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Leite Ferreira, Laura Maria; dos Santos Wanzeler, Maritiza; Melo e Silva de Oliveira, Renata; Berg de Oliveira, Alef

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COST MANAGEMENT IN AGRIBUSINESS: STUDY PROFITABILITY SCENARIOS OF INTEGRATED SYSTEM VS. INDEPENDENT SYSTEM FOR A POULTRY PRODUCER

Laura Maria Leite Ferreira
Fundação Getulio Vargas, Brazil
E-mail: laurinhaf@hotmail.com

Maritiza dos Santos Wanzeler
CIABA, Brazil
E-mail: maritizawanzeler@hotmail.com

Renata Melo e Silva de Oliveira
University of Porto, Portugal
Universidade do Estado do Pará, Brazil
E-mail: renata_ep@yahoo.com.br

Alef Berg de Oliveira
Universidade do Estado do Pará, Brazil
E-mail: alefberg@hotmail.com

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ABSTRACT

Addressing the theme of the cost management in agribusiness poultry industry, this study aims to analyze from the perspective of variable costing indicators the possibility of a poultry producer who works under the scheme of integration migrate to a system of independent production. Through an applied, quantitative case of study, the cost were raised, the contribution margin, break-even point and margin of safety and income statement were calculated in both production systems to enable a comparative analysis between the independent and integrated system of production. Finally, a sensitivity analysis of the contribution margin in relation to the variable cost in the independent system was performed, so a more accurate comparative analysis was possible. Based on the results obtained it was possible to address the pre-established problem of the research and discuss the results found.

Keywords*:* Variable costing; Sensitivity Analysis; Decision.

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1. INTRODUCTION

Agribusiness is considered one of the most important economic activities Brazil (MIELE, et al., 2010), every year thousands of tons are exported abroad Brazil. Inserted into this context, Poultry Industry is one of the most expressive activities of Agribusiness in the Amazonian State of Para, where the agro industry has exceeded both geographic and technologic boundaries for becoming an international business activity.

Beside the fact that Brazil leads Poultry exportation, this industry weighs on other important economics activities, e.g.: production of soya, corn, rations. The Brazilian Association of Producers Cutting Poultry (APINCO) has published that this country produced 6.006 thousands of birds in 2012. This production volume raised 4% since 2011 and it is an upward trend. Thus, it is clear that this industry shows high relevance to the country's economy.

In order to analyze the manner of operation at Poultry industry and also to identify opportunities to raze the low margins of profitability, which are considered fairly modest (FERREIRA; WANZELER, 2011), this work aims to study the case of a Poultry Industry located at the State of Para. This company works under the integrated system of Poultry production, which has shown very little improvement in profit margin during the last 20 years. As this company possesses the resources to migrate to the independent system of production, it created the opportunity to conduct a comparative study of scenarios in both systems for production. Thus, it became possible to analyze if the change in modus operandi was advantageous from the financial point of view.

To accomplish that, the variable costing method was applied in combination with a sensitivity analysis, so advantages and disadvantages could be discussed in order to subsidize decision making. Consequently, it was necessary to identify all the exposedness involved in this process in order to measure efficiency indicators (e.g. margin contribution, break-even point, safety margin) – which was performed all long 13 months.

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It is important to point out that the analysis of scenarios for enhancing profitability is not only important for measure gains but also it is fundamental to guarantee enterprises survival in long term. Under this perspective of regarding the economic sustainability of Poultry farms companies, Araujo *et Al.* (2008) emphasize that all economic agents involved in the production chain should be properly paid, to stay on and they must make the necessary investments in order to continue at this activity.

Therefore, this study aims to examine the financial advantages for a Poultry farmer to migrate from integrated system to independent system of production. The analysis performed in this work follows the perspective of the indicators of variable costing, which has been proved as an efficient tool to support both medium and short term at operational planning.

1.1. Conceptual framework

This section presents the theoretical framework of Variable Cost Method and Sensitivity Analysis. Both themes are aligned with concepts and peculiarities of Poultry Industry agribusiness and its main challenges related to competitiveness. Concepts related to Cost Management here presented are based on Variable Costing and its short term indicators, as Even Break Point, Contribution Margin and the report named Incoming Statement. Sensitivity Analysis Approach is the method used to analyze profit scenarios of rather Independent System and Integrated System.

As in Brazilian Poultry agribusiness competiveness almost every link of the chain is totality restricted to the integrated system the producers need to compete basically for offering the best price. This fact is explained cause the chickens are commodities, so the market share defines the price of this kind of product, the producers aim to reduces the cost can competes in market share.

1.2. A variable costing method review

According to this Cost Management System, the costs faced by companies can be categorized into two main categories: fixed costs and variable costs. The first group, fixed costs, comprehends the costs which are independent of production output. Fixed Costs often include among other items: rent, buildings, machinery. The second group is composed by the Variable Costs which consist to vary with

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production output. Often, variable costs increase at a constant rate relative to labor and capital applied.

Variable costs category may include wages, utilities, materials used in production, among other items. Cost management is defined by Martins (2010) as the field of accounting which focus on strategic cost issues which are driven by both financial and non-financial information. It possess great affinity to Industrial engineering approaches to Manage both Strategic and Operational management. Therefore, the purpose of cost management is to provide assessment to enterprises take decisions that ultimately increase the organization's competitiveness.

Colauto et al. (2004) argue that the increasing use of variable costing method has proved that it became an essential tool for Business planning, control and decision making that involves minimizing costs and optimizing results. Then, much of the knowledge established on this field can ultimately increase decision taking in short term as argued by Bruni and Fama (2009) or to enhance the effectiveness of Strategic Planning while supporting Financial Perspectives indicators as the ones defined by Kaplan and Norton (1996). Variable costing also brings about advantages to business management, as this method arose from the need to solve the problems, which were caused by the difficulty of appropriation of indirect fixed costs to products and useful knowledge variable cost (BACKES et al., 2007).

To provide input for decision-making is one of the main functions of cost accounting, which involves estimates of prices, quantities demanded and costs of products and / or services that provide the contribution of each of the venture. In this context, the analysis of costs, volumes and profits aims to establish a table showing the relative importance of products / services offered by the enterprise. Horngren et al. (2003) cite the Cost Analysis / Volume / Profit is one of the most basic assessment tools used at managerial level since it examines the behavior of total revenue and costs, results of operations resulting from changes in the levels of outputs (sales), selling price, unit variable costs or fixed costs. For the same author this is the kind of analysis that all managers ought to do, because understanding the patterns of behavior of costs brings information necessary for planning and control activities in the short and long term.

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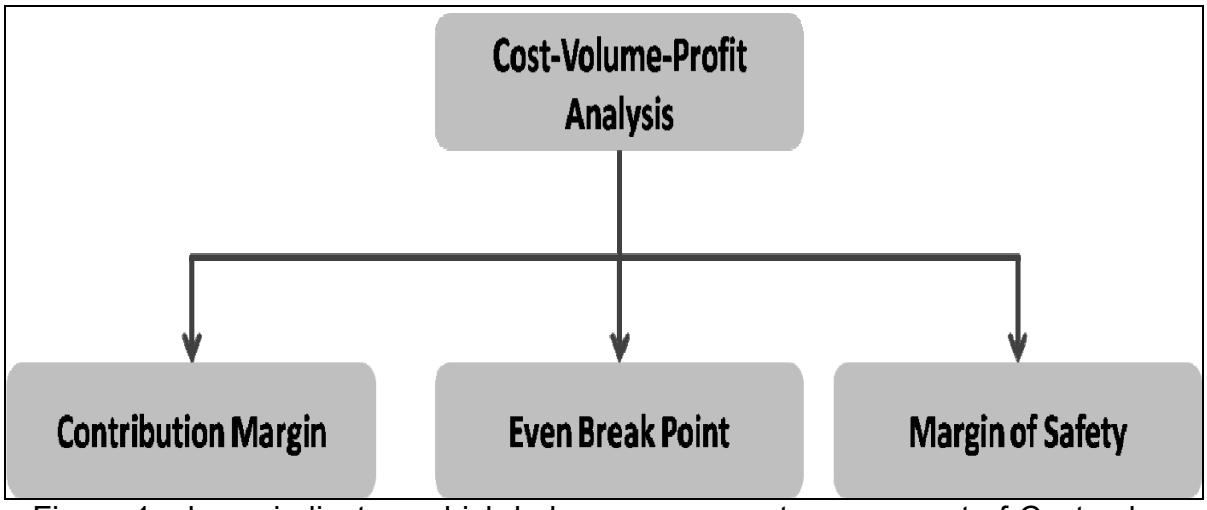

Figure 1: shows indicators which helps management assessment of Cost-volume-profit analysis.
Source: Adapted from Martins (2010)

Indicators of Cost-Volume-Analysis can be observed in details at table 1, below.

Table 1: Variable Costs indicators

Indicator	Components
Contribution margin	CM ($) = Price per unity – Variable Costs per unit
Even Break Point	EBP(q) = [total Fixed costs]÷CM per unit
Margin of safety	MS(q) = Sales(q) –Even break Point(q)

Source: Martins (2010)

Wernke, et al. (2002) define that the assessment of cost-volume-profit agribusiness can provide information about impacts caused by changes in production costs, sale prices and volume produced in profitability. These authors also emphasize that this information is strategic, considering that are constant fluctuations in the prices of production inputs employed in agribusiness.

In the agribusiness sector, it is essential that managers consider the assessment of cost-volume- profit as a methodology for planning, since it provides useful management tools as short-term operational planning; quantitative estimates derived from various expected economic scenarios; anticipation of difficulties arising from unfavorable seasonal disruptions to the company.

1.3. Sensitivity Analysis Concepts

While studying scenarios for Decision Aiding, it is likely that values and constraints incur into errors. Therefore, to increase the reliability of Decision Aiding tools, especially when financial investments are at stake, the Sensitivity Analysis

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(S.A.) can be a valuable resource for the investigation of potential changes and errors in artificial scenarios. S.A. can aid managers and decision makers to further understand the impacts of each available choice. Thus, Horngren, et al. (2004); Carneiro, et al. (2004) define the Sensitivity Analysis as a simulation technique that examines how much results will change if the initial forecast data are not obtained or if any fundamental assumption is changed. Complementarily, Sensitivity Analysis consists into a range of exploratory steps that aim to observe the behavior of variables by the alterations of a model. For example, Pannell (1997) defines that there are various possible ways to explore changes by varying:

i) The contribution of an activity to the objective;

ii) The objective (e.g. minimize risk of failure instead of maximizing profit);

iii) A constraint limit (e.g. the maximum availability of a resource);

iv) The number of constraints (e.g. add or remove a constraint designed to express;

v) Personal preferences of the decision maker for or against a particular activity),

vi) The number of activities (e.g. add or remove an activity), or

vii) Technical parameters of a model.

Additionally, the sensitivity analysis studies the effects of a certain variation of a given input on income results. It can reflect on the increase or decrease in revenues or expenses (MATSUHITA, et al., 2006). For the same authors, the sensitivity analysis can be successful used on various situations and planning practices such as: **i)** Manufacturing of new products, since it can represent changes on the set of variables of a problem; **ii)** Impact Assessment related to the use of new technologies or new manufacturing processes; **iii)** Estimation of changes caused by the use of new resources or new production systems.

The chosen approach in this study was to vary the value of the numerical parameter of variable costs through several levels in order to verify if the independent production system would be more profitable than the integrated system even if the costs were higher.

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2. METHODOLOGY GUIDELINES

This section aims to present the methods and approaches applied on this research. According to the criteria used by Silva and Menezes (2005) and Kumar (2010), this work is based on the applied research settings, which focus on using practical solutions for the problem case of one specific poultry producer. Then, the design for this research aims to investigate the profitability in a different scenario, where the independent *modus operandi* at poultry farms could be explored in comparison to the integrated system of production. Thus, this work is also based on quantitative models in order to subsidize information analysis under the optics of rational knowledge.

Likewise, this research addresses the idealization of a model capable of maximize the profit on poultry supply chain. Wherefore, according to Miguel, et al. (2010), aligns to the axiomatic type of research. In addition, this work sets a Case Study which is defined by Richardson (1999); Yin (2009) and Miguel, et al. (2010) as an empirical work that investigates a certain phenomenon within the context of the current reality, through detailed analysis of one or more cases.

In this article, the phenomenon investigated is the profitability in two decision scenarios for poultry business: i) the integrated system of production; ii) the independent system of production. The conceptual model of this research is presented at Figure 1: Case Study Conceptual model.

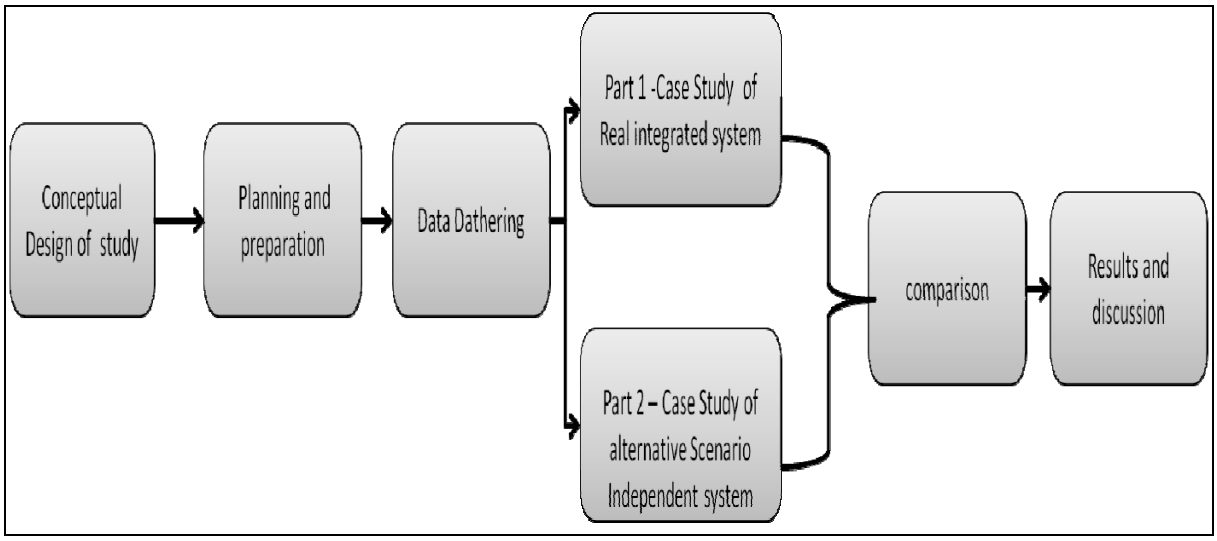

Figure 2: Case Study Conceptual model.
Source: Adapted from George and Bennett (2005) and Yin (2003)

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The stages and proceedings to collect data and analyze results were performed according to the Variable Cost Management approach of Leone (2000), Martins (2010) and Bruni and Fama (2009). Thereby, for rather real scenario and simulated scenario, there were calculated:

i) Income Statements;

ii) Total contribution margins;

iii) Contribution margin per unit;

iv) Even Break Point;

v) Sensitivity analysis.

On section 3, the obtained results are presented and discussed

3. RESEARCH RESULTS

After presenting the theoretical framework used on this research, there are presented in this sections the Case Study of integrated system and independent, which contains in addition to the enterprise contextualization: **i)** Application of variable costing the integrated system; **ii)** application of variable costing system independent system (simulated scenario); **iii)** calculation of contribution margin, even break point balance and margin of safety; **iv)** sensitivity analysis **v)** recommendations.

3.1. Company's Framework

Since 1986, the studied company works with fattening and sale of live chickens, which configures its fitting to the segment of the poultry industry. The farms plant is located in the municipality of Benfica (State of Para, Brazil), where this company commercializes mostly live chicken. Beyond chicken sales, the farmer also sells organic manure, a byproduct of poultry production.

It stands about 30 kilometers from the state capital which represents an advantage to the company and yet to the client because, cause it is close to major retail outlets and abattoirs – which implies into economic advantages during products distribution.

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The company operates according to integrated production system, with an integrative company that provides the one-day-born birds, food and technical support during the fattening period.

The integrative company also pays expenses related outbound logistics, as delivery of one-day old chicks and delivery of feed on farms, the integrator is also responsible for logistics distribution the final product (chicken with an average weight of 2.5 kg). This context is important because, as the focus of this study is the poultry production itself (fattening and sale), the main variable costs considered into this case are related to electricity, manpower. The other costs, like feed, poultry vaccine and young birds, were considered as fixed costs.

At the beginning, the company counts with seven employees. During its early years during the decade of 1980, this enterprise possessed a shed of 132 m^2 and capacity for fatting one thousand birds per batch. From 2011, this company started to work with five aviaries, with a capacity for 27,000 birds per each batch. Its production plant is divided into two units: a) farm 1 consisting of three aviaries with a total capacity of 171,000 birds per batch, and b) farm 2, which has two aviaries and total capacity to 114,000.

After more than 2 decades operating under the integrated system, this poultry company started to question of the independent system would represent a more profitable business scenario in a short term horizon. In order to answer to that question, indicators of variable costing method were measured for both situations so that the real context could be compared to a different scenario simulated. As a way to acquire the results of interest to this study, there were taken the steps illustrated at Figure 3: Research Application.

Figure 3: Research Application.
Source: Adapted from Ferreira and Wanzeler (2011)

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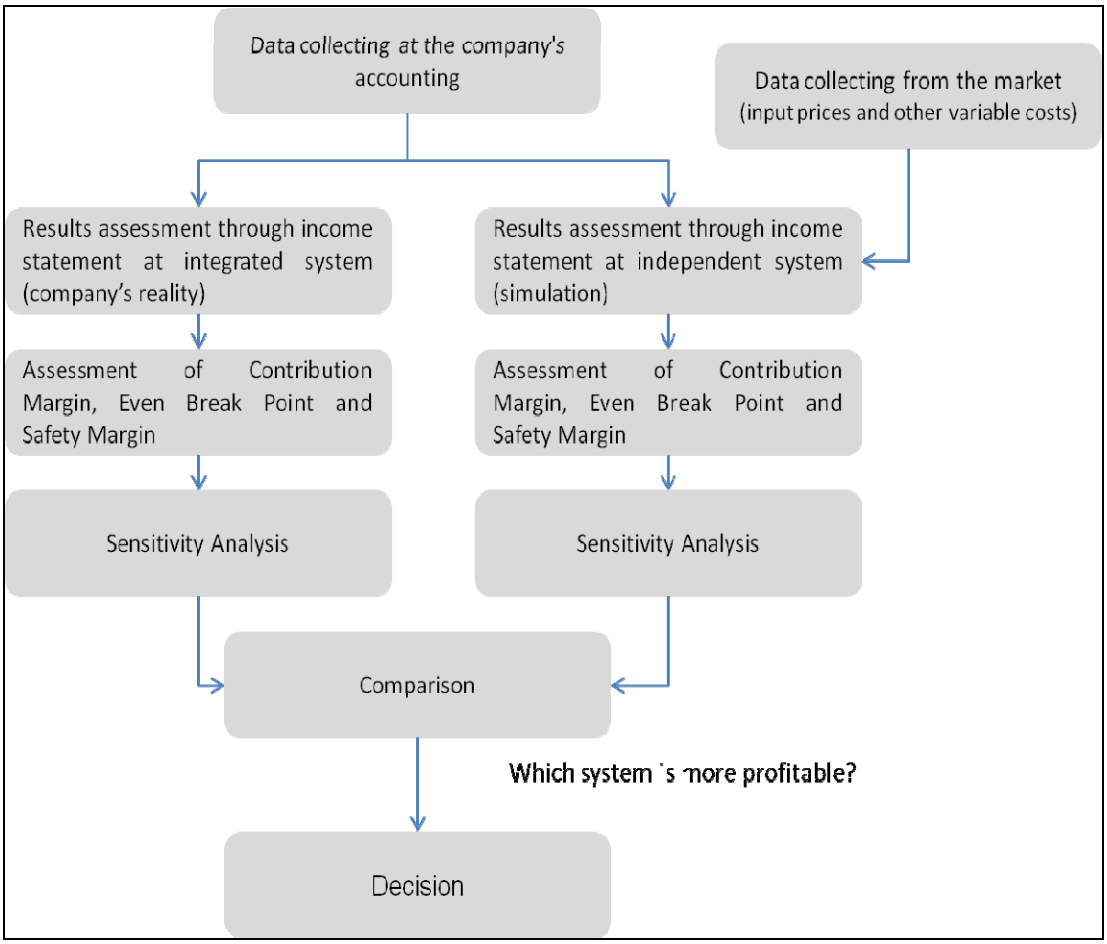

Figure 3: Research Application.
Source: Adapted from Ferreira and Wanzeler (2011)

In the next sections, there will be presented details of the research applications as well as preliminary results will be discussed.

3.2. Application of variable costing on integrated system

In order to apply the variable costing method appropriately it was necessary to perform data collecting during 13 months. After that, classification (Table 2) of expenses was conducted based on the criteria of EMBRAPA Methodology for the Calculation of Cost of Production of Broiler - Version 2, Miele, et al. (2010).

Table 2: expenses classification

Expenses	Classification	Comments
Electricity	Variable Cost	These expenditures have changed their total value in the quantity produced.
Manpower	Variable Cost	
Firewood	Variable Cost	
Sawdust	Variable Cost	
General Accommodations	Variable Cost	
Maintenance	Variable Cost	
Depreciation on plant and machinery	Fixed Cost	There are no changes to the amount produced.

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After classification of the expenses it became possible to calculate the variable costs per unit. First, it was obtained the sum of total spending on each item during the period from July 2010 to July/2011. Next, this sum was divided by the total number of birds produced in the same period and then the result per bird was obtained (R$ / bird). Finally, this last result was divided by total kg produced during the same period, obtaining the variable cost per kilo at each farm.

As it was necessary to know the production volumes and weight per month at each farm, this information is presented at table 3.

Table 3: Production volumes and production weight

Lots	Birds Production (Birds)		Production weight (Kg)	
	Farm 1	Farm 2	Farm 1	Farm 2
Lot 1	66.445	43.400	174.086	120.348
Lot 2	67.763	43.869	169.950	109.014
Lot 3	65.914	43.144	177.770	114.245
Lot 4	60.043	42.700	148.066	103.889
Lot 5	73.839	48.248	177.657	108.654
Lot 6	73.829	49.398	187.009	134.511
Subtotal	407.833	270.759	1.034.537	690.662
TOTAL	678.592		1.725.199	

If studied separately, there could found differences in consumption of inputs between the studied farms, which permitted to observe that each farm generated different costs to produce 1 kg of chicken, although the amount produced in quantity and number of birds remained constant. However, for this study, the target information is the average Costs/kg. Results of the Costs calculations are presented on the next table.

Table 4: Costs Calculation for Integrated System

Costs Calculation	Amount	Per Birds	Per Kg
Variable Costs (VC)	R$ 170.943,45	R$ 0,25	R$ 0,10
(+) Direct Manpower	R$ 49.209,14	R$ 0,07	R$ 0,03
(+) Electricity	R$ 59.016,28	R$ 0,09	R$ 0,03
(+)General Accommodations	R$ 3.771,82	R$ 0,01	R$ 0,00
(+)Maintenance	R$ 11.246,21	R$ 0,02	R$ 0,01
(+)Firewood	R$ 5.700,00	R$ 0,01	R$ 0,00
(+) Sawdust	R$ 42.000,00	R$ 0,06	R$ 0,02
FIXED COST (FC)	R$ 83.414,32	-	-
(+)Depreciation on plant	R$ 45.106,62	-	-
(+) Depreciation on machinery	R$ 18.043,74	-	-
(+) Indirect Manpower	R$ 20.263,96	-	-
TOTAL COST (VC +FC)	R$ 254.357,76	R$ 0,48	R$ 0,19

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The next step was to build the Income Statement through which it could be concluded that on the integrated system gross profit R$ 0,22/bird or R$ 0,09/kg. Net profits are R$ 0,10/bird R$ 0,04/kg. Income Statement calculation for this production system is present on the table 5.

Table 5: Income Statement for Integrated System

Income calculation	AMOUNT	PER BIRD	PER KG
GROSS INCOME	R$ 323.155,26	-	-
(-) TAXES	R$ 12,00	-	-
NET INCOME	R$ 323.143,26	R$ 0,48	R$ 0,19
(-) VARIABLE COSTS	R$ 170.943,45	R$ 0,25	R$ 0,10
GROSS PROFIT (CONTRIBUTION MARGIN)	R$ 152.199,81	R$ 0,22	R$ 0,09
(-) FIXED COSTS + EXPENSES	R$ 83.414,32	-	-
NET PROFIT	R$ 68.785,50	R$ 0,10	R$ 0,04

Once calculated the incomes of the enterprise on integrated system, the next step was to construct a simulated scenario of Independent system in order to not only to analyze possibilities, but also to make possible a further incomes comparison for subsidizing decision.

There are presented on section 3.3 the calculations for the simulated profitability at Independent system, according to variable costing procedures.

3.3. Application of variable costing on Independent System

For the application of variable costing method into the independent system of poultry production first it was necessary to identify the new expenses which that naturally incur to the independent producer. For example, the independent producer would produce bird feed, besides to operate the logistics to buy one-day old birds for fattening.

The operational management of machinery maintenance and its depreciation would be an additional responsibility for the farmer, as well as the additional expenses related to the depreciation at new ration fabric plant – this would also incur into new expense on electricity to guarantee the operation of this new plant. Note that this study did not consider financial disbursements for the construction of the ration factory, as this configures not a production cost but a long term investment.

As the calculation of results at independent system was performed on the same temporal series used for section 1.2, another point to be remarked it that the total expenses with sawdust, firewood and various accommodations were the same calculated to the integrated system. Yet, since to perform the comparison between

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the two systems, the quantity produced (table 3 – section 4.2) were the same for both cases.

Although much information to simulate this independent scenario was available from the previously presented on section 1.1 and 3.2; it was necessary to define new expenses which were innate from Independent System. For example, to illustrate one of the many procedures taken to perform this stage of the study, calculate new costs which would generated to produce birds ration at the farms an auxiliary study was performed in order to better understand Birds ration formulation which had to consider the animal nutrition needs during all the different stages of fatting (13 months). Only after that, it would be possible to precede the costs rising.

According to FAEPA - North Unity (2011), there are 4 stages on the fatting process and for each stage there must be used a different ration composition, aiming to maximize the gain of weight. The table 6 presents the fatting stages and the ration quantities per bird to gain the appropriated weight.

Table 6: Required amount of feed per bird.

Stage	Pre-initial	Initial	Growth	Finishing	Total
Amount (Kg)	0,3	1	2,2	2,5	5

Source: FAEPA S.A (2011)

After that, the feed formulations were calculated for 723.100 broiled birds at the company farms during the realization of this study. The next step was to perform ingredients average quotation for each ingredient of the ration. Summary results can be observed table 7.

Table 7- quotation of ingredients per feed type

Ingredients	Total	Pre-Initial	Initial	Growth	Finishing
Corn (R$)	1.269.770,69	61.499,66	237.408,19	557.175,16	413.687,68
Soybean meal (R$)	835.809,60	75.556,72	198.490,95	366.524,93	195.237,00
Soybean oil (R$)	205.533,94	9.892,01	32.973,36	96.721,86	65.946,72
Meat and bone meal (R$)	98.095,75	6.074,04	19.740,63	43.429,39	28.851,69
Limestone (R$)	9.596,98	585,71	1.887,29	4.390,66	2.733,32
Salt (R$)	3.771,33	292,86	976,19	1.574,91	927,38
Sodium bicarbonate (R$)	21.114,52	867,72	3.326,26	9.544,92	7.375,62
Premix (pre-starter) (R$)	25.380,81	25.380,81	-	-	-
Premix (initial) (R$)	79.541,00	-	79.541,00	-	-
Premix (growth) (R$)	164.331,71	-	-	164.331,71	-
Premix (finishing) (R$)	101.197,85	-	-	-	101.197,85
Total (R$)	2.814.144,17	180.149,52	574.343,87	1.243.693,53	815.957,25

Source: Ferreira and Wanzeler (2011)

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After that, calculation of unitary costs of feed was possible to be performed. Therefore, results obtained were: R$ 4,15 /bird R$ 1,63/bird-kg. Similar proceedings were adopted to calculate other costs that were not contemplated at section 3.2. Thus, first results obtained through variable costing method on the simulated independent system of production can be observed on table 8 – Variable Costs for Independent System.

Table 8- Costs Calculation for independent System

Costs Calculation	Amount	Per Bird	Per Kg
Variable Costs (VC)	R$ 3.871.571,40	R$ 5,71	R$ 2,24
(+) Ration (bird feed)	R$ 2.814.144,17	R$ 4,15	R$ 1,63
(+) one-day old bird	R$ 686.945,00	R$ 1,01	R$ 0,40
(+) Direct Manpower	R$ 69.473,10	R$ 0,10	R$ 0,04
(+) Electricity	R$ 73.612,17	R$ 0,11	R$ 0,04
(+)General Accommodations	R$ 3.771,82	R$ 0,01	R$ 0,00
(+)Maintenance	R$ 175.925,14	R$ 0,26	R$ 0,10
(+)Firewood	R$ 5.700,00	R$ 0,01	R$ 0,00
(+) Sawdust	R$ 42.000,00	R$ 0,06	R$ 0,02
FIXED COST (FC)	R$ 72.339,36	-	-
(+)Depreciation on plant	R$ 54.295,62	-	-
(+) Depreciation on machinery	R$ 18.043,74	-	-
TOTAL COST (VC +FC)	R$ 3.943.910,76	R$ 5,81	R$ 2,29

Source: Ferreira and Wanzeler (2011)

From Table 8 it is possible to observe that unitary operational costs both per bird and per produced kg are much greater than the costs observed for integrated system (section 3.2). While the former costs $0, 48 per bird the latter costs 12 times more ($5,81). As costs have increased so much, for the independent scenario to be interesting to the farmer, it is necessary that the net profit be much higher than the one obtained on the integrated model, which is tested below (Table 9).

Table 9- Income Statement for Integrated System

Income calculation	AMOUNT	PER BIRD	PER KG
Gross income	R$ 4.398.128,53	-	-
(-) Taxes	R$ 12,00	-	-
Net income	R$ 4.398.116,53	R$ 6,48	R$ 2,55
(-) Variable costs	R$ 3.871.571,40	R$ 5,71	R$ 2,24
Gross profit (contribution margin)	R$ 526.545,13	R$ 0,78	R$ 0,31
(-) Fixed costs + expenses	R$ 72.339,36	-	-
Net profit	R$ 454.205,77	R$ 0,67	R$ 0,26

After the formation of Income Statement, there were estimated a gross profit per bird of R$ 0.78 and R$ 0.31/kg. Estimated net income is $ 0.67/bird and R$0.26/kg. Thus, it was verified that the net profit per bird at the independent system is 6,7 times greater than in the integrated system.

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As a preliminary conclusion for this particular study, it can be inferred that although the expenses increases at independent system, net profit at this system is more attractive than the net profit of integrated system.

3.4. Calculation of variable costing indicators

Variable Costing indicators provide a broader view on results of each production system, as it allows extending the analysis beyond the net profit earned at each production system.

Table 10-Indicator Calculation

Indicator	Integrated Production System		Independent Production System	
	Amount	Per bird	Amount	Per bird
Contribution Margin (R$)	152.199,81	0,22	526.545,13	0,78
Even Break Point (unit)	371.908	-	93.228	-
Even Break Point (R$)	177.107,81	-	604.236,52	-
Safety Margin (unit)	306.684	-	585.364	-
Safety Margin (R$)	146.047,45	-	3.793.892,01	-
Safety Margin (%)	45,19%	-	86,26%	-

Results were surprising, as according to these indicators, independent production system has shown more attractive rates, although majority of scientific and technical studies abroad Brazil has proven the opposite. For this reason, a further analysis must be performed: the sensitivity analysis.

3.5. Sensitivity Analysis

As effective decision depends on the accuracy of results calculation, sensitivity analysis was used to measure the sensitivity to the variation of the most representative Variable costs of the Company, which had great impact on both gross and net profit. For example, at Independent system, one of the most impacting costs are the ones related to birds feed production and new birds acquisition (e.g. Ration Corn represents 72,69% of variable costs, and one-day old birds represents 17,74% of them). Final results calculation of sensitivity analysis can be observed on table 11.

Table 11- Sensitivity Analysis Scenarios

Costs Calculation	Initial	5% Variation	10% Variation	15% Variation	20% Variation
Variable Costs (R$)	3.871.571,40	3.935.059,93	3.998.548,47	4.062.037,00	4.125.525,54
Bird Feed (R$)	2.814.144,17	2.877.632,70	2.941.121,23	3.004.609,77	3.068.098,30
Corn Cost R$/Kg	0,54	0,57	0,59	0,62	0,65
Corn Cost (R$)	1.269.770,69	1.333.259,22	1.396.747,76	1.460.236,29	1.523.724,82

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Contribution Margin (R$)	526.557,13	463.068,60	399.580,06	336.091,53	272.603,00
Contribution Margin (R$/Kg)	0,31	0,27	0,23	0,19	0,16
Contribution Margin (R$/bird)	0,78	0,68	0,59	0,50	0,40

After these results, it was observed that contribution margin remains positive even with the simulated increases on the price of corn. That means that for this particular case, the independent system presents superior profits than the integrated system even if the cost with corn raises 20%.

4. CONCLUSIONS AND RECOMMENDATIONS

A critical observation of the dynamics of integrated system shows that it is advantageous in many ways as the integrator company stands responsible for providing all necessary inputs and also for the supplements to the Poultry Production, but as in counterpart the producer will be unable to reach different options of suppliers as well as it will be forbidden to freely pursue new buyers. The results obtained through this study show that the net profit per bird (R$0, 10) and per produced Kg(R$ 0, 04) is not as much attractive as the net profits simulated for the Independent System (R$ 0, 67/ bird and R$ 0, 26/kg). In fact, after performing the sensitivity analysis this second system remains more profitable even of if variable costs increase 20%.

Therefore, if the decision to considered only criteria of minimizing costs and maximizing of profits per bird, the production system recommended would be the independent one. However, there are other aspects to be considered on this study.

This work accomplished its objective to make a comparative study of profitability, between two different systems of poultry production. However, it is important to point out that it is necessary to conduct a further study on investment analysis to support the decision of expanding the farms and migrating to the independent systems.

Although the accuracy of results they can only partially support decision of this magnitude. Furthermore there are qualitative management aspects to be considered beyond financial indicators which are the willingness of the producer to assume the management of supplies and if this farmer possesses the required expertise to operate his under the rules of an independent strategy of cost leadership.

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