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**THE EFFECTS OF FERTILIZER MARKET POLICY REFORMS IN  
KENYA ON PERFORMANCE OF LOCAL FERTILIZER  
MANUFACTURING FIRMS - THE CASE OF KEL CHEMICALS LTD.**

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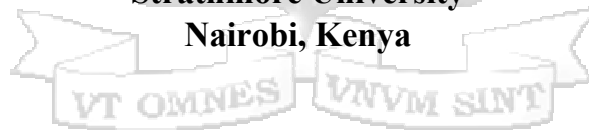
**A Research dissertation submitted in partial fulfilment of the requirements for  
the award of Master's Degree in Public Policy and Management (MPPM) at**

**Strathmore University**

**Strathmore Business School**

**Strathmore University**

**Nairobi, Kenya**



**[September 2019]**

## DECLARATION

I declare that this research is my original work, and it has not been previously submitted or approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no materials previously published or written by another person except where due reference is made in the dissertation itself.

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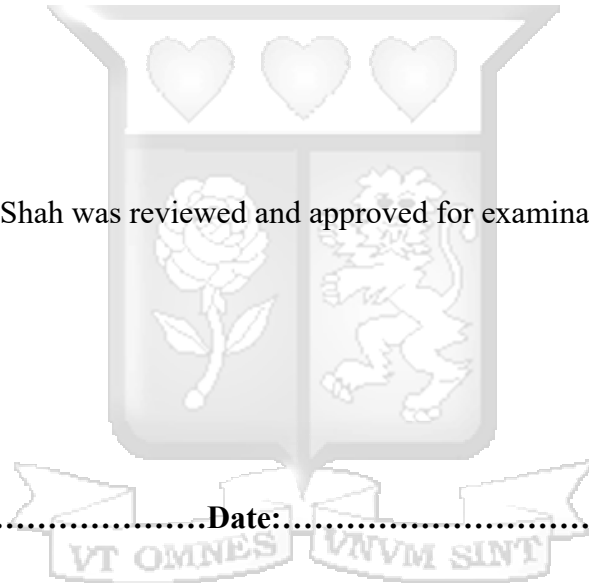
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## Approval

This dissertation of Sahil Shah was reviewed and approved for examination by the following:

**Signature:** .....**Date:**.....

**Dr. Julius Muia**  
**Strathmore Business School**



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## ABSTRACT

As part of reforms to boost agricultural production, the Kenya government introduced a fertilizer subsidy named National Accelerated Agricultural Inputs Access Program (NAAIAP) in 2006. This study uses fertilizer production, sales and income data of KEL Chemicals Ltd., the leading fertilizer manufacturing company in Kenya, to evaluate the effect of this subsidy on the performance of a local fertilizer manufacturing company. With respect to the NAAIAP policy, the specific objectives of this study were to: establish its effect on the fertilizer production of KEL Ltd; ascertain the policy effect on the financial performance of KEL Ltd.; determine how KEL Ltd deals with policy shifts targeting the fertilizer sector; and evaluate KEL's modes of contingency and decision-making in the face of policy changes. Appropriate literature was reviewed to provide a foundation of knowledge on the subject and place the research within the context of existing literature. A mixed-method approach was employed to conduct an empirical investigation of the externalities of demand-side government interventions in the agricultural sector. The independent variable in this study was market policy reforms in the fertilizer market, which specifically focused on (NAAIAP) policy. The dependent variables were the performance indicators of KEL Ltd. Annual fertilizer production and financial data were collected from KEL Ltd records from 1998 to 2015. This data was supplemented by key informant interviews with KEL's top managers. Descriptive, trend analysis, and tests of significance on the quantitative data were done using Microsoft Excel while content analysis was carried out on the responses received from interviewees. This study found out that the NAAIAP policy had a positive impact on the fertilizer production and financial performance of KEL Ltd. Comparative analysis of KEL's fertilizer production, fertilizer sales and profits showed that the annual means and medians for all these indicators were significantly higher, at  $\alpha=0.05$ , after the introduction of the fertilizer subsidy. The study also found that the management of KEL carries out regular reviews of its operating strategies to address public policy shifts in the fertilizer industry and that KEL continuously strives to improve on their contingency plans to deal with adverse policy reforms. This study concluded that the NAAIAP policy led to an increase in fertilizer production, sale, and profitability of local fertilizer manufacturing firms. However, this research recommends that further studies should be carried out to determine the impact of the NAAIAP subsidy policy on the overall growth of the agricultural sector in the country as well as how this policy has affected the distribution, sale, and use of fertilizer in the country.

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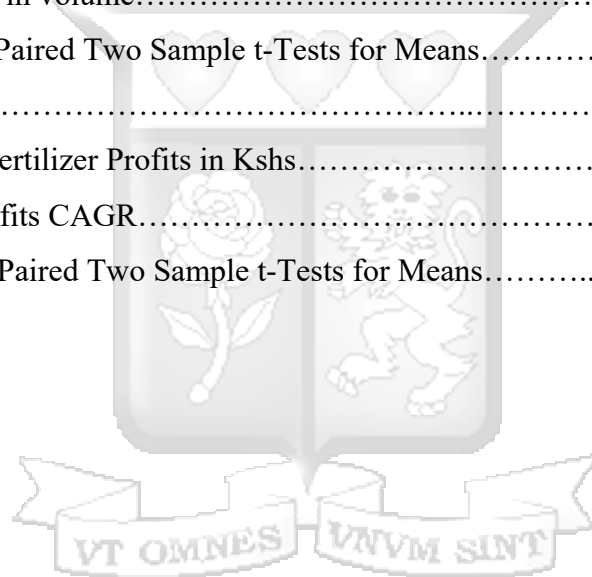
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## LIST OF ACRONYMS AND ABBREVIATIONS

AFS	African Fertilizer Summit
FAK	Fertilizer Association of Kenya
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GoK	Government of Kenya
ICIPE	International Centre of Insect Physiology and Ecology
KEU	Kenya Economic Update
KFA	Kenya Farmers Association
KNBS	Kenya National Bureau of Statistics
MoA	Ministry of Agriculture
NAAIAP	National Accelerated Inputs Access Programme
NCPB	National Cereals Produce Board
OECD	Organization for Economic Development
PEV	Post Election Violence
SAPs	Structural Adjustment Programmes
SSP	Single Super Phosphate

# CHAPTER ONE: INTRODUCTION

## 1.1 Introduction

For most developing non-mineral rich countries, agriculture occupies a central place in determining the nation's social-economic outcomes. Kenya is one such country where low rainfall endowment and in-appropriate soils conspire to demand the use of fertilizer to achieve improved productivity in crop farming (Ariga & Jayne, 2016). Consequently, the Kenya government has over the years, implement fertilizer-based strategies to address the challenge above. This study aimed to assess the impact of fertilizer market policy reforms on private sector development and particularly on local fertilizer manufacturing firms. Specifically, the study proposed to analyze the National Accelerated Agricultural Inputs Access Programme (NAAIAP) that was instituted by the Government of Kenya (GoK) in 2006. Using a mixed-method approach, the study proposed to establish the impact of this fertilizer subsidy policy reform on the performance of KEL Chemicals Ltd. Based in Thika, Kenya KEL Ltd is the only East and Central Africa's manufacturer of phosphate fertilizers. Other companies imports and blend their fertilizers. KEL Ltd is also a leader in producing sulphuric acid-based industrial chemicals.

## 1.2 Background of the Study

The agriculture sector has been an indispensable component of the Kenyan economy since the start of the twentieth century and has played a pivotal role in its functioning through to the current day. The sector is currently the largest contributor to Kenya's economic growth constituting about 25% of GDP and accounting for about 65% of Kenya's total exports (Kenya National Bureau of Statistics, 2017). It is a widely accepted notion amongst development economists that far from playing a subsidiary role in the development process, the agriculture sector and rural economy are at the heart of socio-economic transformation. It is an empirically

proven fact that Gross Domestic Product (GDP) growth in the agriculture sector is about four times more effective in poverty reduction than GDP growth in other sectors (Torado & Smith, 2015). KEL CEO argued that it is, therefore, of vital importance to improve productivity and prospects within the agriculture sector to drive overall economic development and the socio-economic transformation of all Kenyans. Policies targeted at increasing the productivity of this sector are the most important in unlocking Kenya's economic potential.

According to Ariga and Jayne (2016), policies for boosting agricultural prospects have tended to focus on the level and stability of input and output prices, public investments affecting agricultural production as well as the costs and challenges associated with market distribution. The CEO explained that these varying policies are designed to affect agriculture both directly and indirectly. At the impact level, improved agricultural production has been seen as one of the overall objectives for poverty reduction in the country (Alila & Atieno, 2006). The World Bank's Kenya Economic Update (KEU) for 2017 placed a critical emphasis on improving agricultural productivity through increasing the competitiveness of agricultural input and output (World Bank Group, 2017)

Indeed, over the years, the Kenyan government agricultural policies in the country focused on input factors of agriculture such as seeds, water, pesticides, and fertilizers have become increasingly important in improving the overall productivity of the sector. There have been multiple policy reforms on input factors with the fertilizer market being a central target of these reforms. The push for policy reforms in the fertilizer market began with the advent of Structural Adjustment Programmes (SAPs) and the focus on privatization and liberalization (Commander, 1988). These initial reforms sought to liberalize the fertilizer market and encourage more firms to participate. Before this, the Government of Kenya (GoK) provided an importation monopoly

to the Kenya Farmers Association (KFA) and received additional supplies through donor countries (Cook & Gugerty, 2009). These policy reforms led to the establishment of numerous local private sector firms participating in the fertilizer market, including the advent of the first local manufacturing firms producing fertilizer from scratch.

Local manufacturing firms form the basis of the manufacturing sector. Just like the agricultural sector, economists and development practitioners argue that the manufacturing sector is also a fundamental component of economic development (Torado & Smith, 2016). Indeed, the great majority of development advice and undeniably successful development case studies place manufacturing at the heart of improving economic growth and creating sustainable jobs and wealth (Noman & Stiglitz, 2016). However, in Kenya, the manufacturing sector has been cyclical and wavered over the past few decades with multiple attempts to resurrect its prospects and build its inadequate contribution to GDP, which is currently at around 13% (Kenya National Bureau of Statistics, 2017).

Vision 2030 identifies both agriculture and manufacturing sectors as two of six vital economic sectors that will drive Kenya's socioeconomic transformation and uplift the nation to an upper-middle income country by the year 2030 (Government of Kenya, 2007). The intersection and areas of synergy that exist between the two sectors provide a unique opportunity to fast-track economic growth. One such area is in the manufacturing of fertilizers, which represents a quintessential intersection of the agriculture and manufacturing sectors. Fertilizer manufacturing boosts agriculture sector through the supply of the vital agricultural input (fertilizers), and it also augments the manufacturing sector as a whole. For these reasons, fertilizer manufacturing creates jobs and drive aggregate growth and innovation in the agriculture sector through the production process.

In Kenya, most of the fertilizers used by farmers are imported. In 2013, KRA figures showed that about 686000 metric tonnes of fertilizer were imported. In the same year, figures show that consumption was approximately 665000 metric tonnes. Farmers use about 95% of fertilizer in crop production and 5% in pasture and fodder production (Osieko&Dienya, 2016). KEL chemicals manufactured about 10000 metric tonnes of SSP fertilizer in 2013 and the two fertilizer blending companies, MEA Limited, and Athi River Mining (ARM) Company blended a combined 130000 metric ton.

The initial liberalization of the fertilizer market in Kenya had an immediate impact on the consumption of fertilizer as follows; Throughout the 1980s, farmers in Kenya used, on average, 208,000 tons of fertilizer per year. After the liberalization in 1990, fertilizer use in Kenya increased to an average of 263,000 tons in 1990 to 1995 period, to nearly 300,000 tons per year in the 1996 to 2001 period (Osieko & Dienya, 2016). After that, this figure jumped to nearly 351,000 tons by 2004 and over 450,000 tons by 2007. According to Cook and Gugerty (2009), the later growth in fertilizer was attributed to an enhancement of supply chains and the introduction of a subsidy policy on imported fertilizer. The initial liberalization policy further allowed the entrance of several private-sector corporations to participate in the growing fertilizer industry. One of these firms that entered the fertilizer market was KEL Chemicals Ltd (referred to simply as KEL henceforth)

Since the initial reform of the fertilizer market by promoting the participation of private sector firms, Kenya has formulated and implemented several policies designed to spur agricultural growth through increasing fertilizer demand and better fertilizer distribution. As claimed by the sales and administration manager, some of these include successive policies on subsidized importation and relaxed regulation on the market. Before NAAIAP (2006), these policies could

be generalized as government interventions to stabilize the fertilizer market. These interventions were in the form of policy instruments such as price control, import quotas, price subsidies, and licensing of the importation and distribution of fertilizer. For example, in January 1990, the government removed the import quota restriction. The next intervention was abolishing fertilizer-licensing requirements in 1992 (Odhiambo.et.al, 2016). After NAAIAP, successive fertilizer policies could be identified and not generalized as before. In 2009, Kenya, under the ministry of agriculture, introduced the popularly known as “The national fertilizer subsidy.” This was an emerging subsidy program following high fertilizer prices in 2008. The main aim of this subsidy program was to encourage fertilizer use through cost reduction (Makau.et.al 2016).

Of central focus in this study was the National Accelerated Agricultural Inputs Access Programme (NAAIAP), which was a market policy reform instituted by the GoK in 2006 to help smallholder farmers to access fertilizers from state outlets at subsidized costs. Because NAAIAP was an envisioned safety net policy, making it a benchmark in fertilizer reform policies, I needed to conduct a study on this policy to determine how it affected the performance of a company in the fertilizer manufacturing sector (KEL Ltd.). The main focus of the study on this policy was the performance of KEL Ltd. The performance helped determine the effectiveness of this policy in the agriculture sector. The level of policy effectiveness is measured in terms of the performance of the players in the sector after the policy is implemented. Knowing the effect of a policy on performance will help to improve the policy itself and influence decisions in agricultural policy formulation and implementation. In this case, the performance helped determine whether NAAIAP promoted private sector development or not. Private sector development is important for the overall economic growth of the country (World Bank Group, 2017)

While the focus of the study is on the company, KEL Chemicals Ltd, it was important to develop a comprehensive and holistic overview of the impact of policy reforms through interviews with other stakeholders in the industry. In this research, a fertilizer expert from the International Centre of Insect Physiology and Ecology (ICIPE) was contacted for his opinions on some important issues that needed to be addressed. As the preeminent international organization mandated with promoting the use of fertilizers, an interview with an expert provided fully objective views on the subsidy program and impact on private sector development, particularly local manufacturers.

According to the fertilizer expert, NAAIAP had been criticized by several scholars and international agencies for crowding out private sector players in the fertilizer manufacture market in Kenya. In a similar study by Odhiambo & Fengying (2016), the duo aimed to find out the effects of fertilizer subsidy policies on vulnerable farmers in Kenya. They used multinomial logistics analysis and data to determine the effect of NAAIAP on vulnerable farmers in Tana River Sub-county. They based their research on the performance (amounts of firm produce) in relation to fertilizer use after the NAAIAP policy was introduced. Their findings show that fertilizer use increased but the firm performance could not be linked directly to fertilizer use as many other factors are also involved in crop production (Odhiambo & Fengying, 2016). Their findings had implications on the NAAIAP policy because their study failed to link this policy to performance fully.

As it stands, no empirical analysis had been conducted to assess the nature and magnitude of performance in the agriculture sector. Therefore, a knowledge gap that should link NAAIAP policy to performance in the Kenyan agriculture sector exist. This study sought to conduct an investigation that filled this knowledge gap. Also, the agriculture sector in Kenya is ever-

changing. These changes are informed by the need to improve operations in this sector. Strategies to guarantee these changes are daily implemented by the Kenyan government. Irrigation schemes like the Galana Kulalu project are some of the strategies being implemented by the Kenyan government to improve this sector. These strategies demand better, improved, and well-informed policies in the agriculture sector. For this reason, policy gaps always exist in the agriculture sector. This study, therefore, sought to investigate the policy gap on whether NAAIAP was a better, improved, and well-informed fertilizer subsidy policy by linking it to the performance of KEL Chemicals Ltd, a local fertilizer manufacturing firm in Kenya that is a player in the Kenyans agricultural sector.

### **1.3 Overview of KEL Chemicals Ltd.**

KEL is a chemical manufacturing company based in Thika, Kenya. The firm was founded in 1977 but began manufacturing fertilizers around 1992 right after the policy of liberalization was adopted. Liberalization targeted the agriculture sector to improve food security. KEL is one of the oldest, and for a very long time, the only manufacturing plant of fertilizer in Kenya (Ng'etich, 2016). The majority of private sector firms mix pre-packaged, imported fertilizer rather than manufacturing from scratch. Not only is KEL Chemicals the oldest but also the leading manufacturer both in Central and in East Africa of Single Superphosphate fertilizer and sulphuric acid.

Sulphuric acid and rock phosphate are the major raw materials used by KEL chemicals in the manufacture of SSP fertilizer. Other raw materials include; acid water used for dilution, natural gas, which is used for air preheating, air, and power. The SSP fertilizer is manufactured in two basic steps that involve grinding of the rock phosphate and acidulation (Simpson & Patherick, 2005). Rock phosphate is passed through the hoppers to the grinding section of the plant.

Grinding is then done to the phosphate using ball mill until size 95% is obtained. The fine size grounded particles are then collected in a cyclone cum bag filter and here clean air is vented to the atmosphere. Diluted sulphuric acid is then fed into the mixing chamber. In this chamber, sulphuric acid is thoroughly mixed with the grounded rock phosphate in what is known as acidulation (Simpson & Patherick, 2005). The output is a dry SSP which is passed out to the storage chambers where curing is done for about 15 days before the product can be packed for sale. According to KEL Chemicals Ltd, SSP fertilizer is essential for healthy and productive crops and is sold in the regional market for prices ranging between Ksh2200 and Ksh2600 for a 50 Kg bag.

Dawa Group, one of the leading players in industrial and pharmacy chemicals manufacture and distribution in Kenya and the larger East Africa, in 2016, acquired KEL chemicals (Ng'etich, 2016). The acquisition brought new dawn at KEL chemicals. The acquisition did not only bring the latest production technologies at the company but also saw the company adopt a more-people focused management approach (Ng'etich, 2016). The consequence has been increased quality and productivity. Taken together, these reasons account for the researcher's decision to select KEL Chemicals as the case study organization in studying the impact of Kenya's fertilizer subsidy policy program on the performance of the private sector.

#### **1.4 Problem Statement**

The evidence reviewed showed that the initial policy reform of market liberalization in the 1990s certainly had a positive impact on private sector participation in Kenya (Sheahan et al., 2016). However, Shively & Ricker (2013) argue that subsequent policy reforms directed at the fertilizer market; particularly those favoring imports through subsidies had been rejected and criticized by local private sector firm. Specifically, Kenya's NAAIAP established in 2006 had been criticized

by private sector firms and scholars for crowding out local fertilizer manufacturers, loss of supplier welfare, and market distortion (Mather et al., 2013). The private sector firms through the umbrella body Fertiliser Association of Kenya (FAK) have criticized the GoK policy reforms of targeted import subsidies for favoritism and discouraging the growth of local firms (Standard Media Group, 2016). Within the scholarship on fertilizer market policy reforms, particularly literature focused on Kenya and East Africa, there is an emphasis on the impact of these subsidies on farmers and agricultural output.

The literature reviewed in conducting this study showed that there had been no comprehensive study on the impact of these policy reforms on the performance of the private sector and particularly on local manufacturing firms (Cook & Gugerty, 2009). Indeed, input subsidy policy reforms by design should have an impact on the performance of local manufacturers of fertilizer, but the mechanism and the extent are not. This presented a knowledge gap that needed to be addressed by analyzing the effect of past fertilizer subsidies on the performance of local fertilizer manufacturing firms – such analysis is indispensable in guiding the nature and form of subsequent government market policies to yield ideal outcomes. Based on the preceding, the primary objective of this study was to assess the impact of fertilizer market policy reforms on local manufacturing firms through an appraisal of the performance of KEL Chemicals Ltd through the successive policy reforms.

## **1.5 Research Objectives**

### **1.5.1 Main Objective**

The general objective of the study was to evaluate the impact of the National Accelerated Agricultural Inputs Access Programme on the performance of KEL Chemicals Ltd.

### **1.5.2 Specific Objectives**

- i. Establish the effect of NAAIAP policy on fertilizer production of KEL Chemicals Ltd.
- ii. Ascertain the effect of NAAIAP policy on fertilizer sales of KEL Chemicals Ltd.
- iii. Determine the effect of NAAIAP policy on fertilizer profit of KEL Chemicals Ltd.
- iv. Evaluate KEL chemicals modes of contingency plans and decision-making following the implementation of NAAIAP policy?

### **1.6 Research Questions**

- 1) What changes have occurred in KEL's fertilizer production following the NAAIAP policy?
- 2) What is the effect of NAAIAP policy on fertilizer sales of KEL Chemicals?
- 3) What is the effect of NAAIAP policy on fertilizer profit of KEL Chemicals?
- 4) What modes of contingency plans and decision-making did the company have in place against NAAIAP policy?

### **1.7 Scope of the Study**

The study was an evaluation of how fertilizer market policy in Kenya affects the performance of local fertilizer manufacturing firms. It was an alternate approach to analyzing the impact of policy reforms in the fertilizer market as most studies have assessed the impact of such policies on: (1) the consumption of fertilizer and (2) on the level of agricultural output. This particular study focused its analysis on the NAAIAP input subsidy policy instituted in 2006 using data collected from KEL Chemicals Ltd. In this study, a fertilizer expert from ICIPE Kenya was consulted to gather additional information and validate the initial findings. A secondary review of other countries, specifically India and Bangladesh where there has been a similar concern from the private sector and academic documentation of the issues was also conducted.

## **1.8 Significance of Study**

The study provided a holistic analysis of the impact of the particular government fertilizer market policy (NAAIAP) and determined what impact it had on private sector performance. This study will be useful to policymakers in government among several ministries and will help them assess the potential direction of future policy reforms. The ministry of agriculture will be able to ascertain the impacts of subsidy policies to the private firms for better decision making. The study will also be significant to private sector firms to better understand policy reforms and develop appropriate contingency plans for the corresponding policies. Finally, the study will contribute to the growing practice of evidence-based policymaking both in Kenya and around the world. Through the study, better policies that can benefit all major stakeholders can be developed in Kenya.

## **1.9 Organisation of this Research**

This dissertation is organized into five chapters. Chapter 1 is a review of the background of the study, the problem statement, outlines the research objectives and question, and provides the rationale. Chapter 2 is a review of the relevant theoretical and empirical literature on market policy reforms and culminates in a conceptual framework of the dominant variables for the proposed study. Chapter 3 outlines the methodology followed in the study. Chapter 4 gives a detailed data analysis based on the data from KEL ltd. It also explains the content analysis of this paper in the findings and discussion sub section. Finally, chapter 5 of this paper gives the conclusion, recommendations, limitations of this study, and the areas for further studies.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter presents an overview of literature and information relevant to the study and its outlined objectives, including an interrogation into appropriate definitions of decisive concepts such as market policy reforms as well as an assessment of theoretical arguments by various scholars. The chapter aimed to create a bridge between the existing literature on the subject and the intended output of this piece of research, clearly outlining the historical and contextual background of the study, theoretical framework, and research gaps. The first part of the chapter is devoted to the conceptual literature review that defines the theories underlying market policy reforms, while the second part comprises an empirical literature review that outlines specific findings of various authors in the field. The literature reviewed is summarised in the third part of this chapter to derive an informed thrust for this study. The ensuing dissertation helps to derive an appropriate conceptual framework from grounding this research by identifying the relevant independent and dependent variables.

### **2.2 Theoretical Literature Review**

#### **2.2.1 Market Policy Reforms**

According to Soto & Loayza, 2003, market policy reforms refer to any form of Government intervention in the market of a good or service that is intended to remedy an inefficiency or suboptimal allocation of resources within that market. This intervention is intended to trigger and stimulate action on either the supply or the demand side. Market policy reforms are distinct from market-oriented reforms. The latter, although not entirely unrelated, is a subset within the wider scope of the former. Market policy reforms can be targeted towards either the supply-side, which is another name for market-oriented reforms aforementioned, or the demand-side but the impact

of both will crosscut the entire market. Economically, supply-side or market-oriented reforms are designed to increase competition and efficiency; examples include privatization, deregulation, and liberalization. The main aim of these reforms is to stimulate private sector activity and in so doing bolster competition, efficiency, and quality of the good or service being supplied (Soto & Loayza, 2003). Demand-side policy reforms, on the other hand, are focused on enhancing consumer welfare and attempting to improve the capability of individuals to consume and use the goods or services. These reforms involve a greater amount of Government intervention in the market through measures such as subsidies, price caps, and direct production and supply (Harvey, 2012).

Within the formal academic theory, supply-side economics and demand-side economics are at polar ends of policy options available to any Government seeking to improve the welfare of end-user consumers. Supply-side economics reflects the more free-market, neoliberal approach to policymaking that emphasizes less Government action in the market. Demand-side economics takes the more Keynesian approach, encouraging Government participation in the market to stimulate demand and increase the propensity of consumers to consume (Freeman, 2006).

Collectively, the above concepts make up two sides of the same coin that is market policy reforms. In practice, Governments more often than not adopt both forms and sometimes a mix of the two depending on the market situation and what is required to create the most utility and welfare for the economy at large.

Within the context of this study, both sides were subjected to interrogation. To this end, fertilizer market policy reforms can be described as Government agendas aimed at stimulating agricultural productivity through enhancing and increasing its distribution, access, and use. These policies have been adopted across the World and have been the subject of many academic papers,

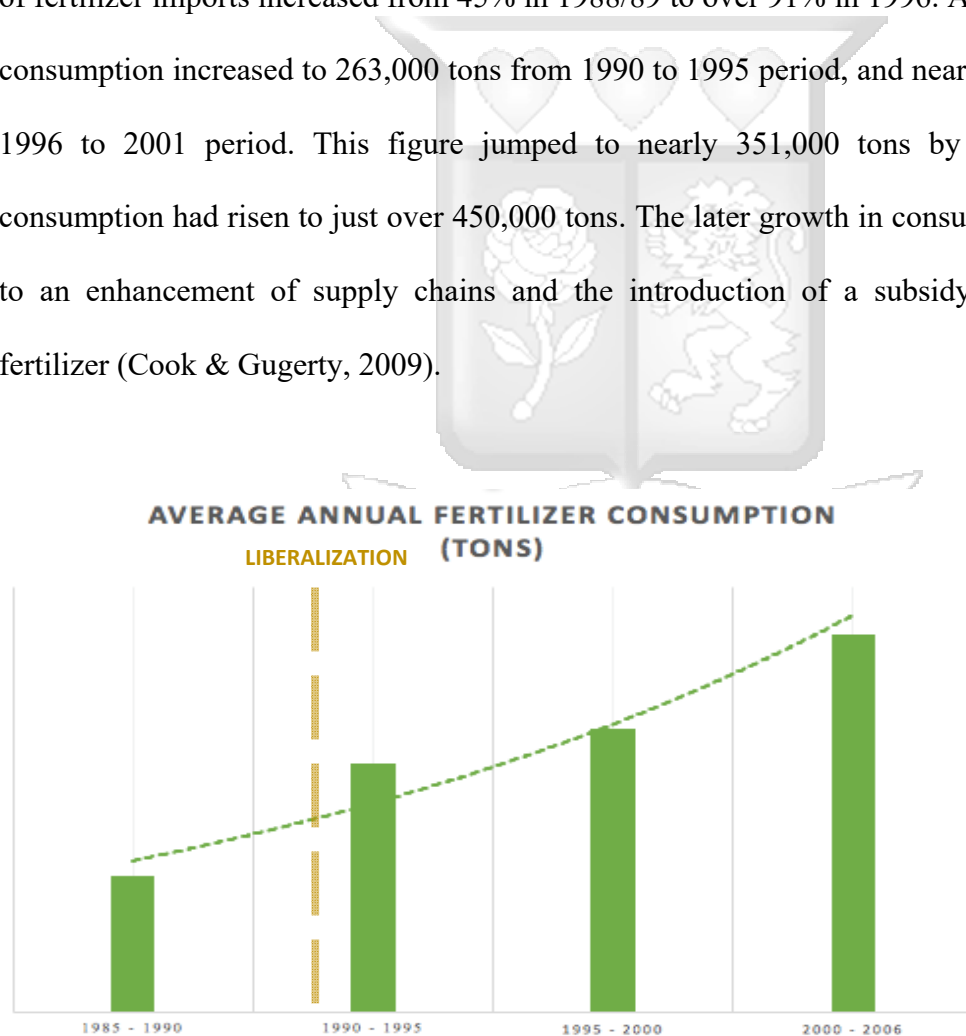
professional reports, and books. Within the literature, scholars have tackled two major policy reforms on the fertilizer market in Kenya, and incidentally, they perfectly align with the two sides of market policy reform discussed above. The first major policy reform of liberalization was a supply-side, market-oriented intervention while the second major policy reform focused on demand-side economics and took the form of a subsidy. This review shall begin by assessing the literature on the first market policy reform of liberalization and its impact on private sector participation in the fertilizer market in Kenya.

### **2.2.2 Market Liberalisation**

During the last two decades of the twentieth century, there was a significant upsurge in both academic and Government interest in market-oriented reforms. Encompassed within the term *neoliberalism*, nineteenth-century ideas on deregulation, fiscal reductions, and free trade witnessed resurgence through the election of Margaret Thatcher and Ronald Reagan in Britain and the USA respectively. Both leaders vehemently pursued policies aimed at deregulation, free markets, and liberal trade regimes (Bockman, 2013). The Bretton Woods institutions quickly followed suit from this and placed neoliberalism at the heart of their advice to developing countries and the implementation of such reforms as a conditionality for loans. Under the Structural Adjustment Programs (SAPs), developing countries were encouraged to liberalize their markets, and through this initiative, the fertilizer market in Kenya was liberalized.

Before this initiative, in the 1970s and early 1980s, many African countries adopted state-led fertilizer distribution policies where governments were heavily involved in fertilizer supply schemes via public agencies (Yamano & Arai, 2010). During this period, the Government of Kenya (GoK) provided an importation monopoly to the Kenya Farmers Association (KFA) and received further supplies through donor countries (Cook & Gugerty, 2009). In 1990, through the

SAPs, the fertilizer markets were liberalized; government price controls and import licensing quotas were eliminated. These initial reforms sought to encourage more firms to participate in the supply of fertilizer. These reforms had an immediate impact on private sector development in the sector in which, Kilungo and Allgood estimated that by late 1996, there were about 10-12 private sector importers, 500 private sector distributors/ wholesalers, and about 7000 private sector stockists countrywide. Kimenye (1997) has built on this argument around the success of the first fertilizer market policy reform of liberalization by showing that private sector market share of fertilizer imports increased from 45% in 1988/89 to over 91% in 1996. After the liberalization, consumption increased to 263,000 tons from 1990 to 1995 period, and nearly 300,000 tons in the 1996 to 2001 period. This figure jumped to nearly 351,000 tons by 2004, and in 2007, consumption had risen to just over 450,000 tons. The later growth in consumption was attributed to an enhancement of supply chains and the introduction of a subsidy policy on imported fertilizer (Cook & Gugerty, 2009).



**Figure 2.1: Average Annual Fertilizer Consumption**(Source; GoK)

Studies by Kimenyi (1997) and Allgood & Kilungu (1996) can be considered immediate accounts of the impact of the policy of liberalization as they were carried out and published in 1996 and 1997, respectively. These studies were done just a few years after the policy was introduced. However, even in studies published more than two decades after fertilizer markets were liberalized, this initial market policy reform is still considered as the architect of increased private sector market participation and growth of overall demand and use of fertilizer in Kenya. Duflo, Kremer, and Robinson (2011); Sheahan, Arig, and Jayne (2016) and Druilhe and Barrerio-Hurle (2012) have all attributed the growth of private-sector market participation and increased demand and use of fertilizers to the initial policy reform of liberalization.

Indeed there is limited contention among scholars with regards to the impact of this initial liberalization of the fertilizer market and all the abovementioned accounts reaffirm the hypothetical relationship that liberalization of any market will naturally enhance private sector participation and improve market outcomes. This case can be considered a textbook example of successful supply-side policy reform. As the graphic above displays, the introduction of market liberalization led to large increases in fertilizer consumption, all driven by the increased private sector participation in the market.

The impact of this first reform on the growth of local manufacturing firms such as KEL Chemicals Ltd can, therefore, be considered positive. It is because of this initial reform that the private sector could actively participate in the fertilizer market with a considerable amount of literature confirming this statement.

## 2.3 Empirical Literature Review

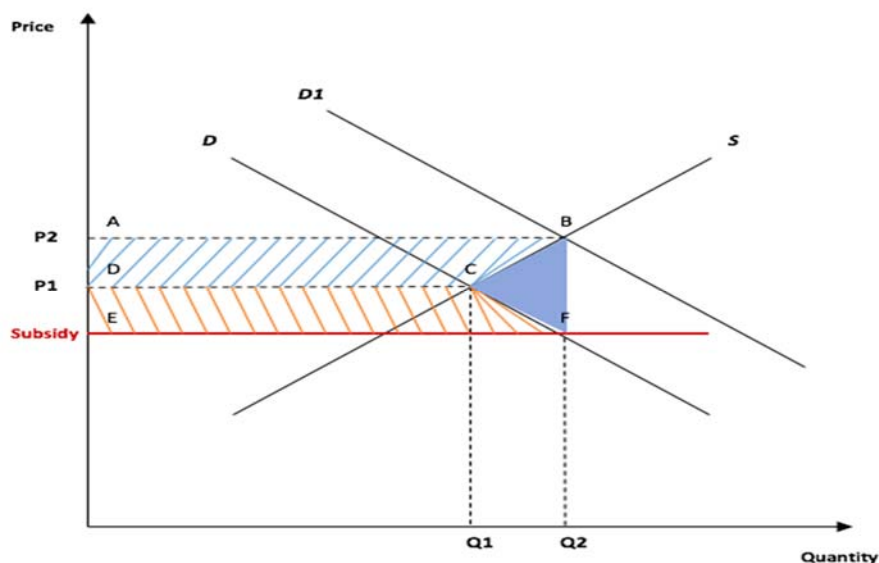
### 2.3.1 Input Subsidies

Following the 2006 African Fertilizer Summit (AFS), at least ten African countries began to introduce and revive a new generation of ‘market smart’, modern input subsidy programs. These were developed in response to a growing argument and strategy that aimed to foster a Green Revolution on the continent through targeting the productivity of smallholder farmers (Sheahan, Ariga, & Jayne, 2016). Indeed, these modern input subsidy schemes were, and still are, intended to target resource-poor farmers unable to purchase inputs such as fertilizer at the prevailing market prices. The subsidies were designed and implemented through the dissemination of vouchers to targeted geographic regions and households, enabling them to acquire agricultural inputs at a more affordable rate. This direct targeting was at the crux of the argument labeling these new generation input subsidies as ‘market smart.’ Through disseminating vouchers to resource-poor farmers, who would otherwise not use optimal agricultural inputs, it was argued that these subsidy schemes would not disrupt the existing demand and supply dynamics of the fertilizer market (Sheahan, Ariga, & Jayne, 2016).

Input subsidy programs fall under the category of demand-side economies of market policy reforms, described at the beginning of this chapter. These interventions intend to stimulate demand and increase the consumption of a certain product by providing the incentive of reduced prices (Boardman, Vining, & Weimer, 2016) The conventional theoretical arguments for input subsidy schemes in agricultural development revolve around the position that reduced costs of inputs increase their use and thus the profitability of farming through higher margins to larger yields. These schemes are intended to boost the short-term welfare of smallholder farmers providing them with a buffer against risks and the opportunity to increase both their economic

and technical resource base and eventually empower themselves to participate effectively without a subsidy scheme in place (Dorward, 2009). The two intended primary outcomes of input subsidy programs in agricultural development are increased production and yields of crops and improvements in household income and welfare of smallholder farmers. The intended secondary outcomes of input subsidy programs are the improvements in consumer welfare and income (through increased supply of produce) and general economic growth as a result of the cumulative impact of all of the above (Dorward, 2009). The theory of input subsidy programs has focussed on these four outcomes and how they may be influenced by various other factors including the design and implementation of the subsidy, the characteristics of the farmers and the dynamics of the output market.

The predisposition of theory within the context of input subsidy programmes is naturally focussed on the market of agricultural produce where economic analysis revolves around the welfare of the farmers (as the producers) and citizens at large (as the consumers). This is an apt reflection of the general trend within the literature on input subsidy schemes in agriculture that emphasizes the direct impact on the farmer and the resultant impact of this to society. However, if the unit of analysis within this context is shifted from the farmer to the fertilizer manufacturer and from the market of agricultural produce to the market of fertilizer, there is a discernible lack of both theory and secondary analysis. One must, therefore, compensate for the lack of theory by adapting existing theoretical models of input subsidy programs to this specific market context where fertilizer manufacturers are the producers and farmers (who participate in the scheme) are the consumers.



**Figure 2.2: The impact of a subsidy on the market of fertilizers**

*(Source; Ministry of Agriculture)*

Given this situation, the economic analysis of an input subsidy on fertilizers considers the costs and benefits in shifting the smallholder farmers' demand for fertilizer. Theoretically, if there are no market failures, a demand-side subsidy through vouchers should shift the demand curve from  $D$  to  $D1$ , in the diagram above. Because end-user consumers (in this case the smallholder farmers) are paying less, producers can increase the price from  $P1$  to  $P2$  and charge more as consumers are artificially encouraged to purchase more of the good; this way both price and quantity increase. In this situation, producer welfare increases and is visually outlined through the shaded area  $ABCD$  in the diagram above. Consumer welfare also increases, outlined through the shaded area  $DCFE$ . The deadweight loss to society as a result of the subsidy is visually outlined through the shaded triangle  $BCF$ ; this is the cost of the subsidy program and borne by the taxpayer on the part of the Government. In theory, a short-term input subsidy program should, therefore, increase both the welfare of the smallholder farmers and indeed, the

manufacturers and suppliers of fertilizer. This situation is, however, based on several critical assumptions including the structure of the fertilizer market in place, characteristics of the smallholder farmers, the number of recipients of the subsidy scheme and factors around governance and policy implementation. Nevertheless, the diagram above provides a useful, albeit normative, basis from which to theoretically understand the impact of an input subsidy scheme on the market of fertilizers.

### **2.3.2 The National Accelerated Agricultural Inputs Access Programme (NAAIAP)**

Kenya was one of the ten countries that introduced an agriculture input subsidy program following the 2006 African Fertilizer Summit. Through the Ministry of Agriculture (MoA), the Government of Kenya (GoK) developed a proposal for three years, \$525 Million input subsidy program targeting 2.5 million smallholder farmers (Odhiambo & Fengying, 2015). Entitled the National Accelerated Agricultural Inputs Access Programme (NAAIAP), the proposal seeks to address the problem of food insecurity and poverty among smallholder farmers. It also sought to enhance the overall productivity of the agricultural sector (Ministry of Agriculture, 2006).

The primary objective of NAAIAP was to improve the access and affordability of farm inputs for smallholder farmers to increase usage and thus enhance both household-level income and food security of the nation. Fertilizer and improved maize seed were to be provided through a voucher redeemable at accredited retail outlets delivering a starter kit entitled *Kilimo Plus*. “Targeted farmers would receive the Kilimo Plus “starter kit” for two agricultural seasons before graduating to the Kilimo Biashara package where farmers would pay for inputs at the market price but receive subsidized credit from local financial institutions”(Sheahan, Ariga, & Jayne, 2016). The two-step program was envisaged to slowly build the capacity of smallholder farmers and financially empower them to engage with the commercial fertilizer market effectively.

Donors who perceived the project too large and expensive to implement, however, did not keenly receive the proposition. Without donor support, the Government of Kenya had to significantly downsize the implementation of the project, and in the first year of the NAAIAP (2007/08), only about \$3 million was deployed towards it. The fiscal constraints with implementation have subsequently led to a revision of the structure of the NAAIA, and in its current form, targeted smallholder farmers receive a one-time input ‘*KilimoPlus*’ package that includes 100 kilograms of fertilizer and 10 kilograms of improved maize seed. This fully subsidized package, enough for one acre of maize, is provided through an input voucher system redeemable at approved local retail stockists across the country (Sheahan, Ariga, & Jayne, 2016). The National Cereals and Produce Board (NCPB) is the Government agency directly responsible for the NAAIAP and more specifically, the procurement and distribution of subsidized fertilizer (Odhiambo & Fengying, 2015).

The NAAIAP can be considered the second major fertilizer market policy reform hitherto. It is estimated that a total of 526.1 thousand tons of subsidized fertilizer was availed to farmers from 2012 to 2017 and an average of around Ksh. 5 billion is allocated towards the input subsidy program annually (Kenya National Bureau of Statistics, 2017).

### **2.3.3 Impact of the NAAIAP on agriculture sector in Kenya**

This second major policy reform has elicited much more scholarly debate around its impact on the fertilizer market than the initial reform of market liberalization. Literature around the impact and effectiveness of the input subsidy program has two clear schools of thought. The two schools of thought also reflect the primary target of analysis of the respective scholars in each school; scholars in the first school focus their analysis on the impact of input subsidies on smallholder farmers and agricultural productivity while scholars in the second school of thought focus their

analysis of impact on private sector development, market welfare, and distortions. While it is the second school of thought that is more apt to this particular investigation, it is important to highlight some of the salient arguments of scholars in the first school.

The first, championed by Druilhe and Barrerio-Hurle(2012), argue that there are clear and abundant amounts of evidence that show how such programs have raised fertilizer use, average yields, and agricultural production. Sheahan, Ariga, and Jayne (2016)using data collected in household surveys from across the country have also clearly pointed to the increase in fertilizer use after the introduction of the input subsidy program. They have pointed to the enhanced access and ease of purchasing fertilizer through the NAAIAP as one of the essential factors increasing its use. These claims have built on earlier reports from the Food and Agriculture Organisation (FAO) and World Bank, which claimed that Kenya had the highest consumption and use of fertilizer in African (Kelly, 2006).

In a study by Odhiambo & Fengying (2016), fertilizer demand and use among smallholder farmers did increase after the introduction of NAAIAP but did not translate into an immediate higher agricultural output. The lack of immediate impact was attributed to the 2007 Post-Election Violence (PEV) and the displacements it caused across the country and primarily in the agri-heartland of the Rift Valley where about 30% of all smallholder farmers resided before PEV(Odhiambo & Fengying, 2015). PEV is an important consideration in this literature review because it was the primary reason hard empirical evidence could not be collected on the immediate impact of the NAAIAP. Therefore studies after 2009, when farmers returned to a form of stability and demand for inputs resumed, provide a more comprehensive picture of the impact of the NAAIAP. However, evidence within the literature reviewed largely reflects the

theoretical relationship presumed between the introduction of a subsidy and improvements in smallholder farmer welfare.

The second school of thought has a less positive view of the impact of input subsidies and does not match the projections of the theoretical framework described under section 2.4. The scholars in this school argue that input subsidies have a distorting effect on the market mechanism, question the sustainability of such policies, and argue that the long-run financial costs of such policies outweigh the benefits. Jayne, Mather, Mason, and Ricker-Gilbert (2013) have argued that in the presence of government programs such as the NAAIAP there can be a considerable displacement of commercial activity. Referred to as ‘crowding-out,’ the introduction of subsidized agricultural inputs from specific sources has a distorting effect on other private suppliers of the same input. The demand for the input is distorted away from the market mechanism, and there are considerable welfare losses. Jayne, Mather, Mason, and Ricker-Gilbert (2013) further argue that analyses of input subsidy programmes that do not account for the crowding out of commercial demand are likely to overestimate the national food production response to such programs. This latter point is the precise rationale behind the NAAIAP and at the crux of arguments supporting input subsidies.

In the longer run, however, it is much less easy to justify input subsidies. A report commissioned by the Organisation of Economic Cooperation and Development (OECD) on the use of input subsidies in Sub-Saharan Africa found that they frequently become a millstone that eats into the funds for public goods and thereby undermine growth and development. Politically, once in place, subsidies are difficult to remove (OECD, 2010). The report further suggested that, as far as possible, the use of input subsidies should not crowd out spending in other important areas, or compromise a long term approach of eliminating market failures – as opposed to offsetting them

– and thereby getting private markets working (OECD, 2010). The report further found that in Africa, depending on the model of input subsidy program implemented, the policy may repress the development of the private supply of inputs, by delivering inputs through state agencies and bypassing nascent local input dealers (OECD, 2010).

In Kenya, as argued by Ariga and Jayne (2013), the model of input subsidies relies heavily on supply through state agencies and the bypassing of local input dealers. The NCPB has a virtual monopsony on the procurement and dissemination of fertilizers to maize farmers who constitute the highest percentage of all smallholder farmers in the country (Odhiambo & Fengying, 2015). Crawford (2006) in his analysis of the NAAIAP proposal highlighted a similar concern on the model of implementation arguing that Kenya's vibrant private sector would be crowded out of production and distribution with an over-zealous input subsidy program. This study was a warning and did not include a comprehensive empirical analysis of the potential distortions that a subsidy on agricultural inputs would have on the market supply.

Sheahan et al. (2016) conclude, in their assessment of whether the NAAIAP was/is 'market smart' as intended to be designed, that there was 'massive amounts of crowding-out of commercial fertilizer purchases' due to the input subsidy program. The only comprehensive study carried out on this area is that by Jayne, Mather, Mason and Ricker-Gilbert (2013) however even this is a broad analysis of Sub-Saharan Africa with Kenya as one of the multiple case studies. The study also has a particular focus on the 'crowding-out' of input suppliers regardless of whether they have imported or manufactured the fertilizer. The review of the literature suggests that the focus of the second school has been on the general impact of 'crowding-out' of private sector players regardless of whether they import and blend the product or fully manufacture fertilizers locally.

Therefore, it can be concluded that there is no specific study that has looked into the impact of input subsidy programs like the NAAIAP on local manufacturing firms such as KEL Chemicals Ltd. These firms represent a wider agenda of promoting locally produced goods and reducing the trade deficit in the agricultural sector. To answer some of these specific questions that have been raised, literature based on other countries, case studies such as Malawi, India, and Bangladesh have been sourced. The literature specific to these countries provides a comparative view of how similar policies affected the growth of manufacturing firms. Malawi, for example, has witnessed substantial growth in agricultural output and the arguments and scholarship around the impact of input subsidies in Malawi reflects the first school of thought aforementioned (Shively & Ricker-Gilbert, 2013). The cases in India and Bangladesh provide much more apt information on the specific case of the growth of local manufacturing firms. These studies were conducted much earlier than any of the other aforementioned but had crucial information that can be extrapolated for use in this investigation.

Abdullah (1986) argues, in his study of the costs and benefits of Bangladesh's fertilizer subsidy program, that the introduction of fertilizer subsidies in Bangladesh had no substantial impact on the profits of local manufacturing firms. He showed that subsidies increased overall demand of the agricultural input and because the subsidized supplies were not sufficient, demand for locally manufactured supply went up. One must, however, be careful in drawing direct comparisons and conclusions from Bangladesh to Kenya. Context is a vital factor and needs to be highlighted. In Kenya, unlike Bangladesh, the supply of subsidized imported fertilizer is significantly greater than that of locally manufactured supply and therefore, theoretically disincentives local production (Duflo, Kremer, & Robinson, 2011).

In the India case, Sharma and Thaker (2010) have similarly argued that the fertilizer subsidy has promoted local production. Their study was fundamentally based on the model of input subsidy adopted by the country's Ministry of Agriculture that includes local manufacturing firms in their subsidy program and thereby encouraging more production as demand increases from smallholder farmers. While both the Bangladesh and India cases have pointed to a favourable view of fertilizer subsidies on local manufacturing firms as the theory of input subsidies would reaffirm, their respective contexts have elicited this conclusion. Kenya's model of input subsidies and the NAAIAP is designed in a significantly different manner, and therefore, the impact on local fertilizer manufacturing firms is not as clear as a theory or comparative case studies would posit.

#### **2.4 Summary of the Literature review**

The review of literature carried out in this chapter has focussed on the market policy reforms undertaken by the Government of Kenya to boost the supply and use of inorganic fertilizers with a particular focus on identifying literature and theoretical arguments assessing the impact of these policy reforms on private sector development and the performance of local manufacturing firms. The literature clearly identifies two major fertilizer market policy reforms that have been undertaken. The first policy reform took the form of market liberalization and occurred at the end of the last century; this reform had a positive impact on the performance and growth of private sector participation in the fertilizer market and the majority of scholars attest to this statement with both empirical and analytical evidence.

The second major policy reform to the fertilizer market was introduced around 2006/07 as part of a continent-wide move to boost the productivity of smallholder farmers. This policy reform took the form of an input subsidy scheme entitled the National Accelerated Agricultural Input Access

Programme (NAAIAP) and targeted distributing vouchers to smallholder farmers allowing them to access salient inputs at more affordable rates. The literature analyzing the second policy reform has two clear schools of thought that mirror the respective units of analysis. The first school focuses the analysis of the impact of the NAAIAP on the welfare of smallholder farmers; within this school, there is a consensus amongst scholars that the input subsidy program had a positive impact on household income and the welfare of smallholder farmers. This study matches the presumed theory of the impact of a subsidy on the fertilizer market to the consumers of the product. The second school of thought analyses the impact of the NAAIAP on private sector development and commercial performance of fertilizer suppliers. While this is the primary area of interest for this study, it is evident that the scholarship has carried out a general analysis of the private sector amalgamating both imports and locally manufactured products. In this analysis, the dominant position argues that the private sector has been significantly crowded out by the subsidy scheme. This argument contradicts the presumed theory that suggests an input subsidy would increase the welfare of producers through increased prices to increased quantities demanded due to the artificially induced demand. While this is certainly a foundation from which to assess the leading statement in question for this study, it is important to separate the various factions within the private sector to truly determine the impact of the market policy reforms on local manufacturing firms.

The literature review has brought forth the fact that there is no comprehensive study on the impact of the NAAIAP on local manufacturing firms, but there are cases and academic studies internationally from which to base an analysis. It is from this latter point that a conceptual framework for the current study can be visually developed.

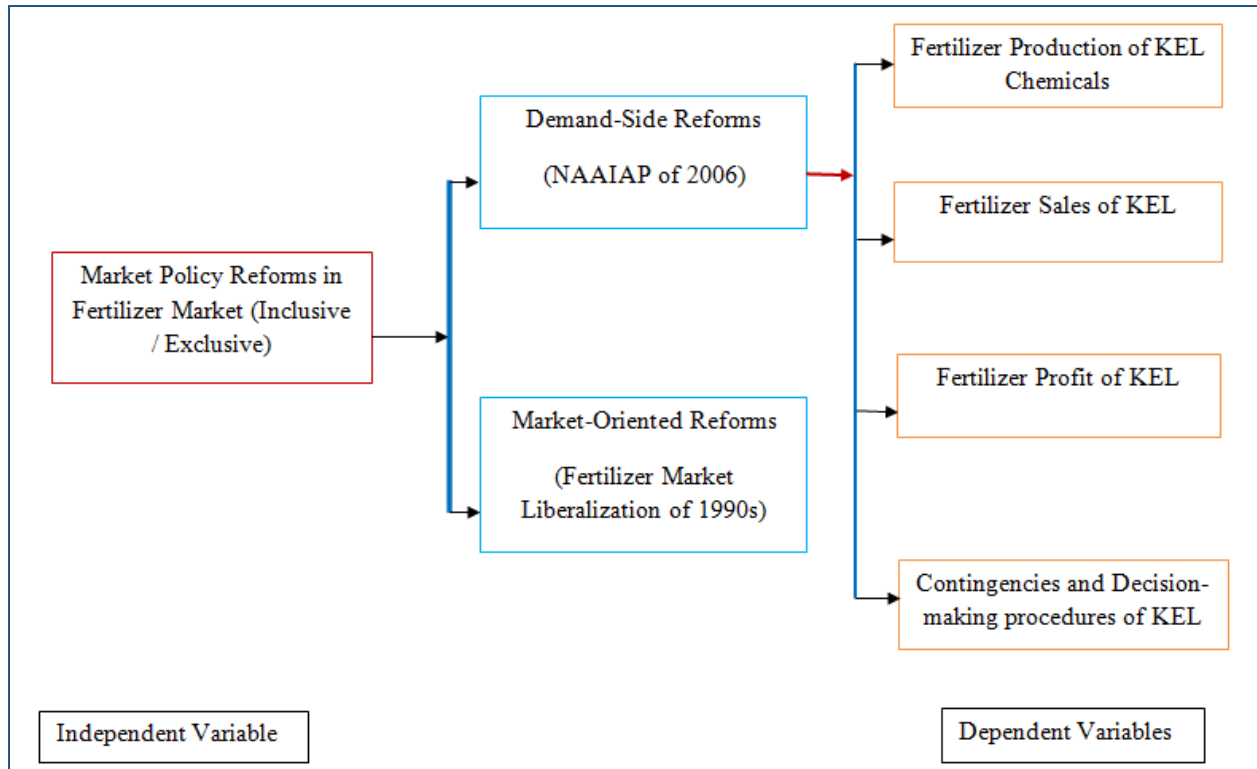
## **2.5 Research Gap**

Through a specific study on a major local fertilizer-manufacturing firm, this study was able to satiate the existing scholarly lacuna through a qualitative and quantitative study on the impact of input subsidies on the performance of local manufacturing firms. The study sought to test the validity of the last statement in the literature review above. That is, does the input subsidies and the NAAIAP adopted in Kenya by the Ministry of Agriculture have any impact on the performance of local fertilizer manufacturing firms? By seeking to answer this question, the study will fill a gap in the existing literature that only focuses on the impact of subsidies on smallholder farmers. It is vital to test what impact the subsidies have had on the performance and growth of the local industry for the development of sound and all-inclusive policies that work towards Vision 2030.

## **2.6 Conceptual Framework**

The objectives of this research have informed the conceptual framework. These objectives determined how the framework was conceptualized and figured out. In this study, we have only one independent variable, which is the market policy reform. This market policy reform affects the four measures of performance of KEL limited. These measures of performance are the dependent variables under investigation in this study. They include; fertilizer production, fertilizer sales, fertilizer profit, and the contingency plans of KEL Chemicals Limited. Available research shows that policy is a factor of performance in manufacturing companies (Mather et al., 2013). This study investigated the relationship between the dependent and the independent variables. Any market policy reform like the NAAIAP is linked to market-oriented reforms and the demand side factors. The above, in return, affected the fertilizer sales of KEL, the fertilizer profit of KEL Ltd and the contingencies and decision-making procedures of KEL ltd. Sales data

from 1998 to 2015 was used as reforms can always affect a company for many years. Thus, my research monitored on the company revenues performance for nine years before the NAAIAP reform and then another nine years after the reforms. The conceptual framework below flow from the left-hand side to the right-hand side, it represents the dissertation of the literature used in this study and provides an overview of how the particular variables used in this study connect.



**Figure 2.3: Conceptual Framework** (Source; Own conceptualization)

Table 2.1 below explains these dependent variables used in this study. It shows a description of each variable, and it strictly defines these variables into measurable factors in the operationalization column. The table explains clearly how these variables are being defined and how the interrelationships with the independent variable have been conceptualized.

**Table 2.1: Explanation of Variables**

Variable	Description	Operationalization
Fertilizer Production	Describes the amounts of fertilizer produced by KEL Ltd before and after NAAIAP policy.	<ul style="list-style-type: none"> <li>• Fertilizer production analysis</li> <li>• Managers information</li> </ul>
Fertilizer sales	Describes the amounts of fertilizer sold by KEL Ltd in Kenya before and after NAAIAP policy	<ul style="list-style-type: none"> <li>• Descriptive sales data analysis</li> <li>• Trend data analysis</li> <li>• Managers response</li> </ul>
Fertilizer profit	Describes the profits made by KEL limited before and after NAAIAP policy.	<ul style="list-style-type: none"> <li>• Profit/loss trends</li> <li>• Managers opinions</li> </ul>
Contingencies and Decision-making process	These are the action plans put in place by KEL to ensure business growth regardless of policy implications.	<ul style="list-style-type: none"> <li>• Profit/loss of data analysis</li> <li>• Content analysis of the information received from the respondents.</li> </ul>

## CHAPTER THREE: METHODOLOGY

### 3.1 Introduction

This Chapter outlines the methods that were employed in the collection of data that is required to answer the research questions outlined in Chapter 1. The section described the various methods through research design, data collection and sources, as well as the analysis of this data and, it further considered the quality of research and ethical matters throughout the entire research process.

### 3.2 Research Design

The study took a mixed-method research design to determine the effect of the NAAIAP subsidy program on the fertilizer revenues, fertilizer profits, and decision-making procedures of KEL Chemicals Ltd in response to policy reforms. In this mixed-method approach, both the qualitative and quantitative research methods were used to determine the impact of fertilizer input subsidies on the performance of a local manufacturing firm in Kenya. The study adopted a study method that focused on research and analysis of one manufacturing company - KEL Chemicals Ltd. This design is informed by Yin (2014) who argues that a mixed-method inquiry is necessary to investigate a phenomenon in depth within its real-life context and in particular, this method is most relevant when the phenomenon under question is not sufficiently theorized. The mixed-method approach has been chosen as the most appropriate method for this study due to the existing literature and distinct theory on the main subject of analysis. Other research methods like the exploratory case studies are not suitable to use in this research because they usually focus on a single case, and interest is particularly strong when existing theories are incomplete or unable to provide a satisfactory representation of the phenomenon (Yin, 2014).

### **3.3 Description of Data**

The study employed panel data variables extracted from the internal company reports of KEL Chemicals Ltd such as financial statements, revenue performance and information on capacity for nine years before and after the introduction of the NAAIAP input subsidy scheme in 2006. The period for the study was eighteen years, ranging from 1998 to 2015: fertilizer production, sales and income performance indicators of KEL from 1998 to 2006 before the reform was implemented, and then compared the outcome of the same variables for the years 2007 to 2015, after the introduction of the NAAIAP policy. This secondary quantitative data was complemented with qualitative data obtained through key informant interviews with senior management within KEL Chemicals.

#### **3.3.1 Dependent Variables**

The policy describes such areas of development as social, economic, employment, and security. For a more general entrepreneurial policy like the NAAIAP subsidy policy, some basic indicators of success include the number of business created, the value-added produced as a result of the new business as a percentage of gross domestic product, the amount of capital investment and the number of employment generated (Pawson & Tilley, 2001; Ongaro, et al., 2011). Expounding on this metrics, Ongaro, et al. (2011) highlight sustainability, and growth as one of the telling element of success as it speaks to the revenue generation and profitability of the firms after the policy change. Accordingly, Gurevich et al. (2012) recognize the significant role of casual information arising from the process of casual attribution in making decisions in strategic environments. Casual attribution describes the process applied by individuals associated with inference about the causes underlying a specific event. Other than the policy change, KEL Chemical's manufacturing activities are informed by many factors including but not limited to

the side effect of input cost. While the NAAIAP was started with the government as the sole funding agency, the environment has since changed to see funding incorporate both the private sector and development partners. As such, given that the study sought to evaluate the impact of the fertilizer subsidy programs on the financial performance of KEL Chemicals Ltd., the dependent variables analyzed in this study pertained to the financial performance of the company, specifically aligned to their fertilizer products. To this end, the following dependent variables were deemed appropriate for this study:

**i. Fertilizer production of KEL Chemicals Ltd**

Since KEL Ltd is a manufacturing company, one of its key determinants of company performance is fertilizer production. Logically, the production outcomes in terms of volume, quality, cost, and timing after that affect sales revenues and company net profit. Quantitative data on KEL's production in terms of the annual volume of fertilizer was obtained from company records. The company packs its fertilizers in 50-kilogram bags for storage, distribution, and sales. Data on the volume of production was deemed to be an appropriate indicator of company operations and performance. The data was for 18 years, from 1998 to 2015. The comparative concent indicators were trends, means, median, and compounded annual growth rates.

**ii. Fertilizer Sales of KEL Chemicals Ltd**

Annual sales data was collected from KEL's management and financial reports to cover the 18 years selected for the study. The sales data was broken into three parts: gross revenue, fertilizer sales revenues, and quantity of fertilizer sold (in 50 Kg bags). Analysis of the growth in fertilizer sales, both in value and volume, as well as the relative contribution of the fertilizer line to KEL's gross revenue, was expected to provide useful insights into how company sales

performance was affected by the NAAIAP subsidy policy. The comparative content indicators were trends, means, media, and compounded annual growth rates.

### **iii. Fertilizer Profits of KEL Chemicals Ltd**

The profitability of KEL Ltd was measured by profit before tax. For the purposes of this study, the profit element relating to the fertilizer business was obtained from management records. The comparative content indicators were trends in absolute profits, means, and median.

### **iv. Contingencies and Decision-Making Procedures of KEL Chemicals Ltd**

Contingency plans and the decision made by companies in anticipation to or as a result of a policy shift are important influencers of the strategic orientation and performance of the organization in terms of its competitive positioning, operational efficiency, and financial outcomes. Concerning KEL, it is recognized that the NAAIAP policy of 2006 remains one of the most fundamental policy shifts that the company has had to address. This study, therefore, recognizes the potential and actual impact of policies on the operations and profitability of KEL Ltd and used a qualitative approach to obtain responses from top management on how KEL's leadership makes contingency plans and decisions to respond to the NAAIAP policy change.

### **3.3.2 Independent Variable**

The independent variable in this study pertains to the input subsidy market reforms in the fertilizer market in Kenya. It is a causal variable whose impact on the dependent variables in KEL Ltd that the study sought to evaluate. This variable is the Government of Kenya fertilizer input subsidy reform of 2006 – National Accelerated Agricultural Inputs Access Programme.

### 3.4 Population and Sampling

A non-probability purposive approach was taken by picking a single case study method that was justified by the fact that at the time of the NAAIAP reform, KEL Ltd was the largest single manufacturer of fertilizers in Kenya and had a large market share. Concerning qualitative data, consideration was made on the target population and appropriate sampling to ensure the content validity of the measurements for the variables under study. This was achieved by carrying out key informant interviews of critical personnel within the company who were in apposition to articulate the impact of the market policy reform on the performance of the company as well as how the company deals with anticipated policy shifts in terms of contingency plans and decision-making procedures.

The respondents were primarily drawn from KEL's senior management and operations and were selected purposively with due attention to the individuals who had been in the company throughout the period in question. These individuals comprised the chief executive officer, fertilizer sales manager, sales and administration manager, finance manager, and production manager. The rationale of this selection is outlined in table 3.1 below.

**Table 3.1: Interview Respondents of KEL**

<b>Interview Respondent</b>	<b>Rationale</b>
Chief Executive Officer	Having been in this position for 23 years, the CEO was best placed to give a broad overview of the situation and performance of the company as a whole through the successive policy reforms. The CEO was also able to respond to questions on contingencies in place against adverse policy shifts.

Fertilizer Sales Manager	The Fertilizer Sales Manager is the individual in charge of boosting the fertilizer sales in the company and was, therefore, best placed to give information on whether the policy reform had a direct impact on sales performance. The sales managers eight years with KEL placed him in a better position for the needed information.
Sales and Admin Manager	Although the sales and admin manager has only worked with KEL for less than five years, he was still able to give an overview of the importance of fertilizer sales to the company's performance as a whole and how changes in fertilizer sales performance affect overall company growth and performance.
Finance Manager	The Finance Manager, who is also the CFO, had worked with KEL for more than ten years. He was able to give the financial information desired in this study.
Production Manager	The production manager was able to give the fertilizer production overview and the contingency plans of the company from the time the DAWA group acquired KEL Ltd.

## **3.5 Data Collection Methods**

### **3.5.1 Desk Reviews**

The bulk of data that was used to explore the impact of the NAAIAP subsidy scheme on the performance of KEL Chemicals Ltd was obtained from existing reports within the company. Data with annual rests was obtained from management and financial reports over the entire period of study, 1998 to 2016. The specific data was KEL's: volume of manufacturing fertilizer; the volume of fertilizer sales, gross revenue, fertilizer sales, and company profit before tax. While the fertilizer volume was expressed in 50 Kgs, the unit of value for sales and profit was Kenya Shilling.

### **3.5.2 Key Informant Interviews**

Key informant interviews (KIIs) were carried out with prime personnel within the company. Key informant interviews are qualitative in-depth interviews with decisive people who know and are fully aware of what is going on in an organization and its environments (Kumar, 1989). The purpose of conducting KII in this research was to collect information from people who can provide insight into the fertilizer industry, people who can describe the nature of problems in the industry and give recommendations for solutions. In this research, face-to-face key informant interviews were done to get information on the effect of NAAIAP policy on the performance of KEL Chemicals Ltd.

Key informant interviews were used to address all the four objectives in this study that finally gave insights on trends, fertilizer profits, and operational orientation of KEL across the period in question. The interview guide method was adopted for all the selected respondents highlighted in the matrices in the preceding section. Latitude was given, however, in the questions posed depending on the specific (end) respondent interviewed giving due consideration to any

sensitivities of the topic. The overall interview guide that was adopted is attached to this research in appendix 1.

### **3.6 Data Analysis**

The analysis of data in this study was guided by the research objectives and questions as well as the conceptual framework in Chapter 2. The dependent variables were the objects of the research and comprised of the fertilizer production, fertilizer sales, and fertilizer profits as well as the contingency plans and the decision making the procedure of KEL through the policy reform. Both quantitative and qualitative data collected were analyzed through this lens. Microsoft Excel version 2010 was used to carry out all the manipulation, presentation, and analysis of data in this study. To answer the study's research questions, comparisons were made on the strings of 18 annual data points for the nine years pre-subsidy period (1998 to 2006) with that of the nine years post-subsidy period (2007 to 2015).

Descriptive statistics were computed to understand the distribution characteristics of the quantitative data. KEL's annual data from 1998 to 2015, which was subjected to this analysis, comprised the volume of fertilizer production, the volume of fertilizer sales, the value of fertilizer sales, gross revenue, and fertilizer profit before tax. Insights into the direction of movement over time and comparative central tendency were obtained from charts on trends as well as means, medians, standard deviation, kurtosis, and skewness as well as minimum and maximum.

Similar inferential statistics were used to deal with the first and second objectives of this study, whether KEL's fertilizer production and sales were affected by the NAAIAP subsidy policy. The first step was to compare the nine-year pre-subsidy with the nine years post-subsidy means and medians. In the second step, the above results were supplemented by comparing the compounded

annual growth rates (CAGR) of the pre-subsidy nine-year period with those for the nine years post-subsidy period. The percentage change in the means and medians, as well as the relative scores of the CAGR, provided suggestive indications of the direction and possible effect of the fertilizer subsidy program on KEL's production and sales. In the third and final step, tests of significance using the student t-test at a level of significance,  $\alpha = 0.05\%$  were carried out to determine whether the post-subsidy means and medians were significantly higher than those for the pre-subsidy years. These analyses were supplemented by the responses from the key informant interviews.

This section describes the inferential statistics for the third objective of this study: whether NAAIAP subsidy policy affected KEL's fertilizer profits. The first step was to compare the nine-year pre-subsidy and nine years post-subsidy mean and median of total profit before tax as a percentage of total revenues. In the second step, a comparison was done on the compounded annual growth rates (CAGR) of absolute profits before tax during the pre-subsidy nine-year period with that for the nine years post-subsidy period. The absolute change in the mean and median profit rate, as well as the relative scores of the CAGR, provided suggestive indications of the direction and possible effect of the fertilizer subsidy program on KEL's profits. In the third and final step, tests of significance using the student t-test at a level of significance ( $\alpha$ ) = 0.05%, were carried out to determine whether the post-subsidy mean and median profit rates were significantly higher than those for the pre-subsidy years. These analyses were supplemented by the responses from the key informant interviews.

Finally, content analysis of qualitative data from key informant interviews was used to address the fourth objective of this study, which sought to determine the contingency plans and decisions procedures of KEL Ltd to deal with policy shifts. This design was informed and guided by the

interview guide whose aim was to draw out clear themes based on the questions posed during the interview process as well as identify any other themes that emerged spontaneously through conversation with the interview respondents.

### **3.7 Data Reliability and Validity**

This section assesses the quality of the measurement procedure used to collect the data for the study. Reliability would refer to the consistency of the data and the degree of repeatability of findings if the research were to be carried out again (Yellot, 1971). In this study, reliability was a useful consideration, measuring the quality of the measurement procedure used to collect the data. The measurement procedure in this research includes both quantitative variables obtained from the company reports and qualitative interviews with senior management. It is expected that this triangulation provides additional comfort that reliability was achieved regarding the measurements for the variables of concern in this study, namely, production, sales, profits, and planning.

It is instructive that the dependent variables identified in this study provide the first avenue of interaction between the policy and the performance of KEL. Nevertheless, it is also recognized that other factors may have influenced fertilizer production and sales as well as profitability in KEL during the study period. Such factors include Kenya's Post Election Violence (PEV) in 2007, general macroeconomic conditions of the country and the event of drought in a particular period. For this study, comfort is derived from the fact that the factors cited above are not specific to KEL alone but to the whole agricultural industry, including competitors and other stakeholders in the fertilizer market in Kenya. These variables would, therefore, not produce much homogeneity to the model. Internal fluctuations in KEL company performance that are not related to the introduction of the input subsidy policy were also controlled for and corrected.

Finally, selecting an 18 year period in which to carry out the study helped to smooth out the effect of short-term interruptions. These aspects were expected to help in supporting the validity of the findings.

The persons selected for the interviewing processes backed the validity of qualitative data used in the study. As aforementioned, the individuals selected for the interview were top company management with access to considerable information and with a substantial tenure of office to give dependable and accurate insights on the performance of the company through successive policy reforms. To this end, both internal and external validity of the findings were upheld.

### **3.8 Ethical Considerations**

In the conduct of any piece of research, one must abide by the crucial principles of honesty and integrity and seek to research in a manner that is sensitive to all considerations. Ethical approval and research permits were obtained to guarantee all the rights while conducting this research. It was also necessary to ensure dignity, safety, and transparency while conducting this research.

In conducting this research, the following three basic ethical considerations were strictly adhered to: Consent– The aims of this research were fully explained to all the respondents. Those who participated gave permissions to be interviewed and responded willingly based on their positions. Confidentiality – Confidentiality of all the respondents was adhered to in conducting this research. Protection of data was also strictly observed. Transparency – throughout the entire research process, transparency was strictly observed, and all the information that relates to this dissertation is outlined transparently. Also, plagiarism and copyright obligations were adhered to.

## **CHAPTER FOUR: : PRESENTATION OF RESEARCH FINDINGS**

### **4.1 Introduction**

Chapter four focuses on the analyses that were carried out in line with the research methodology to satisfy the objectives of this study. It explains the detailed findings and analyses carried out to complete this research. The analyses were conducted based on the secondary KEL data that was collected, and the responses received from the selected interviewees. This chapter is comprised of three parts, analyses, discussion of findings, and interpretation.

### **4.2 Interview Response Rate**

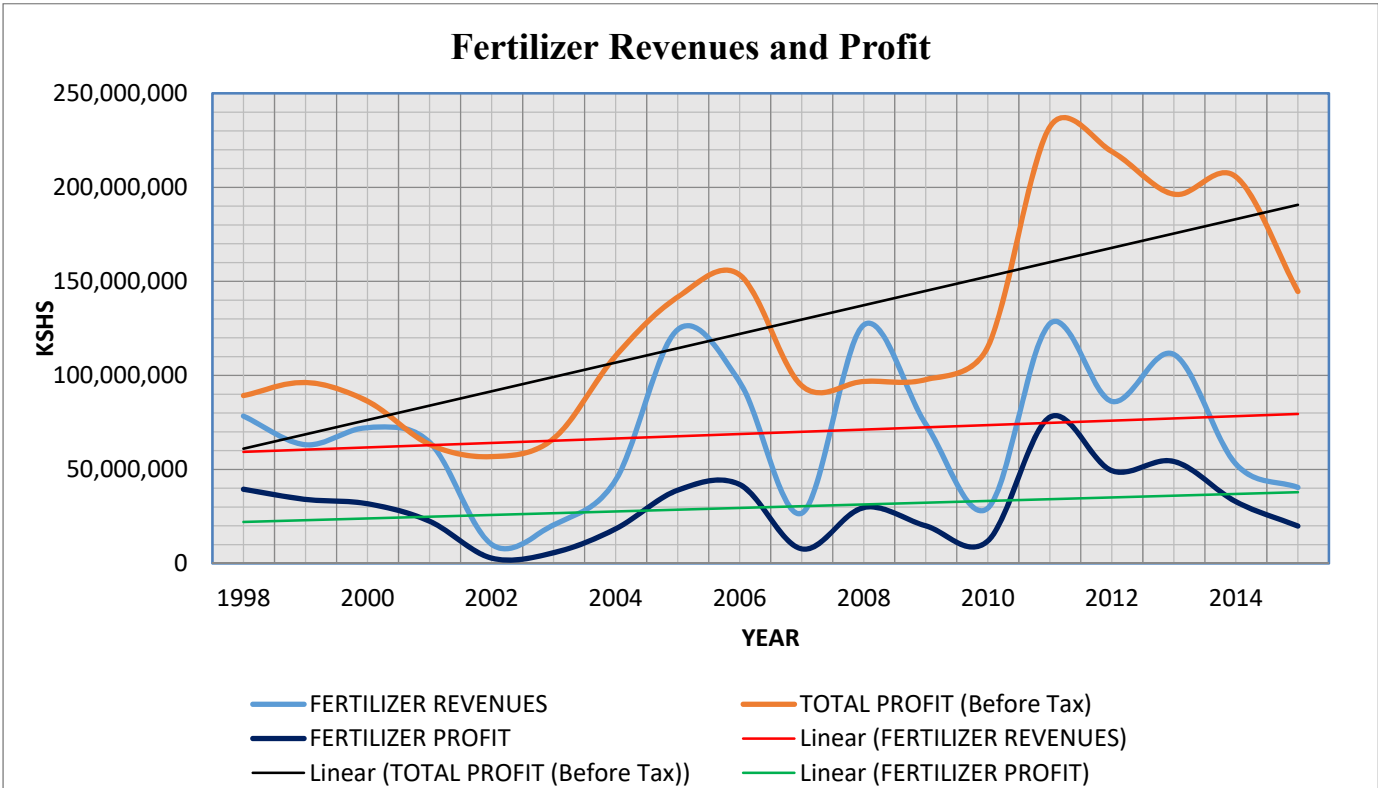
All the selected five top managers' of KEL Ltd were available and participated in the interview. The response rate was, therefore, 100% in this study. The average length of service among the 5 KIIs in KEL Limited was 12 years; the longest service was 23 years; the shortest service was five years. This enabled the researcher to proceed with the analysis, as the core data that was to be used in assessing the effect of the independent variable on the dependent variables was availed by KEL Ltd.

### **4.3 Secondary Data**

In line with the study methodology, specified secondary data on the key performance parameters needed in this research was sought from KEL Ltd records and financial statements. A complete set of annual secondary data from 1998 to 2015 that was required for this study was obtained comprising fertilizer production, fertilizer sales in volume and value; gross revenues, and the company's total annual profits before tax.

Having established that a complete set of data was available, thus permitting continuing with the study, the next step was to subject the data to high-level analyses by computing key descriptive statistics of this data. This was done to obtain satisfaction that the data was reasonable.

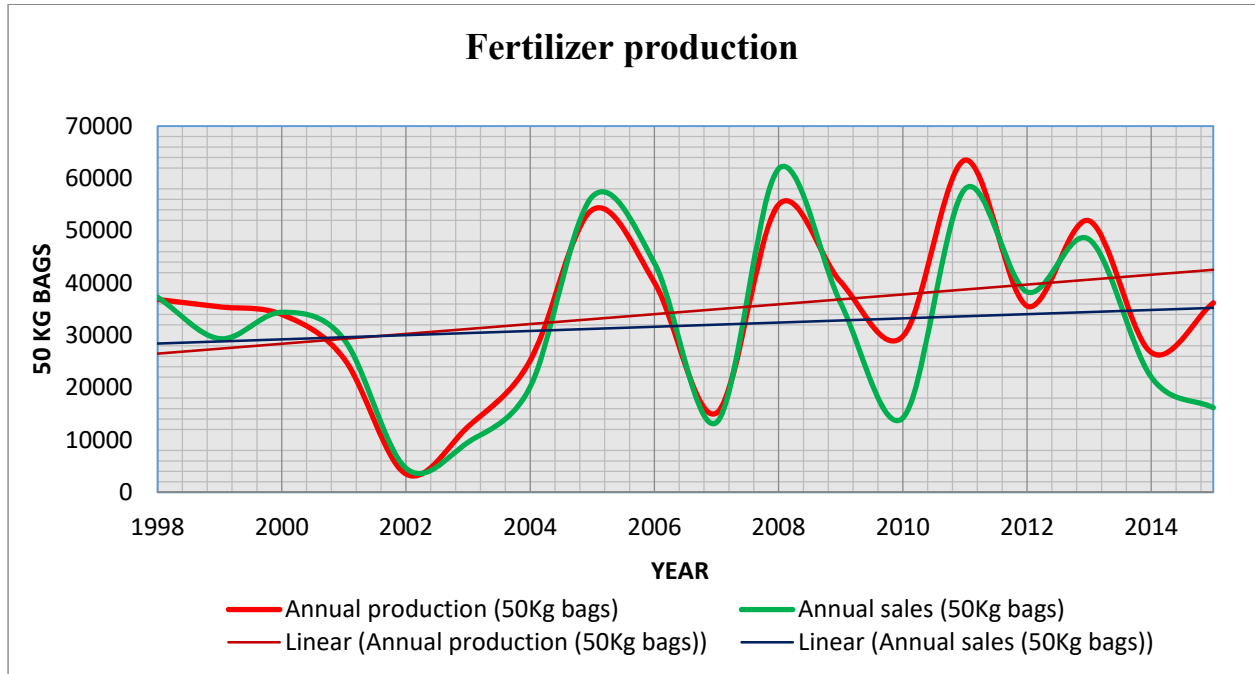
The data was subject to trend analysis, as shown in figures 4.1 and 4.2 below to provide a generalized pictorial view.



**Figure 4.1: KEL's Revenues and Profit Trends 1998 to 2015**

The diagrammatic analysis of revenues and profits for KEL over the 18 years study period, as shown in figure 4.1 above portrays a slowly increasing trend with obvious booms and declines. This is expected from the cyclical nature of the rainfed agricultural industry, which is a major driver of the fertilizer industry business in Kenya.

Figure 4.2 below is a representation of the fertilizer volumes of production (in 50 Kg bags) and the annual sales (also in 50 Kg bags).



**Figure 4.2: KEL Volume of Fertilizer Production and Sales from 1998 to 2015**

KEL’s fertilizer production and sales volume data, as shown in figure 4.2 above, shows a clear cyclical pattern on account of the business cycle in Kenya. Eyeballing on this pattern and the close association between production and sales volumes suggests that the data is reliable and therefore, appropriate for further analysis. Finally, the fitted line of linear trends suggests increasing fertilizer production and sales of the company, which is consistent with the trend observed for fertilizer sales revenue and profits in figure 4.1.

#### 4.4 The Effect of NAAIAP subsidy on KEL’s fertilizer production

This section examines the effect of the fertilizer subsidy on KEL’s fertilizer production. Fertilizer production data from 1998 to 2015 that was obtained from the company records were used to analyze the effect of NAAIAP on the fertilizer production of KEL Ltd. Using a

triangulation approach, observations from these analyses were subjected to further tests based on responses from the key informant interviews. The main sources of evidence were before and after NAAIAP comparative means of production data; comparative compounded annual growth rate (CAGR) and student t-test for equality of mean annual production of fertilizer.

The company packs and sells its fertilizers in 50 Kg bags. The table below shows the descriptive statistics on the fertilizer production of the company before and after the NAAIAP policy was implemented by the Kenyan government.

**Table 4.1: Summary of Fertilizer Production Data**

	<b>Before NAAIAP 1998-2006</b>	<b>After NAAIAP 2007-2015</b>	<b>Change</b>	<b>% Change</b>
Mean Annual Production-(50 Kg Bags)	29,694	39,342	9648	32.5%
Median Annual Production-(50 Kg Bags)	34,000	36,200	2200	6.5%
Standard Deviation	15,085	15,191		
Kurtosis	0.2	-0.5		
Skewness	-0.33	0.13		
Minimum	3,500	15,160		
Maximum	54,000	63,500		
Count-Years	9	9		

From table 4.1 above, the mean number of bags produced after the policy was enacted is 39342. This figure represents a 32.5% increase in fertilizer production of the company from 29,694 bags before the policy was implemented. This suggests that the policy impacted positively on the fertilizer production of KEL Limited.

Using t-Test, a null hypothesis stating that there is no significant difference in sample means after and before the NAAIAP policy is tested against an alternative hypothesis stating that there exists a significant difference between the two means. This is a two-tailed test. An excel output below is used to make the test at 95% significance levels.

**Table 4.2: Production Paired Two Sample t-Test for Means**

	Production before (50Kg bags)	Production after (50Kg bags)
Mean	29694	39342
Standard deviation	15085	15191
Observations	9	9
Pearson Correlation	0.523	
df	8	
t Stat	-1.359	
P(T<=t) one-tail	0.015	
t Critical one-tail	1.859	
P(T<=t) two-tail	0.021	
t Critical two-tail	2.306	

Using p-value to test the hypodissertation above, the p-value, in this case, 0.021, is less than  $\alpha=0.05$ . Therefore, the null hypodissertation is rejected, and a conclusion is made that KEL Ltd recorded a significant difference in the mean production of fertilizer before and after the NAAIAP policy. This analysis shows that there was indeed an increase in the mean number of fertilizer bags produced, and inferentially, there exists sufficient evidence to say that this increase is significant at  $\alpha =0.05$ .

The above inferential results on production were supplemented by comparing the compounded annual growth rates (CAGR) of the pre-subsidy nine-year period with those for the nine years post-subsidy period, as shown in Table 4.3 below.

**Table 4.3 Production CAGR**

	Production (50 Kg bags) CAGR
Before NAAIAP	1.0%
After NAAIAP	10.15%

The analysis in table 4.3 above shows that the CAGR in the post-policy period was higher than that for the pre-policy period and therefore supporting the inference from table 4.2 above; These results support the inference above that that the NAAIAP policy resulted in increased production of fertilizer at KEL Ltd. Furthermore, this inference was corroborated by the responses that were received from the key informant interviews.

#### **4.5 The Effect of NAAIAP subsidy on KEL's fertilizer sales**

This section tests the effect of the subsidy on KEL's fertiliser sales. This was done by analyzing the growth in fertilizer sales, both in volume and value, as well as the relative contribution of the fertilizer line to KEL's gross revenue. However, because fertilizer sales are very low, at about 20%, compared to gross revenues, this subsection ignored the analysis of the gross revenue and focused on fertilizer revenues. The comparative content indicators used here together with inferential analysis are descriptive statistics of each parameter and the compounded annual growth rates. The descriptive statistics are shown in table 4.4 below.

**Table 4.4: Summary of Fertilizer sales in Kshs**

	Before NAAIAP	After NAAIAP	Change	% Change
Mean Annual Revenues (KShs)	63,771,613	75,025,367	11,253,754	17.65%
Median Annual Revenues KShs	64,422,266	74,125,340	9,703,074	15.06%
Standard Deviation	35,616,399	40,277,258		
Kurtosis	0.5	-1.7		

Skewness	0.6	0.2		
Minimum	10,099,786	26,720,235		
Maximum	124,357,103	127,523,593		
Count	9	9		

Table 4.4 shows that the mean annual fertilizer revenues before the subsidy policy were Kshs. 63,771,613 and the corresponding mean fertilizer revenue after the policy were Kshs. 75,025,367. The statistics above show that the mean fertilizer revenues increased by 17.65% after the policy were implemented in 2006. In tandem, after the policy was implemented, the median fertilizer revenues increased by 15.06%. These statistics indicate a possible increase in the direction of fertilizer sales revenues that can be tested by inferential statistics.

Using t-Test, a null hypothesis of no significant difference in means of annual fertilizer sales after and before the NAAIAP policy was tested against an alternative hypothesis that there exists a significant difference between the two means. This is a two-tailed test. An excel output in table 4.5 below is used to make inferences at 95% significance levels.

**Table 4.5: Sales revenues Paired Two Sample t-Tests for Means**

	Before the Subsidy	After the Subsidy
Mean	63,771,613	75,025,367
Standard Deviation	35,616,399	40,277,258
Observations	9	9
Pearson Correlation	0.425	
df	8	
t Stat	-0.894	
P(T<=t) one-tail	0.019	
t Critical one-tail	1.859	
P(T<=t) two-tail	0.039	
t Critical two-tail	2.306	

Using p-value to test the hypodissertation above, the p-value, in this case, 0.039, is less than  $\alpha=0.05$ . Therefore, the null hypodissertation is rejected, and a conclusion made that there is a significant difference in fertilizer sales means before and after the policy was implemented. This analysis shows that there is an increase in fertilizer revenues, and inferentially, there is sufficient evidence to say that this increase in fertilizer revenue is significant at  $\alpha =0.05$ .

An alternative approach to examining the effect of the NAAIAP policy on KEL's sales is provided below by examining the fertilizer sales volume. Table 4.6 below summarizes the descriptive aspects of sales volume in 50 Kg bags for the periods before and after the NAAIAP policy.

**Table 4.6: Fertilizer Sales in volume**

	<b>Before NAAIAP 1998-2006</b>	<b>After NAAIAP 2007-2015</b>	<b>Change</b>	<b>% Change</b>
Mean Annual Fertilizer Sales (50 Kg Bags)	29,447	34,264	4817	16.35%
Median Annual Fertilizer Sales (50 Kg Bags)	29,369	36,158	6,789	23.11%
Standard Deviation	16,303	18,904		
Kurtosis	-0.28	-1.59		
Skewness	-0.02	0.29		
Minimum	4590	13360		
Maximum	56525	61866		
Count-Years	9	9		

The distribution statistics shown in table 4.6 above indicate substantial increases in fertilizer sales volume for both the pre subsidy period, 1998 to 2005 and for the post-subsidy period from 2006 to 2015. This trend supports the conclusion made concerning sales revenues.

The next analysis on the volume sales (in 50 Kg bags) was the inferential t-Test to determine whether the increase in sales volume that was depicted by the descriptive statistics. The output in table 4.7 below helps to test for the significance of mean changes.

**Table 4.7: Sales volume Paired Two Sample t-Tests for Means**

	Before NAAIAP	After NAAIAP
Mean	29447	34264
Standard deviation	16303	18904
Observations	9	9
Pearson Correlation	0.394	
Hypothesized Mean Difference	0	
df	8	
t Stat	-0.85	
P(T<=t) one-tail	0.02	
t Critical one-tail	1.85	
P(T<=t) two-tail	0.041	
t Critical two-tail	2.306	

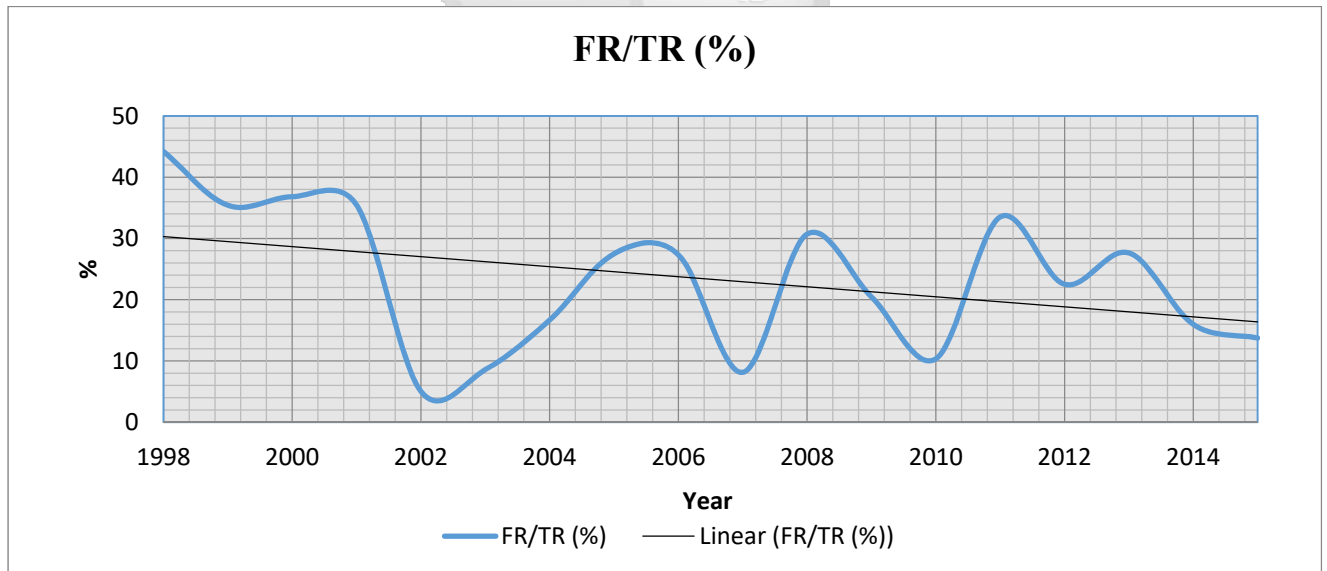
The analysis in table 4.7 above uses the p-value to test whether there is a significant difference between the mean annual sales volumes of fertilizer sales in the pre and post-subsidy periods. The null hypothesis for this test is that there was no significant difference in the two means. The test returns a p-value score of 0.041 which is less than  $\alpha=0.05$ . Therefore, the null hypothesis is rejected, and a conclusion is made that there is a significant difference in the fertilizer annual mean sales volume of fertilizer in KEL before and after the policy was implemented. This analysis supports the findings of an increase in fertilizer revenues that is consistent with an increase in fertilizer sales volumes, and inferentially, there is sufficient evidence to state that the increase in fertilizer sales volumes is significant at  $\alpha=0.05$ .

The inferences made above were complemented by an analysis of KEL's compounded annual growth rates (CAGR) for fertilizer sales revenues and volume, as shown in Table 4.8 below.

**Table 4.8 Sales CAGR**

	Sales (50Kg bags) CAGR	Fertilizer Revenues CAGR
Before NAAIAP	1.81%	2.33%
After NAAIAP	2.14%	7.88%

It is evident that the CAGR of both sales volume and revenues increased after the policy was implemented. Before the subsidy policy, the CAGR of sales volume was 1.81%, after the subsidy was introduced; the CAGR was 2.14%, indicating a higher annual increase in fertilizer sales volume at KEL compared to before. The same trend was also found concerning the fertilizer revenues at KEL, where the CAGR before the subsidy was 2.33% and 7.88% after the policy. Finally, the contribution of fertilizer line to KEL's total revenue was examined to assess whether the subsidy affected the revenue composition of the company. The figure below shows a trend analysis of the annual contribution of fertilizer revenues (FR) to total revenue (TR) and comment.



**Figure 4.3: Contribution of Fertilizer Revenues to the Total Revenues**

From figure 4.3 above, the contribution of fertilizer to the total revenues of KEL Chemicals Limited has been decreasing over the years. In the year 1998, KEL fertilizer revenues contributed about 45 percent of the total revenues. The average fertilizer contribution to the total revenues throughout the years has been about 20%. Evidence from the KIIs indicated that the relative decline in fertilizer contribution to revenue was on account efficiency and economies of scale in producing other KEL products compared to fertilizer. Also, bad weather that affects fertilizer sales in the country were cited by the respondents to be other reasons for this declining trend in the relative contribution of fertilizer sales to total company revenue. During low rainfall periods, the fertilizer sales drop, making KEL focus more on other products.

#### 4.6 The Effect of NAAIAP subsidy on KEL's fertilizer profits

This section examines the effect of the fertiliser subsidy on KEL's fertiliser profits. It was possible to isolate the fertilizer profit before tax figures from the company records. Table 4.9 below is the descriptive summary of fertilizer profits

**Table 4.9: Summary of Fertilizer Profits**

	Before NAAIAP	After NAAIAP	Change	% Change
Mean annual in KShs	26,181,632	33,720,248	7,538,616	28.79
Median Annual in KShs	31,757,087	29,738,833		
Standard Deviation	14663743.58	22794327.09		
Kurtosis	-1.090	0.159		
Skewness	-0.651	0.879		
Minimum	2857536	7697807		
Maximum	41988933	77795239		
Count	9	9		

The fertilizer profits of KEL after the policy was implemented increased. The company recorded no losses. The minimum and maximum profit recorded by the company increased by huge margins. From figure 4.9 above, the data indicate a 28.79% increase in fertilizer profits of the company.

In addition to the descriptive statistics above, the fertilizer profits CAGR shown in table 4.10 below indicates an increase after the policy was implemented. Before the policy was enacted, the CAGR was 1.66%. After the policy, this figure went up to 4.84%. The increase in the CAGR is an indication that the policy affected the fertilizer profits positively.

**Table 4.10: Fertilizer Profits CAGR**

	Fertilizer Profits CAGR
Before NAAIAP	1.66%
After NAAIAP	4.84%

To test for the significance of this increase, a Paired Two Sample t-test for Means is conducted, and the summary of the excel output is shown in table 4.11 below.

**Table 4.11: Sales profits Paired Two Sample t-Tests for Means**

	Before NAAIAP	After NAAIAP
Mean	26181632	33720248
Standard Deviation	14663744	22794327
Observations	9	9
Pearson Correlation	0.016	
Df	8	
t Stat	-3.119	
P(T<=t) one-tail	0.007	
t Critical one-tail	1.859	
P(T<=t) two-tail	0.014	
t Critical two-tail	2.306	

The null hypothesis for this test is that there is no significant difference in the two means. From table 4.11 above and using the p-value to test for the significance, the p-value, 0.014, is less than  $\alpha = (0.05)$ . Therefore, the null hypothesis was rejected in this analysis. A conclusion that there was a significant difference in the fertilizer profits means before and after the policy was implemented can, therefore, be made. This analysis shows that there was an increase in fertilizer profits, and inferentially, there is sufficient evidence to say that this increase in fertilizer profits is significant at  $\alpha = 0.05$ .

Responses received from the KIIs supported these findings.

#### **4.7 Contingency plans and decision making of KEL Ltd.**

Responses from the KIIs revealed that KEL Ltd has devised various strategies to deal with the dynamism in the fertilizer market. The interviewees stated that KEL adopts these strategies in dealing with the challenges that are inherent to its operations, especially where KEL could not control some challenges. For instance, KEL has no control over government policies like the NAAIAP that this research focuses on. Another main challenge to the fertilizer business is the weather. With poor irrigation infrastructure, many farmers in Kenya do not buy fertilizers during drought periods. Political instability is also another challenge faced by KEL Ltd. Information from the interview conducted shows that KEL deliberately adopts strategies that are aimed at increasing the fertilizer sales of the company.

The KIIs established that one strategic decision by KEL has been to increase its advertisements on various platforms in a bid to reach more farmers. An advertisement column on the Daily Nation, in Kenya, known as *The Seed of Gold* demonstrates the effects of its SSP fertilizer on various crops. KEL has also embarked on expanding its *Demo Plots* around the country. Demo plots are demonstration farms which the company uses to show farmers the practical impacts of

its fertilizers on various crops. The company plants various crops on its demonstration farms across the country and enlightens its intended customers on its products. This strategy is very effective during Kenya's annual agricultural shows. Over the past few months, the company has also embarked on hiring salespeople to promote its products. These sales agents source for customers throughout the country. They take samples to Agrovets, and other fertilizer outlets, especially in the agriculture-dominated Rift Valley region. KEL has also collaborated with agronomists in the country to educate farmers on its fertilizer.

The interviewees pointed out that the government of Kenya implemented the fertilizer subsidy program to promote growth in the agricultural sector. To a large extent, this program had the effect of reducing the cost of production, resulting in a fall in the price of a commodity. Kenya is implementing policies like NAAIAP in a bid to achieve Vision 2030. These policies are designed to anchor growth of the agriculture sector, which is fundamental in enhancing food security. From simple law of demand, the lower the price of a commodity, the higher the quantity demanded of a commodity. Thus, a fall in the final price of fertilizer led to a rise in the use of fertilizer as more was demanded than before. According to the interview results of the KEL chemicals Ltd sales manager, the fertilizer market has been increasing significantly over the years. He attributes this expansion in the fertilizer market to the demand-oriented policies implemented, especially the NAAIAP policy that promoted fertilizer use in the country. The same information was given by the C.E.O of KEL asserting that there has been an increase in the fertilizer use across the country since the inception of the NAAIAP policy

Change is inevitable. Thus every department or sector of the economy must be affected by policies set by the government or the industry. Mostly, these new policies could be favourable or unfavourable. The strength of any company is seen in how strong and adaptable they are to new

policies. KEL Ltd. has come up with various ways of dealing with policy changes in the fertilizer industry. These ways have been adopted in consultation with the ministry of agriculture.

KEL Ltd. has approached the NCPB to help with the distribution of its fertilizer. NCPB being a government institution and the major distributor of fertilizers in the country, it has advanced knowledge of the Fertilizer industry. The General Manager of KEL explained that sometimes NCPB dictates the price for private companies like KEL Ltd. The company has also sought to support and expand its market. KEL is aiming to expand its market by improving the quality of its main fertilizer, the Single Super Phosphate (SSP) fertilizer. The improved SSP fertilizer will produce higher yields and therefore, will attract more farmers into buying the product. The company is also planning to introduce blended fertilizers. Blended fertilizers are considerably cheap in the market. By introducing a brand of blended fertilizer, KEL aims to deal with policy shifts in terms of cost-effectiveness. Overall, the General Manager has plans to increase the overall production of fertilizer. KEL Ltd. being the only fertilizer manufacturing company in the region, increased production will increase the company's customer base; this will, in turn, increase profits necessary to deal with policy shifts.

## **CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Discussion**

The forgoing analyses that are based on the study objectives established that the NAAIAP subsidy policy had a significant positive effect on the financial performance indicators of KEL limited. It has been established that the fertilizer production increased, fertilizer sales increased, leading to increased fertilizer revenues and that the final results of the policy are reflected in the increase in fertilizer profits of the company. Also, the research found out that KEL company implemented contingency plans and strategies to deal with the impacts of the NAAIAP policy. It is also clear how the company deals with policy shifts in the fertilizer industry.

From, the responses received all the managers interviewed agreed that the introduction of the new subsidy by NAAIAP led to an increase in fertilizer use across the country and therefore an increase fertilizer production, sales volumes, and fertilizer revenues.

However, the absence of appropriate technology, heavy reliance on rainfed agriculture, and incidence of business cycles hampered the overall growth of the fertilizer business segment in KEL ltd. Consequently, the relative contribution of fertilizer sales to company revenues declined throughout the study.

The strategic response by KEL Company was to focus more on other products: namely aluminium sulfate and sulphuric acid. Aluminium sulfate is a chemical compound that is mainly used as a flocculating agent in the purification of drinking water and wastewater treatment plants and paper manufacturing. Besides aluminum sulfate, KEL also manufactures sulphuric acid that is widely used in the Kenyan market. Increased production and sales of these two products led to the fall in the relative contribution of fertilizers to total KEL's revenues.

Specifically, the production manager pointed out that fertilizer production in Kenya is limited to the manufacturing company's market share. In this regard, KEL's fertilizer market share in Kenya affects the company's financial performance directly. From the interview conducted, all the respondents gave a common view that over 90% of the fertilizer supply to farmers in Kenya is by the government and that 10% is by the private section. However, this 10% from the private sector is distributed between the only local manufacturer (KEL ltd) and other fertilizer blending companies.

After the policy was enacted in 2006, the increased importation of subsidized fertilizers led to an expansion in the quantity of fertilizer used by many farmers in the country. Variety of fertilizers was therefore demanded in the market, and therefore, the local fertilizer manufacturing and blending companies like KEL found a gap to fill in the market. Filling this gap led to increased fertilizer production and sales by KEL Limited. KEL managers explain that the policy prompted the introduction of swift measures by the company that ensured continued production and capitalization on the gaps created after the introduction of the policy. One such policy shift was that the company pumped in more money in fertilizer production, and the company was forced to increase the number of employees in the company following the introduction of NAAIAP. However, the managers agree that the policy proved financially profitable to the company.

## **5.2 Summary of Findings**

### **5.2.1 Introduction**

This study sought to evaluate the impact of the National Accelerated Agricultural Inputs Access Programme (NAAIAP) on the performance of KEL Chemicals Ltd, the largest fertilizer manufacturing company in Kenya. The NAAIAP is a fertilizer subsidy reform that was introduced by the Kenya government in 2006 to support higher agricultural output among

farmers in Kenya. KEL Chemicals Ltd. This chapter presents a summary of the findings, conclusion, and recommendations from the study.

## **5.2.2 Findings**

### **5.2.2.1 The Effect of NAAIAP policy on fertilizer production of KEL Ltd**

The study established that NAAIAP policy increased the fertilizer production of KEL Limited. KEL's mean annual fertilizer production increased significantly from 29,694 bags before the policy to 39,342 bags after the policy. These figures indicate a 32.5% increase in the quantity of fertilizer produced by KEL Limited. The positive impact on fertilizer production is further verified by the compounded annual growth rates (CAGR), which increased from 1% before the policy to 10.15% after the policy.

### **5.2.2.2 The effect of NAAIAP policy on fertilizer sales of KEL Ltd**

The study established that NAAIAP policy increased the fertilizer sales of KEL Limited significantly. The mean annual sales revenues of fertilizer by KEL increased significantly from Kshs 63.8 million before the policy to Kshs 75 million after the policy. These figures indicate an average annual increase of 17.65% in fertilizer sales revenues by KEL Limited. These findings were supported by a compounded annual growth rates (CAGR) on fertilizer sales from 2.33% before the policy to 7.88% after the policy.

### **5.2.2.3 The effect of NAAIAP policy on fertilizer profits of KEL Ltd.**

The study established that NAAIAP policy increased the fertilizer profits of KEL Limited. The mean annual fertilizer profits increased significantly from Kshs 26 millions before the policy to Kshs 33.7 million after the policy. These figures indicate a 28.79% increase in average annual fertilizer profits of KEL Limited due to the subsidy policy. This improvement is supported by an

increase in the compounded annual growth rates (CAGR) of fertilizer profits from 1.66% before the policy to 4.84% after the policy.

#### **5.2.2.4 The effect of NAAIAP policy on KEL Ltd's contingency plans and decision-making**

The study established that this subsidy policy brought in by the government affected the company positively. This positive impact of NAAIAP on KEL helps to explain how KEL deals with policy shifts targeting the fertilizer sector in Kenya. How KEL deals with policy shifts is further proved by the progressive rise in the fertilizers sales and the resulting increase in revenue from sales of fertilizers. NAAIAP policy impacted positively on the contingency plans and decision making of KEL Ltd. Some of the strategic interventions were focus in the sales and marketing of fertiliser through various channels. Also, the company introduced new products in its business. The effect of these strategic decisions by management is reflected in the production, sales, and profits of the company.

#### **5.2.2.5: Incidental Findings**

An incidental finding in this study was that the government rarely consults KEL Ltd and other private stakeholders in the fertilizer industry when coming up with new policies. KEL modes of contingency and decision-making against adverse policy reforms are evaluated due to the minimal support from the government. KEL contingent strategies explained in this paper, and its decision-making processes ensured positive financial results in the fertilizer market.

### 5.3 Conclusion

All the study objectives were achieved in this research. Conclusions can, therefore, be drawn based on each objective. This order informs the structure of this section.

It has been established that the fertilizer production of the KEL chemicals increased significantly after the NAAIAP subsidy policy was implemented by the Kenya government in 2006. The increase in fertilizer production by KEL was caused by the increased demand as a result of an expanded consumer base on account of the new policy. The gap caused by increased demand was filled by KEL through increasing its production.

From this research, fertilizer volume sales increased, and hence, the subsequent rise in fertilizer revenues after the NAAIAP policy was implemented. NAAIAP increased fertilizer awareness and use, this, in return, increased the volumes of fertilizer bought by farmers in the country as proved by the analysis in this project.

The increase in fertilizer revenue as a result of increased buying by farmers increased the company's fertilizer profits. KEL sales manager reported that fertilizer prices dropped drastically after the policy was implemented in 2006. The drop in prices explains the factor of affordability and the increased purchasing power of farmers leading to eventual company profits through higher fertilizer sales. The analysis conducted showed an increase in total revenue from fertilizer sales by KEL. The rise in the revenue came due to the low cost per unit volume of fertilizer as a result of NAAIAP subsidy on production. KEL thus increased its production to satisfy the increasing market for the fertilizers. By the law of demand and supply, the lower the price, the higher the quantity demanded of a product. Prices went down after NAAIAP; more of fertilizer was therefore demanded in the market, making KEL Ltd to increase its production, sales, and profit.

## 5.4 Recommendations

NAAIAP policy was implemented in 2006 with little consultation with the private sector. This research paper recommends that the government should consult widely and deeply with private companies before rolling out such policies. Insights from these consultations would enable private companies can align their operations to the new policies and come up with strategies that will ensure company growth as well as the overall improvement in the sector. An important proposal from interviewees in this study was the need for clear policies to be adopted by the government, and adjustments to be made on the policies based on the response from all the stakeholders in the industry.

This study found that the weather also affects the sales of fertilizer. Thus, the effective fertilizer use relies on the amount of water that the fertilizer requires. Besides, in most cases, Kenyan farmers realize low crop yields because the fertilizer conditions are not usually met. These findings prompt this research paper to recommend the government to come up with avenues of initiating affordable and long term irrigation project to farmers that would ultimately increase fertilizer sales.

The trend analyses of fertilizer sales data show that there is a need for general awareness when it comes to rolling out policies. Some farmers could have lowered their budget or even failed to buy fertilizer due to high prices even after the subsidy had been introduced. The government should use officers at sub-county level to inform the farmers of the fall in prices of fertilizers, thereby increasing the fertilizer use significantly. There is also a need for the agriculture department of the national and county government to sensitive the public on the advantages of good use of fertilizers such as high yields, etc.

## **5.5 Limitations of this research**

The key limitation of this study was that KEL Ltd does not specialize only in manufacturing fertilizers. Fertilizers only account for 20% of its total revenues, implying that fertilizer production, sales, and profits cannot be used to generalize the overall performance of KEL Limited. This also means that 80% of its revenues are from other products that are not influenced by the NAAIAP policy under investigation in the research. Therefore other regulations applied to the other company products are also bound to impact on the performance of fertilizer production, sales, and profit. Another limitation of this study was on the KIIs. The policy was implemented in 2006, a timeframe that some of the KIIs were not holding their current positions in the company. Therefore the views they expressed were not based on what they experienced but on what other former employees experienced. Such information is not first hand and therefore, sometimes cannot be accurate.

## **5.6 Areas for Further Studies**

The objective of this study was to evaluate the impact of the National Accelerated Agricultural Inputs Access Programme (NAAIAP) fertilizer subsidy reform of 2006 on the performance of KEL. The above objective has been achieved; however, further research should be carried out to determine the impact of the NAAIAP subsidy policy on the overall growth of other fertilizer manufacturing companies in Kenya.

In particular, further research should be conducted to determine how this policy affected the company's overall financial position through the distribution, sale, and use of fertilizer in the country. Such studies can provide useful information for the government to know the level of growth such subsidy policies have on fertilizer manufacturing companies. More research work should also be done to ascertain the contribution subsidies have on the overall growth of the agriculture sector in Kenya through the distribution, sale, and use of fertilizer.

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## APPENDICES

### Appendix 1: Interview Guide for KEL Managers

<b>NAME</b>	
<b>POSITION</b>	
<b>YEARS IN KEL</b>	
<b>ROLES IN KEL</b>	
1. Is the NAAIAP subsidy program increasing or decreasing the rate of fertilizer use in Kenya?	
2. Why do you think fertilizer use increased or decreased?	
3. What changes have occurred to KEL Chemicals' fertilizer production because of the NAAIAP subsidy policy?	
4. What changes have occurred to KEL Chemicals' fertilizer sales because of the NAAIAP subsidy policy?	
5. What changes have occurred to KEL Chemicals' fertilizer profits because of the NAAIAP subsidy policy?	
6. What major decisions were made in KEL following the introduction of the policy? What was the intended outcome of the decisions? Were the outcomes achieved with success?	

## Appendix 2: NACOSTI



Dear Customer,

You have successfully transacted on your account as follows:

Account Number:	0XXXXX7001
Debit/Credit:	Debit
Type Of Transaction:	PESA LINK TRANSACTION
Currency:	KES
Amount:	1000
Reference ID:	000KSDR1919700LD
Additional Info:	NACOSTI Approval Sahil Shah shah Sahil
Date:	20190716

## Appendix 3: Introduction Letter



Ole Sangale Rd, Madiraka Estate,  
P.O. Box 59857 00200, Nairobi, Kenya,  
Cell: +254 703 414/6/7, Twitter: @SBSKenya

Email: [info@sbs.ac.ke](mailto:info@sbs.ac.ke) or visit [www.sbs.strathmore.edu](http://www.sbs.strathmore.edu)

Wednesday, 22 May 2019

To whom it may concern

**RE: FACILITATION OF RESEARCH - SAHIL SHAH**

This is to introduce Sahil Shah, who is an MPPM student at Strathmore University Business School, Admission Number – MPPM/90586/15. As part of our Master’s program, Sahil is expected to do applied research and to undertake a project. This is in partial fulfilment of the requirements of the Master of Public Policy and Management. The outcome would be of immediate benefit to the organizations he is researching on. To this effect, he would like to request for appropriate date from your organization.

Sahil is undertaking a research paper on ‘EVALUATING THE EFFECT OF FERTILIZER MARKET POLICY REFORMS IN KENYA ON PERFORMANCE OF LOCAL FERTILIZER MANUFACTURING FIRMS - THE CASE OF KEL CHEMICALS LTD’. The information obtained from your organization shall be treated confidentially and shall be used for academic purposes only.

Our MPPM seeks to establish links with industry, and one of these ways is by directing out research areas that would be of direct usefulness to industry. We would be glad to share our findings with you after the research, and we trust that you will find them of great interest, if not of practical value to your organization.

We very much appreciate your support and we shall be willing to provide any further information if required.

Regards

A handwritten signature in blue ink, appearing to read 'Caroline Tiara'.

Caroline Tiara  
Manager – Masters’ Programs  
Strathmore University Business School