period 1995 to 2000, recording an average of about 5 per cent between 2001 and 2008, while the province registered growth of 1.7 per cent for the same period. This growth has been supported by growth in the agriculture, forestry and fishing industry.

### 4.3.3 Description of Alfred Nzo district municipality

Alfred Nzo is the smallest district and consists of two local municipalities, namely, Mzimkulu and Umzimvubu local municipalities. It is situated on the north-eastern part of the Eastern Cape and shares a border with KwaZulu-Natal, the Kingdom of Lesotho and the two other Eastern Cape district municipalities, namely, Ukhahlamba and O.R. Tambo. The district covers 6 859 square meters. The land is high, all above 1 000 m and rising to the southern Drakensberg on the border of Lesotho. Rainfall is high, but cold and snow are possible in winter. About 94 per cent of the population is rural, while 6 per cent is urban. The total population of the Alfred Nzo District Municipality consisted of 437 707 people in 2008 and increased to 442 050 in 2009. These figures were made up of 98.9 per cent of Africans, 0.7 per cent of Coloureds, 0.1 per cent of Asians and only 0.3 per cent of Whites. About 45 per cent of the 2009 total population was male and the remaining 55 per cent was female. There has been no change in gender proportion since 2008.

Table 4.3 below shows the distribution of the poor in Alfred Nzo district Municipality between 1995 and 2010.

**Table 4. 3: Trends in the incidence of poverty and agricultural GDP for Alfred Nzo district municipality (1995-2010)**

	1995	2000	2005	2009	2010
% Poverty	67.4	81.9	88.9	72.7	
Agric GDP (million Rands)	135	133	182	319	346

Source: ECDC (2008)

Agricultural production in this district follows a positive trend and the sector is the principal private sector, providing 24 per cent of value added and 12 per cent of formal employment (ECDC, 2007). Subsistence farming is significant but must contend with heavy winter frosts and snows in much of the area. Cattle farming has potential through improved marketing infrastructure and increased animal productivity. The total Gross Value Added for 2008 was R2.1 billion, a growth of almost 3 per cent. Alfred Nzo is the smallest economy in the province. The primary sector has experienced a trend reversal in its growth figures, in spite of the positive growth displayed from 2001 to 2005. Growth in the Alfred Nzo District Municipality has been driven by the agriculture, forestry and fishing industry, which accounted for most of the provincial growth between 1995 and 2000.

#### **4.2.4 Description of Cacadu District Municipality**

The Cacadu District Municipality consists of nine local municipalities. It shares a border with the Western Cape and the Northern Cape, as well as two Eastern Cape district municipalities, namely, Chris Hani and Amatole. Cacadu covers an area of 58 272 square meters. About 71 per cent of its population is rural, while 29 per cent is urban. Total population increased from 385 019 in 2008 to 386 875 in 2009. These totals constitute 53.2 per cent of Africans, 36 per cent of Coloureds, 0.2 per cent of Asians and 10.6 per cent of Whites. About 48 per cent of the population are male and 52 per cent are female.

Table 4.4 below shows the distribution of the poor in Cacadu district Municipality between 1995 and 2009.

**Table 4. 4: Trends in the incidence of poverty and agricultural GDP for Cacadu District Municipality**

	1995	2000	2005	2009	2010
% Poverty	62.0	75.8	82.0	74.3	73.0
Agric GDP (Million Rands)	85	85	79	70	71

Source: ECDC (2008)

Despite low GDP figures above, agriculture is the dominant industry in the primary sector in Cacadu district municipality. The numbers of poor have been increasing since 1995. Cacadu's GVA was R11.4 billion in 2008, making it the third-largest economy in the region. The 2008 GVA saw growth of 8 per cent from 2007. The primary sector percentage of the district total output has declined from 14.4 per cent in 1995 to 6.1 per cent in 2008, and this trend is not about to stop. Over that period, it contributed an average of 10.6 per cent to the district's economy, with agriculture being the dominant industry in the sector. Cacadu is the largest contributor to the primary sector, with 35.6 per cent of the total. Similar to the province's primary sector's growth, the primary sector in the Cacadu District Municipality rose from negative territory between 1995 to 2000 to an average growth of almost 3 per cent in 2001 and 2008. Overall, the period 2001 to 2008 experienced positive growth in the district, with a trend that closely resembled that of the province. This sector's growth was driven by agriculture, forestry and fishing, with almost similar growth rates. Despite lagging provincial growth, this industry's growth has tracked the provincial trend.

#### **4.2.5 Description of Nelson Mandela Bay Metropolitan**

The Nelson Mandela Bay is one of the six metropolitan areas in South Africa. It is located on the shores of Algoa Bay in the Eastern Cape and comprises the city of Port Elizabeth, along with other smaller towns, namely, Uitenhage and Despatch. It covers a total area of 1 845 square kilometres, 4 per cent of which is rural. The total population of Nelson Mandela Bay Municipality was 945 479 in 2009, 61 per cent of whom were African, 22 per cent Coloured and 15 per cent White. Females were the largest proportion of the population, at 52 per cent, while males were only 48 per cent.

Table 4.5 below shows the distribution of the poor in Nelson Mandela Bay Metropolitan between 1995 and 2009.

**Table 4. 5: Trends in the incidence of poverty and agricultural GDP for Nelson Mandela Bay Metropolitan (1995-2010)**

	1995	2000	2005	2009	2010
% Poverty	68.0	74.8	87.0	785.3	76
Agric GDP (Million Rands)	274	325	352	522	544

Source: ECDC (2008)

Although agriculture is not the main source of income in Nelson Mandela Bay Metropolitan its contribution is following an increasing trend. The percentage of the population in the Nelson Mandela Bay Metro living in poverty is always changing scoring some significant increase in year 2000 and 2005.

In 2008, the GVA was R31.6 billion, a growth rate of 0.04 per cent from 2007. Nelson Mandela Bay Metropolitan is the largest economy in the province. Sectors that contributed the most were secondary and tertiary sectors. These industries had a joint contribution of about 80 per cent to the GVA. The Nelson Mandela Bay Metropolitan has the largest share of the economy of the Eastern Cape but the primary sector is the lowest contributor, with less than 1 per cent of provincial output. Its primary sector's growth increased from 3.4 per cent between 1995 and 2000 to 5 per cent in 2001 and 2008, and has consistently outperformed the province's primary sector's growth. Agriculture, forestry and fishing were the industry that propelled growth in this sector from 1995 to 2008.

#### **4.2.6 Description of OR Tambo District Municipality**

The O.R. Tambo district municipality is located in the former Transkei homeland area of the Eastern Cape. It is within the well-known Wild Coast and located on the north-eastern side of the Eastern Cape. It has seven local municipalities, namely, Qaukeni, King Sabata Dalindyebo, Mbizana, Mhlontlo, Ntabankulu, Nyandeni and Port St. Johns, and covers both the Wild Coast and the Pondo land. The district has a land area of 15 535 square

kilometers, 92 per cent of which is rural and 8 per cent urban. The population in the O.R. Tambo district municipality increased from an estimated 1 751 820 people in 2008 to 1 771 788 in 2009. Africans constituted 93.3 per cent of the total, Coloureds 0.4 per cent, Asians 0.1 per cent and Whites 0.2 per cent. There has been no change in terms of gender proportion since 2008; in 2009, 45 per cent of the population was male and 55 per cent was female.

Table 4.6 below shows the distribution of the poor in O.R. Tambo Municipality between 1995 and 2009.

**Table 4. 6: Trends in the incidence of poverty and agricultural GDP for OR Tambo District Municipality (1995-2010)**

	1995	2000	2005	2009	2010
% Poverty	65.5	74.1	76.1	63.3	
Agric GDP (Million Rands)	322	291	660	1900	2093

Source: ECDC (2008)

OR Tambo district municipality experienced persistent growth in agricultural GDP since 1994, from a lower figure of R322 million to the highest figure of R2093 million, but no significant change in poverty was recorded during the same period. The percentage of the population in the O. R. Tambo Municipality living in poverty grew by almost 10% between 1995 and 2005.

O.R. Tambo is the fourth-largest economy in the province. The GVA for 2008 was R9 billion, a growth rate of 3 per cent from 2007. About 84 per cent of GVA came from the tertiary sector. The primary sector in the O.R. Tambo District Municipality experienced growth levels that exceeded 4 per cent after emerging from negative territory between 1995 and 2000. Growth in this sector was driven by agriculture forestry and fishing, which rose above 5 percent between 2001 and 2005 before declining between 2001 and 2008.

#### 4.2.7 Description of UKhahlamba District

The UKhahlamba district municipality lies in the northern part of the Eastern Cape and shares a border with the Free State, the Northern Cape and the Kingdom of Lesotho. The surrounding district municipalities are Chris Hani, O.R. Tambo and Alfred Nzo. It has four local municipalities, namely, Elindini, Gariiep, Maletswai and Senqu Municipality. UKhahlamba has a land area of 26 518 square kilometers, 70 per cent of which is rural and 30 per cent urban. The total population of the UKhahlamba region consisted of 349 783 people in 2008, and increased to 352 319 in 2009. Of these, 94.2 per cent were black African, 3.5 per cent Coloured, 0.1 per cent Asian and 2.3 per cent White. About 55 per cent of the 2009 population was female and 45 per cent was male.

Table 4.7 below shows the distribution of the poor and GDP from agriculture in UKhahlamba District Municipality between 1995 and 2010.

**Table 4. 7: Trends in the incidence of poverty and agricultural GDP for UKhahlamba District (1995-2010)**

	1995	2000	2005	2009	2010
% Poverty	63.8	76.4	79.0	62.8	
Agric GDP (Million Rands)	593	631	530	547	567

Source: ECDC (2008).

There are large variations in both the figures for poverty and agricultural GDP in UKhahlamba district municipality. Agriculture enjoys its peak between 1995 and 2000 and later decreases to a minimum of R530 million. During the same period, poverty continuously follows an increasing pathway to its high of 79 per cent. An eagle's eye view can tell us that agriculture has an important effect on poverty in this district.

Out of the seven districts in the Eastern Cape, UKhahlamba is ranked sixth in terms of its contribution to the economy of the province. Alfred Nzo is in seventh place. The total GVA for the UKhahlamba region was R5.7 billion in 2008, a growth rate of 11 percent

from 2007. The sectors that contributed the most to GVA were from the tertiary sector, with a contribution of about 82 per cent. It occupied an average 80.5 per cent of the total production of the district, followed by the secondary sector with 10.6 per cent and the primary sector with 8.9 per cent. The primary sector's contribution to district output declined from 13.7 per cent in 1995 to 2.5 per cent in 2008, making the area more vulnerable to any external shock. Ukhahlamba District Municipality is the only district that experienced negative growth in the primary sector, from 0.5 per cent between 1995 and 2000 to minus 4 per cent between 2001 and 2008. The industry that drives growth in this sector is agriculture, forestry and fishing, as it holds the largest share of output in this sector. Growth in this industry dropped to almost minus 5 per cent during 2001 and 2008.

Several reasons can be noted for studying trends in both public investment on agriculture and rural development in Eastern Cape Province and its effect on addressing poverty and inequality. The reason for selecting Eastern Cape Province is that poverty is indeed widespread in the Province and is worst in the former homelands. Eastern Cape is one of the poorest provinces in South Africa; it is ranked second last in terms of poverty and overall human development index (Perret, 2002). Furthermore, the biggest population in this Province depends on social grants and non-vibrant subsistence agriculture. Estimates show that two-thirds of the population in the Province live below the poverty line. Two-thirds of the Provinces population live in the former homelands', and largely dependent on social grants and surviving through subsistence agriculture (Buthelezi, 2006). Agriculture is the Eastern Cape's biggest primary sector, but it is severely underdeveloped. Therefore any allocations or ideas that support economic development in a historically neglected area like Eastern Cape will be greatly appreciated.

### **4.3 Chapter Summary**

This chapter looked briefly at the province's district municipalities, poverty characteristics and trend in agricultural productivity since 1995. It provides background information on all the district municipalities' economy and tries to map the possibilities

for reducing poverty through the development of agriculture. Increasing poverty and falling agricultural productivity seems to be common across all the district municipalities. Although they shows a decreasing trend, figures on agricultural GDP across all the district municipalities shows a lot about the Province's potential to increase agricultural productivity. Large variation between the maximum and the minimum GDP from agriculture implies that there is a possibility for increasing output and maintains it at higher levels either through provision of infrastructure, farmer support services and provision of inputs.

Several studies has pointed out that growing the agricultural sector in Eastern Cape will involve efficient public spending well directed policies founded through research (Manyewu, 2009; Perret, 2002) hence this study is guided by the conception that growth in agriculture can lead to poverty reduction in the former homelands. In some district municipality, a cross sectional analysis of the tables above show decreasing agricultural productivity leading to an increasing poverty but some districts show both increasing agricultural growth and increasing poverty. Poverty reduction in the former scenario might be a result of underinvestment in small scale agriculture and mismatch between public spending and development strategies with the later scenario likely to be caused by maldistribution of the benefits of agricultural growth.

Transforming and building the agrarian economy in Eastern Cape will deliver the highest returns in poverty alleviation. It is through this study that priorities for pro-poor growth and the effectiveness of public expenditure on rural growth can be analysed. A study of this nature in the above discussed district municipalities will lay the foundations for economic growth in the Province's rural parts, addressing the very structure of poverty and spatial imbalances in growth and development.



## CHAPTER FIVE

### DATA AND MODEL SPECIFICATION

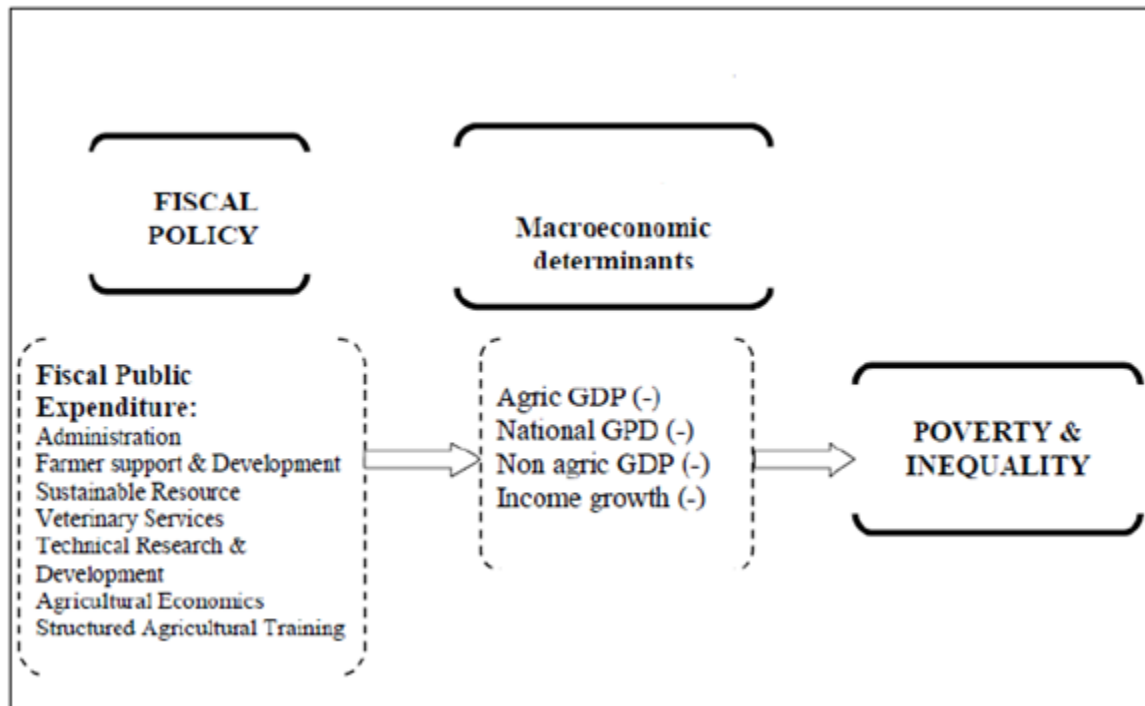
#### 5.1 Introduction

The purpose of this chapter is to specify the model and present the variables used for carrying out the analysis. The choice of variables and the type of models used follow previous studies on the theories and explanations explored in previous chapters. According to the reviewed literature, the dominant theories and research to date reveal important relationships among public agricultural expenditure and growth in agricultural production; and the incidence of poverty. These theories explain the channels through which public investment affects poverty and are based on economic principles. The basic theme drawn from the above literature is that both agricultural and non-agricultural incomes play an important role in reducing poverty in South Africa. The foregoing situation therefore calls for a specific modelling process which will provide policy makers and researchers, with information on how these variables behaved in the past and their ability to predict the present and future relationships.

The chapter consolidates expert views on public expenditure and its effects on poverty reduction to develop a simple methodological framework suitable for this study. There is a complex relationship between public expenditure and growth and this relationship is explained using several economic theories. The next section discusses the poverty reduction pathways of public investment while the fourth section develops the analytical techniques and equations that estimate the relationships among the parameters under study. This same section presents an important review of estimation methods for the required increase in public spending to achieve the expected agricultural growth rate that will enable the achievement of MDG1. The econometric model used in this study is presented at the end of this section. The last section presents the discussion and summarises of the chapter.

## 5.2 Simple methodological framework

Figure 5.1 highlights in schematic fashion the methodological approach adopted in this study. According to this framework, various types of public agricultural expenditure impact on agricultural GDP, non-agricultural GDP and national GDP. These are the macroeconomic determinants of poverty (Pasha and Palanivel, 2004). An increase in any of the macroeconomic variables is likely to result in poverty reduction. A successful policy is one that operates on the right side of this trade off (Pasha and Palanivel, 2004). The presented simple methodological approach was developed following the preceding review of the theoretical framework; diagrammatic framework for the analysis and literature on the linkages between government spending on agriculture, agricultural and non-agricultural income growth and poverty reduction. It summarises the main components and develop the set of models to be employed in this study by drawing simple relationships between the variables. The same framework also presents the set of variables suitable for all the analysis.



**Figure 5. 1: Simple Methodological Framework**

Fiscal public expenditure classifications follow that of the Department of Agriculture for the Eastern Cape Province (Eastern Cape Provincial Treasury, 2010). According to this framework, public fiscal policy aimed at agricultural development through financing the administrative function of public agricultural spending, farmer support programmes, sustainable resource, veterinary services, technical research and development, agricultural economics and structured agricultural training impacts on national GDP, agricultural GDP, non-agricultural GDP and overall household incomes (Aschauer, 1989; Pasha and Palanivel, 2004; Fan *et al.*, 2008 and Govereh *et al.*, 2009). Any positive effect on the immediate macroeconomic determinants (national GDP, agricultural GDP, non-agricultural GDP and overall household incomes) are likely going to cause a decrease in poverty with fiscal policy being the main driver (Bourguignon, 2003 and Pasha and Palanivel, 2004).

The conceptual framework employed in this study follow a study on monitoring and evaluation by Bos (1997) which proposes two types of performance evaluation namely trend performance evaluation and strategic performance evaluation. The former refers to the regular check on an observed indicator against its expected target and the latter involves long term activity that assess the extent to which the use of resources and potentials are being maximised to achieve expected outcomes. Using trend performance evaluation, the contribution of public investment in agriculture is checked against expected level of agricultural productivity and its consequential decrease in the level of poverty. These outcomes are used to assess whether the sector is meeting its roles and the broader set of economic objectives like the CAADP goals, SADC RISDP goals and the MDG goal 1 employing strategic performance evaluation. The analysis tracks down the whole chain of causality between public investments in agriculture and the outcomes associated with the investments. Thus the conceptual framework provides information on what should be evaluated, highlighting both the regional and provincial initiatives used in this study.

Agricultural investments in the context of this study may include fiscal public expenditure and policy on agriculture. The performance indicators are the agricultural GDP, national agricultural GDP, per capita GDP and levels of poverty across South Africa and the Eastern Cape Province. These performance indicators should be compared with the target values set at either provincial level (PGDP), or regional level (SADC RISDP target, CAADP targets and the MDG1). This set of information enables quantification of the deviation from the target and an evaluation to check if the deviation is acceptable. Agriculture has several roles in the economy; therefore similar derivations will be done to evaluate all its roles with respect to all its target reference levels. Time-series indicators and their rates of change are used for this study.

### **5.3 Data used**

Following the theme of this thesis, the study defined the main dependent variable as the incidence of poverty for which time series data for the period 1995 – 2010 were assembled for all the district municipalities of Eastern Cape. There are peculiarities pertaining to data available in South Africa. No definite data on variables under study were found for the period before 1994 and this is explained mainly by the fact that prior to 1994 the area under study were classified as “independent homelands” which were excluded from the country’s data for South Africa. Therefore existing time series for the macro-economic determinants of poverty, agricultural GDP per capita and non-agricultural GDP per capita, for the period 1995-2010 were used to determine poverty.

This data had been generated from various sources, notably National and Provincial Department of Agriculture, Eastern Cape Socio-Economic Consultative council (ECSECC) data base, National Treasury, statistical abstracts, Statistics South Africa (SSA), and miscellaneous government publications. These main variables which consist of a set of macro-economic variables and the range of all the variables discussed in chapter 3 above will now be presented and examined in greater detail. All these variables are described and examined in terms of their relevance and the possibility for obtaining

useable data on the variables concerned (see Table 5.1 below). Possible sources for this data are also summarized in Table 5.1.

Table 5.1 presents the determinants of rural poverty. Agricultural GDP is included as a variable in the poverty equation because agricultural income still accounts for a substantial share of total income among rural households in Eastern Cape. Even in 2008, the percentage was as high as 55 per cent. In some other areas in the province, this percentage is even higher. The income of the poor increases as agricultural output increases. They may also benefit through reduced food prices if they are net buyers.

**Table 5. 1: Data Description and Sources**

<b>Variable</b>	<b>Description</b>	<b>Data Sources</b>	<b>Hypothesised relationship with poverty</b>
GDP constant 2005 prices	GDP is calculated using the output approach, the total value of goods and services, measured in constant prices, produced in a region with labour employed in that region.	National GDP data are compiled by the ECSECC and National and Various Provincial Departments.	(-)
Real Agricultural GDP Constant 2005 prices	Total value of agricultural goods and services, measured in constant prices, produced in a region with labour employed in that region.	Statistical Abstracts, ECSECC database	(-)
Non Agricultural GDP constant 2005 prices	The total market value of all non-agricultural goods and services, measured in constant prices, produced within the political boundaries of an economy during the year	ECSECC database	(-)
Incidence of poverty	The proportion of the population that lies beneath the official poverty line	ECSECC database	N/A
Public agricultural Expenditure	Spending by the government to pursue agricultural and rural development activities with the expectation of greater future benefits or rewards.	National treasury, National and Provincial Departments of agriculture and miscellaneous government publications	(-)
GDP growth rate	The percentage change in GDP from one year to the next. How much GDP grows over time.	STATS SA, Reserve Bank Data, World Bank	(-)
Share of agriculture in GDP	Share of agricultural GDP in total GDP	Authors' calculations based on data from ECSECC and various other sources	(-)
Share of non-agricultural GDP in total GDP	Share of non-agricultural GDP in total GDP	Authors' calculations based on data from ECSECC and various other sources	(-)

The difference between total GDP and agricultural GDP is good proxy for non-agricultural GDP. The differential impacts between agricultural GDP and non-agricultural GDP have important policy implications for further poverty reduction. If improvement in non-agricultural GDP reduces rural poverty more than increases agricultural GDP does, the government resources should be targeted to improve non-agricultural sector, or vice versa. Therefore, the inclusion of agricultural output and non-agricultural output in the poverty equation is because rural households receive their income from these two sources. Since 1995, ECSECC has published GDP data every year for each district municipality both each sector.

Agricultural investments in the context of this study may include any fiscal public expenditure on agriculture. Public spending on rural poverty and agricultural development has been a major policy instrument for the post-Apartheid government to reduce poverty (Hall and Aliber, 2010). Public-sector investment in the realm of agriculture rose by more than 100 per cent between 1994 and 2004. This variable was used in the regression analyses because public investment makes a major contribution to both the promotion of the agricultural sector and poverty reduction. Data on this variable were largely acquired from yearly report on the Analysis of Budgeted Expenditure on Agriculture prepared by Eastern Cape's Department of agriculture.

The depended variable in this study is the incidence of poverty. There are four approaches used in measuring poverty namely; the monetary approach, the capability approach, the social exclusion approach and the participatory approach (Bhorat, Poswell and Naidoo, 2004). Theoretically, if all the approaches identify the same individual as being poor, any one of these approaches can be used to measure poverty. However, empirical evidence shows that poverty rates in countries differ significantly, depending on which approach is adopted. The monetary approach is the approach used to define poverty in this study. A poverty line is defined in terms of the monetary income sufficient for a person to attain a minimal standard of living. The World Bank estimate for the poverty line is \$2 per person. In South Africa, the poverty line for households was set at

R800 per household in the 1996 prices (Bhorat *et al.*, 2004). The same argument is retained in this study.

This study is bound by its objective which merely seeks to gain an understanding of how changes in both agricultural GDP and non-agricultural GDP affects poverty across different district municipalities of Eastern Cape. Quite strictly, the objective suggests that there is no disagreement with earlier findings regarding this relationship. To that extent, the variables that detect trends should be more important in this study. It has therefore been decided to exclude those variables that relate more to the structure of agricultural production than to price trends.

#### **5.4. Model specification**

Another important element in econometric modeling processes is the model specification. Bierens (2009) have presented an elaborate discussion of the procedure and criteria, highlighting the fact that it involves both statistical and non-statistical considerations and depends on the study objectives, the appeal made to economic theory in providing the necessary guidance for the empirical work, as well as how adequate the model is in statistical terms. For most practical purposes, the concern is with the “statistical fit” of the model. In a number of situations, there is a need to work out the appropriate trade-off between “fit” and “parsimony” in econometric modeling (Bierens, 2009). A number of guidelines exist in economic theory regarding the appropriate specification for the poverty determinants. The empirical works on poverty by Klasen And Misselhorn (2006); Ram (2004); Ram (2010); Nurudeen and Usman (2010) and Fan *et al.*,(2008) provide a good basis to postulate that the major determinants of poverty are agricultural GDP and the non-agricultural GDP. The functional form of the model is derived from both economic theory and several reviewed studies. Therefore, the econometric model employed in this study links the dependent variable poverty (P) to explanatory variables agricultural GDP per capita, non-agricultural GDP per capita and the error term. This function is therefore presented as:



$$P = f(\text{GDP agricultural per capita}, \text{Nonagricultural GDP per capita}, \varepsilon) \text{-----} (5.1)$$

Equation 5.1 can be rewritten in a linear regression form as:

$$\dot{P} = \beta_1 * Y_{ag} + B_2 * Y_{ng} + \varepsilon \text{-----} (5.2)$$

Where  $P$  is the incidence of poverty,  $Y_{ag}$  is agricultural GDP per capita,  $Y_{ng}$  is the non-agricultural GDP per capita and the error term  $\varepsilon$ . Bierens (2009) wrote that the above function should be specified such that the adopted equation can hold for all variables of the dependent variable and the explanatory variables. Following Bierens (2009) and Cervantes-Godoy and Dewbre (2010), the above function can therefore be specified by applying log-transformations to both the dependent and the explanatory variables. The log-log model adopted for this study follows the conventional regression model which is a static model, in that incidence of poverty in a given period is determined by the independent variables within that period only. It is specified as:

$$\ln(\dot{P}_{it}) = \beta_0 + \beta_1 * (\ln Y_{ag})_{it} + B_2 * (\ln Y_{ng})_{it} + \varepsilon_{it} \text{-----} (5.3)$$

Following equation 5.3 above, it is important to note that the parameter  $\beta_1$  can be interpreted as the poverty elasticity of agricultural GDP per capita growth and is derived as:

$$\beta_1 = \frac{d \ln(P)}{d \ln(Y_{ag})} = \frac{(dP)/P}{(dY_{ag})/Y_{ag}} \text{-----} (5.4),$$

where the second term follows from the fact that  $d \ln(x)/dx = 1/x$ , hence  $d \ln(x) = (dx)/x$ . Poverty elasticity of non-agricultural GDP per capita growth ( $B_2$ ) can be derived similarly. In equation 5.3,  $B_1$  and  $B_2$  are the ‘‘Poverty elasticity of agricultural growth’’ and ‘‘Poverty elasticity of non-agricultural growth’’,  $\varepsilon$  is the error or disturbance term and,

$i$  is the panel of municipalities and  $t$  is time. The calculation of elasticities was carried out using pooled regression analysis of E-views. It is important to note that the aim of the regressions was simply to examine the historical relationship between poverty rates and agricultural GDP per Capita and non-agricultural GDP per Capita and therefore cannot provide a definitive basis for claims of causality. The above problem has its limitations. The additive nature of the model has the implication of introducing the incidence of multicollinearity.

When carrying analysis that involves the comparison of economic variables across space and time, Podesta (2000) proposes that the space and time domains should be combined in a comparative analysis. The pooled regression analysis stresses this same sensitivity to time as well as space. Podesta (2000) and Cervantes-Godoy and Dewbre (2010), noted that pooled time series cross-section analysis is probably the most important way to examine simultaneously these dimensions. Pooled analysis combines time series for several cross-sections<sup>1</sup>. In this study, pooled data are characterized by having repeated observations (years) on fixed units (district municipalities). This means that pooled arrays of data are one that combines cross-sectional data on 7 district municipalities and 15 years to produce a data set of 7 x 15 observations (105 observations).

Estimating this kind of model and some of its variants solves many problems of traditional methods of the comparative research (i.e. time series analysis and cross-sectional analysis). Several reasons support this. The first reason concerns the “small N” problem suffered by both time series and cross-sectional analysis. The limited number of spatial units and the limited number of available data over time led data sets of these two techniques to violate basic assumption of standard statistical analysis. Most specifically, the small sample of conventional comparisons shows an imbalance between too many explanatory variables and too few cases. Consequently, within the context of the small sample the total number of the potential explanatory variables exceeds the degree of freedom required to model the relationship between the dependent and independent variables. This is because, within the pooled regression analysis, the cases are “district municipality” starting from the district municipality  $i$  in year  $t$ , then district municipality  $i$

in year  $t+1$  through district municipality  $z$  in the last year of the period under investigation. This enables testing the impact of a large number of predictors of the level and change in the dependent variable within the framework of a multivariate analysis (Podesta, 2000). Several reasons for pooled regression analysis are as follows; pooling provides a larger number of degrees of freedom, provides defense against misspecification bias resulting from the use of only time-series, provides cross-sectional data for comparative purposes, provides a richer space of variation and possibly help with multicollinearity and aggregation problems (Pedosata, 2000 and Cervantes-Godoy and Dewbre, 2010),

Agricultural Growth Elasticity of Poverty (AGEP) is defined as the percentage decline in poverty caused by a 1-percent increase in per capita agricultural GDP. The technique employed here is unique as compared to those frequently used in literature (Lenagala and Ram, 2010; Pauw and Thurlow, 2011 and Adigun *et al.*, 2011). It adopts parts of the decomposition technique and then calculates the contribution of different sources to poverty reduction over time. It encompasses the decomposition technique by breaking down income into agricultural income and non-agricultural income. Regressions are the run on the log variables of time series data from both agricultural and non-agricultural GDP per capita and poverty levels. The uniqueness of the study therefore lies in the fact that firstly this seems to be the first study that uses the Eastern Cape Province's new poverty data to estimate the impact of income growth by source on poverty across all the district municipalities. Secondly, this is the only study that directly estimates and compares elasticities for the seven district municipalities of Eastern Cape Province, and third, this is undoubtedly the only work that quantifies the elasticities for agricultural and non-agricultural GDP per capita to poverty since the adoption of several important regional goals like the MDG1, PGDP and SADC RISDP.

The growth effects of each type of public agricultural spending on agriculture in year  $t$  can be derived by calculating by employing arithmetic approach that calculates the agricultural spending intensity (see section 3.7.1.2). Returns to expenditures on agriculture in agricultural productivity are derived as:

$$ASI = \frac{PAE}{AGDP} * 100 \text{-----} (5.5)$$

Where *ASI* is the agricultural spending intensity,  
*PAE* is the public agricultural expenditure and,  
*A GDP* is the agricultural GDP

The above approach uses public agricultural spending as the main input index and the aggregate output index being agricultural GDP. There are several reasons behind the use of this parameter.

Firstly, data on both variables used in the calculation of ASI was hugely available. Secondly, this seems to be an important measure in the realm of agricultural expenditure and productivity studies as there are several imbalances between what agriculture contributes to the economy and how much of public funds it receives (Edmeades, 2007 and Govereh *et al.*, 2009). This disparity is particularly pronounced amongst agriculturally-based developing countries where the use of public expenditures in agriculture is highly inefficient and biased towards unproductive allocations. Thus, before more funds are invested in agriculture, closer attention should be given to the quality of public investment, defined as the efficient use of available resources. More sustainable utilization of public funds in agriculture can be achieved by reallocating funds across the sector since it is the quality or composition of spending that matters. The same can be done to calculate non-agricultural spending intensity (*NASPI*).

### **5.5 Method of Evaluation of progress towards set goals**

Within the South African context and in terms of section 40 of the South African Constitution

*“... government is constituted as national, provincial and local spheres of government which are distinctive, interdependent and interrelated”.*

The implication of this is that provincial development strategies must take cognisance of and clearly reflect national strategic developmental and spatial imperatives and priorities, whilst at the same time providing a framework for the development of municipal spatial development strategies. The provincial and national priorities have a greater overlap, so does the provincial and district municipality priorities. This same overlap is also seen between provincial development goals and the regional policies. The complementarity between PGDP goals of poverty reduction and the MDG1 are not simply a coincidence. Eastern Cape’s provincial strategic plan for the agricultural sector identifies increased public spending on agriculture as priority but the target was not quantified. The overall goal of the ASGISA is to place the SA economy on a permanently higher growth path of more than 4.5% in the period to 2009, and more than 6% from 2010 to 2014. The ASGISA strategy builds on the principles underpinning the Medium Term Strategic Framework (MTSF), which guides the national, provincial and local planning and budgeting processes over the medium term. The majority of the expenditures on agriculture are made at provincial level and support services in the agricultural sector are the responsibility of provincial governments. For those reasons, an analysis of the global and regional policies in South Africa, and the prospects for their attainment must involve both the provincial and district municipalities’ levels of government.

Monitoring and evaluation quantify the observed level of contribution in relation to the target reference level (Olubode-Awosola, Chilonda, Minde and Bhatt, 2008). Regional set targets are used to evaluate improvements in provincial agricultural expenditure, agricultural growth and changes in the levels of poverty. These indicators are used to tell a credible story of how processes and investments associated with CAADP initiative, SADC PRSP, MDG1 and PGDP are influencing economic growth and poverty in Eastern Cape. Thus, each indicator is evaluated against purposively selected goals. The set goals are as follows: (a) CAADP target of achieving at least 6% agricultural GDP, (b) CADDP

target of investing at least 10% of national budgets in agriculture, (c) the SADC RISDP target of achieving 7 per cent GDP growth per year, (d) the Millennium Development Goal 1 of reducing by half the 1990 level of poverty by 2015. Eastern Cape's economy is therefore assessed against these goals. Table 5.2 presents information on these indicators, variables used and set targets.

**Table 5. 2: Selected Indicators to monitor changes in Agricultural Expenditure, agricultural GDP, total GDP and the incidence of poverty**

Indicator	Definition	Units	What is Being measured	Goals and Targets	Baseline year
Agricultural Expenditure	Percentage of annual public spending on agriculture	%	Share of agriculture expenditure in the national budget	CAADP target 5	N/A
Agricultural growth	GDP agriculture as a percentage of total GDP	%	Agricultural growth rate	CAADP target 1 SADC RISDP target 1	N/A
Poverty head Count	Percentage of population whose income is below the poverty line	%	Poverty Incidence	MDG1 target 1 SADC RISDP target 1 PGDP 1	1995 for MDG1 because of data issues 1995 for SADC RISDP because of data issues 2004 for PGDP compact was signed

In view of data issues, the base year for all the indicators in this study is 1995, that's the time South Africa began assembling data for the homelands. Choosing the base year is another important aspect of trend analysis, in this case, the analysis of changes in poverty. Benin *et al.*, (2010) wrote that determining the baseline period is critical and commented that the baseline year is chosen depending on either the date when the compact signed or proceeding to when the investment program is implemented. For each indicator, this study follows the option indicated in last column of Table 5.2. Referring to the CAADP, Benin *et al.*, (2010) wrote that having a baseline year later than 2003, when the compact was signed could complicate issues and bias any measurable impact. In the case of CAADP, the baseline year is 2003 when the Maputo declaration was made.

Olubode-Awosola *et al.* (2008) notes that monitoring the performance of a set target with well-conceptualised and relevant indicators provided by well-defined measures is necessary to inform policy makers on every sector's performance. The need for evaluation was also emphasised by Hendricks and Fraser (2003) and Alemu (2010). In their report for the Eastern Cape PGDP, they recommend that it is absolutely essential that performance indicators and programme evaluation be implemented in order to measure success or failure of the development projects. Alemu (2010) also made similar suggestions in a report that measures progress in service delivery in Eastern Cape. Alemu (2010) suggested two reasons for undertaking evaluation studies, 1) to direct or coordinate spatial or regional development initiatives with the objective of redressing regional imbalances and, 2) to assess or monitor the impact/performance of implemented projects (MDGs for example). In this study, such evaluation provides information on whether the Eastern Cape Province and South Africa as a whole are on course to achieve the MDG1, SADC RISDP targets, CAADP goal and the PDGP target. This evaluation exercise on the agricultural sector performance and progress made by the Eastern Cape Province will provide important information on the need to adjust and fine tune policies and investment decisions. Linking several programmes, goals, objectives and strategies of various development programmes with the agricultural sector performance at provincial level will help in mapping the pathway out of poverty.



## 5.6 Method of tracking progress towards MDG1

Simulations were employed to assess progress made towards achieving the set targets using the time series indicators. Exponential smoothing following the Hodrick-Prescott Filter was used to project whether the 2015 and 2025 estimate for the incidence of poverty as projected from past trends is enough to achieve the first MDG1 of cutting poverty rate of 1995 by half by 2015. The Hodrick-Prescott Filter is used to obtain smooth estimate of trend component of a series. It is widely used among macroeconomists to obtain a smooth estimate of the long-term trend component of a series. The same method was used by Cogley and Nason, (1995) and Bardsen, Fisher and Nymoen (1995), in a working paper which analysed business cycles. Technically, the Hodrick-Prescott Filter (HP) is a two-sided filter that computes the smoothed series of  $s$  of  $y$  by minimizing the variance of  $y$  around  $s$ , subject to a penalty that constrains the second difference of  $s$ . That is, the HP filter chooses  $s$  to minimise:

$$\sum_{t=1}^T (y_t - s_t)^2 + \lambda \sum_{t=2}^{T-1} ((s_{t+1} - s_t) - (s_t - s_{t-1}))^2 \text{-----(5.6)}$$

Let  $y_t$  for  $t = 1, 2, \dots, T$  denotes the logarithms of a time series variable. The series  $y_t$  is made up of a trend component, denoted by  $s$  and a cyclical component, denoted by  $c$  such that  $y_t = s_t + c_t$ . The penalty parameter  $\lambda$  controls the smoothness of the series  $\sigma$ . The larger  $\lambda$  is, the smoother the  $\sigma$ . As  $\lambda$  approaches infinity, a linear trend emerges from the  $s$ . However, HP has the following weaknesses; it lacks rigorous economic motivation, especially the time-varying trends. A HP filter can help to overcome the problems of time changing in the incidence of poverty and indeed McMorro and Roeger (2001) favour the HP filter over a linear time trend for it allows for a partial correlation of cycle and trend. Also, it could help to overcome the potential measurement bias introduced by the possibly inflated figures. Generally, the HP filter has an endpoint problem, the identification of an output gap is difficult as potentially an ‘outlier’ can have big effects on the output gap estimate.

In reporting progress towards MDG1, this study uses the same system as the one used by UNDP (2010). Levels of progress were created for the incidence of poverty indicator and each district municipality is placed in one of the following categories with respect to progress towards MDG1. See Table 5.3 for detailed information.

**Table 5. 3: Progress towards MDG1**

Category	Explanation
Early achiever	It has already reached the target.
On track	It is likely to reach the target by 2015 or any set date.
Off track/slow	It has been making progress, but only slowly, so may not reach the target before 2015 or any set date
Off track/regressing/no progress	It has made no progress and may even have regressed, moving further away from the target.

The simulated performance of each district municipality with regard to MDG1 follows the above categorizations after comparing it with the target values set. This set of information enables quantification of the deviation from the target and an evaluation to check if the deviation is acceptable.

### 5.7 Costing Millennium Development Goal 1

Each MDG requires an assessment of which effective interventions are available and are appropriate to meet the target, taking into account issues involving infrastructure, human resources, and financing. This assessment should be the basis to develop a country-specific strategy to meet the MDGs by 2015. Moreover, it provides a transparent framework for budgeting to meet the MDGs. To estimate the necessary public financial resources required to achieve MDG1, the study considers both the poverty elasticity of agricultural growth, poverty elasticity of non-agricultural growth and the elasticity of agricultural growth to public agricultural expenditure increase. Both equation 5.3 and 5.4 are considered in this regard. Thus, the approach employed use the GEP and growth-expenditure elasticities to estimate the necessary public financial resources required to achieve MDG1 in the Eastern Cape. Similar growth linkages have been modelled by Fan *et al.* (2008). The same model was adopted for this study, and is suitable because it

captures the indirect effect of agricultural growth on poverty through its linkage or multiplier effect with non-agricultural growth. The marginal impact of these two sources of incomes on poverty is assessed using the following equation:

$$\frac{dP}{P} = \left(\varepsilon_{ag}\right) \frac{dY_{ag}}{Y_{ag}} s_{ag} + \varepsilon_{ng} \frac{dY_{ng}}{Y_{ng}} s_{ng} + \left\{ \left( \frac{dP}{P} \frac{Y_{ng}}{dY_{ng}} \right) \left( \frac{dY_{ng}}{Y_{ng}} \frac{Y_{ag}}{dY_{ag}} \right) \frac{dY_{ng}}{Y_{ng}} s_{ag} \right\} \text{-----}(5.7)$$

Equation 5.7 captures the elasticity of poverty reduction with respect to both agricultural and non-agricultural growth. Where for each of the municipalities and the Eastern Cape Province,

$P$  = the incidence of poverty

$Y_{ag}$  = agricultural GDP

$Y_{ng}$  = non-agricultural GDP

$s_{ag}$  = share of agriculture in GDP

$s_{ng}$  = share of non-agriculture in GDP.

$\dot{P}$  = change in poverty for each year

$\varepsilon_{ag}$  = elasticity of poverty reduction with respect to (w.r.t.) agricultural GDP growth

$\varepsilon_{ng}$  = elasticity of poverty reduction w.r.t. non-agricultural GDP growth

$g_{ag}$  = agricultural GDP growth rate

$g_{ng}$  = non-agricultural GDP growth rate

$\phi_{ng,ag}$  = multiplier effect or linkage between agricultural GDP growth and non-agricultural GDP growth.

Thus, equation (5.7) can be rewritten as:

$$\dot{P} = \{\varepsilon_{ag} * g_{ag}\} * S_{ag} + \{\varepsilon_{ng} * g_{ng}\} * S_{ng} \text{-----} (5.8)$$

Strong growth linkages and multiplier effects of agricultural growth to the non-agricultural sectors have been identified by many researchers. Many conclude that agriculture has both forward and backward linkages to other sectors. These linkages and their effects on poverty levels are captured in equation (5.8) above. The first and second coefficients capture the effect on poverty generated by both agricultural and non-agricultural growth respectively. The third coefficient captures the elasticity of poverty generated by multiplier effect due to growth in the agricultural sector. Partitioning the expected reduction in poverty among each of the terms in equation (5.8) and solving for the required agricultural growth rate yields the following equation:

$$g_{ag} = \{\dot{P} - \dot{P}_{ng}\} / \{\varepsilon_{ag} * S_{ag} + (\varepsilon_{ng} * \phi_{ng,ag}) * S_{ng}\} \text{-----} (5.9)$$

where  $\dot{P}_{ng}$  = the rate of poverty reduction emanating from a given non-agricultural growth rate, which is calculated from the second term in equation (5.9), i.e.

$$\dot{P}_{ng} = \varepsilon_{ng} * g_{ng} * S_{ng}$$

Equation (5.9) represents the agricultural growth rate that is required to reduce poverty annually from its direct effect. The level of public expenditure needed for agriculture to grow is calculated in equation (5.10) and once the required agricultural growth rates are known, the corresponding annual changes in expenditure needed to achieve these growth rates can be calculated as:

$$\dot{E}_{ag} = g_{ag} / \delta_{ag} \text{-----(5.10)}$$

where

$\dot{E}_{ag}$  = the annual growth rate in agricultural expenditures, or

$\delta_{ag}$  = elasticity of agricultural growth w.r.t. agricultural expenditure growth which is

calculated as  $\frac{dY_{ag}}{dE_{ag}} * \frac{E_{ag}}{Y_{ag}}$

The annual agricultural expenditure required between 2011 and 2015 can be easily calculated from the baseline data on actual agricultural expenditure in 2010 from equation (5.10).

### 5.8 Chapter Summary

The linkages between public expenditure and growth are complex and sometimes inexhaustible. The analysis of these linkages can only be made possible by simplifying these linkages. The review in this chapter shows that many researchers have examined the effects of aggregate public expenditure on economic growth. Several frameworks were used by these researchers resulting in mixed outcomes as summarised below. Some support the hypothesis that government spending is negatively related to economic growth; others have found that public spending is positively interrelated with economic growth; and some have found no significant relationship between the two. In general, studies of the relationship between aggregate public expenditure and economic growth

have yielded robust results. In fact, they are very sensitive to small changes in the model specification especially the choice of variables leading to notable observations. This study is an improvement on all the above mentioned studies on economic growth-government expenditure relationship. It considers government expenditure specifically on agriculture as an important variable that affects agricultural growth, rural poverty reduction and finally brings in economic growth.

The linkages between public agricultural expenditure, agricultural growth and poverty reduction can simply be estimated using the simple response analysis and the GEP as explained above. Costing poverty, then, is accomplished by first calculating the required agricultural growth rates using the elasticity of poverty reduction with respect to agricultural growth. The calculated required growth rates are then used to estimate the necessary financial resources, using growth with respect to expenditure elasticity. Because growth in the non-agricultural sector will also contribute to poverty reduction, either directly or indirectly through growth linkages with agriculture, the additional poverty reduction effects from this sector are also considered in the analysis. This methodology is exceptional in that it tries to capture both the efficiency and the welfare effect of public expenditure by assessing its impact on the poor.

## CHAPTER SIX

### TRENDS IN AGRICULTURAL PUBLIC SPENDING AND ECONOMIC GROWTH IN EASTERN CAPE<sup>3</sup>

#### 6.1 Introduction

This chapter starts off with a trend analysis of the aggregate level of spending. This is done by looking at the absolute size of the Eastern Cape's agricultural budget, the proportion of the national budget allocated to Eastern Cape agriculture and the intensity of public spending. This will provide an overview of the agricultural investment situation in the Eastern Cape Province because the province only came into existence as a separate administrative entity following the political reforms of the mid-1990's that laminated in multi-party democracy. It primarily draws information from the latest available statistics from the Eastern Cape Province's Department of Agriculture report for the period 2000-2010. Data for the years before 2000 were not available for the Eastern Cape Province. This chapter therefore attempts to elucidate the trends in public expenditure using the available data (from 2000 to 2010). The analysis presented in this chapter has primarily employed data both the Analysis of Budgeted Expenditure on Agriculture presented by the Departments of Agriculture on a yearly basis and other relevant sources like the ECSECC database to understand trends in public agricultural expenditure in the province.

While the chapter discusses trends in public budgeting and spending on agriculture, the following section pays attention to the distribution of the benefits of agricultural growth. By tracing the contribution of agriculture to provincial GDP and how growth in agriculture translates into poverty reduction over the years, the chapter assesses whether

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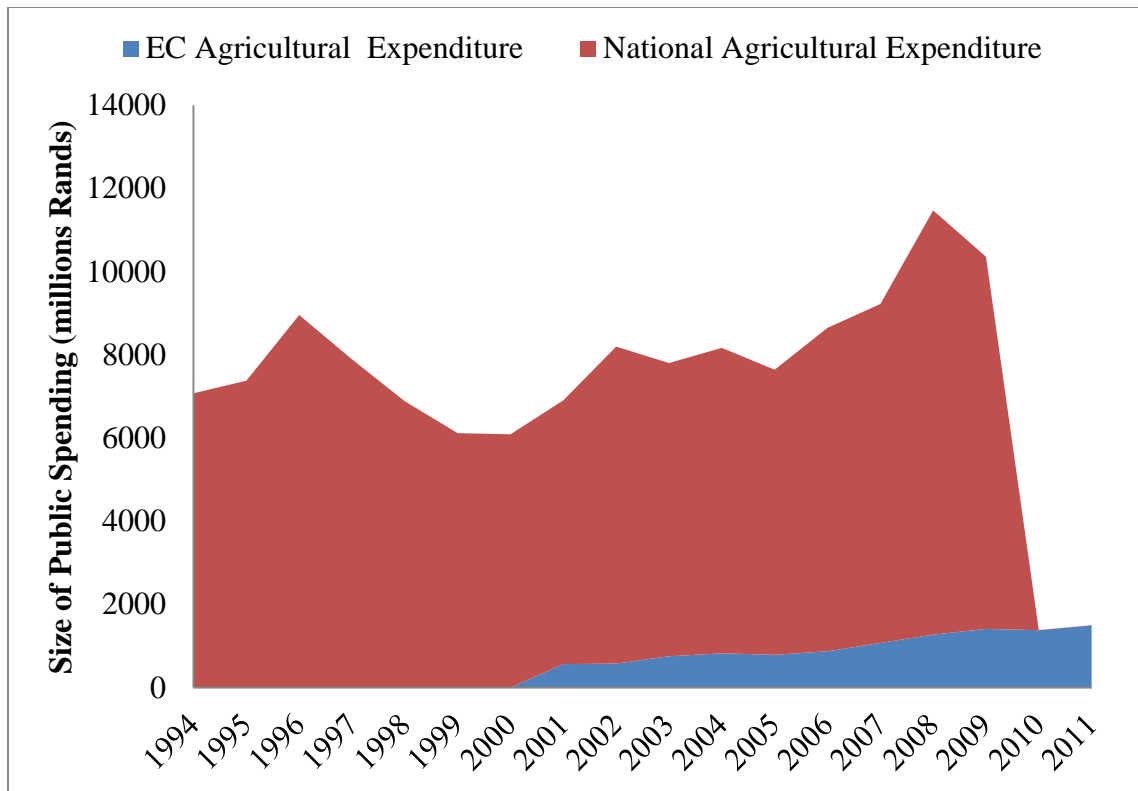
<sup>3</sup>An earlier version of this chapter was accepted and presented as contributed paper at the Agricultural Economics Association of South Africa Annual Conference, September 2011, Pretoria.



growth in agriculture is consistent with reductions in poverty across all the district municipalities of the Eastern Cape Province

## **6.2 Trends in public agricultural expenditure**

Without doubt, the size of public agricultural expenditure is an important determinant of overall agricultural production. Figure 6.1 below shows the size of public capital contributed to the agricultural sector for both South Africa and the Eastern Cape Province. For the reasons already given earlier, the province's figures were only available for the period between 2000 and 2010. Data for South Africa's public agricultural expenditure were obtained from the National Treasury and was available from 1994 to 2010. Total public expenditure on agriculture in the Eastern Cape Province grew steadily over the period 2000 to 2011. In real terms, total public expenditure allocated to the sector grew from a low level of 563 million Rand in 2000 to 1.494 billion Rand in 2011, as shown by Figure 6.1 below.



**Figure 6. 1: Size of Agricultural Public Spending**

Source: Modified data from various government documents

The size of public expenditure almost doubled during the period under review (Figure 6.1). During this same period, South Africa’s total spending on agriculture has been variable throughout, with an average growth rate of 96% over the period 1994 to 2009. Overall, South Africa’s national public agricultural expenditure increases sharply during the period under review. This is also in line with rhetoric on the part of the Government and the CAADP’s goal of increasing national budgetary resources to the agriculture sector (AU/NEPAD, 2003). Eastern Cape’s provincial budget for agriculture follows a similar trend as that of the national budget for agriculture. During the period 2000 to 2011, public spending on agriculture in Eastern Cape increased impressively. This phenomenal growth rate confirms the desperation to expand public investment as a vehicle for reducing poverty in a country that has the inevitable distinction of being the most unequal in the world. The Eastern Cape is the least developed and has poor physical and social infrastructure. Growth in public agricultural expenditure is important for agricultural growth.

Several reasons can be adduced for the increase in public spending on agriculture in South Africa. Increased knowledge by the successive elected governments that took over from the Apartheid regime of the potential role of agriculture in promoting growth and equitable distribution of income is probably the most compelling reason. The increase could also be explained by the greater emphasis placed on rural development by the ANC government since the last elections. Govereh *et al.* (2009) noted that the size of public spending on agriculture is the outcome of political decisions influenced by interest groups and democratic reforms. The increase in public agricultural spending in South Africa might also be explained by the ruling government ideas and role regarding helping the poor and addressing the problem of inequality. The period under reference also coincides with the era of heightened regional and global concern about poverty and South Africa's endorsement of these actions.

### **6.3 Functional Analysis of Public Agricultural Expenditure**

According to Fan *et al.* (2002) and Govereh *et al.* (2009), many developing countries increasingly face tighter budgets. It is therefore assumed that these governments strive to spend at a level that gives the highest impact on the agricultural GDP and promote sustainable agriculture. When undertaking a public agricultural expenditure tracking survey, it is important to understand whether public investments are in place in appropriate combinations, levels and sequences (Benin *et al.*, 2010). Even though the government has succeeded in increasing public agricultural expenditure, it is deemed necessary to analyse if the province is allocating these to the core pillars of agricultural growth. Recently, Hall and Aliber (2010) noted that even though agricultural expenditure is known to have increased over the past decades in South Africa, the former homelands have experienced stagnation in agricultural productivity over the same period. Therefore, it is imperative to understand that the challenges in stimulating agricultural growth through increased public investment lies mainly on addressing allocative inefficiencies. Govereh *et al.* (2009) pointed out that the size of public expenditure is not an efficient

measure as it fails to account for efficiency in the use of resources. Between year 2000 and 2011, allocations to various sub-programmes under the Department of Agriculture and Rural development also increased, Table 6.1. The table listed eight functions that the government of Eastern Cape performs in the agricultural sector and against each function, the trend in spending on each sub-programme since 2000 are shown. Each function is discussed in detail below.

**Table 6. 1: Eastern Cape's Public agricultural Expenditures by programme**

	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011
Administration	258875	249991	344180	409374	242539	220423	298330	534893	421997	421353	532220
Farmer support & Development	81656	69809	65515	63368	54589	88756	132542	165897	199237	249801	288979
Sustainable Resource	44211	61424	218815	266543	323119	413209	655539	882325	1197700	1113042	1285509
Veterinary Services	78097	57970	84514	87667	88563	157005	186521	200738	506394	413570	462738
Technical Research & Dev	24989	44478	37035	27267	41741	59045	7153	106656	71195	63590	72652
Agricultural Economics	----	----	----	1639	6312	10412	215834	68483	57693	65383	71789
Structured Agric. Training	3953	2100	4341	28527	30464	29358	43277	123195	195083	210105	243682
Total payments and estimates	403015	414967	718183	858066	787327	965334	1456010	2053103	2520708	2416641	2836211
Source: Eastern Cape Department of agriculture Budget statements (2000-2011)											

Table 6.2 below displays the average share of the budget and the trend in spending on agriculture by the Department of Agriculture and Rural Development of the Eastern Cape Province since the year 2000. The following discussion gives a summary of these types of spending and descriptions of trends throughout the period illustrated.

**Table 6. 2: Functional Classification of Discretionary Expenditure, Eastern Cape, 2000-2010**

Functions	Per cent	Annual Average	Growth rate
Administration	25.50	357652.6	3.92
Farmer support & Development	9.46	132741.3	12.5
Sustainable Resource	41.87	587403.5	17.3
Veterinary Services	15.06	211252.9	16.2
Technical Research & Development	4.02	56381.05	5.9
Agricultural Economics	4.43	62193.52	40.2
Structured Agricultural Training	5.92	83099.07	27.8
Total payments Agric. Sector	100	1402688	12.7

Source: Modified data from ECSECC (2010) database

In descending order, the domineering function of the Eastern Cape Province's government in agriculture is to promote sustainable resource management (42 per cent of spending), followed by spending on administrative function (25 per cent of spending) and then farmer support programmes with an average spending of 9 per cent. The budget for these functions has been increasing over the period from the year 2000 to 2010 with an average growth rate ranging from 4 per cent (administration) being the least and 28 per cent structured agricultural training (see Table 6.1 for figures for public agricultural expenditure by programme).

### **6.3.1 Intensity of Public Agricultural Expenditures**

An overview of the size of public agricultural investments reveals several aspects of the status of the agricultural sector in any given region. However, it is equally important to analyse the efficiency and effectiveness of these investments if the goal is to develop a highly performing agricultural sector (Geschwind and Eriksson, 2010). The most established proxy for doing this is the agricultural spending intensity measure (Edmeades, 2007). Public agricultural expenditures were indexed to agricultural GDP to get a measure of efficiency in the use of public funds in the sector. According to Edmeades (2007), the measure is defined as the intensity of public agricultural spending. As explained in the methodology, agricultural spending intensity (ASI) measures the returns to resources government spend on agriculture for each Rand of agricultural output.

Table 6.3 below displays figures for agricultural GDP, public agricultural expenditure and agricultural spending intensity. The figures for agricultural GDP and public agricultural spending were used to assess the impact of public spending on agricultural growth.

**Table 6. 3: Intensity of public spending in Eastern Cape, 2000 to 2010**

<b>Year</b>	<b>Agricultural GDP (2005 constant prices)</b>	<b>Agricultural expenditure</b>	<b>Agricultural Spending Intensity</b>
2000	106264.6	563	0.53
2001	109093.4	576	0.53
2002	110879.2	752	0.68
2003	113746.9	822	0.72
2004	117809.7	787	0.67
2005	123551.3	872	0.71
2006	130238.5	1 071	0.82
2007	136948.5	1 271	0.93
2008	142052.4	1 409	0.99
2009	140674	1 379	0.98
2010	145164.8	1 494	1.03
Average Agricultural Spending Intensity			0.78

Source: Authors' calculations based on data from government publications and following the methodology presented in section 5.4.1, Equation 5.5.

The relationship between government investment in public goods and agricultural GDP shows that public funds were largely behind the Eastern Cape Province's success in increasing agricultural productivity through the 1990s to 2010. Public spending on agriculture recently has increased at 2005 constant prices and in all the cases it is complemented by a corresponding increase in agricultural production. During the years 2000 to 2010, provincial spending on agriculture increased from R563 million to R1494 million, an average of 16 per cent per year at 2005 constant prices. This was as a result of



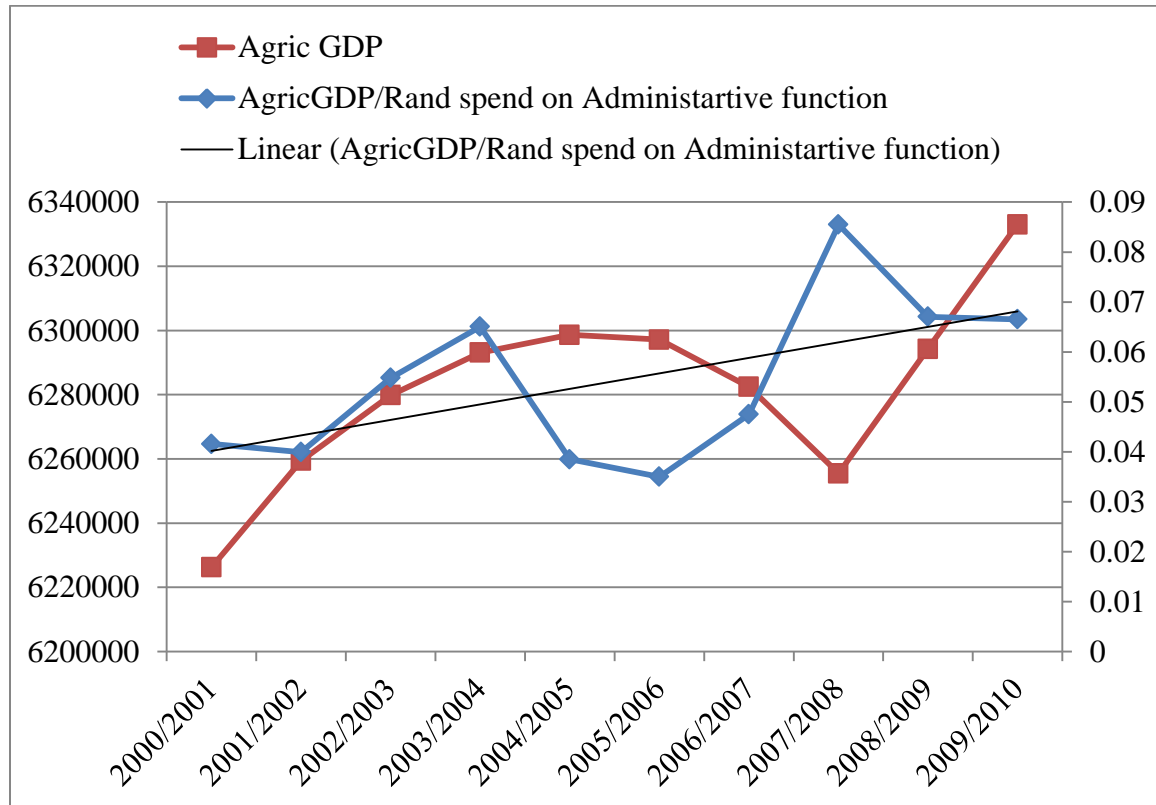
large budget increases and big spending boosts from the government. This shows that increases in public agricultural result in a corresponding rise in agricultural production.

Results in Table 6.3 also provide figures for agricultural spending intensity. In 2000, the Eastern Cape Province spends approximately 5 for each R100 of agricultural output. The whole period following the year 2000 saw a positive trend in the amount of investment spend on agriculture for each rand of agricultural output. By 2010, agricultural spending intensity increases to a high level R1 being spend for each R100 of agricultural output. This is approximately a fivefold improvement in the quality of use of public agricultural funds from the year 2000. This shows that agricultural spending intensity has changed fundamentally over the period. The change in intensity might imply some important structural changes leading to a greater weight of public agricultural investment in the Eastern Cape economy over the period. The average annual spending intensity during the period under review was R7 per for each R100 of agricultural output. When comparing these trends with the averages for other countries, the results found here are not impressive. Besides resembling a fivefold increase during the period 2000 to 2010, the figures are also encouraging when comparing then to Africa's average range of 5.4 to 7.4 per cent and Asia's range of 8.5 to 10.5 per cent (Govere *et al.*, 2009).

### **6.3.1.1 Administration**

The overall purpose of the Administration programme is to manage and formulate policy directives and priorities, and to ensure that there is an appropriate support service to all other programmes that concern finance, personnel, information, communication and procurement (DoA, 2010) in the sector. The administrative programme has enjoyed an allocation of 25% of the budget between the period 2000 and 2010 an allocation well above that of farmer support and development (13%) programmes, sustainable resource management (17%) and technical research and development (6%). The administrative function has been criticized for low marginal agricultural productivity effects in Ghana by Benin, Mogue, Cudjoe and Randriamamonjy (2009), and in Zambia by Govere *et al.* (2009). Figure 6.2 below shows the marginal productivity effect of the administrative

sub-programme represented by the amount of resources spend on the administrative function of the department of agriculture and rural development for each rand of agricultural output.



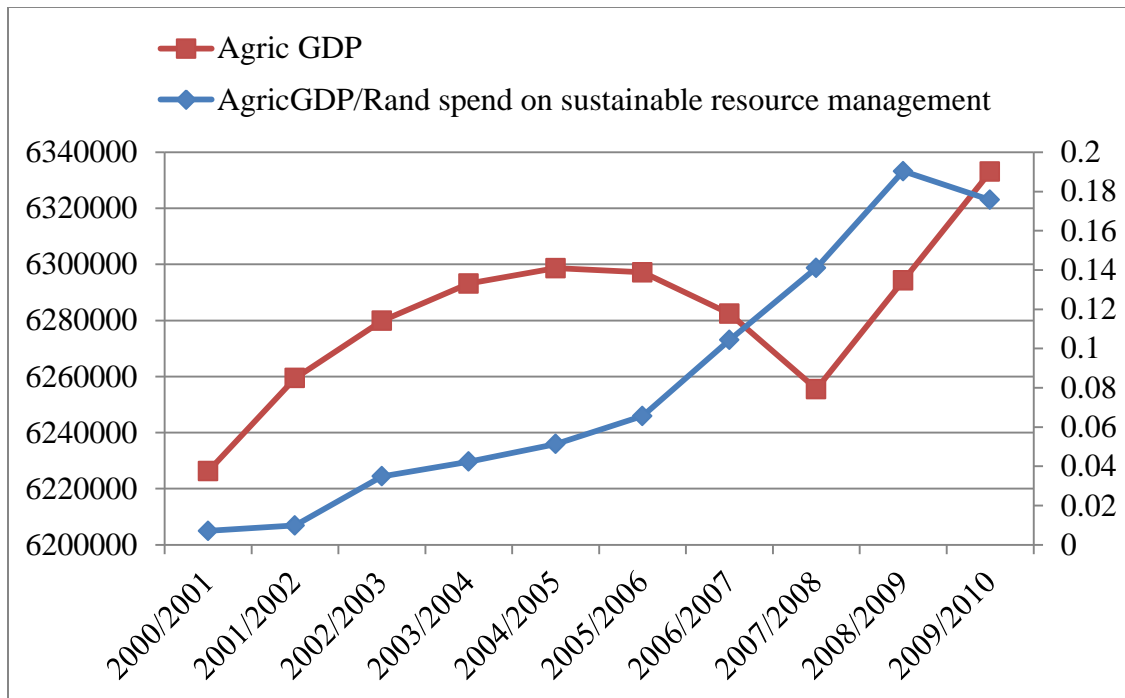
**Figure 6. 2: Level of public spending on the Administrative function as percentage of agricultural GDP.**

Within the agricultural sector there are large differences in terms of the level of resources allocated to a specific sub-programme. Trend in expenditure allocated to the administrative programme of the Department of Agriculture and Rural Development as a percentage of total provincial agricultural GDP increased at a rate of 0.3 per cent per annum and ranged from 3.5 per cent to 8.5 per cent. This result echoes the fact that by simply paying staff salaries, administrative costs and other overheads, it is unlikely to yield any substantive outcomes in terms of agricultural growth. Recently, compensation to employees increased substantially from a revised estimate of R169.8 million in 2008/09 financial year to R255.7 million in the 2009/10 financial year. This represents a

growth of 50.6 per cent. This increase is attributable to the provision of R126 million for payment of salaries for human resource management employees (Eastern Cape's Department of agriculture, 2010). This has a very weak link with long term agricultural development. This increase is therefore not expected given the off-reported low returns attributed to this programme (Govereh *et al.*, 2009), the state of Eastern Cape's agricultural infrastructure and the overall economic environment in the province.

### **6.3.1.2 Sustainable Resource Management**

The sustainable resource management function was created to provide an agricultural support service to farmers in order to ensure that there is sustainable management of agricultural resources. Sustainable resource management provides engineering services, land care and resource planning, and management of communal land. This is an important function with respect to the development of communal areas as it focuses on infrastructural development and the promotion of commercial crop production and conservation of agricultural resources among other things. This function received the bulk of the budget, averaging 42 per cent in the period under review, and saw an increase of 17 per cent over the period from the year 2000 to 2010. The economic arguments in support of sustainable resource management in the province were provided by Hendricks and Fraser (2003). Their report suggests that the stimulation of agricultural development in the Eastern Cape Province can only occur after infrastructural development and promotion of sustainable resources management. The same emphasis on this type of spending was suggested by Hall and Aliber (2010), as he strongly argued that agricultural productivity in the Eastern Cape Province is strongly linked to sustainable resource management. Figure 6.3 below shows the marginal productivity effect of the sustainable resource management sub-programme for the period 2000 to 2010. The graph shows the resources spend on the sustainable resource management sub-programme by the department of agriculture and rural development for each rand of agricultural output.



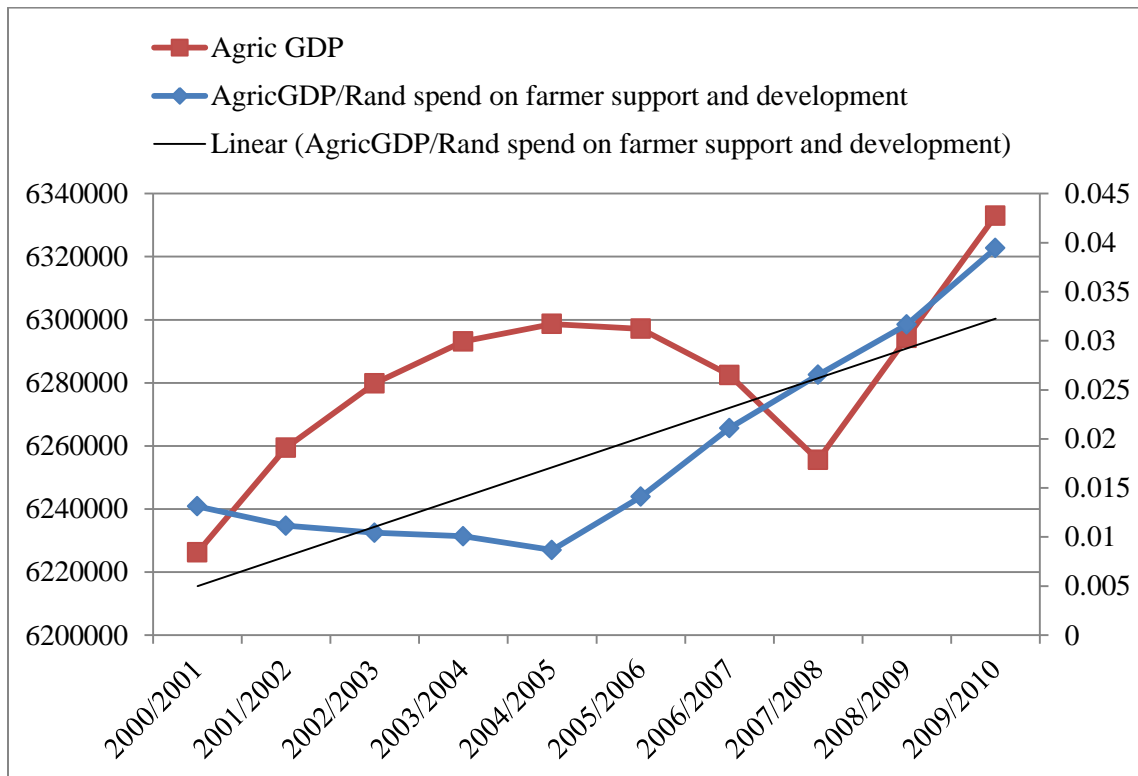
**Figure 6. 3: Level of public spending on sustainable resources management as percentage of agricultural GDP**

The share of expenditures on structured agricultural training in agricultural GDP by way of comparison rose from 0.7 per cent in 2000 to 17.5 per cent in 2010. Furthermore, literature strongly advocates for increased spending on infrastructure, land and management of communal lands in the Eastern Cape Province. Therefore, the amount allocated to this function by the Department of Agriculture for the Eastern Cape Province is in line with its relative importance (Hendricks and Fraser, 2003) given the severe infrastructural deficiency in the province.

### 6.3.1.3 Farmer Support and Development

The farmer support programme was developed to provide agricultural extension services and training to farmers. The programme was designed specifically to assist the beneficiaries of land reform programmes, agricultural rural development projects and to address the problem of food security in the province. This programme addresses such issues as post-farmer settlement and farmer support services. The extension services

function falls under this sub-programme. This is an important function of public agricultural spending and it has a very strong link with long-term agricultural development (Govereher *et al.*, 2009 and Hall and Aliber, 2010). Figure 6.4 below shows the marginal productivity effect of the farmer support and development sub-programme for the period 2000 to 2010. The graph shows the resources spent on this programme by the department of agriculture and rural development for each rand of agricultural output.



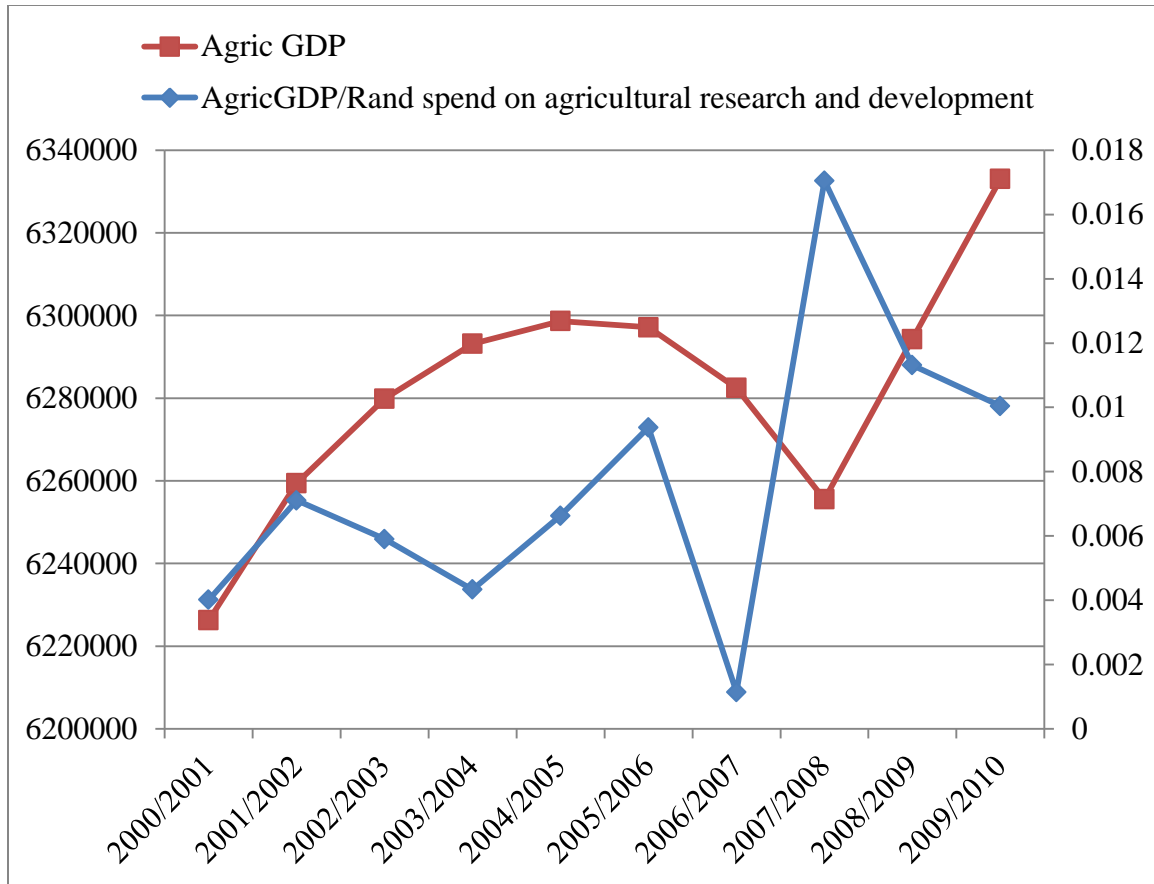
**Figure 6. 4: Level of public spending on farmer support and development as percentage of agricultural GDP**

The allocation received by farmer support and development should therefore be revised from a lower proportion of less than 10 per cent of the total spending on agriculture. Nevertheless, the department seemingly understands the growing importance of the programme as it saw a record increase of 13 per cent in budget allocation over the past 11 years. The expenditures-to-GDP ratio of the farmer support programme followed an upward trend in 2004 until 2010. Since 2007, an increasing association with agricultural

GDP has been has been observed. The recently launched strategic partnership for developing and implementing a model for assisting land reform beneficiaries to participate in different commodity production fall under this same function. The programme is at the core of agricultural development as it assists land reform beneficiaries to access profitable value chains of the specific industry. Prioritisation is therefore needed in order to improve rural incomes and bring poverty level in line with the Millennium Development Goal 1 (MDG1).

#### **6.3.1.4 Agricultural Research and Development**

The challenge of revitalizing agricultural production in any setting lies in spending on research and development (Pardey *et al.*, 2009). The agricultural research and development programme assists with executing agricultural research and the development of information systems with regards to crop production technology, pastures and animal production technology, and resource utilization technology. This function of the spending is widely applauded for promoting agricultural productivity (Benin *et al.*, 2009; Govereh *et al.*, 2009 and Pardey *et al.*, 2009) and should therefore receive huge budget allocation in Africa and several developing countries (Pardey *et al.*, 2009). This, apparently, is not the case in the Eastern Cape Province where technical agricultural research and development gets the smallest allocation of 4 per cent relative to other programmes. Given the support for spending on research and development and the associated benefits, the level of public spending on this programme is inadequate. Figure 6.5 below shows the marginal productivity effect of the agricultural research and development programme for the period 2000 to 2010. The graph shows the resources spend on the programme by the department of agriculture and rural development for each rand of agricultural output has been variable through the period under review.

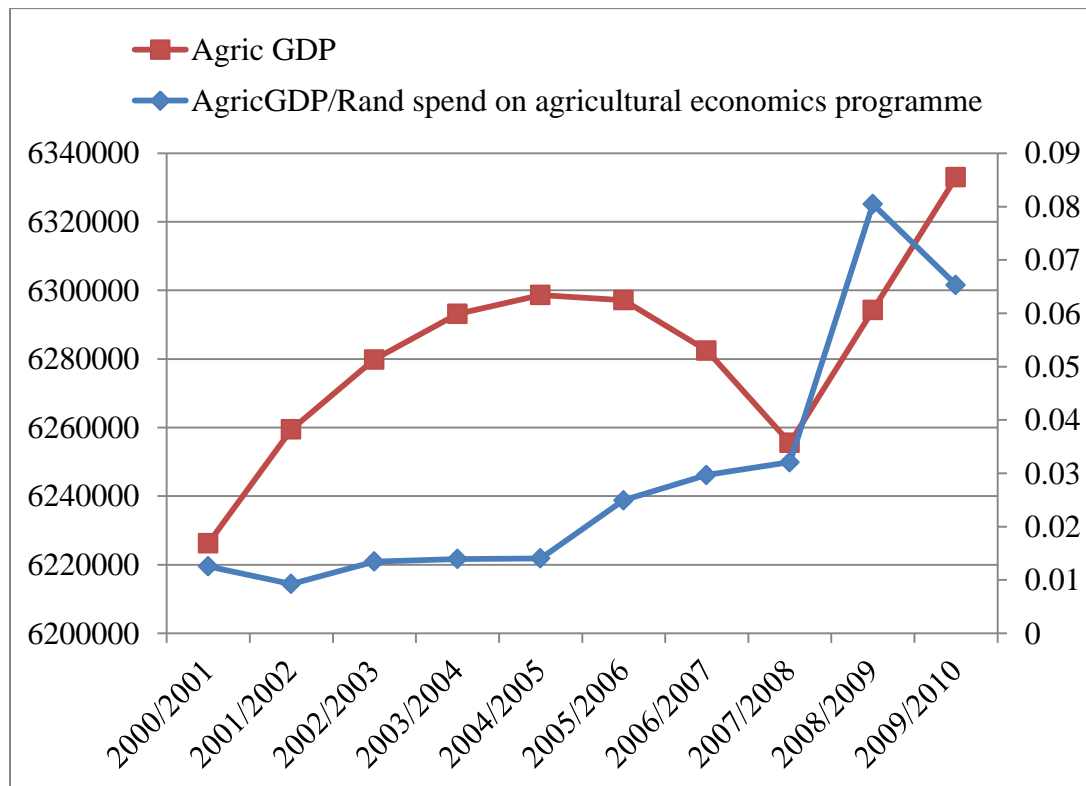


**Figure 6. 5: Level of public spending on agricultural research and development as percentage of agricultural GDP**

The observed variations in the ratio represented above might be explained by huge variation in allocations made to this programme by the department. Govereh *et al.* (2009) argue that financing the administrative function of the agricultural sector relative to that of agricultural research and development, farmers support programmes and agricultural training services generates very low returns. It has to be pointed out that agricultural capital spending by the Eastern Cape DoA is high on administration and the other types of spending account for a much smaller share of total agricultural spending. Such an agricultural investment portfolio reveals an unbalanced concentration of resources on unproductive spending, leaving others that are vital for accelerating agricultural productivity and pro-poor growth without enough funding. These vital public investments include agricultural research and development, capacity building among agricultural officials and farmers, agricultural finance, irrigation and agribusiness development.

### 6.3.1.5 Veterinary services

The veterinary services aim to ensure healthy animals and the welfare of people of South Africa. This is done by promotion of animal health through controlling of imports and exports of veterinary products. The allocation of 15 per cent of the province's budget to the veterinary services and an average increase of 16 per cent over the period 200-2011 is justifiable as the livestock industry plays an important role in the Eastern Cape Province's agricultural economy.



**Figure 6. 6: Level of public spending on veterinary services as percentage of agricultural GDP**

Livestock contributed higher gross farm income for communal farmers than crop farming in the same period and also saw an increase of 16 per cent in the budget allocation to this department. Trend in the intensity of spending for the veterinary services presented in



Figure 6.7 above shows a marginally low rate of increase when comparing it to the other function discussed above.

### 6.3.1.6 Agricultural Economics

The agricultural economics sub-programme provides economic support to internal and external clients with regards to marketing and statistical information including financial feasibility and economic viability studies. This programme also oversees marketing, macro-economics and statistics for the Department of Agriculture. It was introduced in 2003. Analysis of the trend in public spending for this sub-programme shows that it has received an average allocation of 4 per cent of the budget and its budget allocation has increased by an average of 40 per cent since its introduction in 2003. Many stakeholders have always noted the problem of market access in the Eastern Cape Province and the effects of limited access to inputs and output as being highly unfavorable to the development of agriculture in the province, particularly smallholder farmers (Hendricks and Fraser, 2003 and Hall and Aliber, 2010). Table 6.4 below shows the intensity of public spending of the agricultural economics sub-programme for the period 2000 to 2010. The graph shows the resources spend on the programme by the department of agriculture and rural development for each rand of agricultural output.

**Table 6. 4: Level of public spending on the agricultural economics percentage of agricultural GDP**

Year	2002/ 2003	2003 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010
Expenditure on Agricultural Economics	1639	6312	10412	215834	68483	57693	65383	71789
Agricultural GDP (000's)	6280	6293	6299	6297	6282	6256	6294	6333
Intensity of public spending	0.0002	0.001	0.0016	0.034	0.010	0.009	0.010	0.011

Trend in expenditure allocated to the agricultural economics function of the Department of Agriculture and Rural Development as a percentage of total provincial agricultural

GDP increased from an insignificant value of less than 0.01 per cent in 2002 to a value slightly higher 1 per cent in 2010. Therefore, the founding of this function was a necessary development. The government therefore should not vacillate in support as the function's benefits are likely going to be immense given the state of smallholder farmers and their willingness to join the mainstream economy through participation in various agricultural commodity markets.

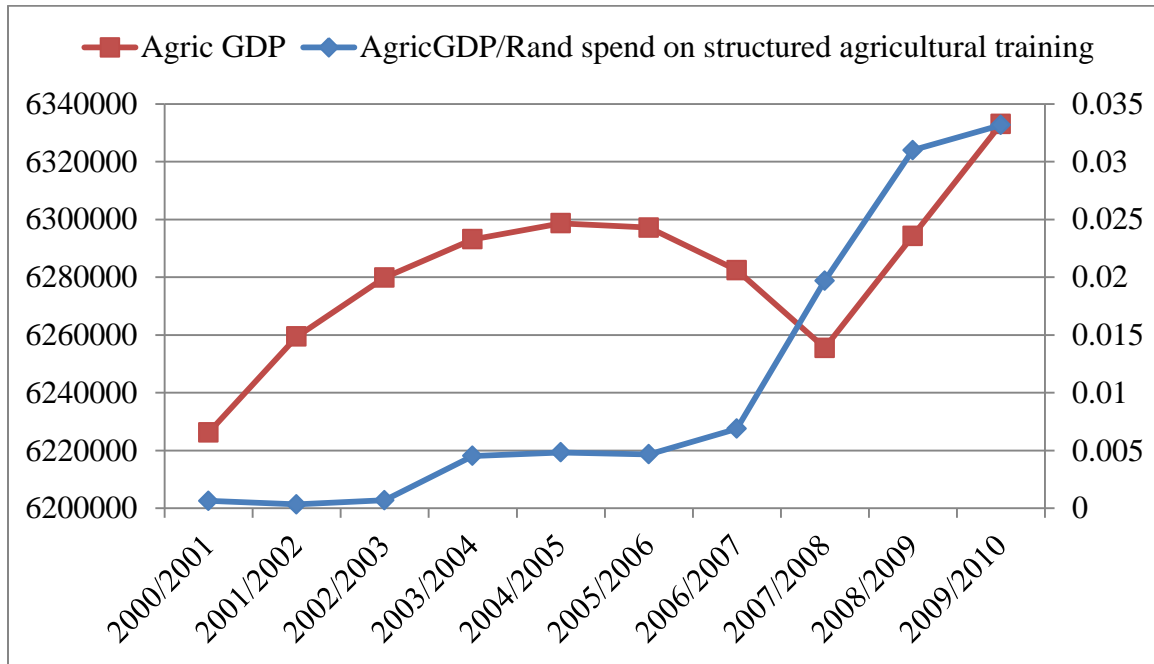
### **6.3.1.7 Structured Agricultural Training**

Structured agricultural training facilitates and provides education to all participants in the agricultural sector in order to establish a knowledgeable and competitive sector (DoA, 2010). This involves the provision of tertiary education, further education and training. The programme oversees the provision of non-formal training under the Department of Agricultural and Rural development in the form of short courses to anybody who desires to participate with special emphasis on emerging farmers and farm workers. Structured agricultural training received an average allocation of 5 per cent over the period under review and saw an increase of 28 per cent during that same period. The growth in this programme is an indication that the department is committed to skills development both internally (departmental staff) and externally (emerging farmers).

Exceptional growth in expenditures was recorded against agricultural economics, structured agricultural training, sustainable resources management and veterinary services with an average growth rate of 40 per cent, 28 per cent, 17 per cent and 16 per cent, respectively. The whole period between 2000 and 2011 saw an average growth rate of 12 per cent on total payments to the agricultural sector by the DoA Eastern Cape. In absolute terms, an increase in total payments to the agricultural sector of 13 per cent is particularly rapid over a period of 11 years. This implies an important shift in the role of government in promoting agricultural growth.

Increasing agricultural growth requires additional investment in the sector but less additional investment can also bring about the required growth if public spending has a high rate of return. Figure 6.7 below shows the marginal productivity effect of the

structured agricultural training programme for the period 2000 to 2010. The graph shows the resources spend on the programme by the department of agriculture and rural development for each rand of agricultural output has been following an increasing trend with the highest rate of increase recorded from 2006 to 2010.



**Figure 6. 7: Level of public spending on structured agricultural training as percentage of agricultural GDP**

This is only made possible by the prioritization of public expenditure functions in agriculture. In their ranking of functions of the government in agricultural expenditure, Govereh *et al.* (2009), prioritize long-term programs such as infrastructural development. They rank agricultural research and development second. Administration and agricultural training follows after these two and its effect on agricultural development is always ranked on an average basis. In the Eastern Cape Province, the actual shares of expenditure on sustainable development functions reflect this priority ranking as they receive high priority in the budget. Nevertheless, all the other functions fail to reflect the above reviewed priorities. Agricultural research and development and structured agricultural training should top the list of priorities according to Govereh *et al.* (2009). These programmes were among the functions receiving the least level of spending in Eastern Cape. Following this evidence, it is logical to conclude that there is a strong

misalignment between agricultural development plans and public agricultural expenditure as the two processes must reinforce each other.

Following discussions on both functional classifications and the intensity of public spending in Eastern Cape above, it is clear that agricultural growth is a function of derived by productive public spending and prioritisation of public funds. Agricultural investment expenditure needs careful sequencing and prioritisation. The rate of return of each rand invested depends on the type of spending. Therefore expenditure analysis should analyse which programmes have higher rate of return. The generation and exploitation of this knowledge is one of the most important competitive advantages for agriculture in the Eastern Cape Province. Agricultural research and development should remain a priority in the province. The mobilisation of research, education, training and innovation becomes an essential aspect in order to lever an improved agricultural production in the Eastern Cape Province. In light of this development, it is perceived to be increasingly important that the DoA of the Eastern Cape Province allocates the bulk of their budget to agricultural research and development and structured agricultural training. The presentation above indicates that there is still a long way to go with regard to these allocations, with an average of 4 per cent allocation to R&D and 6 per cent to structured agricultural training. The Eastern Cape Province's agricultural R&D expenditure in the period between 2000 and 2010 has an unimpressive growth of 5 per cent. Given that the growth of R&D has started out at a very low level, it is logical to assume that the increases have not had any profound impact on the overall agricultural output. Alemu *et al.* (2005) also made an important contribution on this subject of total factor productivity in agriculture as they strong argue that TFP is not only affected by public investment. Total Factor productivity is also influenced by the share of agents in the population having HIV (Alemu *et al.*, 2005). Aggregate GDP for each economy falls by 30 per cent to 35 per cent across generations due to HIV and AIDS. It is therefore important to note that returns to agricultural spending can be influenced by various other factors other public agricultural spending.

## **6.4 Growth in agriculture and the incidence of poverty in the Eastern Cape**

The following section illustrates important trends in the level of poverty and growth in the agricultural sector which are practically important for this study. Following the analyses of trends in both agricultural production and the incidence of poverty in Eastern Cape, the forthcoming reported results correspond to the estimates of simple correlations and the estimates of sectoral growth elasticity of poverty (Equation 5.4).

### **6.4.1 Trends in Agricultural Growth**

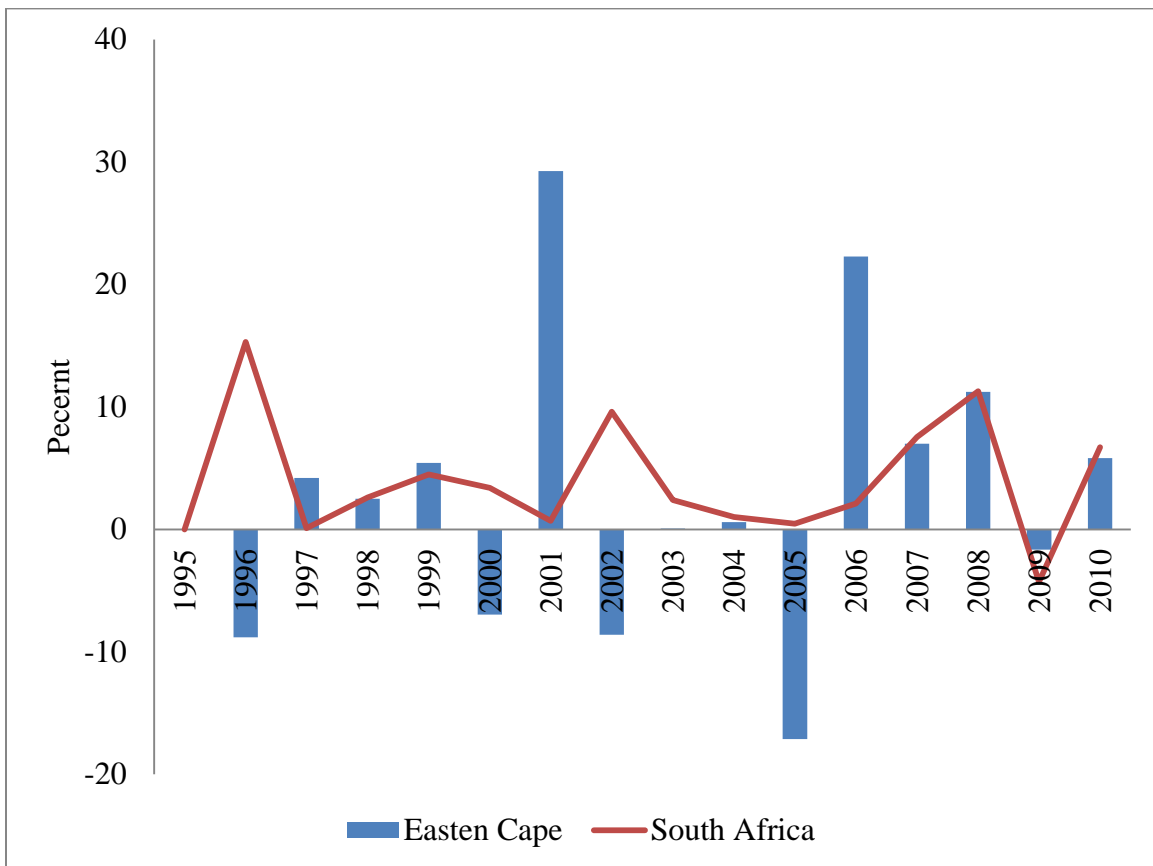
Table 6.5 shows the relatively unimpressive performance of South Africa's agriculture between 2000 and 2008. Annual agricultural GDP remains relatively constant with slight changes between 2002 and 2005. The percentage contribution of agriculture to the overall GDP remains at an average of 4 per cent reaching its maximum in the year 2002/3 and lowest of 2.7 per cent in the year 2005/6.

**Table 6. 5: Growth Rates in Key Agricultural Indicators in South Africa**

Year	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8
Annual GDP Agric. '000 (R)	27,451	26,558	28,292	27,700	28,083	29,614	27,284	27,379
% contribution to GDP: Agric	3,3	3,5	4,1	3,6	3,2	2,7	2,9	3,2
Gross Value of agricultural production (R)	17 923,4	27 258,3	23 072,4	20 518,9	17 768,7	18 151,9	23 470,6	39 922,4
Gross Value of Field crops (R)	17 923 440	27 258 329	23 072 445	20 518 890	17 768 698	18 151 936	23 470 590	39 922 426
Gross Value of Horticultural products (R)	13 140 184	15 970 637	19 622 140	21 614 257	20 630 134	20 087 220	23 012 474	27 096 919
Gross Value of Animal products (R)	21 086 293	25 138 353	30 019 705	31 014 226	32 865 626	37 246 758	44 925 953	53 136 103
Gross Value of agricultural products (R)	52 149 917	68 367 319	72 714 290	73 147 373	71 264 458	75 485 914	91 409 017	120155448

Source: Abstract (2010)

The overall performance of South Africa is trending down and seemingly unstable during the reviewed period. The same unstable performance was observed across all the subsectors. It is important to note that agricultural GDP is a fairly small share of the overall GDP, an average of 4%. Animal products and field crops contribute a bigger share of GDP than horticultural products. Variations in the contributions of agriculture to total GDP have a direct negative impact on the welfare of rural residence the majority of whom are engaged in agriculture. Figure 6.8 below shows trends in the rate of per capita agricultural GDP growth for both the Eastern Cape Province and South Africa.



**Figure 6. 8: Growth of per capita Agricultural GDP**

Source: Modified data from ECSECC (2010) database.

Firstly, one immediately sees that the rate of per capita growth from agriculture has been varied for all the years between 1995 and 2010, both for South Africa and the Eastern Cape Province. The growth is largely characterised by both upward and downward

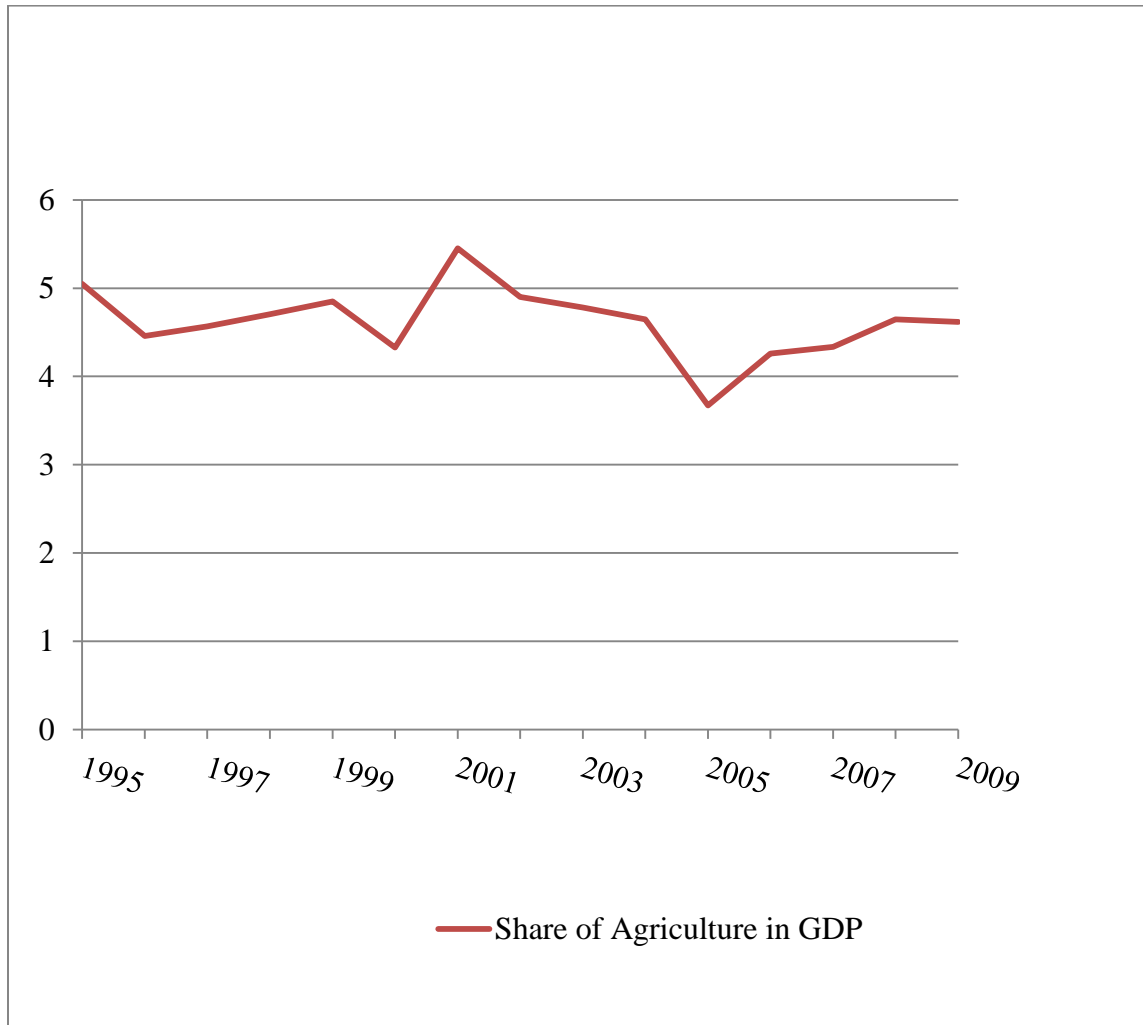
cycles, with sharp falls in per capita production. Both the Eastern Cape Province and South Africa's agricultural production per capita have never notched an even growth rate since 1994. Secondly, the rate of per capita growth from agriculture for the Eastern Cape Province follows a similar with that of South Africa. They registered similar increase in GDP per capita during the year 2000 and this was followed by similar sudden fall in the following year, 2001. Completely opposite trends where, however, noticed between 1995 and 1997 where the national GDP per capita rises sharply whilst there was a record slump in the Provinces GDP per capita during the same period. These trends do not only tally with growth in the national agricultural GDP per capita only. ECDC (2007) recorded similar trend for total GDP which is characterised by significant increases and decreases. This therefore implies that the both the country and the province are struggling to achieve stable growth rate. Nevertheless, the average rate of per capita growth from agriculture was 0.6 per cent, 2.9 per cent and 4.5 per cent for periods between 1995 and 1999; 2000 and 2004; and 2005 and 2010 respectively. This implies that the province is scoring some remarkable increases in the rate of per capita growth from the agricultural sector.

Evidence from Figure 6.8 shows that South Africa and the Eastern Cape as a province are both failing to achieve sustainable output increases in the agricultural sector. Growth in agricultural production has been variable during the whole period from 1995 to 2010 with some cases of negative growth. The finding that growth in the agricultural sector is so varied with some significant peaks like that observed during the year 2001 has important implications on both the province and South Africa's potential to increase overall production from the sector. This shows that production from this sector is elastic and efforts should be directed towards pushing it to its peak potential. These results are not outstanding, Hendricks and Fraser (2003), wrote that "there is undoubtedly a very high potential for agricultural development especially in the former Transkei, and to a lesser extent in the Ciskei".

As the share of income from agriculture increases, average income per person increases. Assuming that the Eastern Cape is an agricultural province, this is as well expected from



the current data for Eastern Cape. Figure 6.9 below shows the trend in the share of agriculture in total GDP for the Eastern Cape Province.



**Figure 6. 9: Share of Agricultural GDP in Eastern Cape**

Source: Modified data from ECSECC (2010) database

For most of the years, the trend shows that the share of agriculture in total GDP for the Eastern Cape Province remains between 4.5 per cent and 5.5 per cent and it varies throughout the period. By following the trend, a conclusion can be made that; besides the variations in the percentage contribution, the share of agriculture's contribution to total GDP for the province is falling. Vink and Van Rooyen (2009) also reported the same trend for the period 1994 to 2008.

Beside the observed variations in agricultural production (see Figure 6.2), overall agricultural production from the sector is low (Vink and Van Rooyen, 2009). Figure 6.3 shows that the sector contributes less than 5 per cent to the total provincial GDP. This sector therefore needs to be boosted and several solutions to improve production in the agricultural sector have been proposed. The observed 5 per cent share of the national GDP is low compared to an African average of 18 percent. It should be noted that the target as set by CAADP is informed by evidence of the true potential of smallholder agricultural development in alleviating poverty by getting a large percentage of the population participating in the economy and hence benefiting from it. In Zambia, Govereh *et al.* (2009) suggested that growth in this sector can be achieved by the use of research and development that generates improved technologies, and these technologies should be put in the hands of the small farmers, and provide them with the knowledge to get the most out of these technologies. China and most of the Asian countries realised similar growth during the Green Revolution (Fan *et al.*, 2002). Therefore, if pushed to its frontiers either by the provision of necessary support services or financing of irrigation infrastructure, the sector can drive economic growth in the Eastern Cape Province and all the other provinces. The resulting effect of increased agricultural production per capita in the Eastern Cape Province is obviously poverty reduction since most households in the province depend on it.

#### **6.4.2 Growth in agriculture and the Incidence of poverty**

Increase in agricultural productivity is known to have a strong influence on the reduction of poverty in rural areas, as you would expect from the literature reviewed, and all the previous chapters. The relationship between agricultural and non-agricultural growth with poverty was analysed using simple correlation analysis and GEP (see chapter 5 for details on methodology). The results for both the correlation analysis and GEP are presented below.

#### **6.4.2.1 Relationships between Growth in agriculture and the incidence of poverty**

The relationship between agricultural growth and the incidence of poverty across the Eastern Cape Province's district municipalities was assessed using simple correlation analysis. Table 6.6 displays data from all the district municipalities of Eastern Cape, showing both the rate of per capita growth in agriculture and the rate of change in the incidence of poverty. These changes were measured over a period of 5 years to remove the impact of random factors and to identify the underlying long-term relationships (Pasha and Palanivel, 2004).

**Table 6. 6: Growth in agriculture and the incidence of poverty**

<b>District Municipality</b>	<b>1994 - 1999</b>		<b>2000 - 2004</b>		<b>2005 - 2010</b>	
	Rate of per capita Growth Agriculture	Rate of change in incidence of poverty	Rate of per capita Growth Agriculture	Rate of change in incidence of poverty	Rate of per capita Growth Agriculture	Rate of change in incidence of poverty
<b>Amatole</b>	-0.00329	0.026985	0.032918	0.001906	0.054104	-0.02128
<b>Alfred Nzo</b>	0.005562	0.029981	0.082617	-0.00724	0.103148	-0.01545
<b>Cacadu</b>	0.01879	0.034314	0.035947	0.002075	-0.05348	-0.12826
<b>Chris Hani</b>	0.00589	0.03306	-0.00963	-0.00795	-0.02974	-0.01739
<b>Nelson Mandela Metropolitan</b>	0.040863	0.05656	0.050849	0.003177	0.31154	-0.011584
<b>O R Tambo District Municipality</b>	-0.01238	0.024797	0.169252	-0.00449	0.230634	-0.01282
<b>UKhahlamba</b>	0.0127	0.04382	-0.00823	-0.00175	-0.037	-0.01528
<b>Eastern Cape</b>	0.006702	0.031045	0.028831	-0.00293	0.045979	-0.01282
<b>South Africa</b>	0.045	0.0385	0.034245	0.005552	0.039764	-0.01545

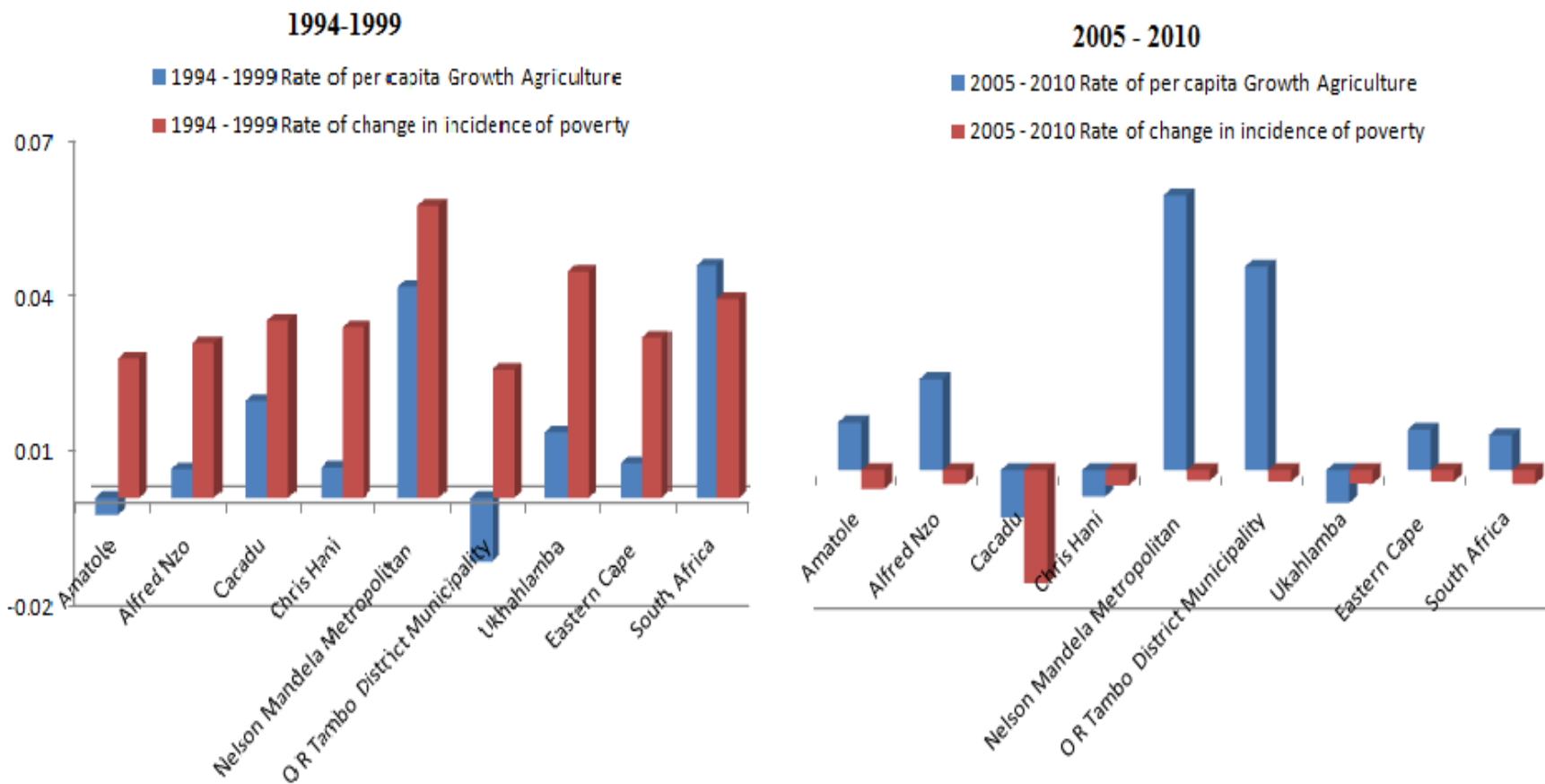
Source: Authors' calculations based on data from ECSECC (2010) database.

The poverty rate is the proportion of the population that lies beneath the official poverty datum line and figures for these poverty rates for the above mentioned municipalities are used in the analysis. Annual rates of change in the incidence of poverty are computed for five year periods and presented along with the rate of agricultural income growth in Table 6.6 above. Altogether, including national and provincial figures, 54 cases were generated using the available data. Out of 26 cases examining trends in the rate of change in the incidence of poverty, 14 show a decrease in the rate of incidence of poverty. It is interesting to note that there is much decrease in the incidence of poverty in the later years, as we move from the 1990's towards year 2000. All the cases recorded five years immediately before year 2000 show decreasing poverty.

Poverty increases in all the cases of South Africa, the Eastern Cape Province, and all the district municipalities in the Eastern Cape between 1994 and 1995. Despite the increase in poverty noted during the period 1994 to 2000, it is significant to note however that, most of the cases after this period record decreases in poverty. This indicates some positive change in performance by the province with regard to poverty reduction during the past fifteen years. During the period 2005 to 2010, the incidence of poverty in all the district municipalities decreases by an average of one per cent. An outstanding decrease was only realised in Cacadu where poverty falls by an average of 12 per cent during the same period.

Per capita income from agriculture is positive for all the cases except for seven. During the years after 1994, income from agriculture has been increasing for all the regions under study. Although the distribution is not even, this result and the observed poverty trend demonstrates a strong relationship between growth in the agricultural sector and change in poverty. Despite the orchestrated negative relationship between growth in the agricultural GDP per capita and reduction in poverty, cases appear where poverty increases after an increase in income from agriculture with some regions on the other hand showing decreases in poverty after an increase in income from agriculture during the same period. Most cases during the period 1995 to 2000 resemble these confounded relationships (Figure 6.10 below).

South Africa and the Eastern Cape Province have enjoyed growth in agriculture throughout the period 1995 to 2010 but significant changes in poverty were only noticed after the year 2000. Variations in the levels of growth during the two periods can be displayed in the following diagram.



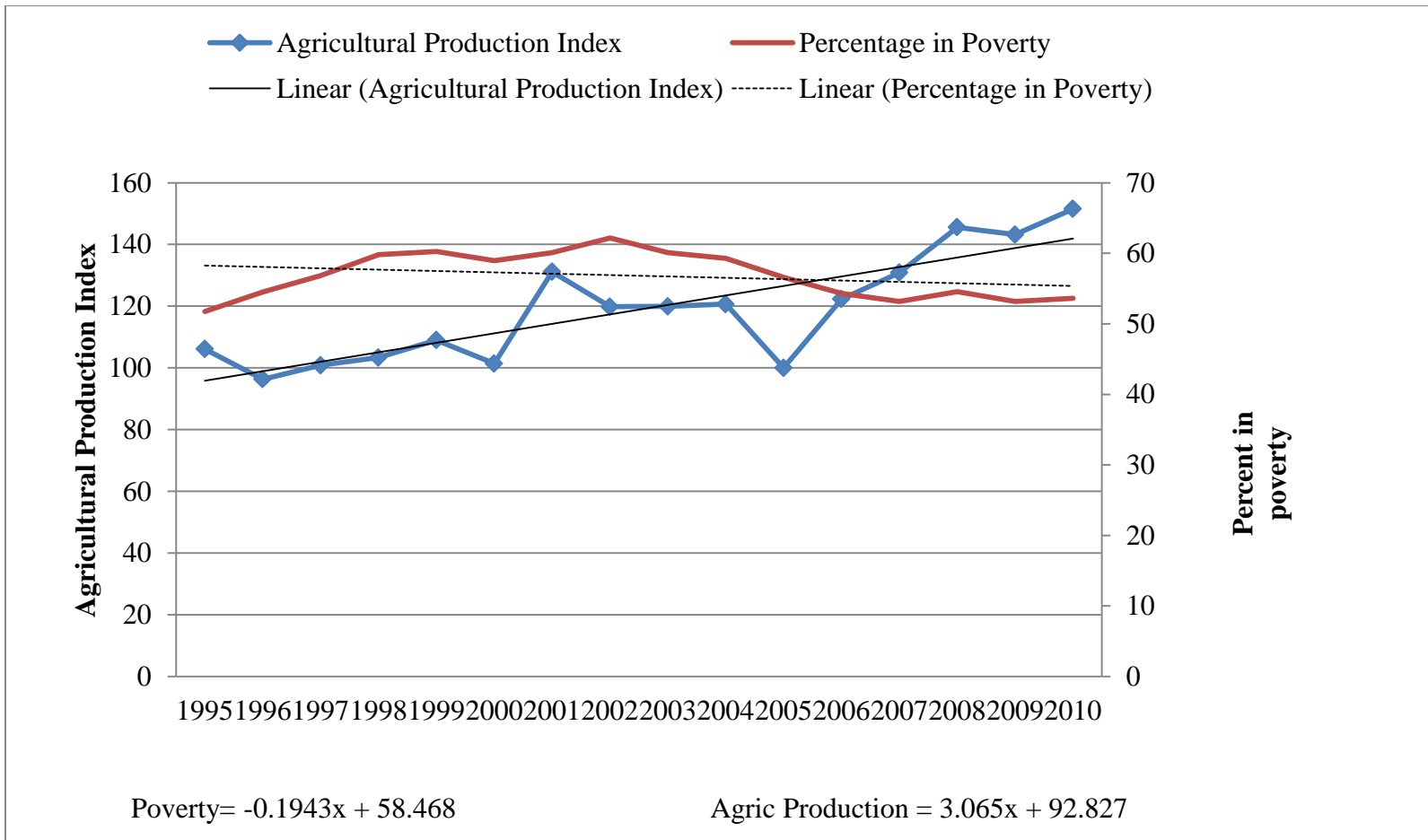
**Figure 6. 10: Rate of per capita growth from Agriculture and the Incidence of poverty**

Source: Modified data from ECSECC (2010) database

Although the two look similar, it is possible to discern between growth in the rate of agricultural growth and changes in the incidence of poverty for two periods, i.e., between 1995-1999 and 2005-2010 for all the district municipalities. The above diagram clearly shows some important differences between the “unappealing” growth earned during the period 1995 to 1999 and the “appealing” growth enjoyed during the period 2005 to 2010. Although dominated by positive growth in per capita income from agriculture, 1995 to 1999 era is marred by huge increases in the incidence of poverty. Contrarily, the 2005 to 2010 era displays increases in per capita income from agriculture and decreases in the incidence of poverty across all the district municipalities. There are only three cases where poverty drops. This implies that agricultural growth gains between 1995 and 2002 do not lead to a reduction in poverty. Poverty during this period actually increased from approximately 50% in 1995 to a peak figure of approximately 60%.

Figure 6.11 below provides an overall trend of the relationship between the index of agricultural production and poverty using linear functions. The graph shows relationships between trends in agricultural production and the gains from this growth as indexed by changes in the incidence of poverty. The graph shows an inverse relationship between growth in agriculture production and the incidence of poverty. This implies an increase in agricultural productivity results in poverty reduction in the Eastern Cape Province.





**Figure 6. 11: Trends in Agricultural Production and the Incidence of Poverty**

Source: Modified data from ECSECC (2010) database.

Using linear models to explain the two trends provides a magnified picture of the two data sets. An overall positive performance in the agricultural sector proved to be a forerunner to poverty reduction. A positively slanting line for agricultural production index is complemented by a negatively slanting curve for the incidence of poverty. These two lines have a gradient of 3.065 and -0.1943 respectively. This implies that from 1994, agricultural productivity has been increasing at an average rate of 3.06 per year and poverty has been falling at an average rate of 0.19 per cent per year.

The finding that increases in agricultural production usually complemented by a decrease in the level of poverty concurs well with earlier reports by Haggblade, (2007) in Uganda; Govereh *et al.* (2009) in Zambia; Fan *et al.* (2006) in China; and Akroyd and Smith (2007). They strongly agree that wide-scale poverty reduction requires productivity gains in agriculture. This finding and the observed trend testifies to the success of the Eastern Cape Province in reducing poverty, on average, especially during the period between 2000 and 2010. The above results to some extent explain the importance of the agricultural sector in reducing poverty in the province, one of the poorest provinces in South Africa. The same realised trend in the growth of the agricultural sector and fall in the incidence of poverty can also be used in fostering the achievement of several regional goals like the MDGs, CAADP and the SADC RISDP.

The observed differences in the nature of reductions in poverty and the associated growth in agricultural production between the two periods 1995-1999 and 2005-2010 could be attributed to the differences in the distribution of the gains of agricultural productivity. Fan *et al.* (2002) wrote that growth in agricultural production can reduce poverty if its benefits are skewed towards the poor. This probably explains the differences between reductions in poverty during the 90's and between 2005 and 2010. Significant reductions in poverty after year 2000 show that growth during that period was probably pro-poor as compared to the previous years when growth in agriculture was realised without associated reductions in poverty levels. During this period, a wide range of resolutions meant to reduce poverty and promote rural development were adopted. The CASP,

PGDP, and declarations on “rural development, land reform and agrarian change” made by ANC at Polokwane benefited the poor as poverty decreases in all the reported cases in Eastern Cape. This scenario warns that any interventions meant at reducing poverty in the study area should be sufficiently pro-poor. That is the distribution of resources, public investment in agriculture and provision of community-level infrastructure should be skewed in favour of the poor.

Hall and Aliber (2010) made similar observations about the nature of growth in the Limpopo and Eastern Cape Provinces. An evaluation of the Comprehensive Agricultural Support Programme a programme meant to provide land reform beneficiaries with resources showed that the benefits from this programme have been largely accrued to the rural elites who used their influence over the administration of this programme to corner most of the resources at the expense of the targeted poor farmers. Several similar projects meant at improving the state of the poor suffered similar viability problems. Following these arguments, it is quite apparent that growth in agriculture does not always result in poverty reduction. It can only reduce poverty if it is pro-poor in nature. In their critical analysis of CASP programme, Hall and Aliber (2010) observed that distortions in the allocation of public resources across rural farmers in these two provinces negatively impacts on the effectiveness of the CASP programme in addressing poverty. Efforts should therefore be made to ensure that whenever attempts are made to improve production in the agricultural sector, the benefits should be more lop-sided to the poor. Such research outcomes should be used to pronounce the need for more pro poor policies. It was this same pro poor growth strategy which led to the reduction in poverty in China during the Green revolution (Fan *et al.*, 2002).

### **6.5 Growth Elasticity of Poverty**

The best way to capture the intensity of the relationship between agricultural production and the incidence of poverty is to compute the growth elasticity of these variables. This relationship between poverty and: 1) agricultural GDP per capita, 2) non-agricultural GDP per capita was examined through a pooled regression analysis using panel data. The elasticity of poverty with respect to agricultural growth indicates the percentage

change in the incidence of poverty associated with a one per cent increase in agricultural production. Before we quantify the relationship between growth and poverty in different settings, we proceed to describe how the data was calibrated. Annual rates of change in Agricultural GDP per capita, non-agricultural GDP per capita and the incidence of poverty for each district municipality were computed. The three variables are time series variables and according to Granger and Newbold (1973 and 1974), there are properties of time series that violate the Gaussian assumptions of regression analysis. There is a tendency for the mean and variance to constantly vary and this is termed non-stationarity. This means that predictions based on them have little stability over time and therefore of little predictive value. Therefore statistical properties of the three variables were checked for existence of these structural breaks using the Unit root test. Following Unit root test, double log transformation was then applied on the variables. The estimation of the required elasticities was then done using E-views.

Since the panel data set is used and there may exist complex relationships between variables special attention is needed to avoid or minimize the bias by using certain econometric estimation techniques. Unit root test was conducted to test for the existence of structural breaks on the variables, and then Growth elasticity of poverty estimates were used to analyze the response of poverty to both increase in agricultural GDP per capita and non-agricultural GDP per capita.

As is well known, the non-stationary data series are poor candidates for reliable regression Statistical Properties of Variables and Structural Breaks procedures since they yield spurious results that are useless for predictive purposes. For this reason, economic theory requires that they be subjected to differencing or detrending procedures to make them stationary. The Unit Root tests were conducted on all the five variables for both Eastern Cape (pooled data for seven district municipalities) and South Africa. The results are shown in table 6.7. The results of the unit root tests indicated that all the variables

**Table 6. 7: Present Results of Unit Root tests**

Variable		Level	I (1)
Eastern Cape	Agricultural GDP	0.903	5.61 <sup>*</sup>
	Non-agricultural GDP	0.41	2.8 <sup>***</sup>
	Agricultural Expenditure	2.73	3.78 <sup>***</sup>
	Poverty	1.88	3.02 <sup>***</sup>
South Africa	Agricultural GDP	0.67	2.92 <sup>***</sup>
	Non-agricultural GDP	0.24	3.43 <sup>***</sup>
	Agricultural Expenditure	0.44	5.46 <sup>*</sup>
	Poverty	1.93	2.08 <sup>**</sup>

Unit root tests conducted on the variables indicated that all the variables were integrated of order one [I (1)]. Unit root test for both Eastern Cape and South Africa shows that agricultural GDP, non-agricultural GDP and poverty are non-stationery at levels. From the results presented for Eastern Cape in Table 6.7, only agricultural GDP was stationary at 1% with all the variables being significant at 10%. According to the results, the test statistics for all the variables for South Africa were significant but at different levels. This confirms that the variables are non-stationary as predicted by economic theory. It is therefore possible to accept the alternative hypothesis of non-stationarity.

Estimates of growth elasticity of poverty for the seven district municipalities of the Eastern Cape Province are given in Table 6.8. It provides estimates of the elasticity between both agricultural GDP per capita and non-agricultural GDP per capita and the incidence of poverty in Eastern Cape for the period between 1995 and 2010. Using the Amatole district municipality as an example, the results suggest that for every one per cent growth in agricultural production, as indicated by agricultural GDP change, the incidence of poverty falls by 0.28 per cent.

The estimated results on agricultural production show that the elasticity of the incidence of poverty with respect to agricultural GDP ranges from 0.12 to 0.41 and that for non-

agricultural production ranges from 0.012 to 0.38. Non-agricultural production scored the lowest of the two ranges given with an elasticity of 0.012. This figure is lower than 0.12 for agricultural production. The estimated coefficients of non-agricultural GDP per capita are significantly lower than that for agricultural GDP per capita for most district municipalities. It is however important to note that this does not necessarily imply that growth in agricultural GDP per capita was more important than growth in non-agricultural GDP per capita since the answer to that question also depends on actual rates of growth in the two variables over the study period.

**Table 6. 8: Growth Elasticity of Poverty**

<b>Agricultural and Non-agricultural GDP growth Elasticity of poverty</b>			
	<b>Constant</b>	<b>Agricultural GDP per capita coefficient</b>	<b>Non Agricultural GDP per capita coefficient</b>
Amatole	0.288	-0.245	-0.068
Alfred Nzo	0.152	-0.260	-0.133
Cacadu	4.424	-0,414	-0.050
Chris Hani	2.540	-0.312	-0.003
Nelson Mandela Metropolitan	4.774	-0.128	-0.390
O R Tambo	2.495	-0.225	-0.357
UKhahlamba	0.041	-0.393	-0.012
EC	0.325	-0.114	-0.007
SA	1.166	-0.035	-0.05

Included observations: 105

$$R^2 = 0.54$$

Source: Authors' calculations based on data from ECSECC (2010) database and following the methodology presented in section 5.4.2, Equation 5.2.

The results of this regression show an inverse and statistically significant relationship between poverty and each one of the two indicators: agricultural GDP per capita and non-agricultural GDP per capita. The observed relationship simply examine the historical relationship between poverty rates and these indicators and therefore cannot provide a definitive basis for claims of causality. With respect to agricultural GDP, the above results can be easily explained by categorising them into three groups; those with a low elasticity of less than 0.20, those with an average elasticity between 0.20 and 0.30 and those with high elasticity, above 0.30. The higher the figure the higher the response of poverty with respect to the variable examined. The agricultural growth elasticity figure for Nelson Mandela Metropolitan municipality is in the low category. This municipality scored the lowest percentage of all the municipalities with respect to

agricultural GDP. Amatole, Alfred Nzo and O R Tambo fall in the same category, with average elasticity values between 0.20 and 0.30. Relative to all the district municipalities in the Eastern Cape, the estimated results for these three district municipalities show that an increase in agricultural productivity results in moderate reductions in poverty. Cacadu, Chris Hani and UKhahlamba districts fall in the third category, and in these three districts agriculture is an important determinant of poverty.

The above results show that agricultural GDP and non-agricultural GDP seem to be substituting for each other with respect to their poverty reducing role. In municipalities where agriculture has a higher figure for elasticity, the corresponding figure for non-agricultural elasticity is low and vice versa. A relatively high marginal effect is found for agricultural GDP in Cacadu, Chris Hani and UKhahlamba districts. These differences seem to be in line with the economic structure of the district municipality. More rural district municipalities seem to have a coefficient for agricultural growth elasticity of poverty relative to urbanised district municipalities.

An important link emerges from this study as high elasticity was reported between agricultural production and the incidence of poverty in most district municipalities across the province. In similar studies, Thirtle *et al.*, (2003), and Pinstrup-Andersen and Shimokawa (2006), found that the elasticity of poverty reduction with respect to agricultural production is significant, positive and higher than the elasticity with respect to other sectors' output, especially in the early stages of development. This outcome advocates for increased agricultural production in order for poverty to be reduced significantly in the province. These results are supported by Christiansen and Demery's (2006) results from Africa where 70% of the poor work primarily in agriculture. Acceleration of agricultural productivity growth therefore offers a potentially powerful tool for income growth among the rural poor as agriculture remains the most effective engine for growth and poverty reduction. These linkages and the composition of people practising agriculture make agriculturally-led growth pro-poor.



To make judgements about the historical importance of agricultural versus non-agricultural growth in reducing poverty we used the estimated elasticities from the regression equation, the average growth rate from each sector and the average share of each sector in total GDP for each year for the entire period 1994 to 2010. The rate of poverty reduction emanating from agricultural growth is calculated from the first term of equation 5.8 and that emanating from non-agricultural GDP growth is calculated from the second term of equation 5.8. These calculations estimate how much of the observed changes in poverty could be attributed uniquely to each income source and the results are presented in Table 6.9 below.

**Table 6. 9: Major contributor to poverty reduction**

<b>District municipality</b>	<b>Rate of poverty reduction emanating from non-agricultural growth rate</b>	<b>Rate of poverty reduction emanating from agricultural growth rate</b>
Alfred Nzo	1.23	2.43
Cacadu	0.25	2.56
Chris Hani	0.01	4.53
Nelson Mandela Metropolitan	1.12	0.35
O R Tambo	2.80	3.52
UKhahlamba	0.08	5.36
Amatole	0.26	0.73

Source: Authors' calculations based on data from ECSECC (2010) database and following the methodology presented in section 5.4.2, Equation 5.8.

Table 6.9 shows the breakdown thus obtained, revealing that for six out of seven district municipalities growth in agricultural GDP per capita was more important in reducing poverty, with only one district municipality shown to have reduced poverty

mainly because of growth in non-agricultural GDP per capita. Notice however that in some district municipalities such as Amatole, Cacadu and UKhahlamba growth in non-agricultural GDP contributed very little to poverty reduction. The contribution for agricultural GDP growth was marginally high for all the district municipalities except for Amatole and Nelson Mandela Metropolitan.

Besides promoting agriculture, the overall reduction of poverty and the feasibility of the MDG1 and all the other goals in the Eastern Cape can be improved by undertaking a growth path that promotes both the agricultural sector and the non-agricultural sector. Therefore, in district municipalities where poverty reduction and the achievement of MDG1 prove unattainable through increased promotion of agriculture, non-agricultural activities could be promoted as they are assumed to contribute significantly to household incomes (as they have been considered essential in some parts of the province by Ndhleve and Obi,2010).

## **6.6 Chapter Summary**

This chapter presents an examination of the trends in public agricultural expenditure of Eastern Cape from the year 2000 to 2010 and the impact of this type of expenditure on the province's agricultural GDP. The results from the above analysis are promising, but more things remain to be done. The analysis reveals that both total agricultural expenditure and agricultural spending intensity increased significantly during the period under reference. However, the same spending seems to be characterised by misalignment of funds as priority is given to public spending functions with lower returns per unit investment. The share of spending on administration has been higher than that of agricultural development focused spending like farmer support programmes, structured agricultural training and technical research and development. This shows that agricultural spending is not much focused on increasing agricultural productivity. There is probably a need to prioritise spending on productive functions of public agricultural expenditure.

The Eastern Cape Province experienced overall agricultural growth since 1994, but this growth was not uniformly translated into reduced poverty. The results from the above analyses show that the Eastern Cape realized varied and increasing benefits from the growth in agricultural GDP during the period from 1994 to 2010. The province is an agricultural economy that is liberally endowed with agricultural resources (vast land and labour), yet having inconsistent agricultural contributions to economic growth. If well supported, agriculture will be the prime source of rural development and the accompanying increase in socio-economic developments. In general, across all the district municipalities of Eastern Cape, advances in agricultural productivity are mostly associated with complementary reductions in poverty rates. This is explained as negative correlation between these two indicators. Having established the possibility of reduction in the incidence of poverty through mostly increases in agricultural productivity and some marginal increase in non-agricultural productivity in selected provinces, a case is made for promotion of both agricultural and non-agricultural GDP growth through weighted public spending with bias towards the poor. The rate at which agricultural production affects poverty reduction lies behind other factors that probably include the 'pro-poorness' of such growth, which explains the changes in the share of growth from the sector gained by the poor, amongst other factors.

## CHAPTER SEVEN

### EVALUATING EASTERN CAPE'S PROGRESS TOWARDS SET GOALS

#### 7.1 Introduction

Governments are under increasing pressure to deliver results. Therefore, it is important to evaluate the effectiveness, efficiency and relevance of the public service in implementing policies and programmes for social betterment. Eastern Cape is committed to a range of national, regional goals and global initiatives notably, Provincial Growth and Development Plan (PGDP), CAADP, SADC RISDP and MDG1. The main objective of this chapter is to assess the Eastern Cape Province's progress towards meeting the targets set under these initiatives. This type of assessment also helps us to understand the performance of the Eastern Cape Province's agricultural sector and its relevance with respect to the achievement of the MDG1 of poverty reduction. This study intends to assess growth in spending in the agricultural sector in the Eastern Cape and South Africa against several outcomes like growth in agricultural productivity, income growth and poverty reduction.

With a perspective of evaluating performance, this chapter attempts to quantify set scenarios for agricultural development and poverty reduction in the Eastern Cape Province and South Africa in general. Figures are used to track:

- a) The Eastern Cape Province and South Africa's agricultural growth, growth in agricultural expenditure with respect to the CAADP goal and SADC RISDP goals.
- b) The Province's progress towards meeting the 6% agricultural growth target set by the CAADP initiative through accelerated agriculture production,
- c) Whether the Province will be able to meet the provincial PGDP goal and the MDG 1 of halving the 1994 level of poverty by 2014 and 2015, respectively.

The four initiatives, PGDP, CAADP, SADC RISDP and MDG1 were all set with an important objective of reducing poverty in Africa as a whole by 2015 through investment in agriculture. As explained above, South Africa is a signatory to the MDG1, CAADP and the SADC RISDP. These development programmes have existing schemes and proposed targets against which progress is usually measured. This evaluation exercise on the agricultural sector performance and progress made by the Eastern Cape will provide important information on the need to adjust and fine-tune policies and investment decisions. It is expected that linking several programmes, goals, objectives and strategies under various development programmes to agricultural sector performance at provincial level will contribute in mapping the pathways out of poverty.

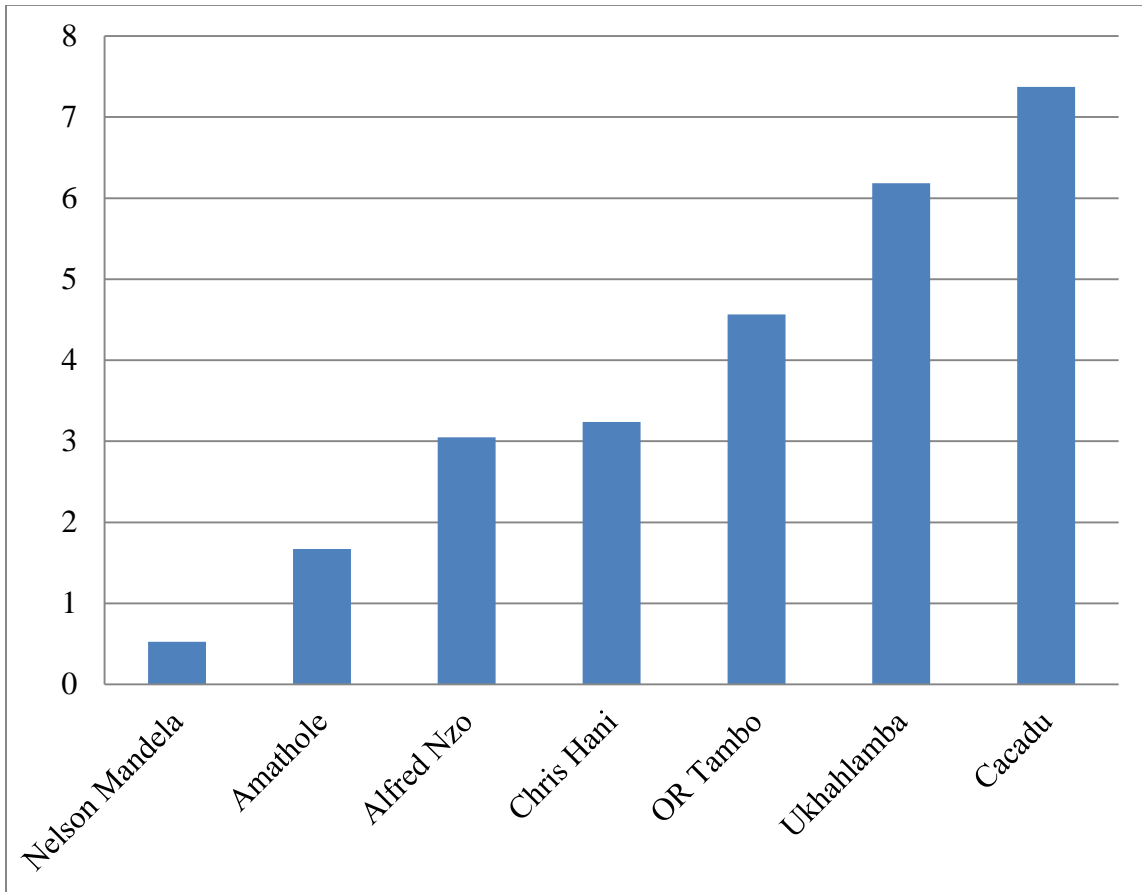
## **7.2 Findings**

The following section presents the results of the evaluation of all the mentioned initiatives and they are presented one after the other. At the beginning, a snapshot of municipal position towards set targets which provides a comparative analysis of the provincial and key regional set targets and current economic indicators is presented. This analysis draws specific attention to municipal public agricultural expenditure, agricultural GDP and the incidence of poverty across all the district municipalities of Eastern Cape. To contextualize this discussion, a comparative analysis with relevant provincial-level data will be presented.

### **7.2.1 Eastern Cape's Public Expenditure Evaluation Outcome for 2010**

The CAADP mandates signatory countries to invest at least 10% of national budget in agriculture, South Africa is a signatory to this initiative which is one of the major planks of the NEPAD process and therefore obliged to report progress in respect to that goal. The CAADP goal emphasises the role of public investment in increasing agricultural productivity. This section provides information of public expenditure assessment for agriculture in the Eastern Cape Province focusing on whether the province is meeting the

CAADP target for public expenditure. Municipal agricultural expenditure tracking survey employed here uses data from seven district municipalities of the Eastern Cape Province. In line with the broad national and provincial mandates, each municipality is expected to invest 10 per cent of its municipal budget in agriculture. Therefore the municipal agricultural expenditure will be expressed as a fraction of the total municipal budget. To what extent the municipal expenditure is in line with the CAADP target will then be assessed. Knowledge of the gaps between the set target expenditure and actual expenditure may help in highlighting budget management capacity issues that hinder growth in agricultural productivity in the province.



**Figure 7. 1: Agricultural Expenditure as a share of Total Expenditure (2009/2010)**

Source: Authors' calculations based on data from Government publications.

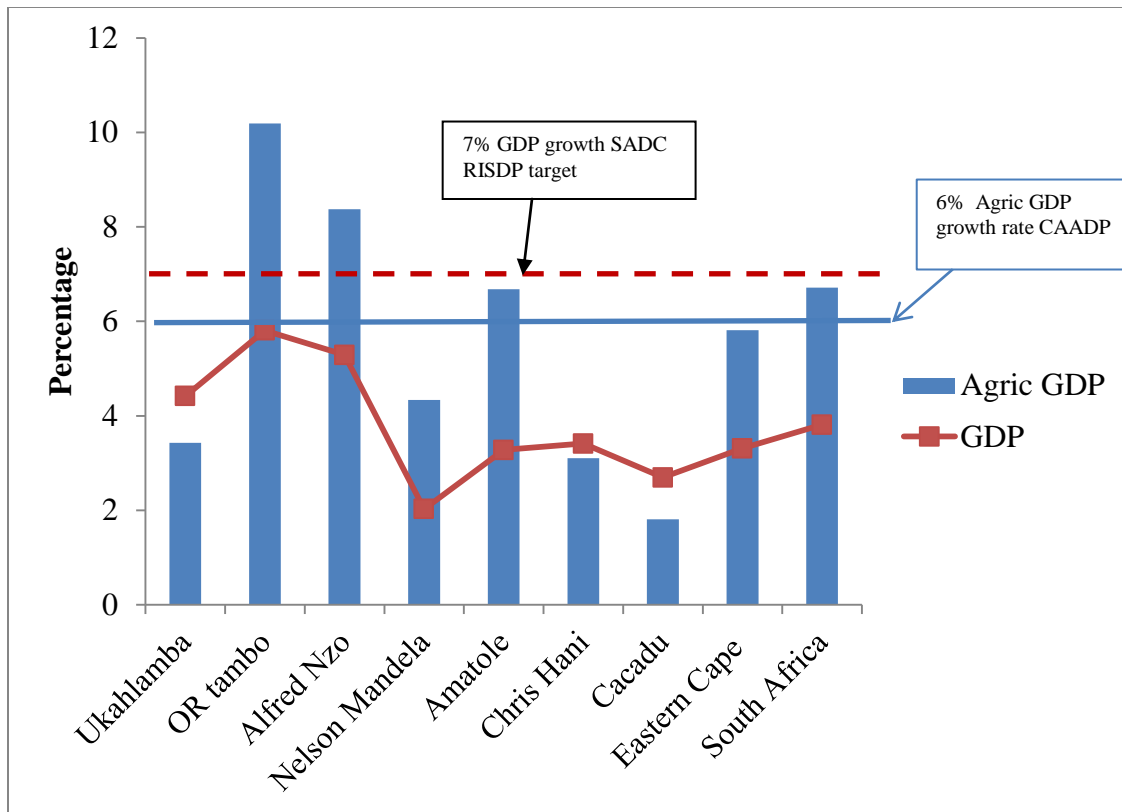
The results of the agricultural expenditure tracking survey for Eastern Cape presented in Figure 7.1 above indicates that all the district municipalities have not reached the 10 per

cent target using budget figures for 2010, and the bulk of the district municipalities five out seven district municipalities are within about 5 per cent points of the set threshold.

Some important implications emerge from the above finding concerning Eastern Cape's progress towards attaining the CAADP target of allocating 10 per cent of total public expenditure to the agricultural sector. Agricultural expenditure tracking survey for the Eastern Cape Province shows that none of the seven district municipalities has reached the 10 per cent CAADP target for agricultural expenditure, see figure 7.1. The emphasised role of public investment in agriculture call for increased spending by the province. It is expected that both the Eastern Cape Province's capacity and district municipality programs should continue to foster an increase in productive agricultural public investment like research and development, irrigation and provision of infrastructure. Countries that sustained agricultural growth during the Green Revolution were committing 11 per cent of their budget expenditure to the agricultural sector (Mwape, 2009). This therefore implies that there is a need to increase the scale and size of public expenditure across the Eastern Cape Province since it is acknowledged to be essential in increasing agricultural productivity.

### **7.2.2 Agricultural Growth Rate**

South Africa is mandated to achieve at least a 6 per cent agricultural growth rate per annum by investing at least 10 per cent of national budgets in agriculture under the Maputo Declaration (African Union, 2003). Using the most recent data for 2009/2010, Figure 7.2 presents both the growth rates in provincial GDP and GDP from the agricultural sector for South Africa and the Eastern Cape Province and all its district municipalities. Total GDP growth rates are compared with the SADC RISDP target 1 of reaching a 7 per cent GDP growth rate and the agricultural GDP is evaluated against the CAADP target of 6 per cent agricultural growth rate.



**Figure 7. 2: Total GDP and Agricultural GDP Growth Rates**

Source: Authors' calculations based on data from ECSECC (2010) database.

The red line shows the 7% GDP growth rate target set under the SADC RISDP target and the blue line shows the 6% agricultural GDP growth rate set under the CAADP. Figure 7.2 shows that some district in the Province are doing relatively well in progressing towards the CAADP target as two municipalities reached the targeted 6% agricultural GDP growth rate, using 2009/2010 figures. The province is doing less well in progressing towards both the SADC RISDP target 1. Using 2009/2010 figures, three out of seven district municipalities scored more than the set 6 per cent growth in the agricultural sector. This is a reflection of the Province's significant progress towards the 6 per cent agricultural growth rate set by the CAADP. When comparing figures for 2009/2010 for Cacadu and Chris Hani district municipalities, the chances of reaching the CAADP target are in great doubt. These two districts scored a growth rate of less than 3 per cent.



Relative to the SADC RISDP target, the situation in the Eastern Cape Province is depressing. When comparing progress towards the SADC RISDP target with the CAADP target discussed above, progress towards this goal is less impressive. Using figures for 2009/2010, Figure 7.2 above shows that prospects towards the achievement of the 7 per cent growth rate in GDP remains gloomy as all the district municipalities scored a growth rate less than the set 7 per cent growth rate.

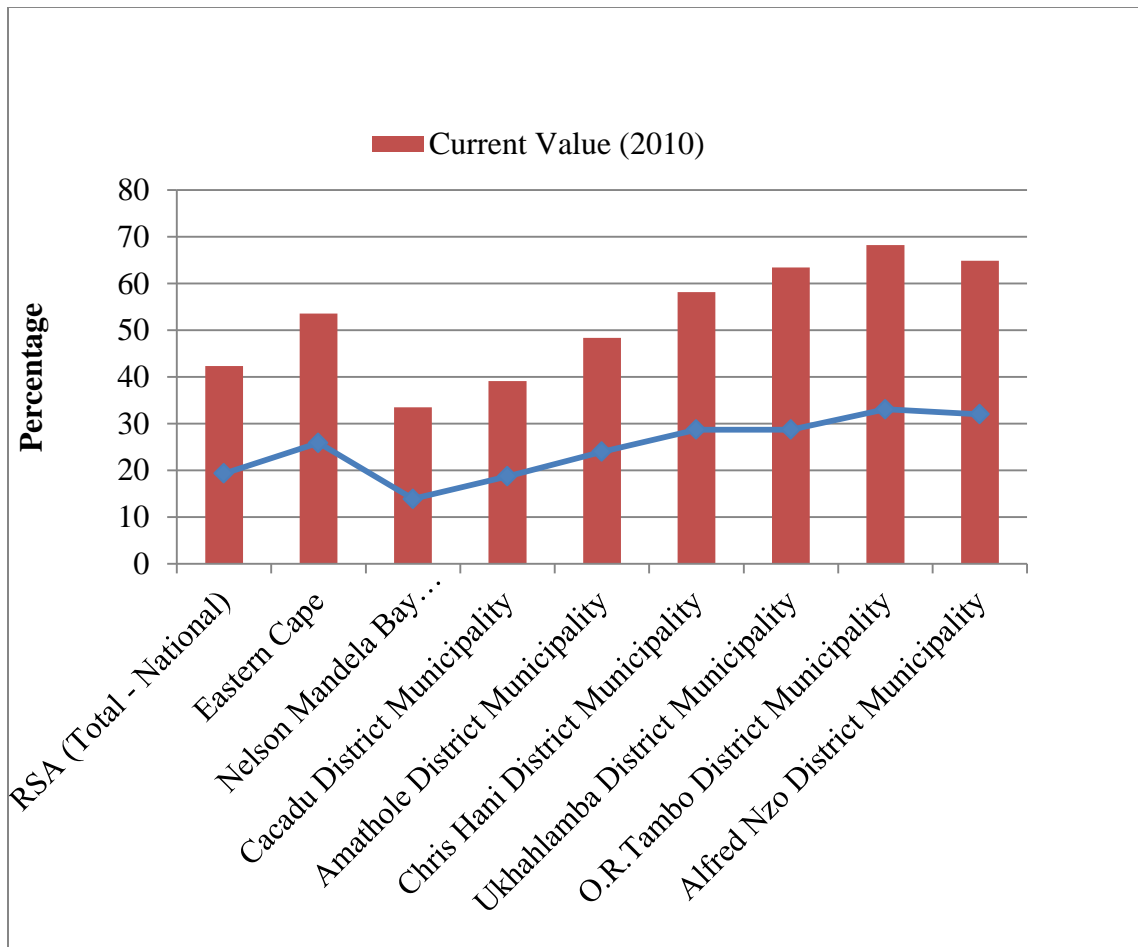
Agricultural growth rate of most district municipalities is less than the 6 per cent CAADP target and all the seven district are seemingly struggling to reach the SADC RISDP target of 7 per cent growth in total GDP. It is virtually impossible that the MDG1 of poverty reduction target will be attained in the absence of agricultural growth (Mwape, 2008). Therefore, to improve progress towards the set goals support to both the agricultural sector and all the other sectors that make up the total GDP should be increased. The CADDP target can be achieved by increasing public investment in agriculture (Mwape, 2008). There is abundant evidence to support that increased public investment in agriculture results in increased agricultural production (Lopez, 2005; Lopez and Galanato, 2007 and Edmeades, 2007). Recent estimates from Africa by Mwape (2008) confirm this linkage between public investment in agriculture and agricultural productivity. Mwape (2008) reported that quite a number of African countries have achieved 6 per cent growth in agricultural sector by allocating 5 per cent of national expenditure to agricultural development. This therefore provides a strong link between level of investment in agriculture and growth in the sector.

### **7.2.3 Progress in reducing Poverty**

At provincial level, however, using 2004 as the base year, the PGDP aims to reduce by 50 per cent the proportion of people living below the poverty datum line by 2014 in the Eastern Cape Province. The SADC RISDP target and the MDG1 are similar with respect to poverty reduction. Both initiatives are aimed at halving the 1990 proportion of people living on less than a dollar a day by 2015. In the sections below, progress towards meeting the set targets across all EC district municipalities is evaluated.

### **7.2.3.1 Progress towards MDG1 and SADC RISDP**

Both the SADC RISDP and MDG1 aim to halve the incidence of poverty by 2015. Figure 7.3 presents a snapshot of the margin between the current level of poverty and the targeted value for the incidence of poverty under these two initiatives. Therefore, presented data uses the Eastern Cape's poverty figures for 1994 as base year and figures for 2009/2010 as the current level of poverty for all district municipalities. Figure 7.4 show that all the district municipalities have not halved poverty levels as the graphs present the variations between the set target for both the MDG1 and the SADC RISDP and the current level of poverty in 2010.

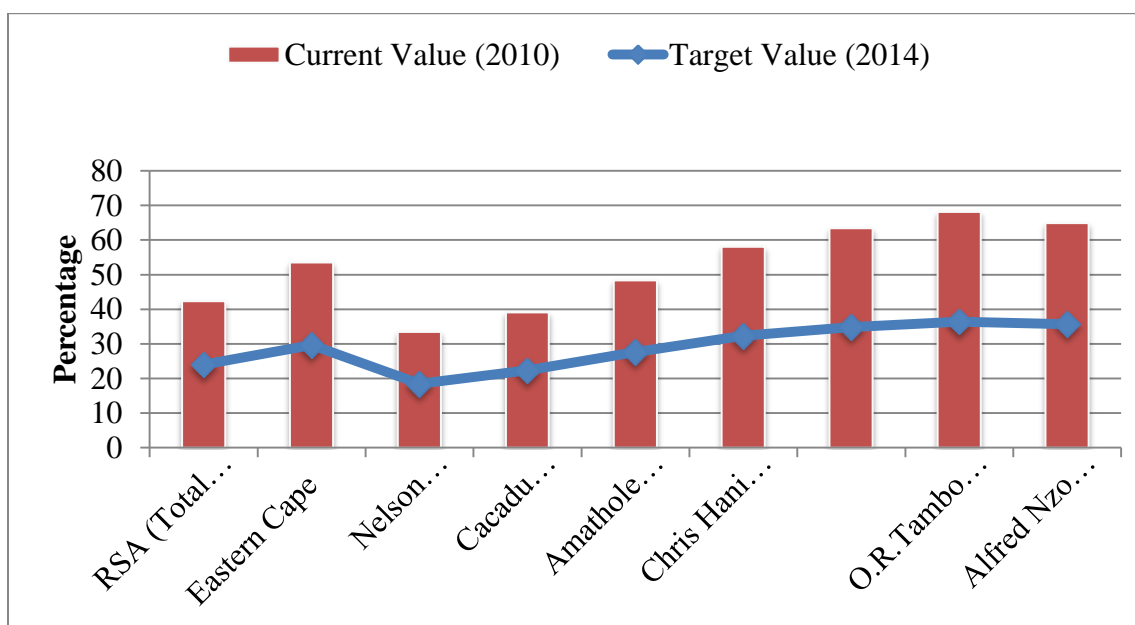


**Figure 7. 3: Changes in Poverty and progress towards MDG1 and SADC RISDP**  
 Source: Authors' calculations based on data from ECSECC

With five years left, the prospects of reducing the level of poverty in the Eastern Cape Province are bleak with the most doubtful prospect being in respect to five district municipalities namely Amatole, Chris Hani, UKhahlamba, O. R. Tambo and Alfred Nzo. Poverty levels in all these five districts are well above the set SADC RISDP and the MDG1 target, with some even recording more than 60 per cent.

### 7.2.3.2 Level of progress towards PGDP

The Provincial Growth and Development Programme aims to reduce by half the level of 2004 by 2015. Using 2004 as the base year, the Figure 7.4 compares Eastern Cape's 2009/2010 poverty levels with the target set under the PGDP with respect to poverty.



**Figure 7. 4: Changes in Poverty and progress towards PGDP**

Source: Authors' calculations based on data from ECSECC (2010) database.

Huge variations still exists between the incidence of poverty for 2009/2010 and the target set under the Provincial Growth and Development Programme of halving the 2004 incidence of poverty by 2015. However, considering that the programme was only implemented less than six years ago, the province seems to have reduced poverty by noticeable percentage points. With five years left, the prospects of achieving the PGDP target good across all the districts municipalities since the reductions in poverty shown in Figure 7.4 above are noticeably linked to the initial level of poverty for 2004.

Besides variations in target incidence of poverty which is determined by the base year, the MDG1 and the PGDP share the similar goal of halving the proportion of the poor. Given this, it is deemed important to compare progress towards these targets in the Province under study. Comparing Figure 7.3 and Figure 7.4 suggests that the Eastern Cape Province is progressing relatively well towards the PDGP than the MDG1. Both figures show a large variation between the target value and the achieved value for 2010. The average margin between the target percentage and the percentage for 2010 is relatively lower under the PGDP than what appears in Figure 7.3 showing progress

towards the MDG1. The PGDP seems to be presenting a slightly impressive picture of progress towards poverty reduction relative to the MDG1.

The adoption of both the PDGP and the MDG1 was a landmark decision for the Eastern Cape Province. From the above results, it is obvious that both the 2014 deadline for PGDP and the 2015 deadline for MDG1 were optimistic. The above results show that the prospects of achieving both the PGDP and MDG1 by 2014 and 2015 are highly unlikely as the differences between that current value and the set targets are still high with less than five years left. Even though there is limited progress, the observed changes from the base year provides enough justification for the province to commit resources in line with the two policy frameworks. Further inferential statistics on progress towards the set poverty level that takes into consideration the past trend in annual changes in the incidence of poverty and the forecasted trend over the next five years will be presented in the following section, succeeding discussion of the above results.

Although it is difficult to isolate the impacts of PDGP and MDGs, the above results show slight variation in progress towards the PGDP and the MDG1. The outcome that the Eastern Cape Province is progressing well towards that PGDP target than the MDG1 target reflects importantly on the variations in the impact of regional policy as compared to local policies. PGDP is a local policy framework designed for the Eastern Cape Province and the MDGs are global programmes. It is important to note that a good set of policy framework and set targets may not necessarily produce commensurate gains in terms of poverty reduction. In fact, for many countries the effects of regional or global policies have been noticeably smaller than that of local policies. This suggests that the province had a potential for reducing poverty faster using local development policy frameworks than regional policies. This situation is not surprising given the variation between the impact local policy and that of regional policies observed in across Eastern Cape district municipalities. The fact that the PGDP is an initiative specifically meant for the Eastern Cape Province cannot be taken lightly. Progress noted under the PGDP is probably attributed to the suitability appropriateness of the set of policies drawn for the programme relative to the MDG which is a set of umbrella policies for all countries. It is

probable that local policy could have a magnified impact on poverty relative to a regional policy because of stronger involvement of either country or provincial leadership and stakeholders in the implementation of the local programmes unlike global programmes.

Another factor that must also be taken into account is the process by which the policies have been derived, under either the MDG1 or the PGDP. Since the Eastern Cape Province guided the PGDP, the provincial government officials and consultants have been quite influential in facilitating the process, thus the better results. The MDGs have been driven by world leaders without sufficient prior national or grassroots consultations with inhabitants of the Eastern Cape Province or other entities for that matter. This might be the probable reason why the PGDP is having a higher marginal impact on poverty than the MDG1. It is also important to note that whenever new agricultural development programmes are put in place, there will be some improvement programme in place. The advent of new growth frameworks needs to accommodate the previous capacities upon which the sector is presently working on and this is highly possible when implement local policy than regional or global initiatives.

The use of provincial policy in conjunction with regional policy or global policy can improve the efficiency of resource use in the Eastern Cape Province. Policy making at provincial can improve efficiency in the use of public resources, especially the allocation of public funds. The theoretical premise of decentralization of policy making for greater efficiency in the provision of public goods and services to meet local demand seems to be materialising in South Africa when comparing progress towards MDGs with that of the PGDP. The sub-national government are always assumed to be efficient in both policy and use of public funds as they are relatively better in aligning either expenditures or policies with local priorities.

### **7.3 Eastern Cape's progress towards MDG1**

Based on the discussion above it is imperative that the provincial MDG1 progress evaluation is done based on a situation analysis of the province's development record in reducing poverty from 1994 to identify the trend towards the target until 2015. Inferential

statistics showing trends in the incidence of poverty up to 2010 and the consequence of continuing with the observed trends in poverty reduction over the next five years are more informative in assessing progress towards MDG1. In this study, this was done using the E-views and the results of the Exponential Smoothing for each district municipality are presented in Appendix B. However, the simplified these results are interpreted in Table 7.1 below where figures for the base year and current status are compared to the estimate for 2015 and 2025 assuming a Business as Usual Scenario<sup>4</sup>. These analyses are narrowed only to assess progress towards the MDG1. Using the available data, an attempt is made to extrapolate figures for the coming years and these figures are then used to assess whether the set targets for different initiatives are achievable or not. Using the MDG1 as a case study, Table 7.1 evaluates the Eastern Cape Provinces' progress towards this goal, checking on whether this goal is achievable or not. The MDG1 is chosen for this section only because it covers all the targets used for all previous evaluations. Understanding progress towards this goal will therefore, also help us understand all the previous targets.

**Table 7. 1: Achievement of Poverty targets in Eastern Cape**

<b>District municipality</b>	<b>Base Year 1994/1995</b>	<b>Current Status 2010</b>	<b>Estimate 2015</b>	<b>Progress towards target by 2015</b>	<b>Progress towards Target by 2025</b>
Amatole	50.9	45.6	47.1	Off track/slow	Off track/slow
Alfred Nzo	68.2	61.2	62.9	Off track/slow	Off track/slow
Cacadu	40.4	36.7	38.5	Off track/slow	Off track/slow
Chris Hani	62	54	56.1	Off track/slow	Off track/slow
Nelson Mandela Metropolitan	30.8	30.9	34.2	Off track/retrogressing /no progress	Off track/retrogressing /no progress
O R Tambo	69.8	64.1	66.4	Off track/slow	Off track/slow
UKhahlamba	62.9	60.0	63.3	Off track/slow	Off track/slow

Source: Author's simulations based on data from ECSECC (2010) using Hodrick-Prescott Filter (HP), (see Equation 5.6).

<sup>4</sup>Baseline scenario that examines the consequences of continuing current trends in the population, economy, technology and human behaviour.

Except for Nelson Mandela Metropolitan, all the district municipalities have been making progress albeit, slowly. The results of the estimates show that all seven districts may not reach the MDG1 target before 2015 or even 2025. The situation is even worse in the case of Nelson Mandela Metropolitan. In this district, poverty is even increasing implying retrogression, moving further away from the set target. The observed slow progress in the Eastern Cape Province suggests that the global goal of halving poverty by 2015 is unattainable. In the Eastern Cape Province, amongst all the seven district municipalities, none is considered on track to achieve the MDG1. Using 1995 to 2010 estimates, the province will not meet the poverty target, neither by 2015 nor 2025.

Despite implementing the PGDP, the SADC RISDP and the CAADP, which contributed to the positive economic growth trends and poverty reduction, the Eastern Cape Province is yet to register notable declines in income poverty. The most challenging goal is the MDG1 of reducing poverty as this goal is seemingly unreachable both in 2015 and 2025. This implies that the province would require more robust pro-poor growth well above historical rates. UNDP (2003) reports almost similar results in sub-Saharan Africa. They found that the current rate of progress across sub-Saharan Africa shows that the region would not meet the poverty targets for at least another century. UNDP (2003) reported that of the 47 countries in sub-Saharan Africa, 42 countries are considered off-track for MDG1. This result and that of the noted previous studies calls for immediate action in sectors that contribute to high marginal reductions in poverty. Agriculture is used as a reference point in this study.

#### **7.4 Required Agricultural Growth rate to meet MDG1**

The question that this section addresses is forthright. What is the estimated agricultural growth rate required to meet MDG1 in the Eastern Cape Province? Based on their past performance, results from the above section show that all the district municipalities of the province are either off-track and slow or off-track and retrogressing as far as progress towards the MDG1 is concerned. Growth-poverty elasticity values are used to determine the extent to which poverty declines as agricultural production grows (Fan and



Rosegrant, 2008 and Fan *et al.*, 2008). The current research employs this methodology although it is usually limited by the unavailability of data. Therefore, data for missing variables was supplemented for by estimates from previous studies and explanations are provided for the choice of selected estimates. The variables needed to carry out the required estimates are level of poverty, elasticity of poverty reduction with respect to agricultural GDP growth, agricultural GDP growth rate, share of agriculture in GDP, elasticity of poverty reduction with respect to non-agricultural GDP, share of non-agriculture in GDP and non-agricultural GDP growth rate. Fan and Rosegrant (2008) and Fan *et al.*, (2008) successfully estimated the amount of resources required to meet MDG1 in sub-Saharan Africa (SSA), Asia and the Pacific, respectively, using similar variables. By adopting the same procedures, the methods employed here estimate the resources for the Required Annual Agriculture Growth Rates to Achieve MDG1 and the Required Agricultural Expenditure Growth Rates to Achieve MDG1 across all district municipalities of the Eastern Cape Province of South Africa. Following the methodology explained in chapter 5 and the foregoing procedures, Table 7.2 below provides the list of variables used and the estimated statistic for each respective variable.

**Table 7. 2: Variables used in Costing Millennium Development Goal 1**

<b>District municipality</b>	<b>Required change in poverty for each year</b>	$\varepsilon_{ag}$ = elasticity of poverty reduction with respect to (w.r.t.) agricultural GDP growth	$g_{ag}$ = agricultural GDP growth rate	$s_{ag}$ = share of agriculture in GDP	$\varepsilon_{ng}$ = elasticity of poverty reduction w.r.t. non-agricultural GDP growth	$s_{ng}$ = share of non-agriculture in GDP	$g_{ng}$ = non-agricultural GDP growth rate
Amatole	5.52	-0.24	0.03	0.01	-0.07	0.97	0.04
Alfred Nzo	3.30	-0.26	0.07	0.03	-0.13	0.93	0.10
Cacadu	4.60	-0.41	-0.003	0.11	-0.05	0.89	0.06
Chris Hani	3.10	-0.31	-0.01	0.05	-0.003	0.95	0.05
Nelson Mandela Metropolitan	14.60	-0.13	0.05	0.004	-0.39	0.99	0.03
O R Tambo	5.71	-0.23	0.14	0.026	-0.37	0.97	0.08
UKhahlamba	4.03	-0.39	-0.01	0.10	-0.012	0.90	0.08

Source: Authors' calculations based on data from ECSECC (2010) database and following the methodology presented in Chapter 5.

Estimates for the above variables were calculated from the Eastern Cape Province's data, Figures for both agricultural and non-agricultural elasticity of poverty were calculated using the growth elasticity of poverty method proposed earlier (See Chapter 5, Equation 5.10). Fan *et al.* (2008) proposed an important argument concerning the values for the multiplier used in studies of this nature. They noted that the results of studies of costing poverty reduction are sensitive to the choice of the multiplier and therefore proposed the use of values derived from systematic research. But municipal data on public expenditure on agriculture is scarce. In order to accommodate this, a careful review of the literature was undertaken to determine the most appropriate values for elasticity agricultural growth with respect to public agricultural expenditure to be adapted for this study. These two values, the multiplier and expenditure elasticity, were considered flawed due to lack of appropriate data. The use of values from previous studies will make the results comparable to previous outcomes. Further, the use of values from previous studies is relatively common in the literature on costing poverty reduction (Fan *et al.*, 2008). Table 7.3 shows the values for agricultural elasticity of public agricultural expenditure and the multiplier effect as founded in the literature, the respective authors and the reason for adoption of those variables. Furthermore, these same figures were used recently by Fan *et al.* (2008) for similar studies in sub-Saharan Africa.

**Table 7. 3: Adapted values for the multiplier and expenditure elasticity of growth**

<b>Variable</b>	<b>Elasticity Value</b>	<b>Source</b>	<b>Reason</b>
Multiplier effect	1.5	Christian Delgado <i>et al.</i> (1998); Fan and Rao (2003); Fan <i>et al.</i> , (2008)	-Recent and comparable to other values from Africa
Expenditure Elasticity of Growth	0.32		-Founded using data from Africa

Values from Table 7.3 will be used to carry out the estimates required for this section. They are used to estimate agricultural growth rates required to reduce poverty annually from its own direct effect. Following equation 5.7 and the subsequent equation for

poverty reduction due to non-agricultural growth, it is possible to calculate the value of the required agricultural growth rate. To estimate the agricultural growth rate required to meet the MDG1 in the Eastern Cape Province, we assume that growth rates will follow the business-as-usual trend. This scenario assumes that the economy follows similar growth as that observed during the past years. The estimated figures for both the required annual agricultural growth rates to achieve MDG1 and the required agricultural expenditure growth rates needed to attain this growth rate are presented in Table 7.4

**Table 7. 4: Agricultural growth and Expenditure required reaching MDG1**

<b>District municipality</b>	<b>Assumed Annual Non-Agricultural Growth Rates, 2004 – 2015(percent)</b>	<b>Agricultural growth rate since 1995</b>	<b>Required Annual Agriculture Growth Rates to Achieve MDG1(percent)</b>	<b>Required Agricultural Expenditure Growth Rates to Achieve MDG1(percent)</b>
Amatole	0.03	0.03	2.04	6.38
Alfred Nzo	0.07	0.07	2.93	9.15
Cacadu	0.003	-0.003	0.55	1.73
Chris Hani	0.01	-0.01	2.98	9.33
Nelson Mandela Metropolitan	0.05	0.05	6.94	21.68
O R Tambo	0.14	0.14	5.96	18.63
UKhahlamba	0.01	-0.01	1.33	4.14

Source: Authors' calculations based on data from ECSECC (2010) database and following the methodology presented in Chapter 5.

Table 7.4 shows the per cent increase in public investment requirements based on growth-poverty elasticity methodology (see section 5.4). All the district municipalities of the Eastern Cape Province will need to boost their annual agricultural growth to 3.2 per cent per year on average in order to achieve MDG1. This is higher than the observed municipal averages shown in column 2 of Table 7.4. There is a huge gap between the required agricultural growth rate and the observed averages for the period 1995 to 2010. To reach this target, government agricultural spending will have to increase by an average of 10 per cent per annum (Table 7.4) from an average of three per cent per annum observed from 2000 to 2010. However, there is a large variation in required investment increases across the province's district municipalities. The above estimate shows that in order to achieve MDG1, all the district municipalities will need to increase agricultural spending. Some of the MDG1 gaps can be closed with relatively low investment. Presenting the exact current level of public spending and the required increases is more informative but because of data scarcity, results on the required increase public finance for agriculture per municipality will be presented in percentages. Estimates indicate that in order to achieve MDG1, all the municipalities are expected to increase public spending on agriculture. Cacadu and UKhahlamba have the least expected increase of 2 and 3 per cent per annum respectively. Nelson Mandela Metropolitan and OR Tambo have the highest required increase of 18 per cent and 21 per cent per year, respectively. Therefore, almost all district municipalities will need to increase their financial outlays in order to reach the MDG1 target. The inability of the Eastern Cape Province to substantially raise the level of their agricultural investments may have serious implications for poverty reduction and the achievement of the MDG1.

Important findings emerge from the estimates found using the growth elasticity of poverty (GEP) technique on data drawn from the Eastern Cape Province's district municipality's database. Increased growth rate in agricultural production is paramount to reducing poverty in the province and increased investment in agriculture is key to the achievement of this required growth. Computation of GEP has demonstrated that all the district municipalities of Eastern Cape will need to boost their annual agricultural growth to 3.2 per cent on average in order to achieve MDG1. To reach this target, government

agricultural spending will have to increase to an average of 10 per cent per annum. However, there is a large variation in required investment increments across the Eastern Cape Province's district municipalities. These gaps between the 2010 level and the target poverty level can still be bridged by meeting the required increases and in all the cases this will imply stepping up investment by various few percentage points (Table 7.4). Municipalities will need to increase agricultural spending significantly in order to achieve MDG1.

The overall outcome of both the above finding and reviewed literature advocate for increased public investment in agriculture and increased agricultural productivity for poverty to be reduced significantly. With regard to poverty reduction through increased public expenditure in agriculture, previous studies strongly recommended a growth path which is pro-poor in nature. The feasibility of MDG1 and all the other goals can be improved by a growth path that takes into account the nature of inequality in South Africa. Therefore, effort should be made so that the policy intervention and increased public spending are designed to achieve pro-poor growth. If poverty reduction and the achievement of MDG1 prove unattainable through increased public expenditure in agriculture, non-agricultural activities could be promoted in selected district municipalities (as they have been considered essential in some parts of the province by Ndhleve and Obi (2011)).

The magnitude of challenges faced by the province in attaining MDG1 calls for sustained levels of government commitment in the development of agriculture and a clear shift in government priorities towards investment in the sector. Continuing with the observed trend and policy frameworks will not reduce poverty to ambitious levels envisaged in the Millennium Development Goals. Rather than maintaining the status quo, the government needs to commit to a new, more radical course of action that clearly puts the agricultural sector at the forefront. Agricultural transformation require fiscal policy adjustment on various aspects of public agricultural investment, including size of public spending, type of public spending, efficiency of public spending, and even investments in non-agricultural sector.

## 7.5 Chapter Summary

Accurate and realistic policy frameworks provide coherent plans government departments can use to evaluate progress towards set targets and effective use of scarce public resources. Progress towards all the goals under CADDP, the SADC RISDP, the PGDP and the MDG1, is slow in the Eastern Cape Province, with the targets seemingly unachievable during the set timeframe. Although showing some significant stride towards the set target, the province is seemingly faltering in meeting all the regional targets of increasing agricultural public expenditure, increasing agricultural productivity and reducing poverty. Failure to achieve agricultural productivity may be attributed to inefficient public investment in agriculture, misallocation of public funds, and adoption of inconsistent policies. Failure to meet the PGDP goals and the MDG1 is largely attributed to the province's failure to boost agricultural production. Therefore, a case is made for articulation of strengthened provincial comprehensive agricultural public expenditure programs that build a consensus for increased levels and efficiency of public expenditure for agriculture development in the Eastern Cape Province. The province should undergo a public expenditure re-configuration exercise with stakeholder participation on expenditure priorities as this can lead to improved public agriculture expenditure planning and implementation. Furthermore, the Eastern Cape Province would require increased investment in agriculture accompanied by robust and pro-poor growth well above historical rates.

## **CHAPTER EIGHT**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **8.1 Introduction**

This study analysed the linkages between three components namely, public agricultural expenditure, agricultural growth and the incidence of poverty in Eastern Cape between the period 1994 and 2010. This objective was attained through extensive review of the literature on the linkages between these three components, a background analysis of agricultural growth in Eastern Cape and analysis of trends in the incidence of poverty in the province. Various empirical models were then employed on these variables to give answers to whether Eastern Cape Province will attain various regional and provincial as well as estimating the amount of agricultural investment required to reach agricultural productivity which is enough to meet MDG1. The following three sub-section summarises the results, provide the conclusion and a summary of recommendations derived from the study.

#### **8.2 Summary of findings**

The main body of the thesis is divided into seven chapters. Chapter 1 and 2 covered the introduction and background to the study and the review of regional and national policies and rural development programmes relevant to South Africa. Chapter 3 review literature on the linkages between public investment, agricultural growth and the incidence of poverty and chapter 4 provides information on the study area. Following these, the thesis discussed various methodologies employed in previous studies conducted on the linkages between the mentioned variables. Model specification and detailed description of data used for the study was the presented in chapter 5. Study results were then presented and discussed in chapter 6 and 7.



### **8.2.1 A review of regional and national policies relevant to agricultural development**

Since the subject under study is agricultural development and rural development in South Africa, it was important to review various policies and programmes implemented in South Africa since 1994. The section identified all the policies that were implemented in South Africa and tries to analyse how they affected poverty and the level of agricultural production. Various programmes were discussed starting with the adoption of the new Government Constitution in 1994 including how it affected budget allocation across the provinces. Following independence the South African government implemented the Reconstruction and Development programme in 1994, Growth, Employment and Reconstruction programme (GEAR) in 1996; the South Africa's Pro-Poor growth strategy in 1996 and land reform programme and Black Economic Empowerment in agriculture. All these were discussed and reference was made on how they impacted poverty and agricultural production in South Africa. Eastern Cape's Provincial Growth and Development programme was also discussed in the same manner as other programmes mentioned above. The reviewed policies show that South Africa was determined at improving the state of agriculture and the lives of the poor.

Realising that the South African rural development programmes cannot be viewed in isolation with various regional and global initiatives meant to promote agricultural and reducing poverty, a discussion of regional initiatives like the CAADP, SADC RISDP and the millennium development goal was presented in the same chapter. One motivation for this approach was that South Africa is also a signatory these programmes and the same programme have also contributed to the current level of poverty in the country.

### **8.2.2 Review on public investment, agricultural growth and the incidence of poverty**

The importance of public agricultural expenditure and its linkage to economic growth was reviewed in this study and it is well documented in the literature for both industrialised and developing economies. The arguments presented in literature are that public expenditure in agriculture positively affects growth in agricultural production

across all nations. The impact of public spending on economic growth is varied but many strongly agrees that increased public spending in the agricultural sector of any country improves overall agricultural production. It emerged in literature that the agricultural sector benefits the poor in many ways. These are: provision of food, source of income, source of food and source of employment. In Eastern Cape, the sector emerged as the main economic activity for the poor and seems to be playing a pivotal role in the reduction of poverty. However, the sector's role of reducing poverty is undermined by low output, mismanagement of resources and unequal distribution of gains from the sector itself and this seems to be the case across various nations. Literature also tries to provide solutions to these problems by recommending that it remains crucial across various nations to evaluate the trends in agricultural production, the impact of relevant policies on agricultural production and determine how the allocation of different types of public funds impacted on agricultural growth. Feasible and sustainable agricultural development that benefits the poor can be achieved by understanding the characteristic of growth experienced in the past, and to fully understand the linkages between this growth and how that growth was manifested into overall poverty reduction.

### **8.2.3 Methodology**

Following a discussion of various methodologies it emerged that the major determinants of poverty are agricultural GDP per capita and non-agricultural GDP per capita and these were then modelled for this study. The linkages between public agricultural expenditure, agricultural growth and poverty reduction were then estimated using the simple response analysis and the growth elasticity of poverty. The elasticities were then used to estimate the amount of resources required to finance agricultural growth in order to reduce poverty to the level specified by the MDG1. Costing poverty reduction was accomplished by first calculating the required agricultural growth rates using the elasticity of poverty reduction with respect to agricultural growth. The estimated figures for the agricultural growth rate required to meet MDG1 were then used to estimate the necessary financial resources using agricultural growth elasticity of public agricultural expenditure. Because growth in the non-agricultural sector will also contribute to poverty reduction, either directly or

indirectly through growth linkages with agriculture, the additional poverty reduction effects from this sector were also considered in the analysis. The linkage between public agricultural expenditure and agricultural growth was analysed using agricultural spending intensity. Data were pooled from all the district municipalities of Eastern Cape. Therefore, it involved both cross-sectional and time series data. At some point, trends in public agricultural expenditure, agricultural GDP and the level of poverty were assessed against various set provincial, regional, and global targets.

#### **8.2.4 Findings**

The broad objective of the study was to evaluate the linkages between public spending in agriculture and agricultural growth; agricultural growth and poverty reduction and agricultural growth and the achievement of regional set goals in Eastern Cape. Several findings clearly emerge from this study.

##### **8.2.4.1 Public Agricultural Expenditure and growth**

In Chapter 6, the roles of public agricultural spending and effects on agricultural production in Eastern Cape were assessed. Public agricultural spending grew impressively over the study period. However, there were observed inefficiencies in the allocation of public agricultural spending as priority was seemingly given to those types of spending that brings lower returns per investment. This observation calls for prioritization of public expenditure functions meant for agricultural development. Priorities in Eastern Cape's agricultural sector should be given to agricultural research and development and structured agricultural training as these were receiving less allocation with regard to their value in improving production from the sector.

One of the major concerns that emerged from the findings of Chapter 6 was inefficiency in the use of public agricultural funds. It, therefore, was imperative to determine the quality of public spending in Eastern Cape. The quality of public spending was measured by agricultural spending intensity. The relationship between government investment in agriculture and agricultural GDP shows that public funds were largely behind the

province's success in increasing agricultural production throughout the period 1990s to 2010. Furthermore, it is worth mentioning that the reported increase in ASI shows some improvement in the efficiency in the use of PAE. Three aspect of agricultural spending therefore emerged as important in increasing agricultural growth. These are the size of public spending, prioritization of public spending and the intensity in the use of public funds. Monitoring these variables will help in establishing the highly needed growth in agricultural production.

#### **8.2.4.2 Agricultural Growth and Poverty**

Over the period 1994-2010, the overall output from the agricultural sector fluctuated. The growth rate during the same period fluctuated between negative growth and 5 percent growth rate. This shows that both output and growth rate from the sector is elastic. The Province is however continuously failing to take advantage of the observed positive growth by maintaining output increase in the agricultural sector. The agricultural sector contributed less than 5 per cent to the total provincial GDP over the whole period under study. Furthermore, relative to other sectors, agriculture has persistently registered a lower growth rate compared with industry and services. This pattern of economic growth partly explains why economic growth in Eastern Cape over the past years has not been associated with poverty reduction, especially in rural areas. The sector, which supports over 70 percent of the population, has been growing relatively slowly and contributing less compared with other major sectors.

Although unsatisfactory, minor reductions in the incidence of poverty were reported during the period from 1994 to 2010. Overall, findings from the relationships between agricultural GDP and poverty between 1994 and 2010 show a negative relationship between the two. The observed relations for the period 2005-2010 attest to the success of Eastern Cape in reducing poverty. Some differences were observed in the nature of reductions in poverty and the associated growth in between the periods 1995-1999 and 2005-2010. These differences were however attributed to the differences in the improvement in the distribution of the gains from increased agricultural output. The

above results to some extent explain the importance of the agricultural sector in reducing poverty in Eastern Cape.

Growth Elasticity of Poverty (GEP) shows the breakdown of the GEP into that emanating from agricultural GDP per Capita and that due to non-agricultural GDP per capita. The breakdown thus obtained in Table 6.4 reveals that 5 out of the 7 district municipalities shows that growth in agriculture GDP per capita was more important in reducing poverty. Only two district municipalities have shown to have reduced poverty mainly because of growth in non-agricultural GDP per capita. A relatively high marginal effect found for agricultural GDP on poverty in Cacadu, Chris Hani and UKhahlamba is complemented by relatively low marginal effect of non-agricultural GDP on poverty in the same district municipalities. This outcome advocates for increased support to the agricultural sector in those district municipalities where the sector has a higher marginal effect on poverty. Complementary support should therefore be given to the non-agricultural sector in those municipalities where it reduces poverty significantly. These propositions are supported by literature from Africa (Christiansen and Demery, 2006). Accelerating agricultural production growth offers a potentially powerful tool for income growth in most of the district municipalities of Eastern Cape. This make agricultural led growth crucial for poverty reduction in the province.

#### **8.2.4.3 Achievement of Regional Goals**

Concerns over increase in agricultural public expenditure, agricultural growth and poverty reduction in Eastern Cape are also driven by the need to meet regional set goals like the MDG1, SADC RISDP, PGDP and CADPP goals. It emerged that most of the district municipalities are not in a position to meet any of the set targets. Although showing some significant stride towards the set targets, the province is seemingly faltering in meeting all the regional targets of increasing agricultural public expenditure, increasing agricultural production and reducing poverty.

With regard to the CAADP target, agricultural expenditure tracking survey for Eastern Cape shows that none of the seven district municipalities have reached the 10% CAADP

target for agricultural expenditure. The above results show that the prospects of achieving both the PGDP and MDG1 by 2014 and 2015 are highly unlikely as the differences between the current value and set targets is still high with less than five years left. Failure to meet these targets is largely attributed to the province's failure to boost agricultural production. Failure to boost agricultural production can be blamed on low and inefficient public expenditure management, inconsistent policies and misaligned policies. Failure to reduce poverty is partly because the province is not fully embracing the concept of pro-poor growth.

#### **8.2.4.4 Required growth rate to reach MDG1**

The ultimate purpose of this study was to estimate both the required agricultural growth rate and the increase public spending on agriculture required in order to reach MDG1. The study finds that all the district municipalities of Eastern Cape will need to increase public investment in agriculture for them to achieve MDG1. Provisional estimates of the required annual agricultural growth rate and required annual increase in public spending for respective district municipalities were provided. These estimates were varied but the overall outcome suggests that all district municipalities must increase their spending on agriculture between 2010 and 2015. A recommendation is therefore made for increased spending across all district municipalities.

### **8.3 Conclusion**

Existing data and empirical evidence were used to explain the relationship between public agricultural expenditure; the mixed performance of Eastern Cape's agricultural sector and the incidence of poverty. The accumulated body of research on this issue is clear that increased public spending is a necessary pre-condition to success in improving agricultural production and reducing poverty in Eastern Cape. At the same time, we found that while growth in public agricultural expenditure was an important precondition for improved agricultural production, prioritization of spending and efficiency in the use these funds mattered substantially. With regard to poverty reduction, both agricultural and non-agricultural GDP contribute to poverty reduction but the former seems to be

important in most district municipalities. Furthermore, it emerged that the province is lagging in achieving all the regional goals. In order to achieve the MDG1, the DoA should invest substantially in several aspects of agricultural and rural development. The study therefore ends by estimating both the required agricultural growth rate and the required increase in agricultural spending necessary to achieve MDG1, per municipality.

#### **8.4 Recommendations**

Important implications for rural development and poverty reduction in rural Eastern Cape arise from this study. The following is a summary of the policy implications and recommendations.

The basic lesson of experience from this study is that to increase growth in agricultural production there is need to encourage increase in public agricultural spending. Public agricultural expenditure increased substantially over the whole period from 1994 to 2010 but its size remains lower than the set target set by the CAADP. This standard of increasing public agricultural expenditure should be adhered to. A more positive policy proposal for expanding the size of public agricultural spending can foster increased agricultural production. The Department of Agriculture and rural development can encourage support from the Premier by providing information on public spending and how it is linked with agricultural production. This will definitely strengthen their proposal for increased budget. They need data and knowledge systems that make the objectives and outcomes very clear and convincing to the Premier.

Care must be taken not ignore the allocative inefficient aspect of public spending. This increase in public agricultural spending should be pursued without overlooking the importance of efficiency in the allocation of these funds. The criteria for spending should favour those programmes that have higher rate of return. Agricultural public spending intensity improving programs should improve expenditure composition through impact evaluation than just scaling-up public spending. Desired outcomes can be achieved by

shifting public spending to more productive spending by getting the right volume and pattern of public expenditure. Evidence from this study shows public agricultural expenditure must give higher allocation to research and development, sustainable resource management, structured agricultural training and allocations to other sectors such as administrative function should be kept lower. For this to be executed properly, it is essential to put in place the right personnel to administer the whole process of budget allocation and this process should include all the stakeholders across the whole spectrum.

Greater attention is needed on improving the quality and availability of data on the impact of spending. The department must gather and have access to regular and reliable information on public spending and output. There is limited data on public expenditure and this component is not made public. Eastern Cape's public expenditure management systems are too weak to support a meaningful presentation of the overall public expenditure evaluation exercise. Budget execution lacks comprehensiveness and meaningful functional classification of expenditures. In most cases, budget execution often differs significantly from budget allocation and the overall auditing systems are extremely weak.

The province should take advantage of peaks in production as that observed in 2001. Agricultural output should be maintained at that same level. Variations in output should be used as indicators that the sector is operating below its potential and output is highly elastic. This can be made possible by studying all the factors responsible and then incorporate them when promoting similar output for the coming years. New opportunities for realizing this potential should be generated continuously by the act of intensive research and development across all the centres in the province. Therefore, to reduce shocks in output, the best option is to figure out what are the most responsible factors.

It emerged from this study that increase in agricultural production are usually complemented by a decrease in the level of poverty and that the agricultural sector contributes less than 5 per cent to the total provincial GDP and the share has been following a decreasing trend. If this trend continues the output is expected to decrease



further. Authorities need to look into the reasons for this worrying trend since the bulk of the population in Eastern Cape is depended on agriculture for either employment or as the main livelihood. This finding further confirms the stance of the Eastern Cape's DoA with regard to supporting agriculture. It might therefore be recommended that this support should not be given up upon and the sector should be prioritised. A word of caution is echoed, greater attention is needed on improving output from this sector.

The above results to some extent explain the importance of the agricultural sector in reducing poverty in Eastern Cape, one of the poorest provinces in South Africa. Although the promotion of either agricultural or non-agricultural activities should be pursued where appropriate, the feasibility of each varies between municipalities, and thus its possibility should be examined on a case-by-case basis. Following the outcome of the GEP (Table 6.4), the Eastern Cape Department of Agriculture and Rural development should support agricultural activities in Amatole, Alfred Nzo, Cacadu and UKhahlamba and non-agricultural activities should be promoted in Nelson Mandela Metropolitan and O R Tambo as they seems to have a higher poverty reducing effect in the respective district municipalities.

Regional goals are generally recognised as valuable instruments for promoting agricultural growth and reducing poverty, however, it is worth thinking about when implementing these policies. The inherent diversity in the conditions and strategies of regional goals implies that no single goal can be prescribed for Eastern Cape as these goals require information on the socio-economic characteristics of rural households, private sector participation in agricultural development, role of the public sector and that of the civil society. The Province can also learn from previous successes stories achieved by other provinces.

This study is the first the researcher is aware of that empirical track Eastern Cape's progress towards national and regional initiatives and estimates the cost of achieving MDG1. However, there are a few areas that further research on the topic can bolster the above conclusions. Firstly, the study scrutinise the relationship between public

agricultural expenditure and economic growth in Eastern Cape, however, there is need to explore how all these relationships are affected by the institutional framework operating in the agricultural sector of the province. Investigating more thoroughly the role of institutions in the process of public funds allocation would be essential, especially given the complications surrounding budget allocation and budget presentation.

Accounting for several other important factors with advanced econometric models could also be valuable since poverty is explained by several variables other than agricultural GDP per capita and non-agricultural GDP per capita. Location, regional spill-over effects, climate, socio-economic variables and several other factors are likely to play an important role in all the observed relationships.

This study was unable to estimate the relationship between public agricultural expenditure and agricultural growth due to data constraints; especially lack of municipal time-series, spatial disaggregated public expenditure data. The study borrowed values for elasticity of agricultural growth with respect to public agricultural expenditure and the multiplier effect from literature. The calculated values for the multiplier and expenditure elasticity were considered flawed due to lack of appropriate data. This assumption is unlikely to be realistic especially for public goods that are provided at municipality level. The unit costs will be different to the extent that local capacities differ.

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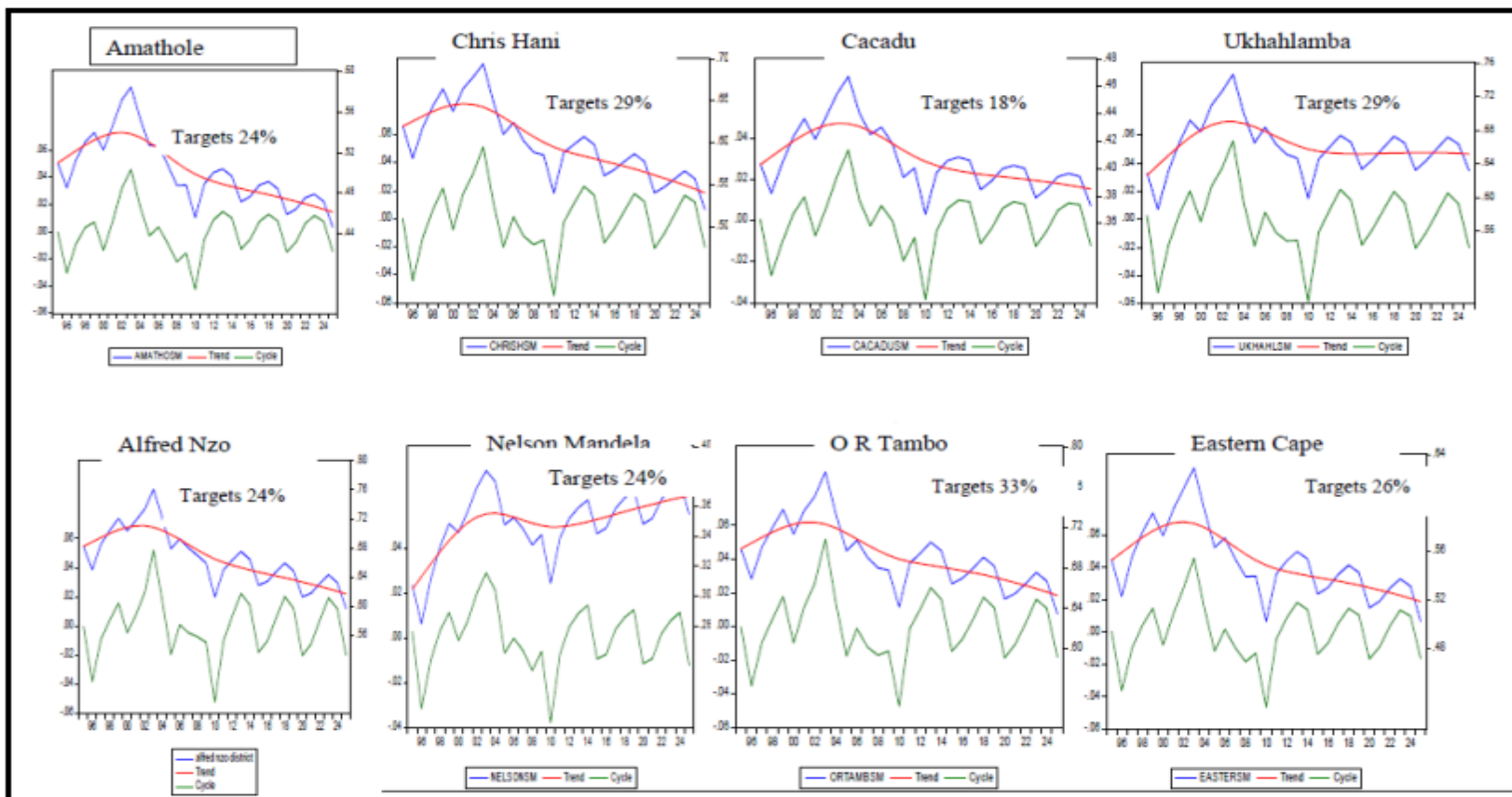
**Appendix A: Eastern Cape's Public agricultural Expenditures by programme**

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Administration	258875	249991	344180	409374	242539	220423	298330	534893	421997	421353	532220
Farmer support & Development	81656	69809	65515	63368	54589	88756	132542	165897	199237	249801	288979
Sustainable Resource	44211	61424	218815	266543	323119	413209	655539	882325	1197700	1113042	1285509
Veterinary Services	78097	57970	84514	87667	88563	157005	186521	200738	506394	413570	462738
Technical Research & Dev	24989	44478	37035	27267	41741	59045	7153	106656	71195	63590	72652
				1639	6312	10412	215834	68483	57693	65383	71789
Structured Agric. Training	3953	2100	4341	28527	30464	29358	43277	123195	195083	210105	243682
Total payments and estimates	403015	414967	718183	858066	787327	965334	1456010	2053103	2520708	2416641	2836211

Source: Eastern Cape Department of agriculture Budget statements (2000-2011)



**Appendix B: Simulated trend for the incidence of poverty until 2025**



### Appendix C: Variables used in Costing MDG1

	$\dot{P}$	$\dot{P}_{ng}$	$\dot{P} - \dot{P}_{ng}$	$\varepsilon_{ag} * S_{ag}$	$(\varepsilon_{ng} * \phi_{ng,ag}) * S_{ng}$	$\{\varepsilon_{ag} * S_{ag} + (\varepsilon_{ng} * \phi_{ng,ag}) * S_{ng}\}$	$g_{ag}$	$\varepsilon_{ag}$	$\varepsilon_{ng}$	<b>Adopted multiplier</b> $\phi_{ng,ag}$	$S_{ag}$	$g_{ng}$	$S_{ng}$	$\dot{E}_{ag}$
Alfred Nzo	5.52	1.23	4.29	0.83	0.63	1.46	2.93	0.26	0.13	1.50	3.19	0.10	93.00	9.15
Cacadu	3.30	0.25	3.05	4.67	0.85	5.52	0.55	0.41	0.05	1.50	11.30	0.06	89.00	1.73
Chris Hani	4.60	0.01	4.59	1.52	0.02	1.54	2.98	0.31	0.00	1.50	4.85	0.05	95.00	9.33
Nelson Mandela Metropolitan	3.10	1.12	1.98	0.05	0.23	0.28	6.94	0.13	0.39	1.50	0.40	0.03	99.60	21.68
O R Tambo	14.60	2.80	11.80	0.59	1.39	1.98	5.96	0.23	0.36	1.50	2.60	0.08	97.00	18.63
UKhahlamba	5.71	0.08	5.63	4.06	0.19	4.25	1.32	0.39	0.01	1.50	10.33	0.08	90.00	4.14
Amatole	4.03	0.26	3.77	0.36	1.49	1.85	2.04	0.24	0.07	15.00	1.47	0.04	97.00	6.38

Source: Source: Authors' calculations based on data from ECSECC (2010) database and following the methodology presented in section 5.4.2, Equation 5.7.