CHAPTER EIGHT

CONCLUDING REMARKS

8.1 Introduction

This study has explored the growth and structure of organic agriculture in Kenya. The main focus was on the reasons behind emergence of the system, growth drivers and the input and production structure. The specific objectives addressed include; growth in terms of land devoted to organic and stakeholders, adoption of organic techniques, profitability and the technical efficiency of organic production. While secondary data helped to address the growth of the system, field survey in Central Province availed data related to the input and production structure. To achieve the objectives of the study, it was found imperative to explore global agriculture. This is because organic agriculture is one of the alternative agricultural systems that hinges largely on the gaps arising from the developmental aspects of global industrial agriculture. In addition, Kenyan organic sub sector is influenced by global organic agriculture. The current chapter presents the summary of the findings drawn from the data presented and discussed in the previous chapters.

Excluding the introduction and conclusion chapters, the remaining part of this thesis can be categorized into three main parts. The first part deals with global agriculture as presented in chapters two and three. It helps in linking the global agriculture and Kenyan organic agriculture. Part two deals with Kenyan agriculture which is presented in chapter four and five. The issues addressed bring light to the emergence and growth of organic agriculture in the country. Part three focuses on the participation of farmers in the system using field survey as reported in chapter six and seven. The chapters are interlinked in a way that helps in the understanding of the emergence and growth of organic agriculture in Kenya as explained in the first chapter.

In the next section, the summary of the main findings and conclusions are presented based on the themes of the research. Finally, section 8.3 presents the policy implications based on the research outcomes.
8.2 Main Findings of the Study

Global Agriculture
Organic agriculture exists within the context of industrial agriculture. The exploration of contemporary global agriculture has led to a better understanding of the benefits and challenges of global organic agriculture. There are two dominant agricultural paradigms worldwide and a third emerging paradigm which is the focus of current study. The two are traditional and industrial agriculture while the third has since been referred to as greening agriculture which encompasses several alternative agriculture systems. Among these systems, organic agriculture has received global recognition relative to the others.

Industrial agriculture advancement in the last sixty years has largely addressed global food supply issues. While it has succeeded in increasing agricultural food production, the system has been criticized for its production related externalities. In some developing countries, challenges associated with industrial agriculture have led to continued use of traditional agriculture. Literature reveals that the agricultural development outcomes based on contemporary agriculture have been at the expense of social and environmental dimensions of agriculture. Consequently, the ensuing debate based on the production externalities has led to the emergence of alternative agricultural systems. More precisely, the industrial based agricultural system and its inherent characteristics have largely triggered development of alternative agriculture and by extension organic agriculture. This is because it is biased towards the economic function of agriculture while failing to address the social and environmental functions of agriculture.

There are several alternative agricultural systems addressing the various emerging global issues. Most of the systems aim at making use of global scientific developments and the accumulated local traditional knowledge to propel global agriculture. Support for the emerging system is based on the argument that, despite the industrial agricultural advancement, many developing countries have continued to witness stagnant agricultural productivity, increasing food deficits and rising levels of hunger and poverty (FAO 2009). While inappropriate policies and neglect of agricultural sector following liberalization have contributed to global food crisis in the
last two decades, globalization has contributed to the observed shift in the control of global food supply from farmers to transnational corporations.

The unfolding scenario is that global agricultural changes have led to the destruction of agricultural livelihoods. Consequently, this has been associated with the issues of food safety, food insecurity, rural impoverishment, corporatization and environmental degradation among others (IAASTD 2008). These challenges have featured prominently in the search for alternative production systems. They have triggered the search for a production system that ensures safe food and formulation of agricultural input policies. For instance, research findings associated with pesticide health effects in the 1960s led to the banning of some agricultural inputs in the developed countries. With globalization, some of these inputs continue to be used in developing countries with weak regulatory framework. Organic agriculture’s zero tolerance on the use of harmful agricultural inputs has helped create awareness of such malpractices being advanced mainly by transnational corporations using their political and economic power as explained in chapter two.

The alternative agricultural systems have contributed to increased health awareness among consumers which has triggered International Food Safety Standards (IFSS) in the global North. This has exposed farmers in developing countries to the risk of losing external markets in the developed countries. Organic agriculture, as one of the alternative options, has been promoted on the premise that its principles are all encompassing and that they inherently address these issues. This has been a major reason for its international acceptance as a desirable agricultural system.

A major challenge has been the current corporatization of global food supply chains which has shifted the control of food away from farmers to corporate. This has since been found to impact negatively on organic agriculture globally. As the organic system continues to receive global recognition despite many challenges, corporate have also ventured into organic production, processing and distribution to tap on the price premiums. Multinational threat has been regarded as one of the driving forces for the growth of organic agriculture worldwide. To many analysts this poses a major challenge in the development of organic system. This possibly explains why organic agricultural proponents are in the forefront in supporting the current third agricultural
paradigm, the greening of agriculture. Its main objective has been lobbying for public recognition for the alternative agricultural systems globally.

Global Organic agriculture
The current internationally accepted definition of organic agriculture portrays the system as a production process that takes into consideration the wellbeing of all the productive resources involved in the economic activity. It makes use of ecological principles and processes by giving due consideration to physical, economic and socio-economic conditions of the people, soils and ecosystems. It is for this reason that organic agriculture has been referred to as a systemic and encompassing approach.

Based on its principles, the potential benefits of the system towards achieving environmental objectives have hastened government support particularly in the global North. The sustainability debate in the 1970s and 1980s has largely contributed towards policy recognition of organic agriculture in many countries. Countries with organic policies, most of which are in the developed country category, have been found to record faster growth of the system. The price premium associated with organic produce in such countries has attracted corporations into the organic industry.

The scientific orientation of organic agriculture has been a pillar upon which the system has managed to develop from a movement created by the debates, to a globally recognized discipline. This has been possible through accommodation of certification of the production process following organic principles. Certified organic lands have recorded rapid growth particularly in the last decade. For instance, while the certified organic lands were low at the turn of the century, the same stood at 32 million hectares in 2007, with 1.2 million farmers (Willer et al., 2009). This suggests that in spite of the shortcomings, market may be dictating the continued presence of certification. Though contested for excluding small scale farmers, the certification process has helped in the growth of organic agriculture globally.

The share of organic agriculture is significantly low in many countries but the sub-sector has been recording notable growth rates during the last decade. In 2008, only ten countries had more than seven percent share of organic agriculture to total agriculture (Willer et al., 2009). In some countries, the recorded shares are less than one percent including Kenya. Several reasons have been advanced for this scenario. First, being in its initial stages of development, the statistics are based mostly on
certified lands. However, not all organic producers are certified and this amounts to underestimation. Lack of policy recognition of organic agriculture has meant lack of documentation and teething problems of the system further leading to underestimation of its share in most countries.

Reliance on private sector for the organic data documentation has led to fragmented data that is difficult to reconcile. In an effort to bridge this gap, IFOAM instituted a global search for data in the last five years. It is possibly for this reason that there are notable increases in the size of organic agriculture in some developing countries. Other reasons that have been associated with the recent increased rates of the system include increased policy support, environmental awareness campaigns, and global health awareness leading to increased consumer demanding organic produce, international institutional support and lately having a unified international definition of organic agriculture.

Unlike in the past, having an internationally acceptable definition, which finally came into being in 2008; has helped to further entrench the system globally. The process characterized organic agriculture in details and has since acted as a source of information to many governments and stakeholders across the globe. The definitional search criteria were based on past principles of organic agricultural practices. They were initially categorized into five broad areas namely; soil fertility, pest control, soils and water conservation, animal husbandry and Biodiversity. Factoring in these broad themes, the Terms of Reference for the Task Force led to the four principles which were finally coined to guide the process. They include the principle of health, ecology, care and fairness. These have since become the foundation for the organic production system. A prominent feature arising from the definition process is that the current definition is framed in a positive manner as opposed to earlier definitions that had negative connotations. In addition, it excludes all highly contested terms like certification. It is postulated that the current change of promotional tact to the use of scientific backing of the system may positively influence uptake of the system in future.

In the last six decades, the growth of global organic agriculture has developed in an uncoordinated manner in many countries. As a result, adoption of organic agriculture has remained low particularly in developing countries. In many of the countries,
private sector players have initiated promotional efforts in isolation for some time before forming a unified force to help push for policy recognition. Further, in addition to acting in isolation, organic producers in the 1970s and 1980s had limited finances. This scenario changed in early 1990s with the number of organic farmers increasing owing to political support and media involvement particularly in European Union and the United States. In many countries, the media has been sympathetic to green issues and increasingly critical of conventional agricultural practices that have been seen as the root cause of most of the emerging global agricultural issues. Kenyan organic agriculture has its base from such developments owing to its close link with the European Union market as a major destination for its agricultural exports. Indeed, the pioneers of the formal organic agriculture in Kenya were trained in the UK in early 1980s at a time that organic agriculture in EU was agitating for policy recognition and soon thereafter the organic promotional efforts in Kenya started. Earlier, for close to a decade, organic agriculture was promoted along other alternative agriculture systems particularly in Western Kenya and in Rift Valley provinces and it still continues to date.

Several benefits have been associated with the organic technology and it is becoming increasingly important in helping small-scale farmers in developing countries who have been excluded from contemporary agricultural system. In addition, there has been a steady growing market for organic products in developed countries which has been driven by rising consumer awareness for health and environment. This offers farmers particularly those targeting developed countries market a chance to produce for a premium price and hence, an opportunity to increase farm profitability and livelihoods. However, premiums are limited and usually absent in developing countries, a factor that makes critics of the system wonder why the farmers would bother to grow organically.

Further, most African countries rely heavily on the European markets for agricultural exports. With the global market witnessing ever increasing stringent standards and regulation requirements, organic principles together with other alternative systems have been found to offer a solution. For instance, governments and agribusinesses in the European Union have been helping African Countries comply with organic standards. With the export thrust policies in most of these developing economies, such intervention by the importing countries has helped in the growth of organic
agriculture. In some cases, farmers have been able to retain the markets after adjusting to the new market demands with organic agriculture conveniently offering acceptable compliance criteria.

_Agricultural Sector in Kenya_

Kenyan agriculture sector has been facing four major challenges namely; declining agricultural productivity, land use, markets and value addition. The share of agricultural GDP to overall economic growth has consistently declined from a high of 35 percent at independence in 1963 to 25 percent in 2009. However, despite the declining trend, agriculture continues to be the main driving force behind Kenya’s economic growth. Moreover, there is renewed interest in revitalizing agriculture in the country which has factored in a unified ministerial implementation strategy. Unlike the past, all ministries with a stake in agriculture have jointly declared their commitment to take part in developing the sector through signing of the Agricultural Sector Development Strategy 2010-2020. Earlier, only the Ministry of Agriculture (MOA) was involved in implementing and overseeing such diverse and multidisciplinary efforts in isolation thereby hindering its effectiveness. In this context, lobbying for organic agriculture is likely to bear fruits unlike the past where promotion of industrial agriculture was being advanced by the MOA.

Like other countries, agricultural output has been increasing but at a slow rate. Several factors have been associated with this trend with the main ones categorized broadly into agro ecological, technological and institutional changes. For instance, use of industrial agriculture has been associated with resource degradation in Kenya. There has been increasing concerns regarding soil degradation in some areas of the country following increased use of intensive agriculture. Specifically, to enhance agricultural output, there has been increased use of chemical fertilizer input all of which is imported. Use of the input has been associated with mining the soils by use of chemical fertilizer leading to decreased productivity. Organic agriculture proponents have therefore come in to bridge this gap. They advocate internal source of organic fertilizer inputs focusing on the small scale farmers. Moreover, inappropriate policies during the control era and involvement of multinationals in advancing industrial agriculture with globalization has led to changes in the cropping patterns in Kenya. Among other challenges, it has resulted in food insecurity as producers shift away from indigenous crops to export crops. Organic agriculture in Kenya has been in the
forefront in promoting diversification of agricultural produce particularly paying special attention to indigenous crops.

Despite the potential of agriculture to reduce poverty in Kenya, the current global economy changes are gradually depriving the sector this crucial role. Besides, agricultural policies pursued during the control era consistently excluded the small scale farmers in the use of external inputs while high price of inputs in post liberalization era continued excluding small scale farmers. This is happening despite small scale farmers being the majority at 75 percent of total farmers. Again, by utilizing partly 5 percent of the total land area, crop production is a main source of livelihood in Kenya contributing to over 80 percent of GDP (Republic of Kenya 2007a). This explains why organic agriculture until recently has been promoting crop production in the country.

Additionally, agricultural exports contribute to about a third of Kenya’s total exports. The stringent private food safety standards have led to increased interest in organic agriculture by large scale Kenyan farmers involved in the exportation. As shown in figure 4.4, embracing of the alternative agricultural systems by exporters of horticultural produce from Kenya to the European Union has led to increased exports. Indeed, the Kenyan case has been cited as a success story in the emerging paradigm.

**Developmental issues of Organic Agriculture in Kenya**

Organic agriculture in Kenya stems from global organic agriculture which in turn emerges from contemporary or industrial global agriculture. Though organic land in the country has been increasing, lack of data conceals the true size of the sub-sector which still remains unknown. However, the current private sector requirement, that certain standards be met by producers supplying the global market has led to availability of partial data. More precisely, data on certified land for export is becoming increasingly available. As pointed out in chapter five, organic certified land has been increasing in the country. However, it is believed that a large number of uncertified farms apply organic agricultural practices for local market as well as export. This translates into increased incomes and consumption of safe food in the country. In 2009, the land under uncertified organic agriculture according to KOAN was estimated to at least 100,000 acres. This translates to less than one percent of the total arable land. Though Agriculture is the main employer in Kenya, less than twenty
percent of the total land in the country is arable. The HMPL constitute sixteen percent (9.2 million ha) while the rest eighty four percent (48.384 million ha) fall in the ASALs.

Promotional efforts are aimed at encouraging more Kenyans into embracing desirable farming practices to ensure sustainability of this scarce resource. The set of recommended organic agricultural practices comprise over 25 techniques (Goldberger 2008) while the set in the survey area comprise of thirteen main practices (Survey data 2009/10). Most of the techniques have been enhanced from existing techniques as presented in table 5.2. In support of the benefits of organic agriculture, results of the survey data suggests presence of spill over effects of the system in the province. Non organic farmers have slowly but gradually adopted the soil enhancing techniques promoted by organic agricultural agents. More specifically, it was noted during the survey that farmers have come to understand the need to deliberately invest in soil enhancing techniques in the production process using internally sourced inputs. For instance, non organic farmers in one of the surveyed districts, Kiambu East, demanded to be trained on organic composting technique by the public agricultural agents. Considering that organic farming has been in the area for about two and half decades, the outcome of farmers who have been persistent in using the organic techniques has acted as model farms. Such farmers have demonstrated that organic farming indeed works. This supports the widely held notion that farmers are influenced more by what they observe and experiment rather than being told what to do by word of mouth. In the district, composting of organic fertilizer turned out to be one of the highly sought skills by non-organic farmers. The farmers ruled upon the public extension officers to train them on how to make the fertilizer claiming that it has proved to be equally good compared with externally sourced fertilizer. This has eventually encouraged the officers to acquire the skills thereby changing their negative attitude towards the organic system.

From the local market’s perspective, the organic system has encouraged farmers to revive the traditional or indigenous crops with valuable attributes like medicinal properties. A main concern in the country has been that a number of such crops are at the verge of disappearance. Consequently, concerted efforts by organic promoters to diversify in an informed manner seem to bear fruits with organic farmers having a diversified cropping pattern in Kenya (Goldberger 2008). It was observed that in
addition to exotic crops, indigenous crops are slowly finding their way into the local green groceries. A comparison of the cropping pattern of farmers in the survey area indicates that organic farmers had more crops on their farms than their contemporary non-organic farmers. With the exception of maize and beans, almost all other crops grown by farmers in the region were destined for the market. Further, promoters of the system have been encouraging commercialization of high nutritional crops across the country. Given that different geographical areas grow different crops suggest that the system has had health benefits as a positive externality in the country. The habit is expected to diffuse into the social network.

Though organic market in Kenya is small, it has been growing both in the domestic and external fronts. Analysts contend that the sub-sector has great potential if handled well. Like other countries, the local market is developing along the lines of supermarket, retail outlets and restaurants in the main towns in Kenya. Some organic producers have adapted home delivery basket model channel to the Kenyan context to cater for the working high class customers in Nairobi and its environs, Mombasa and Nakuru towns. The deliveries are made once a week and have become popular with top management government employees, those working in international bodies particularly UN affiliated offices and those in relatively busy private sector offices. This is an example of a development that may not be captured at the macro level data. However, high running cost of the basket model, casts doubt on the sustainability of the model in Kenya.

A notable achievement of organic agriculture has been its contribution in the diversification of Kenyan exports. Reliance on few traditional exports put farmers at risk. Through concerted efforts of the various organic promoters across the country and its principle of location specific approach, farmers have increased the number of products in the exportable basket in spite of many formidable challenges. For example, farmers who could not continue supplying green beans to the European Union after IFSS of the 1990s have been shifting from the traditional vegetable exports to include new products like spices, herbs and honey. These exportable products have come to be associated with alternative agricultural systems and they constitute of a large percentage of the organic exports. The recent development of East African Organic Standards has acted as a motivating factor to the continued
growth of the exports to the European markets. Though the impact is yet to be felt, producers and those involved in marketing of organic products in Kenya are optimistic that the standards have a high potential of boosting the sector.

Organic agriculture has benefited from several interventions. However, two policies have been singled out as having initially paved way for the growth of the sector in the first decade. They include the 1990 NGOs Act that recognized the organizations as partners in rural development and liberalization of the economy which meant that private sector players could venture into agriculture which was not the case earlier on. Convinced that the system is beneficial in the economy and determined to help the sector, Kenyan organic promoters have been actively involved in the international arena regarding promotion of the sector. Indeed, Kenya in 2002 was in third position tying with China in terms of membership representation at IFOAM. Each had 16 members and was the highest recorded in Africa.

Institutional support from IFOAM and other like minded institutions have played a key role in financing and building capacity in Kenyan organic sector. Consequently, the number of NGOs promoting the principles of organic agriculture has been able to stay afloat and they have increased marginally. While there were six institutions in the 1980s, the number of stable and well established NGOs has increased to over ten institutions in 2010. However, as an indication of the presence of a formidable gap in this sub sector, several NGOs have been started in the last decade only to wind up due to financial difficulties. It emerged from the survey that lack of follow up extension services after training from such NGOs was one of the reasons for this adoption. The evidence seems to suggest that as much as training is an important adoption factor, other factors determine the continued adoption of the system. Quantifying this argument, the current study analyzed adoption factors in the study area and found that attending demonstration farms, extension services from organic promoters and visiting successful organic farmers are highly significant adoption factors in Central Kenya.

Considering certified export land devoted to organic management, Kenyan farmers have been increasingly devoting more land relative to other African countries since 2005. Correspondingly, there was a sharp increase in organic fertilizer import since 2004 and a sharp increase in export of the fertilizer in 2006 as shown in figures 3.2c
and 5.3. Though the figures are seemingly small, the reverse may be true if compared to total arable land in Kenya where only 20 percent of total Kenyan land falls in this category with the rest being Arid or Semi Arid. This suggests that we need to interpret the given figures with some caution.

Sources of Organic Growth

Both internal and external forces have contributed to development of organic agriculture. Internal drivers include a formidable force emanating from the private sector determined to address the agricultural problems in Kenya in a sustainable manner. For the first two decades, NGOs and faith based institutions had concerted promotional efforts in offering training, extension services and conducting research on the system. Though growth of the sector in the 1980s and 1990s disappointingly recorded low rates, the foundation laid then is now acting as a base within which the current rapid growth is based on. Considering the period after the formal recognition of the system in 1980s to date, over 300,000 farmers have been trained on the organic agriculture. Several extension officers and diploma holders from KIOF have been instrumental in starting or working in several organic related NGOs across the country.

Decreasing agricultural productivity due to resource degradation has played a key role in the adoption of the techniques in central region. Evidence of soil caking associated with increased use of contemporary agriculture inputs in small scale farms has convinced farmers in densely populated areas, who have been using the input insistently over time that an alternative method needs a trial.

Both domestic and external markets for organic produce have been growing. This has in essence acted as a motivating factor for the continued promotional efforts on the system. However, inconsistent supply from uncertified farmers has led to slow growth of local market. In many instances, lack of organic produce from Kenyan farmers has led to established outlets to source their produce from neighbouring countries. As noted earlier, there has been a growing demand in the developed countries for organic produce. Consequently, large scale farmers and exporting companies in Kenya have partnered with importers of organic produce in the European Union in an attempt to comply with standards and regulations. It was after the organic large scale farmers' involvement in the sub-sector that a national coordinating body KOAN was formed
and lobbying for organic policy with the government gained recognition. Organic policy is currently at draft level as from November 2010.

Factors Influencing Adoption of Organic Techniques.
Indicators frequently used to characterize organic growth include increased use of inputs, increased land under the system, increased output and employment among others. While acknowledging that all these aspects are important, this study examined the use of organic techniques. The organic agricultural system though over two decades old seems to fall in the early stages of development and this influenced the focus of the study. The need to increase uptake of the system calls for identification of policy issues related to adoption of the system. The study therefore sought to analyze the factors that lead to the adoption of the inputs as one of the key objectives. Survey data was conducted in Central Province which is one of the three provinces where the system is practised.

Empirical analysis conducted on data obtained from a random sample in 2009/10 revealed that several factors influence adoption of organic techniques in the province. Economic modelling was preceded by extensive exploration of the survey data. Based on theory, averages were modelled and graphical analysis used extensively to guide in model specification identification process. The exploration helped in ruling out outliers and leverage effects that may affect the regression outcomes. Transformation of the data was carried out where necessary.

Guided by data exploration outcomes, the adoption factors were examined using low and high adopter categorization of organic recommended techniques. Survey data exhibits a bimodal distribution of techniques applied by farmers thereby guiding in the use of four techniques as the threshold criteria for low and high adopters as figure 6.2 shows. Non adopter farmers were used as the control group. Ultimately, parameters of the multinomial logit model were estimated using the Stata statistical software package. The model estimation shows some factors were consistently stable in explaining the adoption behaviour of both low and high adopters. The factors include gender, attending demonstration days, information from organic agents, perception that organic agriculture is better and being a member of an agricultural group.
Female farmers were found to be more receptive to organic agriculture relative to male farmers. Livestock ownership highly influenced adoption for low adopters while it was not a significant variable for high adopters. Attendance to demonstration farms increased the probability for high adopters significantly while it had no effect for low adopters. The results suggest that demonstration farms play a crucial role in increasing the number of organic practices. In addition, the number of visits by extension officers was found to be statistically significant for high adopters but no effect on low adopters. While extension services did not have significant influence on the initial adoption, the variable increased the probability of having more than four techniques on the farm relative to the non adopters. Being a member of an association for farmers turned out to be a strong factor influencing the probability in both high and low adoption.

The initial source of organic information was found to influence adoption of the system. Learning about the organic techniques initially from organic agents had a positive impact on the probability of adoption. This has since been associated with dissemination of the right information regarding the system. However, information from other farmers had negative impact on adoption in both cases of low and high adopters. This confirms a widely held belief that potential farmers do get discouraged from adopting the system owing to lack of the right information. It emerged during the survey that some adopters had indeed been discouraged from adopting by farmers who had never practiced the techniques. Such farmers, in the words of the adopters relied on hearsay to discredit the system. According to proponents of organic agriculture in Kenya, in most cases the hearsay turned out to be propaganda by groups opposed to the development of the system for various reasons.

A follow up on the role of information adoption found that farmers learnt about the new ideas from different sources. The main sources include NGOs, other farmers, extension officers, relatives, friends and the print and electronic media. Seeking of information from successful farmers turned out to be highly correlated with most of the explanatory variables in the adoption model suggesting that it was endogenous to the adoption decision. This prompted further analysis to explore the information seeking behaviour of the farmers. Results show that female farmers, those attending demonstration farm activities and those who were initially introduced into the system by organic agents had higher tendency to continue seeking information from
successful farmers. Attendance to demonstration days significantly encouraged farmers to seek further information from successful farmers. In addition, farmers who perceived organic agriculture to be better than industrial agriculture tended to seek information from successful farmers.

To increase uptake of the organic production techniques in the study area, there is need to draw intervention instruments based on the above discussed factors. Since organic techniques are location specific, it is important to conduct similar studies across the country to help identify appropriate policies.

**Profitability Results**

One of the objectives of the study was to establish the relative profitability of organic farmers. Based on the important role played by horticulture in the study area, this study utilized vegetable production to achieve the objective. Earnings from the production of kales, cabbages and tomatoes were analyzed to assess the relative performance of the two systems. Agreeing with other studies, it was found that profitability varied by crop. While non-organic farmers earned higher incomes from kales and cabbages enterprises, organic farmers earned more income from growing of tomatoes. Results showed that on average, non-organic farmers earned higher incomes than organic farmers from kales and cabbage growing compared with adopters. The difference in earnings was found to be 40 thousands Kenya shillings for kales and 23 thousands per acre for cabbages. Among the adopters, higher adopters on average earned more than low adopters from kales enterprise. The reverse was true for cabbage enterprise where low adopters earned more profits than high adopters.

For tomatoes, organic farmers on average obtained higher earnings while non-organic farmers obtained highest income from cabbage growing. However, it is good to note that the sample for tomato farmer was relatively small, and the high earnings for organic farmers derived from premium price the farmers enjoyed relative to non-organic farmers. However, it was observed that organic farmers had more crops grown in their farm particularly high value crops. This suggests the possibility that the organic farmers may be earning higher total income owing to their diversified cropping pattern compared with non-organic farmers.

Variations in average earnings seem to have come from both cost of production and from price. The cost of production for organic farmers in the production of kales and
cabbages was relatively lower than for non-organic farmers. Organic farmers made use of internally sourced inputs and this had an effect on reducing cost of production. However, this was not the case with tomatoes production which, though organic farmers fetched higher prices, the cost of production per acre was higher than that of non-organic farmers. It was observed that producers of organic tomatoes made use of externally sourced organic inputs, which are usually more expensive than industrial inputs. This could be the reason why few farmers were involved in production of tomatoes organically.

Further, in order to have a better understanding of the profit distribution, the study used quartiles to help categorize data. The earnings were examined further using three categorization of low, medium and high profit. From the data, low profit corresponding to 25th percentile was at least thirty thousand Kenya shillings, medium profit category ranged from thirty thousand and one hundred and fifty thousand based on inter quartile range while high profit, based on 75th percentile, were earnings greater than one hundred and fifty thousand Kenya shillings per acre.

Overall, results indicate that higher percentage of organic farmers earned low profits in all crops compared to non-organic farmers. The highest difference was recorded from cabbage enterprise where 53 percent of organic farmers earned low profits compared to 9 percent non-organic farmers in the same category. For high income category, there were more non-organic farmers earning high incomes compared to organic farmers with the exception of tomatoes. Only 6 percent organic farmers earned high income in both kales and cabbages while it was 13 and 18 percent respectively for non-organic farmers. Further, there were fewer organic farmers (41 percent) who earned medium profits from growing cabbages compared to non-organic farmers (73 percent) while there were more in kales enterprise.

Considering the entire sample, the overall results from gini coefficient analysis indicate the existence of high inequality for both farm categories. While organic farmers had a gini coefficient of 0.49, it was slightly lower for non-organic farmers at 0.42. This suggests that though both systems post high inequalities, it is more pronounced in organic production enterprises compared to non-organic production enterprises.
**Technical Efficiency Summary Results.**

To further understand organic production, the study did a comparative analysis of technical efficiency of organic and non-organic vegetable growing. To achieve the objective, the study followed stochastic frontier approach where translog production functions was estimated using Frontier 4.1 developed by Coelli 1996. Using output oriented measure, the levels of efficiency and sources of technical efficiency were jointly estimated for cabbage and kales enterprises.

Results indicate that organic production enterprises were less efficient than non-organic production on both crops based on their respective production frontiers. The estimated average technical efficiencies for organic and non-organic kales production were 0.532 and 0.539 respectively. The estimates for organic cabbages were 0.540 compared to 0.533 for non-organic cabbages. Findings indicate that though both systems have high inefficiency levels, organic farmers operated less closely to their production frontier compared to non-organic farmers. The results further suggest that both systems can increase production using the same input bundle. Organic farmers can increase production of kales and cabbages by 46.8 percent and 46.0 percent with the present state of technology.

The results show that technical efficiency is significant in explaining output variability in crop production. The inefficiency effects result show that age, land size and perception that organic agriculture is better are significant in explaining efficiency levels for both kales and cabbage organic production. In addition, family size and gender were found to significantly contribute to the efficiency of production of organic kales while they were insignificant in organic cabbage production. The results are as expected given that kale production is a relatively more labour intensive enterprise.

In conclusion it can be argued that, firstly organic agriculture growth has been low in Kenya and facing insurmountable challenges. Secondly, despite low profitability organic farmers continue to embrace organic techniques suggesting that other than economic returns, there exist other motivating factors that influence farmers into the organic system. Factors found to influence adoption include gender, source of initial information about the system, attendance to demonstration days and perception that organic agriculture is better than industrial agriculture. Thirdly, there was little
variation in the level of relative technical efficiency while factors influencing technical inefficiency vary by crop.

8.3 Some Policy Implications
Some policy issues can be drawn from the outcomes of this study. The promotional efforts by the private sector have led to increased awareness about organic agriculture among the farmers in Kenya. However, despite the documented benefits of the system, adoption was low in the 1980s and 1990s followed by increased adoption in the second half of the last decade. Several policy implications arise from these key findings.

To start with, there is need to have a partnership between the public and private sector in promoting organic agriculture. With majority of the farmers being aware of the system, chances are that such a partnership is likely to encourage more farmers into organic production. To ensure continuity, policies may be formulated to advance the cause of KOAN in its effort to promote the system. Indeed, coordination of the private sector promotion agents has been associated with the increased uptake of the system in the last decade.

The realization that global market portray the system as a rich man’s agricultural system rather than a poor man’s agricultural system seem to be changing the farmers perception towards the system in Kenya. This becomes a policy item where the government can spearhead its growth by being involved in shaping the right perceptions regarding the system.

Just like the success of industrial agriculture hinges on government support, public policy recognition of organic agriculture is likely to spearhead its growth. Many farmers in Kenya have been accustomed to the government playing the role of informing and assisting in agricultural production and marketing issues. With this mind set, potential organic farmers have been shying away from a system that doesn’t have explicit approval of the government. To help popularize the system, it may be important to have explicit dissemination of information and involve farmers in the current policy draft process. This has the effect of farmers owning the system and it is therefore likely to enhance its implementation. Finally, involving women groups by accessing a revolving fund to overcome the credit challenge is likely to have a positive impact on the uptake of organic agriculture.