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Abstract

Purpose: The purpose of the study was to evaluate the profitability of poultry and pig investment projects in Meru Town

Methodology: This study adopted a descriptive survey design. The study targeted a population of all the farmers located at Meru town. According to the Meru town statistics, there are 210 farmers in Meru town. Simple random sampling was used to select a sample of 20% from the population. Therefore, 42 farmers i.e. 20% of 210 were picked at random. The researcher used a questionnaire which was administered to the selected sample population respondents on a drop and pick basis. The data collected was analyzed by use of descriptive statistics. In particular, frequency tables, averages and percentages were used. The data analysis actually involved simple tabulation and presentation of report generated form spreadsheets i.e. excel. The data was then presented using tables, graphs and charts.

Results: The study concluded that the success rate of poultry and pig farming projects was low as evidenced by a maturation rate of 51 to 60 percent of the stock. The rest of the stock either died or didn't lay eggs. In addition, the study concluded that despite the low success rate; poultry and pig farming were described as profitable compared to other investments. However, several challenges related to cost of production, infrastructural factors as well as market-oriented factors posed a serious challenge to poultry and pig farming. These factors ranged from high cost of feeds to poor selling prices and shrinking markets as well as competition from subsidized imports.

Unique contribution to theory, practice and policy: The study recommended that the bottlenecks associated with the poultry and pig projects be eliminated through a committed effort from the government to subsidize the cost of inputs, establishment of marketing associations and the elimination of middlemen in the sale of produce, improvement in extension services, and the provision of good infrastructure. While the challenges outlined in the study relate primarily to infrastructural and institutional bottlenecks, it might be interesting to study the role of entrepreneurial/management skills and general education on the success or otherwise of poultry and pig farming.

Keywords: *profitability, success rate, maturation rate, challenges, poultry and pig investment projects*

1.0 INTRODUCTION

Since the 1970's, urban agriculture has recorded significant growth. By the year 2005, more than half of the vegetables, fruits milk and eggs consumed by the residents of Nairobi City came from the outskirts of Nairobi such as Kikuyu, Banana, Kiambu, Kasarani and Wangige among others (FAO, 2005). According to IDRC(1999),the key factors that have accelerated the growth of urban agriculture as a survival strategy by the poor urban farming families include rapid urbanization, ineffective agricultural policies, crippled domestic food-distribution systems, constrained public spending and subsidies, wage cuts, soaring inflation and rising unemployment, plummeting purchasing power, and lax urban land use regulations or enforcement. The study (IDRC, 1999) further contends that rapid urbanization has been caused by rural urban migration, globalization and the shrinking industry in the rural areas. While the study of IDRC (1999) is quite old, it still remains relevant as other studies such as FAO (2005) and EPZA (2005) quote the same factors to have contributed to the growth in urban agriculture. According to EPZA (2005), ineffective agricultural policies relating to rural areas has led to the reduction in marginal productivity of rural farms, for example, the inadequate provision of extension services in the rural areas, deterioration of cattle dips, run down agricultural societies and poor agricultural research facilities

Globally, about 200 million urban dwellers are now urban farmers, providing food and income to about 700 million people (DGIP/UNDP 2003). According to the Ministry of Planning (2008), more than half of the Kenyan population lives in urban areas. However, the exact figures have not been arrived at since the last census was marred by inaccuracies (GOK, 2008)

The factors mentioned in the above studies have accelerated the growth of urban agriculture as a survival strategy by the poor urban households. According to GOK (2007), commercial urban agriculture, spurred by increasing urban market, has also grown as urban population seeks alternative income and employment. The role of urban agriculture has become even more critical in Kenya because of increasing urban poverty situation. It is estimated that about 60 per cent of the Kenyan population live below the poverty line (IPAR, 2007). According to Institute of Policy Analysis and Research (2007), structural adjustment policies has led to persistent unemployment, retrenched civil service, newcomers added yearly to the local labour pool, sheer population growth, women at home resorting to urban agriculture, and a growing urban demand for abundant, regular, and cheap supplies of good-quality food has led to rapid growth of urban agriculture in Kenya.

The growth of urban agriculture has taken place in the face of socio-economic prejudices in form of planning standards and regulations that exclude agriculture from urban land use systems. Although urban agriculture is tolerated in Kenya (note: developed countries such as America, great Britain have laws prohibiting intensive urban agriculture due to the resultant inconveniences such as traffic jams caused by animals and the smell of compost), town planning legislative provisions do not recognize urban agriculture as a legitimate land use that should be provided for in the urban areas. For example, the City Council of Nairobi has not set aside any area for purposely for urban agriculture. In the case of Tanzania, efforts have been made to integrate urban agriculture into the urban land use system, but little has been done to actualize the legislative provisions. Therefore, it has not been possible to harness the full potential of urban agriculture in employment, income and food supply (Caleb, 2005).

1.1 Problem Statement

Caleb (2005) argues that high rates of urbanization associated with deteriorating economic performance in both Kenya and Tanzania have heightened urban poverty. In the last 10years (1995 to 2005), rural urban migration has resulted to an unprecedented increase in population in urban areas. While Caleb (2005) does not provide statistics to back his argument, the daily media (Daily Nation, 2007) reported a shortage in housing due to an increase in demand for housing in urban areas. However, such an increase has put more strain on basic necessities such as food, shelter and clothing. According to the ministry for planning economic survey of 2007, the strain on basic necessities has been compounded by the problem of increasing unemployment and landlessness. The unemployment problem has led to families in the urban areas to live under a dollar a day while the landless ness has led to families being squatters on other peoples land (Economic Survey, 2007).

In order to balance the influx of population and the availability of basic needs such as food, shelter, clothing and education, it is important to use the resources available efficiently to produce food as well as earn a sustainable source of income. As an addendum to these objectives, the national goal of reducing unemployment postulated in the Millennium Development Goals (MDGs), the Economic Recovery Strategy (ERS) and the Vision 2030 would be achieved(Ministry of Planning,2008). According to Mireri (2002) in his article on *private investment in urban agriculture in Nairobi*, poultry and pig farming fit the bill to achieve these objectives as they require a relatively small land space, relatively low capital and post a good return within a relatively short payback period. In a another collaborative study titled *Urban Agriculture in East Africa: Practices, challenges and opportunities* ,Mireri et al. (2005), argue that urban agriculture in general and poultry and pig farming in particular is profitable as each pig that matures after 6 months earns a net profit of Kshs 2000. Mireri (2005) from Kenyatta University department of Environment in collaboration with resource persons from Kenchic in his study *Urban Agriculture in East Africa: Practices, challenges and opportunities* further argues that a chick matures within six weeks and each chick earns net profit in the range of KShs 15 and ksh45, depending on the management system. According to Mireri (2005) therefore, a contracted poultry farm can earn a net profit of about Kshs. 100,000 within six weeks that translates to about Kshs. 700,000 per year.

Despite the opportunity to bridge the food shortage gap noted above, it was reported in the Associated Press (2009) and the Daily Nation (2009) that the government has declared famine in Kenya as a national disaster and that over 10 million Kenyans face imminent starvation. While the majority of the populace live in urban areas, (over 60%), this by implication means that they also face starvation (IPAR, 2007). The noted starvation exists despite the existence of a possible solution in pig and poultry farming. This study therefore aims to determine the whether pig and poultry farming is being practiced in urban areas. More importantly, the study wishes to determine whether there is a business case for the investment in pig and poultry farming by analyzing the risk and returns associated with such investment projects.

1.2 Research Objectives

i. What is the success rate of pig and poultry investment projects established in Meru town?
ii. What is the profitability of poultry and pig projects in Meru town?
iii. What are the challenges facing poultry farming in Meru town?

2.0 LITERATURE REVIEW

Urban agriculture involves crops and livestock production, but it may also include agro-forestry and fuel production. Urban agriculture is practised both within the urban boundary and its periphery. Madden and Chaplowe (2007) define urban agriculture as the practice of crop cultivation and livestock keeping within the boundaries or the immediate periphery of a city. The choice of what to produce and how to produce it is determined by the culture, traditions, market, water supply, and rainfall, and climate, exposure to sun, soil condition, plot size and distance from home. Family and individual resources, land availability and location are critical determinants of the type of urban agriculture practised. UNDP (1996) defines urban agriculture as an industry that produces, processes and markets food and fuel, largely in response to daily demand of consumers within a town, city or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and recycling natural resources and urban wastes, to yield a diversity of crops and livestock. Urban agriculture is divided into five broadly defined farming systems: aquaculture, horticulture, animal husbandry, agro-forestry and other urban farming activity (UNDP, 1996).

Kenyan urban centres have witnessed haphazard changes of boundaries. The boundary changes have included areas that are predominantly rural in character with agriculture as the dominant land use (Mireri, 2002). The second major group of urban farmers comprises urban migrants and their families. Although these urban farmers come from all income groups, the poor dominate. The majority of urban households in Kenya are unable to feed themselves adequately from their earnings, and those who are able cultivate land in backyard spaces near their dwelling, on roadside verges, or on other publicly owned vacant land. Subsistence farming is an economic imperative for them. Hence, satisfaction of basic needs is the primary motivating factor governing their behaviour, rather than profit making and capital accumulation. In contrast with better-off households who tend to farm on private land mostly their backyards, the very lowincome groups tend to use public land (Mireri, 2002).

Most of the Kenyan urban farmers (77 per cent) produce mostly for household consumption. In Nairobi, over 50 per cent used the entire amount harvested to feed their families or dependants. The pattern that emerges is of a relatively simple self-sufficient peasant economy, based on petty commodity exchange existing in the larger urban centres (IDRC, 1999). Freeman (2001) found that most of the food produced on urban plots is reserved mostly for the cultivator's immediate family and/or dependants. Since most of the produce is for domestic consumption, it does exemplify the important role of urban agriculture in meeting food security needs of the farmers.

Urban agriculture involves crop and livestock production of different kinds. Crops include: vegetables, maize, beans, millet, sugar cane, bananas, while livestock include poultry, dairy cattle, sheep, goats, pigs and fish farming both for domestic consumption and sale. A survey conducted by IDRC in Kenya (1999) states that poultry was the most common livestock in all towns, though goats, sheep and cattle were fairly numerous in the smaller towns. Very few urban households keep fish, pigs and bees. Nairobi city had an estimated 23000 cattle in the town, although most belonged to medium-high income dairy farmers. Similarly in Dar es Salaam, commercial dairy farming is practised mainly by middle-high income urban households. Livestock keepers in the other towns usually let their animals roam freely, particularly during the rainy season, eating grass or whatever they can find.

Available data on urban agriculture in Kenya (IDRC, 1999) indicates that urban agriculture makes an invaluable contribution to national development. It is estimated that 25.2 million kg of crops worth about 60.9 million KES (about 4 million USD in 1999), were produced in urban areas in one season. There were an estimated 1.4 million head of livestock, worth about 259 million KES (about 17 million USD), kept in all towns in Kenya at the time of the survey. In fact, these livestock represent only 47 per cent of the total number of animals that were kept or disposed of in various ways. This represents a considerable contribution to national economic production, especially if it is assumed that most urban areas have two crops per year.

During the case study survey by Mireri (2002), efforts were made to determine approximate initial capital requirement to establish economically viable units of urban agriculture. According to Mireri (2002), the following estimates are based on the current prices and exclude the cost of land. Economically minimum viable small-scale poultry farming requires 300 chicks either for laying eggs or chicken. Each poultry unit requires a 1ft2 space amounting to 300ft2 space for the 300 chicks. Table 1 below shows that a farmer requires an initial capital of KShs 73,590 and KShs 140, 250 for chicken and eggs production respectively. These estimates indicate that commercial farming is out of reach for poor farmers who can hardly meet their food security requirement. Middle- and high-income urban residents with sufficient space can undertake profitable poultry farming. It is much cheaper to undertake chicken production because it requires only 6 weeks for chicks to mature for meat, while chicks require 6 months to start laying eggs. Each mature chicken generates a net profit of about Kshs 30 amounting to a total profit of about Kshs 9000 from 300 chicken after every six weeks. This indicates that a poultry farmer (meat) can get a return on his capital within 18 months.

Table 1: Estimated Initial Capital Requirement for a Poultry Farm

Table 1. Estimated initial capital requirement for a poultry farm Broilers (meat production)			Layers (eggs production)	
	Item description	K. shilling	Item description	K. shilling
1.	Shed construction	15000	Shed construction	15000
2.	300 Chicks @ 43	12900	300 chicks @ 65	19500
3.	Feeds for 8 weeks	19000	Feeds for 6 months	43000
4.	1 employee (excluding family labour) @ 5000 for 2 months	10000	1 employee (excluding family labour @ 5000 for 6 months	30000
5.	Veterinary services	10000	Veterinary services	20000
6.	Miscellaneous expenses (water, electricity)	6690	Miscellaneous expenses (water, electricity)	12750
7.	Total	73590	Total	140250

Source: Mireri (2002)

Pig farming requires much higher initial capital outlay than poultry farming. To be able to undertake viable pig farming involving a minimum of 5 breeding mothers, a farmer requires an initial capital of about KShs 220,000. Five breeding mothers is the minimum viable economic pig farming unit. Each pig requires one foot-wide feeding space, so a space of about 330ft2 can support pig farming. The feeding mothers are expensive, but each mother delivers about 10 piglets 2.5 times a year. A pig matures after 6 months, so within one year a farmer can get 100 mature pigs from 5 breeding mothers. Each pig earns a net profit of KShs 2000. Therefore a pig farmer with 5 breading mothers can earn a net profit of KShs 200000 per year. According to this estimate, a pig farmer gets a return on his investment within a period of 18 months.

Table 2: Estimated Initial Capital Requirement for a Pig Farm

Item description		Amount in K. shilling
1.	5 breeding mothers @ 14000	70000
2.	Shed construction	25000
3.	Feeds for 6 months	50000
4.	1 employee @ 5000 for 6 months	30000
5.	Veterinary services	25000
6.	Miscellaneous expenses (water, electricity)	20000

Source: Mireri (2002)

3.0 RESEARCH METHODOLOGY

This study adopted a descriptive survey design. The study targeted a population of all the farmers located at Meru town. According to the Meru town statistics, there are 210 farmers in Meru town. Simple random sampling was used to select a sample of 20% from the population. Therefore, 42 farmers i.e. 20% of 210 were picked at random. The researcher used a questionnaire which was administered to the selected sample population respondents on a drop and pick basis. The data collected was analyzed by use of descriptive statistics. In particular, frequency tables, averages and percentages were used. The data analysis actually involved simple tabulation and presentation of report generated form spreadsheets i.e. excel. The data was then presented using tables, graphs and charts.

4.0 RESULTS AND DISCUSSIONS

Findings in this study indicate that the majority of respondents, 76 percent were male while female respondents in the study were 24 percent.

Table 1: Gender

	Gender	% response	
Gender			
Male	32		76%
Female 10	24%	Total 42	100%

Study findings indicate that the majority of the respondents, 67 percent had secondary school level of education. While 14 percent had primary school level of education, another 14 percent had college level education. Meanwhile 5 percent had graduate level. No other response was obtained.

Table 2: Highest level of education

	Highest level of education	**Highest level of education**
Primary level	6	14%
Secondary level	28	67%
College level	6	14%
Graduate level	2	5%
Posts graduate level	0	0%
Total	42	100%

The majority of the respondents, 52 percent, were aged between 31 and 40years. Meanwhile, 21 percent were aged between 21 and 30yrs, 17percent were aged between 41 and 50years, 5 percent were aged between 51-60years, another 5 percent were less than 20 yrs.

Age	Age	% Response
<20 years	2	5%
21 - 30 years	9	21%
31 - 40 years	22	52%
41 -50 years	7	17%
51-60years	2	5%
61-70 years	0	0%
71-80 years	0	0%
>80 years	0	0%
	42	100%

Findings in this study indicate that the majority of the farmers, 52 percent, had brought in new stock of poultry 6 to 7 times, 29 percent had brought in new stock of poultry 4 to 5times, 10 percent 2 to 3 years,5 percent once and 5 percent 8 to 9 times.

Table 4: Frequency of new stock of poultry

How many times have you brought in new stock of poultry?	Frequency of new stock of poultry	%Frequency of new stock of poultry
Once	2	5%
2-3 times	4	10%
4 to 5 times	12	29%
6 to 7 times	22	52%
8 to 9 times	2	5%
Over 10	0	0%
Total	42	100%

The majority of respondents, 60 percent indicated that they had brought in new stock of pigs 4 to 5 times. Meanwhile, 29 percent had brought in new stock 6 to 7 times, 7 percent had brought in 2 to 3 times while 5 percent had brought in new stock once.

Table 5: Frequency of new stock of pigs

How many times have you brought in new stock of pigs?	Frequency of new stock of pigs	% Frequency of new stock of pigs
Once	2	5%
2-3 times	3	7%
4 to 5 times	25	60%
6 to 7 times	12	29%
8 to 9 times	0	0%
Over 10	0	0%
Total	42	100%

The majority of respondent, 57% indicated that 51% to 60% of the stock laid eggs, became mature for pork or poultry meat harvesting. In addition, 24 percent indicated that over 61% of the stock laid eggs became mature for pork or poultry meat harvesting**.**

Table 6: Percentage of stock that became mature

What percentage of the stock, laid eggs or became mature for pork or poultry meat harvesting in each case	Success Rate	% Success Response rate
Less than 10%	0	0%
11-20%	2	5%
21-30%	3	7%
31-40%	1	2%
41-50%	2	5%
51-60%	24	57%
0ver 61%	10	24%
Total	42	100%

According to study findings, the majority, 57 percent indicated that the shortest payback period was 16 to 18 months. While 24 percent indicated the shortest payback period was 14 to 16 months, 14 percent indicated 19 to 21 months. Meanwhile, 5 percent indicated 11 to 13 months.

Table 7: Shortest payback period

poultry project-layers	shortest payback period	shortest payback period-layers
less than 10 months	0	0%
11 to 13 months	2	5%
14 to 16 months	10	24%
16 to 18 months	24	57%
19 to 21 months	6	14%
22 to 24 months	0	0%
over 24 months	0	0%
Total	42	100%

According to study findings, the majority, 64percent indicated that the shortest payback period was 16 to 18 months. While 19 percent indicated the shortest payback period was 14 to 16 months, 5 percent indicated 19 to 21 months. Meanwhile, 5 percent indicated 11 to 13 months.

Table 8: Shortest payback period

Poultry-broiler meat	shortest payback period	shortest payback period -Broiler
less than 10 months	3	7%
11 to 13 months	2	5%
14 to 16 months	8	19%
16 to 18 months	27	64%
19 to 21 months	2	5%
22 to 24 months	0	0%
over 24 months	0	0%
Total	42	100%

According to study findings, the majority, 60percent indicated that the shortest payback period was 16 to 18 months. While 24 percent indicated the shortest payback period was 14 to 16 months, 5

percent indicated 19 to 21 months. Meanwhile, 5 percent indicated 11 to 13 months. ***Table 9: Shortest payback period***

Pigs-pork	shortest payback period	shortest payback period -Pork
less than 10 months	3	7%
11 to 13 months	2	5%
14 to 16 months	10	24%
16 to 18 months	25	60%
19 to 21 months	2	5%
22 to 24 months	0	0%
over 24 months	0	0%
Total	42	100%

According study findings, 67 percent, 76 percent and 71 percent of the respondents indicated that the profitability of poultry and pig farming is very high compared to other investments. While 21 percent, 17 percent and 19percent of respondents indicated that the profitability was high, 7 percent, 5 percent and 5 percent indicated that the profitability was average while 5, 2 percent and 5 percent indicated low profitability when compared to other investments.

Table 10: Profitability compared to other investments

Profitability compared to other investments	Very high	High	Average	Low	Very low	Total
Poultry farming-layers	67%	21%	7%	5%	0%	42
Poultry farming-Broilers	76%	17%	5%	2%	0%	42
Pig rearing-pigs	71%	19%	5%	5%	0%	42

The majority of the respondents, 81 percent, indicated that inadequacy of funds was one of the challenges facing poultry and pig farming, the rest of the findings were presented in table 11.

Table 11: Inadequacy of funds

Inadequacy of funds as a challenge to farmers	Yes	% response
Highly agree	34	81%
Agree	6	14%
Neutral	2	5%
Disagree	0	0%
Highly disagree	0	0%
Total	42	100%

The majority of the respondents, 76 percent, indicated that poor extension facilities was one of the challenges facing poultry and pig farming, the rest of the findings were presented in Table 12.

Table 12: Poor extension facilities

Poor extension facilities as a challenge facing farmers	Yes	% response
Highly agree	32	76%
Agree	6	14%
Neutral	2	5%
Disagree	2	5%
Highly disagree	0	0%
Total	42	100%

The majority of the respondents, 86 percent, indicated that high cost of feeds was one of the challenges facing poultry and pig farming, the rest of the findings were presented in table 13.

Table 13: High cost of feeds

High cost of feeds as a challenge	Yes	% response
Highly agree	36	86%
Agree	4	10%
Neutral	2	5%
Disagree	0	0%
Highly disagree	0	0%

The majority of the respondents, 76 percent, indicated that poor transport and communication was one of the challenges facing poultry and pig farming, the rest of the findings were presented in table 14.

Table 14: Poor transport and communication

Poor transport and communication as a challenge to farmers	Yes	% response
Highly agree	32	76%
Agree	7	17%
Neutral	3	7%
Disagree	0	0%
Highly disagree	0	0%
Total	42	100%

The majority of the respondents, 74 percent, indicated that subsidized imports were one of the challenges facing poultry and pig farming, the rest of the findings were presented in table 15.

Table 15: Subsidized imports

Subsidized imports	Yes	% response
Highly agree	31	74%
Agree	6	14%
Neutral	3	7%
Disagree	2	5%
Highly disagree	0	0%
Total	42	100%

The majority of the respondents, 74 percent, indicated that poor selling prices and shrinking markets was one of the challenges facing poultry and pig farming, the rest of the findings were presented in table 15.

Table 16: Poor selling prices and shrinking markets

Poor selling prices and shrinking markets	Yes	% response
Highly agree	32	76%
Agree	4	10%
Neutral	3	7%
Disagree	3	7%
Highly disagree	0	0%
Total	42	100%

5.0 DISCUSSION CONCLUSIONS AND RECOMMENDATIONS

5.1 Findings

One of the objectives of this study was to determine the success rate of pig and investment projects in Meru town. Findings in this study indicated that the success rate of pig and poultry projects in Meru town was low. Study findings showed that the majority of respondent, 57 percent indicated that 51- 60 percent of the stock laid eggs, became mature for pork or poultry meat harvesting.

Another objective in this study was to determine the profitability of poultry and pig farming in Meru town. Findings in this study indicate that poultry farming and pig farming have a payback period of 16 to 18 months. This was shown by the majority of the respondents, 57 percent, 64 percent and 60 percent. In addition, 67 percent, 76 percent and 71 percent of the respondents indicated that the profitability of poultry and pig farming is very high compared to other investments.

The third objective was to investigate the challenges faced by poultry and pig farmers. Study findings indicated that inadequacy of funds, poor extension facilities, high cost of feeds, poor transport and communication, subsidized imports and poor selling prices and shrinking markets were some of the important challenges being faced by poultry and pig farmers in Meru area. The findings were supported by a response of 81 percent, 76 percent, 86 percent, 76 percent, 74 percent and 76 percent respectively.

5.2 Conclusions

The study concluded that the success rate of poultry and pig farming projects was low as evidenced by a maturation rate of 51 to 60 percent of the stock. The rest of the stock either died or didn't lay eggs. In addition, the study concluded that despite the low success rate; poultry and pig farming were described as profitable compared to other investments. However, several challenges related to cost of production, infrastructural factors as well as market oriented factors posed a serious challenge to poultry and pig farming. These factors ranged from high cost of feeds to poor selling prices and shrinking markets as well as competition from subsidized imports.

5.3 Recommendations

The study recommended that the bottlenecks associated with the poultry and pig projects be eliminated through a committed effort from the government to subsidize the cost of inputs, establishment of marketing associations and the elimination of middlemen in the sale of produce, improvement in extension services, and the provision of good infrastructure.

5.4 Suggestions for Further Studies

While the challenges outlined in the study relate primarily to infrastructural and institutional bottlenecks, it might be interesting to study the role of entrepreneurial/management skills and general education on the success or otherwise of poultry and pig farming. The study results would assist the government and other institutions related to poultry and pig farming to make policy recommendations in the promotion of skills set possessed by the farmers.

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