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PRODUCTION PERFORMANCE AND PROFITABILITY ANALYSIS OF SMALL SCALE LAYER PROJECTS SUPPORTED THROUGH CASP IN GERMISTON REGION, GAUTENG PROVINCE

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ABSTRACT

The purpose of this study was to conduct a descriptive survey to study production performance, profitability and constraints of small scale layer projects funded through CASP in Germiston Region, Gauteng Province. Data was collected using a well-structured questionnaire from 26 small scale layer producers using purposive sampling technique. To assess the reliability of the questionnaire, Cronbach's alpha was used. The data were analyzed using descriptive and inferential statistics such as extent of mean, standard deviation, coefficient of variation and correlation analysis. Gross margin analysis was used to determine the profitability. The constraints were analysed using the Likert scale technique. The result of the study reveals that the average flock size kept by farmers was 587 layers and mortality rate was 4%. Hen-day egg production on average was 80%. High cost of feed, access to funding and cost of pullets were amongst constraints associated with egg production in the study area. The total revenue, total variable cost and gross margin were R265.37, R342.98 and R77.61, respectively per bird. In conclusion it was found that egg production was profitable in the study area. The study recommended that farmers should be assisted with economic unit structures and supporting structure should be in place for technical advices through agricultural extension.

Key words: egg production, profitability, CASP, Extension support

1. INTRODUCTION

The importance of poultry production to the biological needs, economic and social development of the people in any nation cannot be overemphasized (Oladeebo & Ambe-Lamidi, 2007:994). Egg production involves the use of good layer birds for the purpose of table egg production. The eggs are sold off fresh to the public , additional revenue is realized from the sales of layers, which are no longer laying eggs well, are culled off from the farm (Bamiro, 2008:1118 and Amos, 2006:247). Egg production and liveability are the main determinants of profitability (Hossen, 2010:1). Egg production is an important economic enterprise offering more rapid and efficient returns than many other livestock production operations. A layer normally starts egg production at around five months (20-21weeks) of age and continues to lay for 12 months (52 weeks) on average, laying fewer eggs as they near the moulting period. On average a bird produces one egg per day. Furthermore, not all birds start to lay exactly when they are 21 weeks old. Planning is therefore required for egg production to be constant so as to meet market demand (FAO, 2003:11).
Due to rapid and higher returns, egg production could be easily adapted on a larger and more efficient scale by applying good management practices. Egg production is a variable phenomenon and could adversely be affected by unfavourable conditions, filthy environment, diseases and management conditions (Farooq, 2002:9).

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Small scale layer projects in Gauteng Province are mostly funded by government through Comprehensive Agricultural Support Programme (CASP), mainly to contribute on food security, poverty alleviation and job creation. According to Department of Agriculture (2004:1), the Comprehensive Agricultural Support Programme (CASP), was introduced to facilitate the development of smallholder farmers. CASP is a post settlement support programme to the beneficiaries of land reform and those who acquired land through private means. There are six targeted areas of support within CASP i.e.:

- ✓ Information and knowledge management
- ✓ Technical and advisory assistance
- ✓ Financial mechanisms
- ✓ Training and capacity building
- ✓ Marketing and business development
- ✓ On and off farm infrastructure

The present study was conducted with the objective of obtaining baseline information on production performance, profitability and also identify constrains which affect the small-scale layer projects funded through CASP in Gauteng Province.

2. METHOD AND MATERIALS

The study population comprised of 26 small scale layer farmers funded through CASP with layer structures and production inputs in Germiston Region, Gauteng Province (GP) since 2005 to 2012. Germiston region is constituted by Ekurhuleni Metropolitan Municipality and Sedibeng District Municipality.

The purposive sampling method was used to interview only small scale layer farmers funded through CASP in Germiston region, Gauteng Province. A structured questionnaire was designed in order to collect both qualitative and quantitative data. A structured questionnaire was administered to all small scale layer farmers (respondents) through face-to-face interviews to obtain primary data for the study. Questionnaire reliability was estimated by calculating Cronbach's alpha. Reliability of the overall instrument was estimated at 0.80. It meant that index had high reliability. The data were collected between August and November 2014.

Data were sorted and coded before being analysed. Data were analyzed using descriptive and inferential statistics such as extent of mean, standard deviation and coefficient of variation analysis. Gross margin analysis was used to determine profitability. According to Jatto (2012:19) the mathematical notation for gross margin is presented as:

$$GM = TR - TVC \quad (1)$$

GM = Gross Margin
TR=Total Revenue
TVC= Total Variable Cost

A 5 point Likert scale method and ranking order were used to determine the constraints and employs an ordinal level of measurement. The responses to various constraints were scored in a way that the response indicating the most serious constraint is given the highest score (5).Very serious (VS) =5, Serious (S) =4, Moderately serious (MS) =3, Least serious (LS) =2, Not serious (NS) =1. For a given constraint the mean was computed by taking the sum of the products between the number of responses and grade point and then divided by the total number of responses. This method of determining the constraints is important because it tells

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us exactly those constraints that are not important, that is when the mean is less than 3, it also show us those very serious constraints, that is, those with mean equal to or more than 3 (Ekunwe, Soniregun & Oyedeji., 2006:82).

Feed intake and hen-day production (HDP) were calculated. Feed intake per hen was estimated based on the total amount of feed given per flock per day. Percentage hen day egg production was calculated by dividing the number of eggs produced for the particular day by the number of hens and converting to a percentage. (Irmasusanti, Isbandi, Prasetiyono & Siregar., 2013:661).

$$HDP = \frac{\text{Total number of eggs produced on a day}}{\text{Total number of hens present on that day}} \times 100 \quad (2)$$

3. RESULTS AND DISCUSSION

Socioeconomic characteristics: The findings are as shown in Table 1. The results of the analysis revealed that 38.5% and 61.5% of the small scale layer farmers supported through CASP are male and female respectively. This shows that females are more involved in egg production enterprises than their male counterpart. This reflects a significant support towards transformation and women empowerment in an agricultural sector within Germiston region. The results show that 3.85% and 50% are within the age range of 36-40 and 41-50 years respectively. According to Jatto (2012:19) they are still in their active age and as a result they are likely to adopt new innovation than older generation. However, 46.2 % are above 51 years and that is a worry factor in terms of adoption of new technology and further possess risk to food security in Gauteng Province should there be no succession plan. According to Irmasusanti *et al.,* (2013:661) age factor is one of the factors that determined the success of a farmer because it deals with physical condition and the way of thinking in managing and expanding business. The educational status of sampled farmers showed that 46.2% has secondary education and 53.8% has tertiary education. This means that their level of adoption and application is very high. Majority of farmers interviewed had a considerable level of experience. Those with farming experience between 0-2 years accounted for 7.69%, those with farming experience between 3-5 years accounted for 46.2%, while those with farming experience between 6-10 years and 11 and above accounted for 38.5% and 7.69% respectively. The longer someone involves in farming, the more they masters the technique. The knowledge gained during farming gives them more experience about raising layer (Irmasusanti *et al.,* 2013:661). The results showed that 92.3% of the farmers are married while 7.69% are single. The results further revealed that 76.9% of government investment is on privately own land or farms while states land accounted for 23.1%. Out of 26 projects supported it was found that only 46.2% are still in production while 53.8% are not active. However, in some cases farmers converted structures to broiler and piggery structures while some are becoming white elephants.

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Table 1: Socio economic characteristics of small scale layer farmers supported through CASP in Germiston region (N=26)

Variables	Categories	Frequency	%
Gender	Male	10	38.5
	Female	16	61.5
Age	36-40	1	3.8
	41-50	13	50.0
	51 above	12	46.2
Education	Secondary	12	46.2
	Post Matric	14	53.8
Layers experience	0-2	2	7.7
	3-5	12	46.1
	6 -10	10	38.5
	11+	2	7.7
Marital status	Single	2	7.7
	Married	24	92.3
Land acquisition	Private means	20	76.9
	State land	6	23.1
Production status	Active	12	46.2
	Non active	14	53.8

Multiple Responses, Source: Field Survey, 2014

Egg production is a function of feed consumed, age at point of lay, age at peak of lay, peak percent lay, percent hen day egg production, laying period, rearing environment, health care and overall management of the flock. Thus, any variation in the aforementioned traits will result in a wide variability. Hence, care must be exercised to fulfil all the production requirements in an appropriate way thereby ensuring better productivity (Ali, Farooq, Durrani, Chand, Sarbiland & Riaz., 2003:275). Production performance was determined from 12 small scale layer farmers who were still active and in production as presented in Table 2. The results showed that carrying capacity of layer structures given to small scale layer farmers was 1000 capacity and flock size varied from 200 to 1000 birds with a mean of (M=587, SD=±264.7) birds. These results indicate that the structures are not utilized to its maximum potential by almost 41.3% and this would have a direct impact on the profitability and sustainability of the project. Data showed feed intake/bird/day ranged from 100 to 120g layer mash with mean of 107.3±5.94grams. On average each bird consumed 39±2.16kg during the cycle period (52 weeks). Hen day egg production range from 76 to 83% and mean was calculated to be 80.1±2.61%. Total eggs produced per birds during production cycle ranged from 275 to 300 eggs with mean of 290±9.47 eggs. This reflected the production capacity of the birds kept by small scale layer farmers in the study. There was a significant (P=0.000; R^2 =0.99) positive correlation between feed intake per day and eggs produced per day. That clearly indicates that 99% of variance in egg production is mainly influenced by feed intake. Production cycle is defined as a period from the start of laying to culling. In this study age at start laying of bird ranged from 21 to 22 weeks with a mean of 21.7±0.49 weeks. This variation might be due to difference of strain, feeding, lighting and management (Abdullah-Al-Amin, Rahman, Howlider & Ahmmed, 2009:284). The results revealed that small scale layer farmers culled their birds after 52 weeks when egg production started to decline. However, should production decline drastically birds were culled before 52 weeks and depending on availability of replacement stock. This is in agreement with the findings of Badubi & Ravindran., (2004:323). The results further revealed that mortality rate range from

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1 to 6 % with a mean mortality rate of 4±1.86%. This could be attributed to number of factors such as diseases, poor ventilation and production management practices.

Table 2: Production performance of small scale layer farmers supported through CASP in Germiston region (N=12)

Variables	Mean	STDV	CV (%)
Carrying capacity	1000	0	
Flock size	587	264.7	45.1
Feed intake (g/bird/day)	107.3	5.94	5.54
Hen-day egg production (%)	80.1	2.61	3.26
Average age at first laying (week)	21.7	0.49	2.26
Length of production cycle (weeks)	52	0	0
Total eggs produced per bird	290	9.47	3.27
Mortality rate (%)	4	1.86	46.5

Source: Field Survey 2014

Constraints faced by farmers: The findings are as shown in Table 3 and using Likert scale method, constraints with mean value less than 3 are minor constraints while those with mean value above are major constraints. The result of the analysis shows that high cost of feed and access to funding ranked first amongst the various constraints with a mean value of 5. High cost of pullets ranked second with mean value of 4.35 (SD = ±0.689) followed by poor record keeping and financial management skills (M = 3.85, SD = ±1.12 and M = 3.38, SD = ±0.9), respectively. Poor record keeping and inadequate financial management skills leads to poor business decision making. The results further showed that production management skills, disease control and access to market are minor constraints faced by farmers in the study. This could be attributed to knowledge farmers acquired through experience in layer farming and role played by agricultural advisors.

Table 3: Challenges faced by small scale layer farmers supported through CASP in Germiston region (N=26)

Major problem	Mean	STDV	Rank
High cost of feed	5.00	0.00	1
Access to funding	5.00	0.00	1
High cost of pullets	4.35	0.689	2
Poor record keeping	3.85	1.120	3
Financial management skills	3.38	0.90	4
Production management skills	2.54	0.90	5
Disease control	2.23	0.59	6
Inadequate market	2.23	0.99	6

Source: Field Survey 2014

Gross margin analysis: Gross margin analysis was used to analyze the cost and return structure for small scale layer farmers in the study area as presented in Table 4. Egg production is the major index of performance of layer business because it accounts for about 90 percent of the income from the enterprise (Ekunwe *et al*., 2006:81). In addition to the sales of eggs, which is the major source of revenue, additional revenue is realized from the sales of culled layers (Bamiro, 2008: 1118). Analysis of the findings shows that cost of pullets and feeds accounted for 20.7 and 65.5 % of the total costs respectively. This is an indication that feed costs have a major impact on the profitability of egg production enterprises. The results

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confirm findings of Tijjani, Tijani, Tijjani & Sadiq (2012:321) and Jatto (2012:20) that feeds constitute the larger proportion of the total cost of poultry egg production. The total revenue, total variable cost and gross margin were R265.37, R342.98 and R77.61, respectively per bird in a small scale layer enterprise in the study area. The result clearly indicates that egg production is a profitable business in the study area. These suggest that egg production enterprises depends on flock size, the larger the flock the more number of eggs and that will results in a huge income generation of small scale layer farmers and bring change in their wellbeing. This finding is in agreement with Oladeebo & Ojo (2012:5173) that level of profit in egg production enterprises depend on the scale of production.

Table 4: Average gross margin analysis of small scale layer farmers for a cycle in Germiston region (N=12)

Items	**Quantity**	**Unit Price (R/c)**	**Total(R/c)**	**Percentage (%)**
Variable cost				
Pullets	587	55.00	32285.00	20.7
Feed (50kg/bag)	458	222.8	102042.00	65.5
Medication	1	647.5	647.5	0.41
Transport	12	500.00	6000.00	3.9
Electricity	12	208.33	2499.96	1.60
Labour	12	R1025-00	R 12300.00	7.90
Total variable cost per group			**R155774.46**	
Total variable cost per bird			**R265.37**	
Revenue				
Eggs	170625	R1.07	R182568.75	
Culled birds	563	R33.33	R18764.79	
Total revenueper group			**R201333.54**	
Total revenue per bird			**R342.98**	
Gross margin per group			**R45559.08**	
Gross margin per bird			**R77.61**	

Source: Computed from Field Survey, 2014

4. CONCLUSION

It is showed in this study that layer structures given to small scale layer farmers in Germiston region are not utilized to its maximum potential ability and majority of them are built in privately owned land. The study revealed that feed and access to funding ranked first amongst major constraints faced by farmers in the study area. It was found that egg production was profitable in the study area but the profit was not significant enough for farmers to expand on their own to become commercial layer farmers. The study further revealed that cost of feed constituted 65.5% of the total cost of layer enterprise in the study area.

5. IMPLICATIONS FOR EXTENSION

Agricultural extension is considered to be an important service in increasing agricultural productivity and attaining sustainable development. Its role is to help farmers identify and address their needs and problems (Kibett, Munyin & Muchiri., 2005:1491). Extension in some cases is used as a vehicle to implement government developmental programmes such as

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CASP to achieve government goals. The study revealed that if implemented well extension will be significantly contributing to the socio-economic well-being of the farmers and farming community in general. The extension message from this study is that sustainability and profitability of egg production enterprises depends on adoption of layer production management techniques, managerial skills and scale of production. Success of layer farmers also depends on specialized, competent and well trained animal production agricultural advisors. Since agricultural advisors plays a significant role in the transfer of knowledge and good farming practices. Farmers should further be cautioned that feeds constitute around 65% of production cost.

6. RECOMMENDATIONS

The study recommends that farmers should be assisted with economic unit structures in order to generated maximum income from egg enterprise. Proper supporting structure through agricultural extension should be in place for technical advices. As a result they will significantly contribute towards job creation, poverty alleviation and food security.

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