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Short Communication

BENEFIT-COST ANALYSIS OF PULLET REARING IN SARPANG DISTRICT

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ABSTRACT: The study was designed to assess the benefit-cost analysis of pullet rearing in Sarpang district. A total of 2000 numbers of commercial Hy-line Brown Day-Old Chicks were placed at the stocking density of 10 birds/m^2 in a private pullet rearing farm. The chicks were reared in a semi-permanent shed in accordance with the entrepreneur's normal management practices. A total depreciated fixed cost, variable cost and total revenue were calculated to compute the unit cost of pullet production at 56 days age. The study revealed that 88 % of the total cost of production was incurred on variable cost and 12 % for fixed cost. Amongst the variable cost, the highest expenditure was recorded on feed cost and least on utilities. For the total fixed cost, large share of investment of 50.23 % was incurred on poultry shed construction, and the least of 1% on chick drinker. The average unit cost of producing eight weeks old pullet was computed at Nu. 131. Rearing 2000 DoCs earns a net profit of Nu. 89,451 at the existing farm gate price of Nu.175. The profitability would further increase with increase in production cycles from four to five per annum. This study indicates that pullet rearing is a profitable venture and need to be encouraged in other regions of the country

Keywords; Benefit cost; cost of production; day old chicks; profitable; pullet.

1. INTRODUCTION

Livestock sector plays an important role in improving livelihood of the people worldwide. Among many other livestock sub-sectors, poultry production has seen a drastic change in the last 35 years. Windhorst (2014) reported that the poultry meat and egg has been increasing faster than beef and pork since 1975 to 2005. The rapid changes seen in poultry sector are essentially due to introduction of modern intensive production methods, genetic improvements, improved preventive disease control and biosecurity measures, increasing income and human population and, urbanization (Narrod et al. 2006). According to Irfana et al. (2015) the poultry sector generates income and provides employment opportunity for 1.5 million population in Pakistan.

In Asia, poultry industry has become one of the most successful businesses and plays a vital role in generating and supplementing the family income especially for those with small land holdings. Globally, India is ranked third after China and USA with egg production of 53.3 billion and ranked 5th after USA, China, Brazil and Mexico in chicken production (Hellin et al. 2015). In Bhutan, 60 % of the population are dependent on livestock farming, and livestock sector contributes 3.5 % to the country's Gross domestic product (GDP) (National Statistic Bureau [NSB] 2013). Poultry farming is an important farming opportunity for income generation and employment for many Bhutanese producers and entrepreneurs, (Gyeltshen et al. 2012).

Currently, Bhutan has three nucleus farms, viz., National Poultry Research and Development Centre (NPRDC) in Sarpang, and two regional farms located in Paro and Mongar. From these three farms, commercial layer Day-Old Chicks (DoCs) are produced and distributed to all districts for egg production. NPRDC is the only agency that produces and distributes the broiler DoCs. Off late, few poultry entrepreneurs have shown interest in pullet rearing pullet rather than keeping layers, for distribution to poultry farmers of higher altitudes. Layer farmers claim that higher cost of pullets had contributed to increased cost of production of table eggs. This is yet to be substantiated. Currently, there are very few farmers who are into pullets farming creating a

favorable condition of imperfectly competitive market. Thus, the pullet farmers are seen as proce makers. The study on cost benefit analysis of pullet and unit cost of production had never been conducted in the country and published. Therefore, the study was mainly aimed to compute the unit cost of production and cost benefit analysis of pullet at eight weeks of age.

2. MATERIALS AND METHODS

2.1 Study Area

The study was conducted at K.K. Pullet Farm located at 26°52'39"N, 90°16'12"E, 344 meters above the sea level under Sompangkha geog, Sarpang from September 19th to 14th November, 2018.

The study area has warm sub-tropical climate, characterized by hot and humid summer and moderately cool and dry winter. The average annual temperature is 22°C and average annual rainfall ranges from 1200-2500 mm.

2.2 Experimental design

A total of 2000 numbers of commercial Hy-line Brown DoCs were purchased from NPRDC, Sarpang and stocked at K.K. Pullet Farm. The DoCs were reared at the stocking density of 10 birds/m^2 in a single shed. The birds were reared up to eight weeks of age.

Standard management practices with regard to brooding, lighting, feed and water provision and, bedding requirement were followed. Also, the standard recommended vaccination regime for poultry in Bhutan was performed.

2.3 Data Collection and analysis

The data were collected for 56 days from 19th September to 14th November, 2018. The body weights were measured weekly and mortality recorded on a daily basis. The actual data on fixed and variable costs were recorded to assess unit cost of pullet production. The revenue generated from the sale of birds and manure were also recorded.

The data collected were entered, cleaned and coded using Microsoft-Excel spreadsheet 2010 version. Simple descriptive statistics (means and percentages) were used to draw the inferences of the study.

The depreciation costs were calculated based on the number of batches reared in a year. Simple total cost and revenue generated were calculated to determine the profit/loss statement of the pullet farms. The following formulae were used to determine the relationships.

$$TC = TVC + TFC$$

$$NFI = TR - TC,$$

Where TC is the total cost, TVC is the total variable cost, TFC is the total fixed cost, NFI is the net farm income and, TR is the total revenue.

3. RESULTS AND DISCUSSIONS

3.1 Fixed Cost

Fixed cost is the cost that remains constant regardless of changes in the level of activity. The current study included fixed cost depreciation on poultry shed, equipment and appreciation on land lease. The depreciation of shed was computed at the useful life of ten years by number of batches reared in a year. The land on lease was calculated for five years by number of batches reared in a year. However, for the poultry equipment (e.g., drinkers, feeder) it was totally depreciated within a year by number of batches to be reared in a year.

The study revealed that the total of Nu. 28,865 was incurred as overall fixed cost for 56 days (Table 1) which constituted 12 % of the total cost of production. This finding was in line with study by Abdurofi et al. (2017) and Olorunwa (2018) where they observed comparatively low investment on fixed cost. Similar result was also revealed by Maikasuwa (2014) in economic analysis of small-layer production in Nigeria with birds ranging from one to 500 numbers for a typical enterprise.

The highest total fixed cost was attributed to poultry shed construction (50.23%), followed by purchase of tarpaulin and medium feeders with 12 % and 11.78 %, respectively. The least fixed cost was computed for chick drinker which accounted to only 1% of the total fixed

Table 1: Depreciated fixed cost per batch of four cycles per annum

Particular	Qty (No.)	Unit cost (Nu.)	Amount (Nu.)	Per batch (Nu.)	Percent
Land on lease	1	7500	7500	375	1.3
Cost of shed construction	1	580000	580000	14500	50.23
Brooder ring	2	1200	2400	600	2.08
Electric-brooder	2	4500	9000	2250	7.79
Chick Feeder	20	124	2480	620	2.15
Medium feeder	40	340	13600	3400	11.78
Chick drinker	20	59	1180	295	1.02
Drinker	40	200	8000	2000	6.93
Tarpaulin	3	4700	14100	3525	12.21
Beak Trimmer	1	5200	5200	1300	4.5
Total				**28,865**	**100**

cost. The similar results of 55% fixed cost fixed on shed construction and 1% on equipment were (Regional Livestock Development Centre [RLDC] 2019).

3.2 Variable Cost

The variable cost changes with the change in activities. The variable cost includes the cost of DoC, feed, labour, bedding materials, consumables (vaccines and medicines) and utility charges such as electricity. The total variable cost of Nu. 214,684 was computed for 2000 number of chicks in a rearing period of 56 days with a 95% livability (Table 2).

Table 2:Total variable cost (Nu)

Particular	Amount (Nu.)	%
Transportation of feed	8000	3.7
Vitamins and minerals	5000	2.3
Saw dust	4000	1.9
Electricity	600	0.3
DoC	60000	27.9
Labour	32000	14.9
Feed	105084	48.9
Total	**214,684**	**100**

The result from the total variable cost showed that the highest proportion of production cost was attributed to commercial feed at 48.9 % followed by cost on DoC at 27.9 % and labour at 14.9 %. The least production cost was incurred in electricity bill and bedding materials which came to 0.3 % and 1.9 %, respectively. This result was supported by Demircan et al. (2010) where feed cost was ranked first among the cost items in the study.

Result by Abdurofi et al. (2017) found that feed cost alone accounts for 70 % which is comparatively higher than current study. In contrasts, Islam et al. (2016) revealed feed cost of 13.58% from the total production cost. The huge variation in feed cost may be attributed to the economy of scale and production systems. For instance, the 13.58% cost, as above, was estimated in rural tribal community with 10 numbers of birds. In poultry production, it is universally accepted that feed represents the major cost, constituting upto 50% of the total cost. The cost of DoC accounted to 27.9 % which is higher than the results by Olorunwa (2018) in the broiler production. The payment for labor accounted 14.9 % in the current study which is comparable to the results obtained by Olorunwa (2018).

3.3 Total Cost

Total cost is the sum of total fixed cost and variable cost. During the study, a total cost of Nu. 243,549 was computed for rearing pullet till 56 days old. Of the total cost was incurred, variable cost and total fixed cost were 88% and 12 % respectively.

3.4 Cost of Production of Pullet

The Cost of Production (CoP) is the essential expenditure to get the factors of production of land, labor, capital and management needed to produce a particular commodity (Guthrie & Wallace, 1969). The unit CoP of pullet was calculated by using the following formula;

$$Unit\ Cost\ of\ Production = \frac{Total\ Cost}{Total\ numbers\ of\ Bird}$$

The study revealed that the unit cost of production of pullet stood at Nu.131. This means that Nu. 131 was incurred to produce one pullet of 56 days of age (Table 3). The study revealed that the rearing of pullet is a profitable venture at the existing farm gate price of Nu. 175 per pullet. The finding of the study was computed based on four batches of pullet production per annum only. However, in ideal circumstance, five batches per annum can be reared in the same facility keeping the recommended downtime period of two weeks (Hy-line International 2018).

Table 3: Unit cost of pullet production (Nu)

Description	Amount (Nu.)
Total Fixed Cost	28865
Total Variable Cost	219684
Total Cost	248549
Total Bird	1900
Cost of Production	**131**

Table 4: Estimated Net Profit (Nu) generated from rearing pullets

Description	**Quantity**	**Existing Rate (Nu.)**	**Amount (Nu.)**	**%**
Sale of pullet (No)	1900	170	323,000	97
Sale of manure (bag)	200	50	10,000	3
Total Revenue			333,000	
Total cost			243,549	
Net Profit (TR-TC)			89,451	100

3.5 Total Revenue

Total revenue of Nu. 333,000 was generated from the sale of pullets and manure (Table 4). The maximum revenue (97 %) was generated from the sale of pullets and only 3% was accounted from the sale of manure. The net profit of Nu. 89,451 was generated after deducting the total cost.

3.6 Profitability of Pullet rearing

Farm budgeting tool (manually developed in MS excel sheet, version 2010) was used to determine the profitability of pullet rearing. The findings showed that the total variable cost constituted the highest proportion (88 %) of the total cost of production. The findings of this study are in line with the results of Maikasuwa (2014), where they observed that total variable cost constituted 94.46 % of the total cost. In broiler production, Olorunwa (2018) observed 81.85% of the average total cost of production was on the variable inputs where feed constituted highest amongst the variable cost. Nonetheless, the study results indicated that pullet farming is economically viable in the study area.

4. CONCLUSION

On the basis of the present findings, pullet rearing is a profitable venture due to short rearing cycle. The result can be partially attributed to nearness of the pullet rearing farm to the DoCs producing farm and feed mills whereby the transportation cost is greatly reduced. Timely supply of DoCs and strict disease and pests control measures in place also would have a bearing on net profitability. However, this finding may not apply to pullet production in areas where feed transportation cost is high, colder climatic condition and regions far from DoC supply centre.

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