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PROFIT ANALYSIS OF BROILER REARING IN NUEVA EJICA PHILIPPINES UNDER CLIMATE CONTROLLED HOUSING AND CONVENTIONAL HOUSING

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Abstract

The study analyzes the profitability of broiler under conventional Housing and Climate Controlled System (CCS). The study covered three farms under contract with Magnolia Foods Company in the areas of Nueva Ejica: San Jose City, Science City of Munoz, and Guimba. This study covered a period of 4 years (2010-2013) with seven growing cycles per year for both CCS and Conventional house. It was classified to small farms with an average of 5,000 birds, medium farms with an average of 10,000 birds, and large farms with an average of 20,000 birds. The CCS farms realized higher profits than the conventional farms. The growers' fee is relatively higher in CCS farms and cost of production per bird is relatively higher in conventional houses. This findings also showed that it is more profitable to produce using CCS in the medium and large farm scale. CCS farms had better productivity which is explained by better growing conditions for the birds. There is significant net profit margin in large and medium houses, the broiler growers producing in large and medium house are recommended to use CCS houses so as to realize higher profit. The results of the study provides government agencies like Department of Agriculture, State Universities, private investors and other stakeholders with a basis and required information to trump up support for CCS housing due to its high profitability.

Keywords: Profits, Growth, Rearing, Production, Housing

INTRODUCTION

Broiler production requires relatively high investment and operating cost to ensure good performance in every growing cycle (Bucklin et al., 2012). The cost of housing and other facilities make up the high investment requirement, whereas the cost of chicks, labor, feeds, biologics, power and water, and house repair and maintenance constitute the high operating

cost. Nowadays, there are two types of housing, the conventional and the controlled climate system of housing (Donald et al., 2011). The latter is more expensive to put up than the former with Php250 per bird vs Php382 per bird. However, the conventional housing has a lower life span. Repair and maintenance is done after five years and bi-yearly or yearly thereafter. On the contrary, the CCS housing has a longer life span of 15-20 years and requires less maintenance and operating cost. It has higher bird capacity that makes the cost per unit area relatively less expensive. Moreover, the use of CCS has productivity gains for broiler raisers. The good atmosphere for growth improves feed efficiency, growth rate and livability. Therefore, the adoption of CCS could improve productivity; hence supply (Bucklin *et al.,* 2012).

The positive effects of quality day-old chicks, feeds, biologics and over-all management on the production performance of broiler farms have long been studied in most animal science researches. Under contract growing, day-old chicks, feeds and biologics are provided by the integrator, whereas, growers provide the over-all management, housing and facilities. To attain the standards set by the integrator, the management practices set forth have to be ensured such as good feeding practices, brooding, bio-security, vaccination and medical schedule, house cleaning, and disinfection. Good management practice leads to maximum utilization of material inputs resulting in higher productivity (Lonely Planet, 2013).

The grower's fee is determined by the farm's productivity. The grower's fee for broiler is dependent on performance as indicated by Average Live Weight(ALW), Harvest Recovery (HR) and Feed Conversion Ratio (FCR) upon harvest. Payment scheme is standardized depending on these performance indicators. Payment is constant throughout the growing cycles as stipulated in the contract. Hence, it is the productivity that determines the grower's fee. This and the operating expenses determine the profit per growing cycle. The performance of the farms was examined in terms of its production performance, grower's fee and profit as differentiated by the type of housing.

The framework of the study used the dependent-independent variable relationship. In this study, the effects on production performance of the different factors such as feeds, biologics, labor, electric and water consumption, other management practices, and temperature was examined on a per farm basis given its performance per cycle.

Efficient feeding practice reduces the volume of feed waste and increases the FCR and ALW. Proper brooding method reduces the volume of rice hull used, LPG and the electricity bills. It also reduces the mortality of the birds during brooding stage especially in CCS housing, thus expected higher HR than in conventional housing.

Contract price is constant throughout the growing cycles as stipulated in the contract. The operating expenses determine the profit per growing cycle, the operating expenses in CCS

farms is expected to be lower than conventional thus enjoying higher profit. The profit of the Broiler farms will be examined in terms of its grower's fee and profit.

Feed conversion ratio (FCR) is a measure of how well a flock converts feed intake (feed usage) into live weight. Birds are assessed and ranked based on their ability to convert a certain input to a certain output. In this case the input is quantity of feed, often referred to as feed intake (amount of feed consumed over a given period of time) and the output is body weight or meat gain. There are a number of ways to assess feed efficiency, currently, the most widely used are feed conversion ratio (FCR) and residual feed intake (RFI). FCR can be defined as the amount of feed consumed per unit of weight gain, and is a composite trait of starting and ending body weight and feed intake (Arbor, 2011).

Small changes in FCR at any given feed price will have a substantial impact on financial margins. Solving, or preventing, FCR problems in a flock requires both good planning and good management. The key to preventing FCR problems is ensuring that throughout the brooding and grow-out period, good management practices are in place so that bird performance is optimized (San Miguel Foods Inc, 2012).

FCR has a significant economic impact to profit. Any factor which affects the feed usage, growth or health of the broiler will worsen flock FCR (Kleyn, 2013). Correcting an FCR problem requires communication and coordination across the whole production unit.

In a comparison between a random bred control population and commercially available stock from 1966 and 2003, Liang et al. (2013) concluded that selection programs alongside management techniques had improved FCR in broiler by approximately 20%. In a similar comparison between breeding lines from 1957 and 1991, genetics, nutrition, and other management changes over the 34 year period studied resulted in broilers (in 1991) that showed significantly improved FCR (3.00 vs. 2.04) at both a constant age and weight (FAO, 2013).

Poultry feed costs continue to climb, with corn and soy prices being the primary driver (Bucklin et al., 2012). Clearly increased feed prices have led to an increase in live production costs for both broilers and turkeys, demonstrating the impact on profitability that feed intake and feed efficiency can have. The economic aspects of both the broiler and turkey industries have been examined (Liang et al., 2013).

Chicken meat production worldwide has been significantly increasing with an annual increase of about 3.63% for the recent past five years (2008-2012) and with highest production in 2012 as of the latest data statistics from the Food and Agriculture Organization (FAO) of the United Nations. World chicken meat production was around 75.8million metric tons (mmt) and about 51.1billion heads slaughtered in 2011. The United States of America posted the highest output (21%) with a volume of 16.2mmt and slaughtered about 9.0billion heads for the same

period (FAOSTAT | FAO Statistics Division 2009 | 2013) Other top producers include China (14%), Brazil (11.85%), Mexico (3.35%), India (2.95%), Russian Federation (2.46%), Islamic Republic of Iran (1.88%), Japan (1.80%), Indonesia (1.71%), and United Kingdom (1.68%) (FAO Statistics Division 2013).

In the Philippines, the poultry sector is valued at about P131 billion ($2.7 billion), and expanded by 11% in 2012 this represents about 14% of the total agricultural production in the country. Chicken production, valued at P98 billion ($2 billion) and the primary source of growth in this sector, went up by 5.76% (Bureau of Agricultural Statistics Report, 2012). The country's total chicken population as of January 1, 2012 was estimated at 158.7 million birds, 2.9% higher than the previous year's headcount. Broiler inventory grew by 9.0% from 52.2million to 56.9million. Total volume of chicken production reached 1,281.34 thousand mt or 5.75% in 2011 higher than the 2010 output. This increment was due to higher broiler production from commercial farms. Broiler production accounted for around 62.3% of the total chicken output in 2011 (Bureau of Agricultural Statistics Report, 2012). As of January 1, 2012, broiler inventory was placed at 56.9 million birds. Of this total, around 34.5% and 22.5% were concentrated in Region III and Region IV-A, respectively. These two regions accounted for about 57.0% of the country's broiler population. Total supply of dressed chicken in 2008 was estimated at 784,418 mt posting an increase of 12% compared with the 2007 level. Of this total, around 94% were locally produced and the rest were imported. Total chicken importation rose by 14.1% from the 2011 level of 38,336 mt to 43,758 mt in 2008 (BAS, 2012).

Nowadays, modern poultry houses with good construction insulation, ventilation design, within environmentally conditioned control system and automatic equipments inside of the house provide the possibility of rearing the birds at higher stocking density (Estevez, 2007; Liang *et al*., 2013). Some researchers have introduced applying environmentally controlled condition poultry houses as an alternative way to achieve good performance and increasing stocking density in tropic areas (Lacy and Czarick, 1992).

Housing for broilers must be focused on providing an environment that satisfies the birds' thermal requirements. Newly hatched birds have poor ability to control body temperature thereby require supplementary heat during the first few days after hatch. But during the later stage, broilers are more prone to heat stress due to its limited ability to dissipate large amount of body heat rapidly. Critical at this stage is the provision and maintenance of favorable temperature and ventilation to enhance the overall performance of the birds (Craig, 2007). Properly ventilated housing is essential for profitable poultry production. There are basically five reasons why we must ventilate poultry houses: 1) remove heat, 2) remove excess moisture, 3) minimize dust and odors, 4) limit the buildup of harmful gases such as ammonia and carbon

dioxide, and 5) provide oxygen for respiration. Of these five, the most important are removing built up heat and moisture. The time of the year determines which of these is of primary concern (Bucklin et al., 2012).

Kachilei (2012), on his study about the productivity and profitability of Central Luzon State University broiler production under contract with Magnolia Foods Company, concluded that broiler production is profitable. The study analyzed the effect of each of the production factors such as labor, feeds, day old chicks, LPG, rice hull, management and temperature on average live weight (ALW), mortality rate (MR), and feed conversion ratio (FCR). He found out that the project recorded a high productivity above the Magnolia's standards resulting in high profit. Production performance for six years in terms of ALW (1.687) and FCR (1.849) were superior compared to the Magnolia's standards of 1.55 and 1.99, respectively. However MR and harvest recovery (HR) are lower at 5.28% and 94.72% than Magnolia's 5% and 95% standard, respectively.

Based on the estimated Cobb-Douglas production function, the factors of production that significantly affect both MR and ALW were feeds and management practices. The project earned a net profit amounting to an average of Php 952,960 per year. The financial condition of the project was further evaluated given un-subsidized rate of electricity and the minimum wage rate for laborers (Kachilei, 2012). Even at this rate the broiler production is profitable.

Many broiler farms in Nueva Ejica have also experienced a steady increase in Production. The CLSU Broiler Project raises 24,000 birds/growing cycle of 7/year in contract with San Miguel Foods Inc. (SMFI) for the last 17 years under conventional housing. It has generated substantial income for the university as a result of its excellent performance. From 2008-2010, it generated an average of P 1.1M/year with return on expenses of 150.87%. In 2008, it has been cited as one of the best (ranked 9th) contract grower in Region III. The project utilized four open-side-elevated conventional housing units (6,000 birds' capacity/house) with curtains installed around the entire building to control draft or strong winds. The conventional housing system is cheaper to build and operating cost is lesser because it takes advantage of natural ventilation. But the conventional design is now outdated by the changing climatic condition and farm performance is being affected. In recent operations in CLSU Broiler Project, higher mortality had been recorded. From 2005-2008, the average mortality rate was 5.13% and this increased to 5.8% from 2009-2011, much higher than SMFI's standard of 5.0%, (SMFI, 2012).

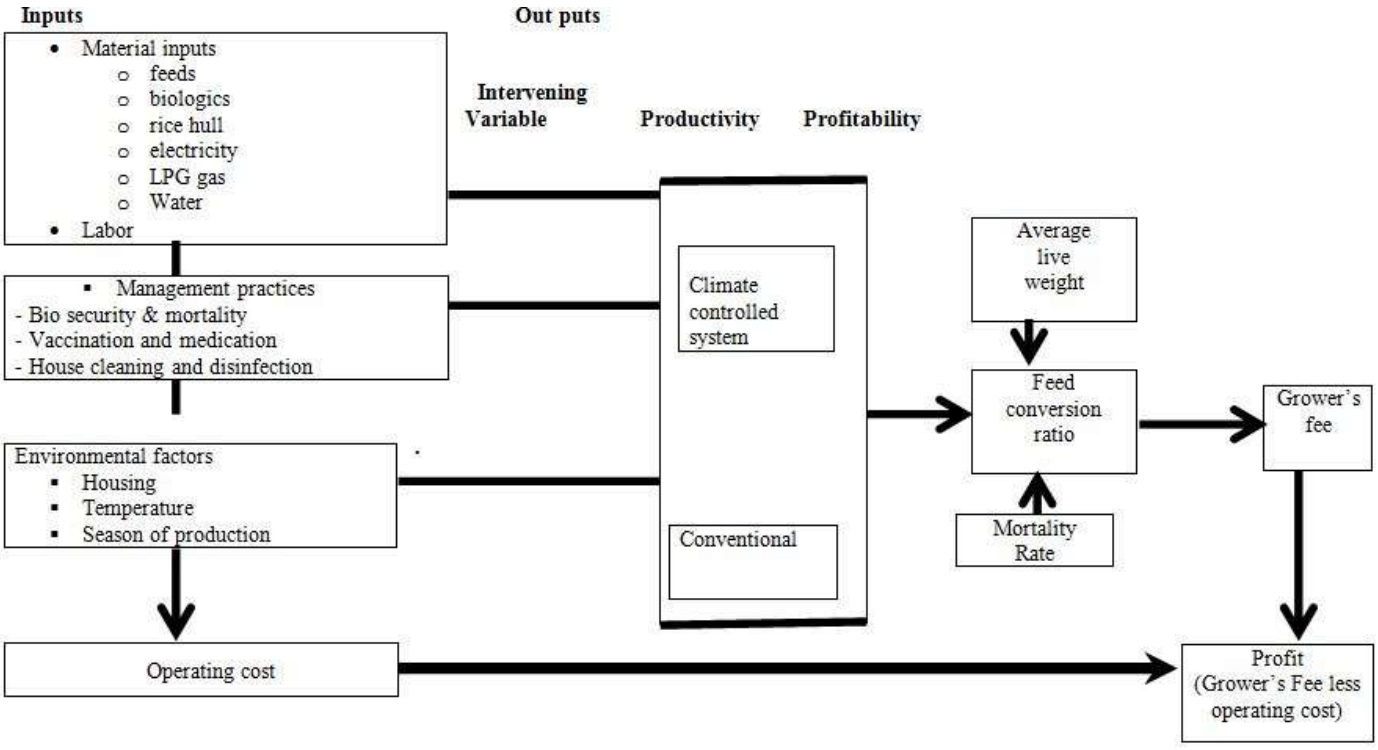
In response to this major problem, the management felt the need for a new system to ensure higher performance. Hence, the establishment of a new housing unit with climate

controlled system (CCS) was conceptualized, proposed and completed in August 19, 2011. CCS is now the trend in modern broiler production industry.

CCS is a system where exhaust fans are located at one end of the house and two large openings are installed at the opposite end. Air is drawn through these openings, down the house, and out the fans. Exhaust fans are placed at one end of the house or in the middle of the shed, and air is drawn through the length of the house, removing heat, moisture and dust. Evaporative cooling pads are located at the air inlets. The energy released during evaporation reduces the air temperature, and the resulting airflow creates a cooling effect, which can reduce the shed temperature by 10 °C or more, depending on humidity. Maximum evaporation is achieved when water pumps are set to provide enough pad moisture to ensure optimum water evaporation. If too much water is added to the pads, it is likely to lead to higher relative humidity and temperatures in the shed (Glatz and Bolla, 2004).

Airflow can be augmented by fans strategically situated inside open-side houses. Reducing temperature can be enhanced by fogging systems. Fogging involves several rows of high pressure nozzles that release fine mist inside the house. Cooling effect is attained by evaporative cooling and enhanced by increased airflow with the use of fans. However, evaporative cooling works best in dry climates and not when the condition is humid(Glatz and Bolla, 2004).

Figure 1. Conceptual model showing that factors determine productivity and profitability



Problem Statement

This study analyzed broiler profitably in conventional housing and environmentally controlled condition. Since the climate controlled system (CCS) is considered modern, it was expected that CCS should have higher profit than conventional housing. Specifically,the study aimed to achieve the following objective:

i. Determine and compare efficiency of inputs from total cost of production using industry standards ;
ii. Evaluate and compare the trends over time as to cost and returns;
iii. Determine and compare profitability under climate controlled system, and conventional housing, and
iv. Identify the problems that hinder the profitability.

Hypothesis

CCS housing have higher profitability over conventional housing.

METHODOLOGY

The descriptive-qualitative and quantitative methods of research were adopted in this study. The broiler production situation in Nueva Ejica was described and analyzed based on the data gathered. An interview was conducted by the researcher with 10 farm managers and 80 employees. Also personal observation was applied as the researcher frequently visited the farms.

The data gathered was tabulated and analyzed using descriptive statistics, arithmetic mean, and regression analysis by Cobb-Douglas production function. Correlation and regression analysis was also done. Means of all parameters (FCR, ALW, Livability and Grower's Fee per Bird) was analyzed using the MS Excel Data Analysis Tool and SPSS version 20. The data was analyzed descriptively using mean, frequency counts, and percentage distribution.

The multiple linear regression models specifically expressed using the Cobb-Douglas production function was estimated to identify significant factors affecting the productivity of the farms in terms of FCR. FCR was used as the dependent variable over the other variables because the cost of feed claims over half of the total budget for most of the broiler farms and FCR tell us the profitability of broiler bird to convert feed into live broiler weight (Arbor, 2011).

The Cobb-Douglas production function is expressed as:

$Y = AK^{\alpha}L^{1-\alpha}$

Y= Dependent variable (FCR)

A= Constant

Land K = variable inputs

$^{\alpha}$ and $^{1-\alpha}$ = Elasticity of production with respect to variable inputs

Specifically, the regression model estimated for FCR is:

$Yi = A X_1^{b1} X_2^{b2} \ldots Xn^{bn} e$

Y = FCR, kg/ farm

Xi = cost of input

bi = Regression coefficients

This was transformed to a linear logarithmic function in order to facilitate computation.

The log linear model is:

$\log Y = \log A + b_1 \log X_1 + b_2 \log X_2 + \ldots + bn \log Xn + e$

Where:

Y = FCR

X_1 = electricity consumed (k/watts)

X_2 = labor (number of man day)

X_3 = feeds consumed (peso)

X_4 = LPG (peso)

X_5= Rice hull (peso)

X_6= management (frequency in hours/day)

Note; X_4 ,X_5= to be used only for conventional house.

The farms profitability was evaluated based on the following parameters:

1) Net profit = Total growers fee – Total operating expenses

$$2)\ \text{Net profit margin} = \frac{\text{Net profit}}{\text{Grower's fee}}$$

$$3)\ \text{Return on investment} = \frac{\text{Net income per cycle}}{\text{Total investment made}}$$

$$4)\ \text{Profit per bird} = \frac{\text{Net profit}}{\text{Actual no of birds harvested}}$$

$$5)\ \text{Cost of Production/bird} = \frac{\text{Average Cost of production}}{\text{Actual no of birds harvested}}$$

6) Operating Cost = Labor cost + Electric bill + LPG cost + Rice hull cost + Cost of biologics + Maintenance fee

RESULTS AND DISCUSSION

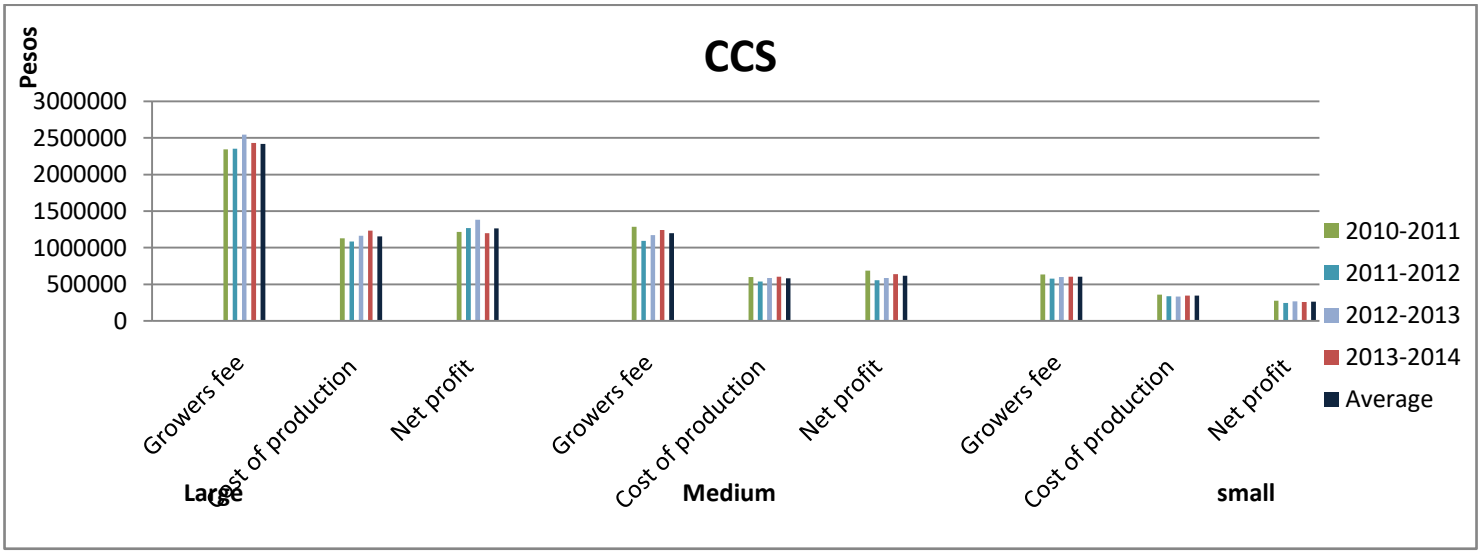
Financial Trend Analysis for Climate Control System Houses

The mean production cost per year and trend in growers' fee and profit for the three house size under CCS farm is presented Fig. 2. The growing year 2012-2013 recorded the highest average growers' fee of PhP2, 546,723 under large farm this is reflected in the highest net profit it recorded. High growers' fee in this year can be attributed to the best average FCR attained of 1.70, while maintaining low production cost hence it guarantee higher payment.

According to Kleyn (2013) poorer performance leads to lower pay and in some cases even a payback to the integrator. To attain the highest possible growers' fee it is important that the best performance in FCR parameter is met.

The medium farm had the highest growers' fee in the growing year 2010-2011 with an average of PhP1, 286,633, which translate to highest net profit of PhP687, 798. During this growing year the farm incurred the lowest expenses in biologics at PhP6, 463. In the regression analysis for productivity, biologics is significant factor that affected the FCR, this explains that mortality rate in the farm was low due to minimal disease outbreak hence lower expenses was incurred on medication/

Figure 2. Average Financial trend for CCS houses



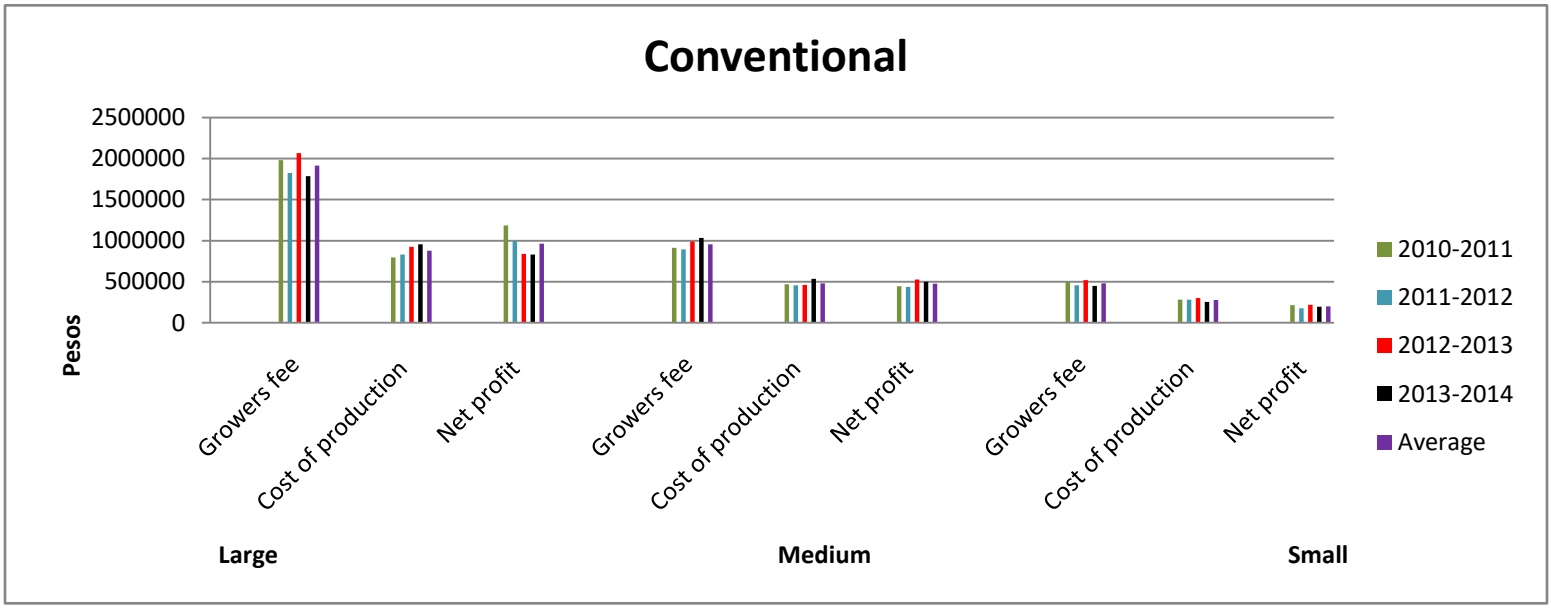
Arbor Acres (2011) stated that when vaccination program is followed and birds are kept health, and it reduces the mortality rate thus the FCR will be better which will increase the growers' fee. The lowest growers' fee in the small farm was in the growing year 2011-2012 with an average of PhP578,978, this translates to lower profit of PhP244, 333. This period experienced the lowest labor expense of PhP10, 743, it indicates that the farm had shortage in man power and hence

the management practices were underperformed. According to Craig (2007), good management practices and good planning helps prevent FCR problems in the flock hence optimized labor performance. The trend in financial performance showed that as the growers' fee increases the profit earned also increases while low growers' fee result in low profit. The cost of production showed a stable increasing trend from small farm to medium farm to large farm hence the profit is translated directly to the growers' fee being received by the farm. Cost of production is calculated from the operating cost incurred by the farm added to the cost of chicks, vaccine administered, services provided by integrator, transportation cost, and technical assistance (SMFI, 2012).

Financial Trend Analysis for Conventional Houses

Production cost and the profit of the farms under the conventional house type is presented in Fig. 3. The highest growers' fee for the large farm was recorded in the growing year 2012-13 at PhP2, 067,723 while the highest profit was recorded in the growing year 2010-11at PhP1, 180, 477. The cost of production incurred in the growing year 2010-11 is the lowest at PhP793, 881 while in the growing year 2012-13 was the high at PhP829, 129. High growers' fee does not guarantee high profitability, it has to be matched with the operating cost. The growing year 2010-11 experienced the lowest operating cost of PhP112, 015 this resulted in lower cost of production while the growing year 2012-13 experienced the highest operating cost of PhP150,554 which lead to higher cost of production does affecting the years profit.

Figure 3. Average financial trend for conventional houses



In conventional houses the highest growers' fee did not guarantee higher profit since there is high fluctuation in the cost of production brought about by the factors of production and operating cost. Being an open house it is exposed to more risks like bad weather, typhoons, high temperatures during summer which causes bird heat stroke, and disease outbreak in the locality which are more expensive to manage hence higher cost of production.

Comparative Analysis of Cost of Production and Profitability per Farm and per House Type

Table 1. Financial analysis by farm size and by house type

Farm size	**Small**		**Medium**		**Large**	
House Type	**Conventional**	**CCS**	**conventional**	**CCS**	**Conventional**	**CCS**
Growers fee	487,693	603,741	957, 386	1,198,777	1,914,773	2,418,431
Operating Cost	29,074	31, 576	50,543	41,004	130,094	100,630
production/bird	56	55	58	50	60	48
Net profit margin (%)	43	41	49	51	45	52
T-value	1.5		2.5**		2.75**	

The comparison of growers' fee, operating cost, cost of production per bird, and percentage net profit margin per farm size and house type is presented in Table 1. The grower's fee is the payment made by integrator to the grower from the total value of harvest determined by the FCR and performance based incentive as stipulated in the contact scheme. Since Magnolia supplies the day old chicks, some biologics, and feeds, the grower's fee is already net of the values of these inputs.

The grower's fee received by the farms was relatively higher in the CCS houses than conventional houses. Regression analysis for productivity shows that CCS houses had better FCR than conventional houses which is translated to higher growers' fee. The biggest growers' fee ratio difference is from the large farms. As the farm size expands the fixed resources of production is overstretched more in the conventional houses than the CCS house.

Operating cost

No cash expenses are incurred by the growers for feeds, day old chicks, and vaccines but they are deducted from the grower's fee. The operating cost is the cash payment for other expenses incurred by the farm like labor, electric bills, LPG, rice hull, biologics, and maintenance. Under

contract growing other cost items such as day-old chicks, feeds and biologics are provided by the integrator, whereas, growers provide the over-all management, housing and facilities (SMFI, 2012).

Operating cost unlike growers' fee had fluctuating price value between the two types of houses. In small farm, CCS had higher operating cost while in medium and large farms the conventional incurred the highest operating cost. In the medium farm, conventional house surpasses the CCS by PhP9, 000, whereas in the large farm it had a difference of more than PhP 30,000. This shows that as the farm expands the conventional house incurs higher operational cost than CCS. Lacy and Czarick (1992) stated that electricity costs over the entire grow out in the tunnel ventilated houses were nearly double those of the conventional house. Labor as one of the operating cost contributed to the increasing expenses in conventional houses since they employ more laborers per house than CCS. Findings show that for every one laborer employed in CCS house four laborers are employed to produce the same number of birds in conventional house.

Cost of Production per Bird

Bucklin et al., (2012) explained that the cost of production and profit per bird depends on cost of inputs, grower's fee as determined by productivity, and the number of birds harvested. The trend changes overtime due to differences in the quantity and cost of variable inputs used. High cost of inputs incurred per bird will result in low profit.

The cost of production per bird is relatively higher in the conventional houses than the CCS houses in all the farm sizes but it can be noticed that in the small farms the difference is only one peso. This shows that the fixed cost of production in the CCS houses is high and less sustainable to produce birds less than 5,000 using CCS house. The cost of production increases in conventional house as the farm size increase, while it reduces as the farm size increase in CCS. It shows that conventional houses experienced diseconomies of scale, while the CCS houses experienced economies of scale.

Net Profit Margin

Net profit margin provides a clue to the project's cost structure and production efficiency, it is an indicator of how efficient a project is and how well it controls its costs. The higher the margin is, the more effective the company is in converting revenue into actual profit (Green, 2008).

The highest net profit margin was realized in the large farm under the CCS house at 52% while the lowest was in the small farm under CCS at 43%. This indicates that CCS houses are less efficient when it raises 5,000 birds or less; this is due to its high cost of running the

equipments used and operating costs. In his study (Estevez, 2007) found out that building and equipments for conventional housing system costs about PhP 250 per bird and the PhP 382 per bird for CCS.

The net profit margin increases in CCS houses as the farm size increase. The best level that can be produced in CCS house is at the large farm with an average of 20,000 birds where the highest profit margin is obtained. However, the difference in the net profit margin between the small CCS farm and the medium is 10% while between the medium and the large is 1%, the profit margin reduces drastically indicating that at 20,000 birds it is the highest profit level for CCS house. Producing more than 20,000 birds the profit margin level will drop below 52% applying the production function theory.

Conventional houses show a different trend from the CCS houses. Medium house had the highest profit margin at 49%, higher than the large farm. The profit margin in the large house drops to 45% which is not advisable economically to produce at that level. To maintain high profit margin the farmer should build two medium conventional houses instead of one large house of 20,000 birds as it is affected by diseconomies of scale.

CCS houses are more profitable than the conventional houses except for the small farms. The highest profit in the conventional house is at 49% while in CCS it is at 52%. CCS house is still superior in medium farm with 51% margin than the conventional farm with 49% even though it is at its peak. It accepts the hypothesis of the study that CCS houses are more efficient than conventional houses and there is significant difference overtime as to cost and returns of CCS and conventional houses.

Statistical result of T-test confirms that comparing the small farms of both CCS and conventional there is no significant difference in the net profit margin. The profit between the firms is not big enough in small but there is a significant difference in medium and large houses between CCS and conventional at 5% level.

SUMMARY

The trend in financial performance in CCS house shows that as the growers' fee increases the profit earned also increases while lower growers' fee result in lower profit in all the farms. The cost of production shows a stable increasing trend from small farm to medium farm to large farm, hence the profit is translated directly to the growers' fee being received by the farm rather than spent on production.

In conventional houses, High growers' fee does not guarantee high profitability as shown in the operating cost. The medium and small farm had variation with the highest growers' fee and profit, the main influence being the difference in the cost of production.

With regards to the comparison of growers' fee, operating cost, cost of production per bird, and percentage net profit margin per farm size and house type. The grower's fee received by the farms was relatively higher in the CCS houses than conventional houses.Operating cost unlike growers' fee had fluctuating price value between the two types of houses. In small farm, CCS had higher operating cost while in medium and large farms the conventional incurred the highest. The cost of production per bird is relatively higher in the conventional houses than the CCS houses in all the farm sizes it was observed that in the small farms, there a small difference.

The highest net profit margin was realized in the large farm under the CCS house at 52% while the lowest was in the small farm under CCS at 43%.The net profit margin is increasing in CCS houses as the farm size increase. Conventional houses showed a different trend from the CCS houses. Medium house had the highest profit margin at 49%, higher than the large farm.CCS houses are more profitable than the conventional houses except for the small farms. The highest profit margin in the conventional house is at 49% while in CCS is at 52%. CCS house is still superior in medium farm with 51% margin than the conventional farm with 49% even though it is at its peak. This accepts the hypothesis of the study that CCS houses are more efficient that conventional houses and there is significant difference overtime as to cost and returns of CCS and conventional houses.

CONCLUSION

Conventional and climate controlled systems can produce better profit above the integrators' standards. CCS improved the profits of birds as indicated by better feed efficiency (FCR).

CCS provides birds with the ideal range of temperature, relative humidity and air quality throughout the entire growing period. Sustained favorable environment exposes birds to lower risks of stress and infection thereby enabling birds to utilize energy intake more efficiently for growth thus lower cost of production. For these reasons, broilers raised in climate controlled system had improved FCR and livability that translated to higher income than in the conventional type.

CCS houses are more profitable compared to conventional houses. The CCS houses had the highest net profit margin compared to conventional houses except in the small farms. Small farm size had a higher profit margin in conventional houses compared to CCS houses. This is due to high operating cost that was incurred by the small CCS farm. It is therefore concluded that due to high operating cost in running a small CCS farm, it could be more profitable to produce under small conventional house. From the findings it can be concluded that conventional farms exhibits the characteristics of diseconomies of scale with medium farm

having greater net profit margin of 49% while the net profit margin for large house drop to 45%. The CCS takes advantage of economies of scale with the small farm having net profit margin of 41 %, medium 51 %, and large 52%.

RECOMMENDATIONS

The following are being recommended in view of the findings generated from this study. In the low land regions of the Philippines and during summer periods when the temperatures are generally high, it is recommended that CCS be established so as to maintain the conducive conditions for bird growth. The CCS houses are advantageous since it help to remove excess moisture, minimize dust and odors, and limit the buildup of harmful gases such as ammonia and carbon dioxide. Moreover, a distant alarm system for changes in temperature and relative humidity inside the system be installed. This will help the management to ensure sustained performance thus maintained the cost of production.

Since feeds and management practices significantly affected the FCR in both houses, it is therefore, recommended that the management team should make sure that appropriate management practices be continuously done in the farms since they significantly affect productivity and profit.

It is recommended that since there is significant net profit margin in large and medium houses, the growers producing in large and medium house are recommended to use CCS houses so as to realize higher profit.

The adoption of CCS should be promoted by the Department of Agriculture and other stake holders like State Universities so as to realize self sufficiency in the country's meat industry.

Power cost is the most expensive component in operating a climate controlled broiler house. Research should be conducted on how power cost can be reduced in order to further increase the profitability and reduce the payback period for this type of system.

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