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Innovative Activities Strategies, Dairy Agribusiness Farming Operations Activities and Performance of Farmers in Selected Counties in Central Kenya

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Abstract

Despite intensive knowledge and skill presumably passed on to the dairy farmers, there is a huge outcry from these farm entrepreneurs of high cost of dairy production and low returns on their dairy farming investment. Nevertheless, a small portion of the farmers have gone ahead to venture into dairy farming as business. This study sought to establish the dairy different investment strategies or combination of investment strategies and their resulting performance in the agribusiness farms. The study focused on the dairy agribusiness strategies of dairy farms in Nyeri, Kirinyanga, Murangá and Kiambu Counties of Kenya. Data was collected from 60 dairy agribusiness farms. The sample size was proportionally determined from the total number of active dairy farmers who delivered milk to Milk Associations (processor, Union, Federation, Cooperative (D.F.C.S.) self-help (S.H.G.), Investment Company) data sourced from Kenya Dairy Board 2015. Data was analyzed using the SPSS and STATA computer software, where both descriptive and inferential statistics were derived. Stochastic frontier production function was estimated using the maximum likelihood estimation technique. The study found that innovative activities strategies in dairy agribusiness and dairy agribusiness farming operations activities influence the performance in dairy farming in central Kenya. The study recommends area for

further studies to consider other County Governments in Kenya for purpose of making a comparison of the findings with those of the current study.

Keywords: *innovative activities strategies, dairy, agribusiness, operations activities*

1.1 Introduction

Under World Bank Development report 2008 titled Agriculture for development, they stated that Agricultural is one of the most important and effective strategies for economic growth and poverty reduction in rural areas where the majority of the world's poor live. Gross domestic product (GDP) growth in agriculture has been shown to be at least twice as effective in reducing poverty as growth originating in other sectors.

It is important to consider inclusive business strategies that will create value for the rural and urban poor, or innovative models that will help build bridges between businesses and the poor. Past agricultural policies and programs have focused mainly on improving production (World Bank, 2013). Hence, the failure of agriculture to function as an engine of growth stems not only from 'production' considerations but from the organization and performance of the value chain as a system. For instance, coordination with urban markets, relations between farmers, processors and traders, transportation, finance, diffusion of knowledge, infrastructure, are all part of the bigger picture. Issues, such as who benefits from the agribusiness value chains, value chain dynamics and upgrading, sector linkages, governance and coordination mechanisms, and social diversity (age, gender), are all important lines of inquiry that have only been fragmentally understood and partially explored in the Kenyan context. Broadly, these aspects are all encompassing to include interaction of factors facilitating upgrading and inclusion or exclusion of actors in the value chain. Inter alia, institutional settings, the governance structure, and standards influence linkages and participation of actors and their role and position in the local and global agricultural value chains (Rutashobya, 2013).

Under the Vision 2030 Economic Pillar (other Pillars includes Social and Political), Agriculture is among the sectors in target to realizing the set objective (moving the economy up the value chain). The sector has for many years formed the backbone of Kenya's economy, contributing about 24 per cent of the Gross Domestic Product (GDP) and accounts for 80 per cent of national employment, mainly in rural areas. Agriculture also contributes more than 60 per cent of the total export earnings and about 45 per cent of government revenue, while providing for most of the country's food requirements. The sector is estimated to have a further indirect contribution of nearly 25 per cent of GDP through linkages with manufacturing, distribution, and other service related sectors.

The promulgation of Kenya's Constitution in 2010 enunciated a plethora of reforms key amongst them being; devolution of various sectors including agriculture. Devolved framework for agriculture is anchored in Part 2 of the Fourth Schedule, providing that the national government shall have exclusive responsibility of agricultural policy formulation whilst the county government shall facilitate, implement and oversee all other agricultural related matters

including the implementation of national policies on agriculture. The new constitution has the national ministry making policy, but crop and animal husbandry, fisheries, disease control and other services being undertaken at the county level (Simiyu, 2012)

In Kenya, we have a State Department of Agriculture that has the mandate "to promote and facilitate production of food and agricultural raw materials for food security and incomes; advance agro based industries and agricultural exports; and enhance sustainable use of land resources as a basis for agricultural enterprises." These government objectives show the renewed focus on the agriculture management. Among the areas being addressed include; Crop Resources, Agribusiness & Marketing; Policy, Crop Research & Regulations; Infrastructure & Mechanization; Licensing, (Simiyu, 2012).

1.1.1 International Dairy Farming

The whole world produced an estimated 721.4 million tonnes of dairy milk. Leading among the countries were India (137.5 million tonnes), USA (84.3 million tonnes, Pakistan (41.6 million tonnes), China (33.9 million tonnes) and Brazil (32 million tonnes) (Hoards Dairyman, 2013).The U.S. is top in milk processing worldwide followed but Germany, China, France and Spain (Hoards Dairyman, 2013). Based on International Farm Comparison Network Data 2013 (IFCN), only 62% of the world milk production is delivered to processing plants, 38% is consumed on farms or sold informally.

In the year 2004, total cow milk production in Africa was 21.2 million tons produced from a total of 46 million dairy cows giving an average milk yield of 461 Kg milk per cow over the year, which is only one fifth of world average yield (FAOSTAT 2006). The top five African milk producing countries in terms of milk volume are Sudan, Egypt, Kenya, South Africa and Algeria. Meanwhile, the first four countries alone produce 52% of total African milk, (Ndambi, Hemme and Latacz, 2007). Dairy trends and production systems can be greatly influenced by policies. In Kenya, for example, the small-scale specialized dairy production system has witnessed enormous growth within the past years, due to the vast adoption of policies favoring this system (Thorpe, 2000).

1.1.2 Dairy Farming in Kenya

Kenya's dairy industry is dynamic and plays an important economic and nutrition role in the lives of many people ranging from farmers to milk hawkers, processors, and consumers. Kenya has one of the largest dairy industries in sub-Saharan Africa. Though the last livestock census was conducted in 1966, the current official cattle population statistics come from the Ministry of Livestock and Development, through its field reports compiled by extension officials. The official statistics place the number of milking cattle at 3.8 million, (Wambugu, Kirimi & Opiyo, 2011).

According to Kenya National Bureau of Statistics 2009 Kenya had 17,417,824 cattle. Data under Kenya Dairy Board (KDB) -2015 shows that 34 counties had active dairy farms which delivered milk to Milk Associations (processor, Union, Federation, Cooperative (D.F.C.S.) self-help

(S.H.G.), Investment Company). The total number of the Milk Associations was 411 with a total of 180,132 active farmers. Dairy production in Kenya is divided into small scale and large scale with the small scale farming being the most popular as it constitutes 70-80% of the total dairy subsector (Ngigi, 2003; Karanja 2004; IFAD, 2006).A survey conducted by Smallholder Dairy Project (SDP) asserts that there were approximately 6.7 million dairy cattle in Kenya (SDP, 2005). The Food Agricultural Organization (FAO) on the other hand estimates a figure of 5.5 million milking animals (Wambugu, Kirimi and Opiyo, (2011). In Africa, Kenya is the only country, after South Africa that produces enough milk for both domestic consumption and export. In this study 17 districts under central Kenya formed a sample representation of the region.

In Kenya, livestock farming is an important economic activity due to its role in raising household incomes, improving food security, providing manure for crop production and providing marketable products like milk, calves and meat (MOA, 2009, Technoserve 2008, Karanja, 2003). With annual milk production in Kenya estimated at 4.2 billion liters in year 2009, the Dairy sub sector in particular provides a means of livelihood to about 2 million Kenyan households and creates forward and backward linkages with the rest of the economy. Dairying is a type of livestock farming whereby cattle are kept for milk production with sole purpose of selling the milk to the consumer.

The industry contributes 14 percent of agricultural GDP and 3.5 percent of total GDP in Kenya. The industry has grown tremendously since its liberalization in 1992 that led to the growth of the informal milk trade, which mainly consists of small-scale operators dealing in marketing of raw milk. The informal milk market controls an estimated 70 percent of the total milk marketed in Kenya. Milk is the main product from a dairy enterprise. A dairy farmer must therefore aim at maximizing on milk output from his/her dairy herd. Raw milk markets offer higher prices to producers and lower prices to consumers but have several challenges relating to quality control and standards, and the associated health and safety concerns.

The rising cost of living in Kenya, and in particular rising prices for branded milk products, has increased the popularity of mobile milk traders selling unpackaged fresh milk (the quality of which is not guaranteed) at lower prices in urban residential areas. This situation has also encouraged supermarkets operators, mainly bigger chains such as Uchumi, Tuskys and Naivas, to establish in-store milk bars/dispensers where consumers can purchase unpackaged fresh pasteurized milk at more affordable prices than branded milk products. It has now been acknowledged that merely improving productivity at the farm level will not suffice to improve the situation for the rural poor, and requires an analysis of agriculture as a system incorporating the whole value chain (World Bank, 2013).

According to Tegemeo Institute in Policy Brief Document titled Productivity Trends and Performance of Dairy Farming in Kenya No. 4/2011), they studied trends in milk productivity and performance of the Kenyan smallholders' dairy sector nationwide between years 2000-2010.The objective of their study was to examine milk productivity trends, assess variable costs of production and gross margin at the farm levels for different grazing systems, and highlight the

constraints in the dairy industry. Their findings included; Households keeping improved animals increased over the years 2000-2010. There was positive trend in milk production between 2000-2007 declines in 2010 due to prolonged drought. Milk production was higher in higher potential areas. Production in any year was associated with seasonal variation. There were relatively low proportions of milk sold indicating that while dairy production was practiced by many households, most of the produced milk is mainly for home consumption. Purchase of concentrates formed the largest cost component in both non-zero grazing and zero grazing system.

Cost of maintenance and repairs was second for zero grazing system. Cost of labor is second in non-zero grazing system. Dairying is an economically viable enterprise in the short run. Both total value of milk produced by each lactating cow per month and the monthly variable cost per lactating cow were higher in zero grazing enterprises. The gross margin per cow per month in zero grazing system was lower with monthly return over variable costs of ksh 935, (Tegemeo Institute in Policy Brief, 2011).The gross margin per cow per month in non-zero grazing system was Ksh 1,567 which was 1.7 times higher than that in the zero grazing system, (Tegemeo Institute in Policy Brief, 2011).Overall the ratio of gross margin to variable expenses was low for all households regardless of the grazing system, with every shilling invested in total variable costs returning just a few cents. The gross margin rate was low on average.

1.2 Statement of the Problem

Despite intensive knowledge and skill presumably passed on to the dairy farmers, there is a huge outcry from these farm entrepreneurs of high cost of dairy production and low returns on their dairy farming. Nevertheless, a small portion of the farmers have gone ahead to venture into dairy farming as business. This study seeks to establish the influence of innovative activities strategies and dairy agribusiness farming operations activities and their resulting performance in these agribusiness farms. This will help answer the question: “are the small dairy farmers not using the right strategies in their milk production”

Various studies conducted on smallholder dairy farms in the 1990’s concurred that nutrition i.e. feed availability and utilization was a major factor limiting animals' performance (Omore, 1996; Omore, 1997; Staal, 1997; Methu, 1998). Some of the identified technologies that could solve the problem of feed shortage were growing of a wide variety of forages and fodder trees, fodder conservation using cost-effective methods, and efficient utilization of crop and industrial by-products. Ter-Hemen, Amah Tony (2015) did a case study of dairy farmer groups in Njabini, Nyandarua County. The general objective of this study was to examine the challenges facing dairy farming groups in Njabini locality. The study concludes that dairy farmers are faced with challenges such as limited finance access, lack of working capital, low liquidity, low spending on agriculture by governments, high costs of production, unavailability of agricultural based financing and agricultural grants.

As per the studies cited above in the two and a half decades farmers have been faced with almost similar challenges even though suggestions have been coined on how to address the challenges. Nevertheless, a few farmers have taken the challenges and implemented the suggested steps in

addressing the challenges and claim to have succeeded in taking dairy farming as an agribusiness venture. Question is. What are the strategies these dairy farmers have used that make them have a competitive advantage in the dairy venture? Can we take these strategies across the board to make the dairy farming venture into the profitable margins hence help the dairy farmers? This study will address itself on dairy agribusiness strategies farmers have used and how they affect performance.

1.3 Objectives of the Study

i. To establish how innovative activities strategies in dairy agribusiness farming affect the performance of dairy farms in Central Kenya region.
ii. To establish how dairy agribusiness farming operations activities, affect the performance of dairy farms in Central Kenya region.

2.0 Literature Review

2.1 Theoretical Orientation

2.1.1 Diffusion of Innovation Theory

Diffusion of Innovation (DOI) Theory, developed by E.M. Rogers in 1962. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behaviour, or product. Adoption means that a person does something differently than what they had previously (i.e., purchase or use a new product, acquire and perform a new behaviour, etc.). The key to adoption is that the person must perceive the idea, behaviour, or product as new or innovative. It is through this that diffusion is possible.

In the context of this study two variables will be covered by this theory; the innovation activities and the training of farmers. The process of new innovations being communicated through the various channels (trainings which can be theory or practical application in the farm) is what is being referred as diffusion. The diffusion process includes the classic process of "technology transfer" and the process of "adoption of technology" (Black, 2000: Warner, 1974).

2.1.2 Theory of reasoned action.

Martin Fishbein and IcekAjzen (1967) came up with a theory of reasoned action. The theory states "An individual's decision to engage in a particular behaviour is based on the outcomes the individual expects will come as a result of performing the behaviour". The theory of reasoned action suggests that stronger intentions lead to increased effort to perform the behaviour, which also increases the likelihood for the behaviour to be performed. In the context of an agribusiness dairy farmer the conceptualized deliberate actions to take departure from the normal dairy farming practices is a reasoned action. Agribusiness dairy farmers have changed their attitudes in adoption of new ideals for commercial benefits particularly technology. The dairy agribusiness farmer decision to for example involve specialist and consultants in designing the cow barn

structure, feeds planning plus many others. A reasoned action in dairy farming would mean were established planned structured system that ensures efficient flow of activities involved in the entrepreneurship exercise. In the covered objectives on the study, each of them will help demonstrate how deliberate planned action help improve performance. For example, Modern dairy feeding practices reasoned action would entail; securing feed and water supplies from sustainable sources, ensuring dairy feed and water are of suitable quantity and quality, control storage conditions of feed.

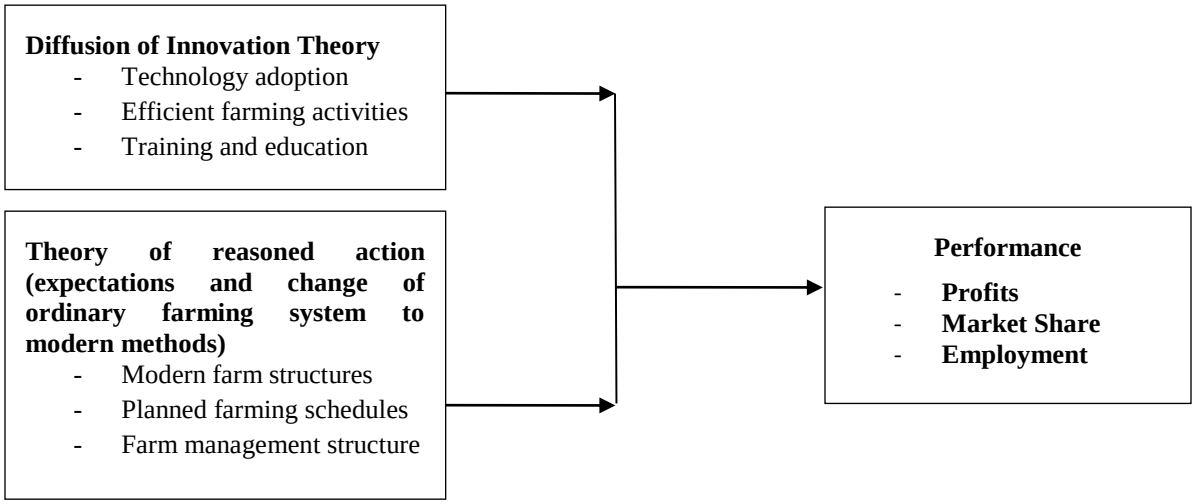

Figure 1: Theoretical Framework

2.2 Conceptual Framework

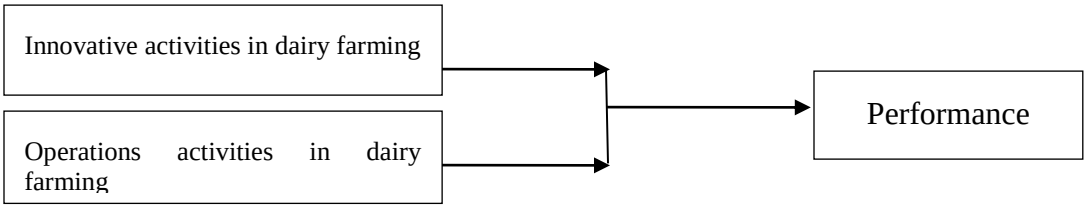

Figure 2 Conceptual Framework

2.2.1 Innovative activities in dairy farming

"An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Roger, 2003, p. 12). For example, when a farmer time the calving to coincide with the dry season when the milk pricing is favorable instead of an all-year-around calving or the farmer monitoring the pasture cover of a farm.

2.2.2 Operations activities in dairy farming

Dairy cow husbandry deals with the feeding, breeding, housing and health care of livestock for getting maximum benefits. The word 'husbandry' means the management of domestic affair. The term used in connection with animal husbandry includes proper feeding, breeding, health care and housing, (R. Bakewell, 2012). This entails a number of critical aspects of dairy cow farming including dairy cow nutritional requirements, feeding plan/schedule, feed quantities, feed hygiene and general dairy cow welfare like proper dairy shed, security, diseases controls, extension services (October 2014 by Thomas H. Herdt).

2.3 Operationalization

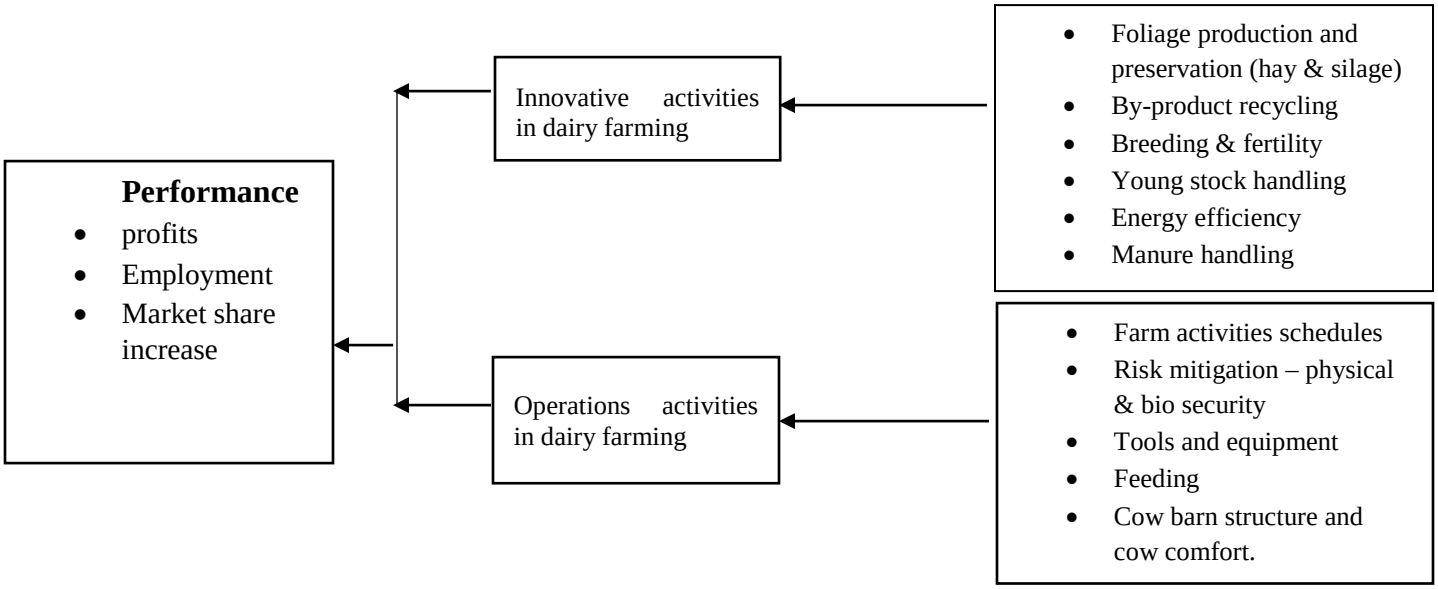

Figure 3: Operational framework

2.3.1 Operationalization

Innovative activities in dairy farming will entail those new ideas the farmers learn Dairy Cow feeding activities entails a number of critical aspects of dairy cow farming including; Feeding schedules, foliage production and preservation, nutrition factors, cow burns structure, hygiene standards. Dairy cow breeding activities involves the carrying on to next generation the genetic qualities and behavior, considered to be advantageous to farmer. The term can refer to the practice of selectively breeding and raising livestock to promote desirable traits in animals in our case for milk production, (Monteny, Gert-Jan, Bannink & Chadwick, 2013). The activities involve; Insemination method, breed selection and breeding manner.

3.0 Research Methodology

The study concentrated in Central Kenya which is mostly an agricultural area with farmers practicing mixed farming. The research study utilized a descriptive, qualitative and quantitative research design to analyze the performance of dairy agribusiness farming in central Kenya region. The target population was 69481 active farmers. The sample size of 384 was determined by Cochran's formula. During the data collection questionnaires were the major instrument. Data validity and data reliability were also conducted. Regression analysis was used in estimating the relationships among variables.

4.0 Analysis, Results and Discussions

4.1 Response Rate

A total of 384respondents were issued with the questionnaires which imply that the entire sample population was used for the study. The result of the analysis of the respondents is presented in Table 1.

Table 1: Response Rate

Response	Frequency	Percent
Returned	346	90.10%
Unreturned	38	9.90%
Total	**384**	**100%**

Table 1 show that a total of 384 questionnaires were distributed. Out of these, 346 questionnaires were properly filled and returned. This represented an overall successful response rate of 90.10%. According to Mugenda and Mugenda (2003) and also Kothari (2004) a response rate of above 50% is adequate for a descriptive study. Babbie (2004) also asserted that return rates of above 50% are acceptable to analyze and publish, 60% is good and 70% and above is very good. Based on these assertions from these studies, 94.06% response rate is considered very good for the study.

4.2 Innovative Strategy Activities

In this study, innovativeness was measured by eleven questions. The analysis is a shown Table 2. According to results in Table 2, majority of the respondents who represented 44.8% of the respondents strongly agreed that their dairy farm had a silage/hay to feed dairy cows, 31.8% agreed, 2.3% were not sure, 10.7 disagreed while 10.4 strongly disagreed. In general, 76.6% agreed that their dairy farm had a silage/hay to feed dairy cows. 75.7% agreed that they kept silage reserve feed stock for future period, 83.8% agreed that the farm kept hay reserve feed stock for a future period, 84.1% agreed that the farm produced its own fodder for dairy cows within the farm, 82.9% agreed that they kept silage reserve feed stock for future period, 83.8% agreed that the farm recycled the by-product like cow dung for bio-gas production and used in the farm, 80.6% agreed that the farm only breed and keep high milk producing cows in the farm, 84.7% agreed that the they engaged vet officer in determining the quality of breed to use when

insemination comes, 75.7% agreed that the farm kept and rear the female young stock for future farm dairy milk production, 82.9% agreed that the farm has a section specifically used for young stock handling, 86.7% indicated with agreement that the farm utilized machineries in the farm for higher work efficiency while 72.9% indicated that the farm used manual produced in the cow barns for the production of fodder crops produced for the cow.

Table 2: Innovative Strategy Activities

Statements	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree	Mean	Std. Dev
The dairy farm has a silage/hay to feed dairy cows	10.4%	10.7%	2.3%	44.8%	31.8%	3.77	1.29
The farm keep silage reserve feed stock for a future period.	6.9%	14.2%	3.2%	57.2%	18.5%	3.66	1.14
The farm keep hay reserve feed stock for a future period	2.3%	11.8%	2.0%	48.0%	35.8%	4.03	1.03
The farm produce its own fodder for dairy cows within the farm	7.5%	5.2%	3.2%	50.6%	33.5%	3.97	1.12
The farm recycles the by-product like cow dung for bio-gas production and used in the farm	4.9%	8.1%	4.0%	49.4%	33.5%	3.99	1.07
The farm only breed and keep the only high milk producing cows in the farm	4.6%	7.2%	7.5%	47.7%	32.9%	3.97	1.06
The dairy farmer engages a vet officer in determining the quality of breed to use when insemination comes.	4.9%	8.4%	2.0%	53.5%	31.2%	3.98	1.06
The farm keep and rear the female young stock for future farm dairy milk production	7.8%	11.8%	4.6%	36.7%	39.0%	3.87	1.27
The farm has a section specifically used for young stock handling	4.3%	9.8%	2.9%	52.6%	30.3%	3.95	1.06
The farm utilized machineries in the farm for higher work efficiency	4.3%	5.5%	3.5%	50.9%	35.8%	4.08	1.00
The farm used manual produced in the cow barns for the production of fodder crops produced for the cow.	8.7%	4.6%	7.5%	40.2%	39.0%	3.96	1.20
Average						**3.93**	**1.12**

On a five-point scale, the average mean of the responses was 3.93 which mean that majority of the respondents agreed with most of the statements on farm innovativeness. The answers, however, were varied as shown by a standard deviation of 1.12. The highest of the mean was 5 while the lowest was 1.

4.3 Farming Operations Activities

In this study, operation activities were measured by nine questions. The analysis is a shown Table 3.

Table 3: Farming Operations Activities

Statements	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree	Mean	Std. Dev
The Dairy farm has a planned feed schedule on what feeds the dairy cows would take and when.	4.6%	10.1%	9.2%	46.5%	29.5%	3.86	1.09
The farm dairy shed has well-built feeding troughs for dairy cows	5.5%	12.1%	6.9%	35.5%	39.9%	3.92	1.20
Farm dairy cows feed quality is determined by feed availability, age of the cow, size of the cow and state of the cow e.g. pregnancy	8.1%	8.7%	9.2%	30.3%	43.6%	3.93	1.27
Dairy cows have a followed schedule of daily activities, e.g. milking hours, feeding hours, resting hours.	4.6%	4.9%	10.1%	40.8%	39.6%	4.06	1.05
The dairy farm shed is well secured to keep off unwanted animals from accessing the sheds	5.2%	12.4%	13.0%	38.2%	31.2%	3.78	1.17
The farm dairy shed has roof and walls sections to protect cows from rains and cold weather	6.9%	8.1%	9.2%	40.2%	35.5%	3.89	1.18
The farm dairy shed has well-built resting compartment for each dairy cow	4.6%	8.4%	12.7%	35.0%	39.3%	3.96	1.13
The farm dairy shed has on open space for cow movement and sunshine.	8.4%	6.4%	17.3%	40.2%	27.7%	3.73	1.18
The farm has invested in machineries powered by either fuel or electricity	5.8%	8.1%	6.4%	54.3%	25.4%	3.86	1.07
Average						**3.89**	**1.15**

According to results in Table 3, majority of the respondents who represented 76.0% agreed that they had a planned feed schedule on what feeds the dairy cows would take and when, 75.4% agreed that dairy shed had well-built feeding troughs for dairy cows, 73.9% agreed that dairy cows feed quality was determined by feed availability, age of the cow, size of the cow and state of the cow e.g. pregnancy, 80.4% agreed that dairy cows had a followed schedule of daily activities, e.g. milking hours, feeding hours, resting hours, 69.4% agreed that dairy farm shed was well secured to keep off unwanted animals from accessing the sheds, 75.7% agreed that dairy shed had roof and walls sections to protect cows from rains and cold weather, 74.3% agreed that dairy shed had well-built resting compartment for each dairy cow,67.9% agreed that

dairy shed has on open space for cow movement and sunshine while 79.7% indicated with an agreement that the farm had invested in machineries powered by either fuel or electricity.

On a five-point scale, the average mean of the responses was 3.89 which mean that majority of the respondents agreed with most of the statements on operation activities. The answers, however, were varied as shown by a standard deviation of 1.15. The highest of the mean was 5 while the lowest was 1.

4.4 Performance of Dairy Farms

On the dependent variable was measured using eight questions. Table 4 shows the findings

Table 4: Performance of Dairy Farms

Statement	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree	Mean	Std. Dev
As a dairy farmer I have been delighted to see a great progress in my dairy farming.	6.7%	4.9%	12.5%	36.2%	39.7%	3.97	1.15
There has been increased production of milk over the years	9.2%	4.6%	9.0%	29.8%	47.4%	4.01	1.26
The milk profitability has been on an upward trend over the years	7.2%	12.7%	11.8%	34.1%	34.1%	3.75	1.25
The market share of milk products has increased over time	4.6%	4.3%	9.5%	40.2%	41.3%	4.09	1.05
The cost of production is low hence improvising income	4.6%	7.5%	14.7%	41.9%	31.2%	3.88	1.08
There has been a wide sale of different milk products that has improved the incomes	7.2%	6.9%	10.7%	36.4%	38.7%	3.92	1.19
The total biological assets for different farmers has grown high over the years	7.5%	8.4%	10.4%	35.8%	37.9%	3.88	1.22
Increased innovation has lowered the cost of production and production of different products	4.6%	6.1%	12.4%	40.8%	36.1%	3.98	1.07
Average						**3.95**	**1.15**

According to table 4.6, 75.9% agreed that there has been increased production of milk over the years, 77.2% agreed that the milk profitability has been on an upward trend over the years, 68.2% agreed that the market share of milk products has increased over time, 81.5% agreed that the cost of production is low hence improvising income, 73.1% agreed that there has been a wide sale of different milk products that has improved the incomes, 75.1% agreed that the total biological assets for different farmers has grown high over the years, 73.3% agreed that increased innovation has lowered the cost of production and production of different products.

On a five-point scale, the average mean of the responses was 3.95 which mean that majority of the respondents agreed to most of statement items. The answers, however, were varied as shown by a standard deviation of 1.15. The highest of the mean was 5 while the lowest was 1.

4.5 Correlation Analysis

The data presented before on innovation activities, operation activities, farm training, value addition and performance of firms were computed into single variables per factor by obtaining the averages of each factor. Pearson's correlations analysis was then conducted at 95% confidence interval and 5% confidence level 2-tailed. The Table 5 indicates the correlation matrix between the factors innovation activities, operation activities, farm training, value addition and performance of dairy farm.

Table 5: Correlation Matrix Table

		Performance	Innovation	Operations
Performance	Pearson Correlation	1.000		
	Sig. (2-tailed)			
Innovation	Pearson Correlation	0.075	1.000	
	Sig. (2-tailed)	0.006		
Operations	Pearson Correlation	.397**	.165**	1.000
	Sig. (2-tailed)	0.000	0.002	

** Correlation is significant at the 0.01 level (2-tailed).

Results in Table 5 present the results of the correlation analysis. The results revealed that innovative activities strategies in dairy agribusiness farming and performance of dairy farms are positively and significant related (r=0.075, p=0.006). The results further indicate that dairy agribusiness farming operations activities and the performance of dairy farms are positively and significantly related (r=0.397, p=0.000).

4.6 Regression Analysis

Regression analysis was performed by using the composites of the key variables. The data was input to the SPSS software. Results were then presented in Tables 6, 7 and 8.

Table 6: Model Fitness

Indicator	Coefficient
R	0.740
R Square	**0.547**
Adjusted R Square	0.542
Std. Error of the Estimate	0.356

The results presented in Table 6 present the fitness of model used in the regression model in explaining the study phenomena. Innovation activities and operation activities was found to be satisfactory variables in the performance of dairy farms. This was supported by the coefficient of determination also known as the R-square of 0.547. This means that innovation activities and

operation activities explain 54.7% of the variations in the dependent variable which is the performance of dairy farms. These results further mean that the model applied to link the relationship of the variables was satisfactory. Table 7 presents results of analysis of variance

Table 7: Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	52.25	4	13.062	102.951	0.000
Residual	43.266	341	0.127		
Total	95.516	345			

Table 7 provides the results on the analysis of the variance (ANOVA). The results indicate that the overall model was statistically significant. Further, the results imply that the independent variables are good predictors of performance of dairy farms. This was supported by an F statistic of 102.951 and the reported $p<0.05$ which was less than the conventional probability of 0.05significance level. Regression of coefficients results is presented Table 8

Table 8: Regression of Coefficients

	B	Std. Error	Beta	t	Sig.
(Constant)	0.065	0.262		0.246	0.806
Innovation strategies	0.014	0.044	0.012	0.328	0.003
Operational activities	0.403	0.053	0.289	7.604	0.007

Table 8 shows that innovation strategies had a positive and significant effect on performance of dairy farms($r=0.14$, $p<0.05$). The Table further indicated that operational activities had a positive and significant effect on performance of dairy farms ($r=0.403$, $p<0.05$).

5.0 Conclusions

Based on the findings above the study concluded that innovative activities strategies in dairy agribusiness and dairy agribusiness farming operations activities influence the performance in dairy farming in central Kenya.

The study concludes that innovative activities strategies in dairy agribusiness are an essential foundation for dairy farming. Being everything that supports the flow and processing of farm performance, innovative activities strategies in dairy agribusiness constitutes a significant enhancer to current and future performance in dairy farming.

In addition, the study concluded that improving dairy agribusiness farming operations activities has become a core determiner of the successful production of dairy and dairy products in dairy farming. It is also a core determiner in dairy farming performance. An improvement in dairy agribusiness farming operations activities will results in improvement of farm performance.

6.0 Recommendations

The study recommends for investment innovative activities strategies in dairy agribusiness in the county to e natured. Farmers who have innovative ideas should be supported both financially and emotionally to encourage realization of the innovation.

The study also recommends that farmers should be made aware of productive dairy agribusiness farming operations activities. They should be guided to ensure that they stick to these ways to realize profitability in their dairy ventures.

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