A Discourse Regarding the Application Cost Accounting System in Agriculture Farms

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ABSTRACT

The practice of cost accounting is essential for business professionals due to its ability to determine the degree to which resources are being exploited most efficiently. Cost accounting may differentiate between industries and sectors; hence, the importance of reviewing pieces of literature based on their comparisons had been the prime focus of this particular research. Agriculture represents an important aspect of any economy. However, certain crucial factors make the accounting procedure in a sustainable agricultural firm much undeveloped in nature, which need to be addressed from the base level to generate favorable outcomes in the future. The paper is based on a Systematic Literature Review (SLR) by levying utmost attention on gathering secondary data only. The overall findings being gathered for this particular research clearly deciphered that the application of cost accounting system in agricultural firms is somewhat distinct from others due to its strong focus on certain crucial factors. A few of these factors were identified as overhead allocation, availability of livestock, and production sizes among others. Specifically, as per the findings being retrieved from the literature review, it certainly became apparent that Activity-Based Costing (ABC) activities in agriculture included significant and unique differences from the practices of other industries, but there are similarities as well. One of these similarities included maximizing huge profits by making suitable expenses at the end of every fiscal year. In terms of recommendation, accounting staff working in rural areas should be prepared enough for making effective application of cost accounting mechanism in diverse agricultural firms to generate favorable or positive outcomes.

Keywords: Cost Accounting System, Agriculture Farms, Manufacturing Firm, Activity Based Costing System, Production Cost

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INTRODUCTION

Cost accounting is a complex approach to accounting practice. It supports a business organization to evaluate its fixed as well as variable expenses being incurred during the operations properly. Accurate cost appraisal along with distribution to specific activities is viewed to be one of the primary objectives of the cost accounting approach within a business or an organizational context (Barg and Swanson, 2004). This kind of practice is often exercised to determine where there exists any cost inefficiency and evaluate the ways through which an organization can reduce its operating expenses as per the desired level (Fisher, 2012). It is worth mentioning that the cost accounting system or practice is applicable in agriculture as well. Taylor (1923) in this context discussed the objectives of agricultural cost accounting that include maintaining equilibrium amid the receipts and the payments within the production procedures and maximizing profits from the growing execution of fertilizers among others. According to King (1927), cost accounting is regarded as an activity or a tool, which facilitates the determination of efficiency in the production level and attracts the potential farmers to generate huge profits from the same. Black (1955) further noted the importance of approaching cost analysis in agricultural farms from the standpoint of measuring costs similar to that of other industries. There often persists a difference in the degree of difficulty and the approaches taken to cost accounting practice because of the variations being witnessed in the production level and inappropriate services being rendered to the end-users (Black, 1955).

There are several challenges of the cost accounting system, specifically in the agricultural farms, that are identified to be unique from other operational segments including manufacturing and merchandising. Such challenges eventually portray that there still exists an undeveloped accounting approach within a sustainable agriculture system. One such challenge can be recognized as the inability of allocating expenses concerning time credits. The reduction of expenses and the conduct of proper accounting of costs in agriculture were the main focus of DeBoe and Stephenson (2016), who discussed the issue of enlarging nutrient business in an agricultural setting. Their research eventually raised the scope of ecological economics and the issue of costs related to term credits. In

agriculture, commonly, some credits are made available to agriculture professionals, which will come back to the respective farms. Nevertheless, estimation of these credits for any specific farm creates a complex cost accounting problem, wherein transaction costs are not known. Determining these costs certainly becomes difficult for the cost accountants (Fisher, 2012). The issue concerning "Value" can be regarded as the other challenge, which depicts that an undeveloped nature of the accounting system duly persists in a sustainable agriculture mechanism. This issue arises from an invalid assumption being made that it is justified enough to ask someone about how much he/she is keen to pay for protecting the underlying environment (Barg and Swanson, 2004). The agriculture industry is important to the economies and the societal developments of varied nations across the globe because the community members mainly rely on the products to be produced by any means such as farming for basic survival. On one hand, agriculture is essential for the monetary advancement of the nations and their underlying societies and on the other hand, cost accounting in agriculture is complex as well as difficult for several reasons (Fisher, 2012). A few of these reasons comprised commercialization or privatization of farming and inappropriate maintenance of ecosystem services among others (Rundgren, 2017). The research aimed at reviewing some scholarly literature to find out why the accounting system is still undeveloped in the agriculture system, specifically within the context of organic farming. Considering this aim, the objectives of the study are evaluating the practices of cost accounting in agriculture as well as other industries and determining the roles along with the implications of ABC accounting in the domain of agriculture.

Cost Accounting in Agriculture and Other Industries

Agricultural activities are similar to that of manufacturing ones, wherein a specific form of raw material is duly converted into an end product efficiently. However, in most agricultural activities, the process is performed through biological mechanisms, wherein the farmers seek to facilitate optimum efficiency in the operations. In this regard, the finished products are duly considered to be commodities with the help of which fair market value is easily determined. Unlike manufacturing firms, wherein, the historical cost is deemed as the basis for evaluation, Lewis and Jones

(1980) asserted that a current cost accounting method must be employed. This is because in the case of agricultural farms, there lays the requirement of examining accurate current costs to maintain a balance amid receipts and payments. This is also supported by financial reporting standards just outside the range of cost accounting (Lewis and Jones, 1980). Marsh and Fischer (2013) further discussed the issue of accounting for agricultural products in GAAP, wherein Accounting Statement Codification 905 along with non-GAAP guidelines are used. The issue of accounting recognition and valuation variances is significant, as the differences between the accounting practices of historical cost and fair value are highly concerned. Table 1 illustrates the PricewaterhouseCoopers' (2009) hierarchy of fair value in agriculture. In the hierarchy, it is found that the highest value for biological agricultural assets is placed on the asset price based on an active market. Herein, an active market can be related to the commodities market. Concerning the study findings of Marsh and Fischer (2013), the nature of USGAAP reporting standards is noticed to be somewhat different from the IFRS method, wherein less information is given to the decision-makers when USGAAP is in use. Therefore, unlike other industries where decision-makers consider financial data to be reported following USGAAP as sufficiently conservative and informative, in agriculture, the current paradigm relies on historical costs for further analysis. These findings further support the practice of cost accounting in the agricultural industry, particularly in the domain of organic farming (Marsh and Fischer, 2013).

Table 1: Fair market value hierarchy

Hierarchy	Type
Highest	Price for the asset on an active market
Second	Recent transaction price
Third	The market price for a similar asset
Fourth	Sector benchmark
Lowest	The present value of future cash flows

Source: PricewaterhouseCoopers, 2009

Based on the above-portrayed Table 1, it is evident that the financial statement computation of fair market value follows a hierarchical chain from the price, which is being measured on an active market to the value of

cash flows into the future. This reflects a higher degree of value being placed on the market when determining the valuation. Valuation, in this regard, is deemed important in cost accounting. This is because it is regarded as the method by which costs may be determined either to single products or a pool of products, wherein percentages are used for cost allocation. There are different theories related to how cost computation should be approached in agriculture. Under this circumstance, Bavita et al. (2010) discussed the issue of allocation, wherein the authors mentioned that when a nutrition unit is used, the equivalence indices method is the best approach to consider for generating favorable results. Herein, this specific method seems to be beneficial because of the complications that are created as well as solved through intercropping and better allocation of production costs being related to nutrition units. In this particular method, the total expenses incurred are measured against secondary production at Net Realizable Value and then divided among the products (Bavita et al., 2010).

In addition to the use of equivalent indexes, other methods of cost accounting are suggested for use in agriculture. These methods include the remaining value method and the method of quantitative equivalence (Bavita et al., 2010). In general, the remaining value method involves the deduction of the value of a secondary product. In this method, several products are obtained from a crop. Crops may be used for several purposes such as the development of cereals or base products. Since different approaches are taken into concern for production, costs are often considered into different lines under distinct measurement methods (Bavita et al., 2010). On the other hand, the method of quantitative equivalence is applied in the situation when there is a secondary product being coupled with the main product. The computation of costs in this particular method generally involves the expenses that are incurred during the production, which are then recorded and grouped for operative accounts on the respective agricultural firms (Bavita et al., 2010).

Another important factor related to the use of cost accounting in agriculture is the issue of external costs associated with agricultural production. These external costs represent the expenses that are not directly incurred by the agricultural firms. Tegtmeier and Duffy (2004) discussed some of these external costs as livestock production and damages are done

to the underlying ecosystems through croplands among others that have an impact on environmental and human health at large. It has been apparent that the entire exterior expenses of agricultural production in the US are projected to fall between the level of $5.7 and $16.9 billion every year (Tegtmeier and Duffy, 2004). In the context of cost accounting for the agri-businesses, Tegtmeier and Duffy (2004) stated that the estimations of the identified external costs are important for determining whether the contribution of such businesses to the economy is neutral or better than the impacts being imposed over the environment. Furthermore, this agricultural cost accounting assessment is important because it posits the potential stakeholders with the ability to measure the impact of agricultural activities on the underlying communities (Tegtmeier and Duffy, 2004). Thus, agricultural cost accounting methods are useful for both businesses and interested stakeholders in agricultural firms.

From a historical perspective, cost accounting activities have been the focus of accounting and agriculture researchers for over a century aimed at describing ways in which accounting systems could be designed to allocate costs of production accurately. Contextually, one of the first scholars to contribute to the progression of accounting in agriculture was Arthur Young (Juchau, 2002). Juchau (2002) discussed the early history of agricultural accounting in the context of how it became relevant during industrialization. Based on the observation made by Juchau (2002), determining the degree of efficiency and benchmarking certainly became an important activity in the late 19th century and is followed throughout the 20th century within agricultural schools. It was evident that questionnaires along with surveys were utilized as the methods to validate the evaluation of crops, harvests, yields, and the costs associated with production (Boss, 1945). Boss (1945) also noted that these tie with the importance of cost accounting in agricultural farms have been supporting them to compare their business activities as a quantitative measurement against the performance of competitors and point out areas of development.

Dogan et al. (2013) also discussed the historical advancement in agricultural accounting. In this regard, the authors mentioned that the unique nature of costs and assets in agriculture, wherein products are treated as commodities with values in a constant state of change, influences

the consideration of different systems for accounting to conduct agricultural activities efficiently. Lewis and Jones (1980) further asserted that the application of a current cost accounting system would be rational for agricultural farm businesses because valuations of crops and livestock rely on historical costs. These facets eventually get linked with cost accounting practices in agriculture, wherein historical elements support the importance of valuations that are deemed as different from other service providers and industries.

Roles and Implications of ABC Accounting in Agriculture

It is argued that traditional and generalized cost accounting practices to agriculture create greater financial stress on the respective operating firms. Barry and Lee (1983) discussed in this regard that the issue of financial stress in agriculture from the standpoint of how lenders make decisions to invest and thereby maximize huge profits. Concerning the study findings of Barry and Lee (1983), financial markets have been hostile to farmers in the past, and thereby obtaining credit proved to be difficult because of valuation in cost accounting, about volatility risk. This issue eventually suggests that an undeveloped accounting system still exists in a sustainable agriculture system. Similar aspects have been highlighted by Pawlowska-Tyszko and Soliwoda (2016; p. 171), wherein it has been stated that "'agribusiness clients operated larger farms'" tend to be more likely to use farm cash/accrual financial record systems. Accountants view some limitation for usefulness in 'present financial reports provided to farmers'". These facts determine that an undeveloped accounting system persists within the sustainable agriculture mechanism. Kapronczai and Tomka (1991) noted that through the use of specific cost accounting practices, it is possible to determine areas where both large and small agricultural firms may attain a superior level of competitive position and thereby ensure long-term sustainability in the respective markets or industries wherein, they operate.

METHODOLOGY

The research is a "systematic literature review" (SLR), wherein a greater focus has been levied on retrieving secondary data only. Google Scholar was mainly utilized as the search engine, wherein a total of 20 articles were searched initially after providing the main keywords of the

research that included Agriculture Farms, Production Cost, Cost Accounting System, Manufacturing Firm, and Activity Based Costing System. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach had been duly followed in terms of methodology for the given research paper. For instance, as per PRISMA, only 10 articles were selected for screening, out of 22 articles being appeared in Google Scholar initially. Amongst these, only 4 articles were selected to analyze the issue identified for this specific research and 6 articles had been rejected after following certain exclusion criteria. The mentioned exclusion criteria were based on the following aspects:

- Articles not relevant to the topic and the identified issue i.e., Discourse Regarding the Cost Accounting System in Agriculture Farms
- Articles published beyond the period of 50 years from the current date (2020)
- Articles that do not involve the discussion about cost accounting practices in agriculture farms

Findings

Authors' Names	Name of the Articles	Methodologies Used	Findings/Discussions
Fatah and Mat-Zin (2013)	Literature Review of the Practice of Cost Accounting System in the Agricultural Firms	Literature Review	Usage of the Cost Accounting System in the agricultural firms is somewhat found to be less than that of manufacturing as well as service organizations. This may be due to the reason of the variations being witnessed in the agricultural business setting on a global basis over the preceding few years. Agricultural firms can boost their profit margins via the execution of the Cost Accounting System in their operations by evading unprofitable actions or tasks and controlling distinct variable costs most efficiently.
Dumitru et al. (2011)	Computing the Cost of the Agricultural Products: A Case Study	Literature Review, Descriptive Analysis and Case Study	Cost computing of the agricultural products of distinct is usually made under a natural-material setting, wherein main calculations are being made based on the categories of the crops harvested and the animals used in the overall production procedure. The bookkeeping of the production expenses is also duly considered under the cost computing mechanism of the agricultural products within varied firms.
Fisher (2012)	Cost Accounting Applied to Farming in Southwest Michigan	Descriptive and secondary data analysis	"Cost accounting allows farmers to see their farm as more than "x" amount of acres that cost "x" amount of dollars to produce "x" amount of bushels. Cost accounting allows the farmer to see the farming operation broken into incomes and expenses based on acres and yield units. This is possible because these grain farmers have a unit of production, grain (Fisher, 2012; p. 19).

Bavita et al. (2010)	Cost Computation for the Agricultural Products within the Vegetal Farms	Qualitative with Inductive approach	Cost computation seems to be difficult for agricultural firms in comparison with manufacturing or servicing organizations because of having a divergence chance amid resource consumption and the time when the production is acquired. However, this adverse condition can be addressed and mitigated in certain ways. A few of these ways typically encompassed executing the Remaining Value as well as the Equivalent Indexes procedures and focusing on valuation techniques. To reap future benefits in terms of profits, agricultural firms need to levy the utmost attention on controlling variable costs, in particular.
Carli et al. (2014)	Introducing Activity-Based Costing in Farm Management: The Design of the FarmBO System	Secondary with descriptive data analysis	In farm management, Activity-Based Costing is mainly used to determine the expenses incurred and measure the performance of the actions being performed to generate favorable or positive outcomes. This particular method or approach in agricultural firms is typically based on the advancement of final products by making sure fuller execution of the accessible resources.
Juchau (2002)	Early Cost Accounting Ideas in Agriculture: The Contributions of Arthur Young	Qualitative with focus on secondary and descriptive data	Cost accounting and its methods in agricultural firms have certain similarities with that of manufacturing-based corporations. One of these similarities was recognized as controlling variable costs in a way so that optimum production level is maintained to the maximum possible degree for obtaining significant profits. Another similarity was the crucial function of such accounting practice in finding out the valuation of any agricultural firm-related product such as livestock. This valuation is likely to enhance the business performance of the agricultural firms by

			generating greater returns to the involved potential stakeholders.
Lewis and Jones (1980)	Current Cost Accounting and Farming Businesses	Qualitative with a secondary method of data collection	The method or the practice of cost accounting in agricultural farming businesses has gained acceptance in its usage due to the fluctuations being witnessed in the inflation rates in this present-day context. Similar to manufacturing and servicing firms, business organizations operating in the agricultural industry are inclined towards applying cost accounting into their respective operational functions because the profitability levels are determined based on the current values instead of any historic cost. Since the agricultural industry or business is becoming quite competitive, the operating firms often execute cost accounting mechanisms so that more earnings can be maximized and the involved stakeholders are provided with greater returns at the end of every fiscal year.
Barg and Swanson (2004)	Full Cost Accounting for Agriculture	Qualitative research with secondary and descriptive data	The "Value" problem does exist in the approaches of financial valuation, making the accounting system in the sustainable agriculture domain quite undeveloped in nature.
Pawlowska-Tyszko and Soliwoda (2016)	Agricultural Accounting Systems Supporting Farm Financial Management – The Case Of Polish Fadn	Qualitative research with secondary and descriptive information	More reliance on the implementation of farm cash/accrual monetary record systems and limitations of the accountants in presenting apt financial reports to the farmers eventually make the accounting technique in a sustainable agriculture system undeveloped.

Dogan et al. (2015)	Historical Development Of Agricultural Accounting And Difficulties Encountered In The Implementation Of Agricultural Accounting	Qualitative research with a focus on secondary data	The farmers and the agricultural enterprises are likely to obtain precise and suitable information about realistic accounting costs via successful usage of "Agricultural Activities Standards 41" and "Farm Accountancy Data Network".
Schnitkey et al. (1991)	Farm Accounting Systems and Information Usage	Qualitative research and secondary method of data collection	The various factors that have a strong influence on the accounting system election within the modern agricultural firms are features of these firms, the number of transactions being made, and determination of the compositeness of the reporting requirements.

DISCUSSION

Juchau (2002) and Lewis and Jones (1980) elaborated on the history of agricultural cost accounting, which is deemed as vibrant and unique from other forms of accounting. Nevertheless, there exist some similarities between agricultural cost accounting and manufacturing. In this regard, Bavita et al., (2010) discussed some unique points of cost computation for agricultural products with a focus on vegetation. A few of these points included the allocation of overhead, which is created across different cycles and can be distributed to specific productive activities. The allocation itself can be done in several different ways; however, when it is done following nutritional units, the equivalence indices method should be used (Bavita et al., 2010). On the other hand, with regards to the study outcomes presented by Carli et al. (2014) and Dumitru et al. (2011), cost computation for agricultural products can also be made possible by the incorporation of the Activity-Based Costing method and the determination of production expenses concerning livestock and others. As per the observation made by Schnitkey et al. (1991), agricultural cost accounting systems represent a novel approach to business management for the owners of distinct agricultural firms, wherein they can assess the current performance of their firms and determine what needs to be done to improve their performance as well as increase the efficiency level as per the desired standards.

The qualitative study outcomes of Fisher (2012) highlighted the fact that cost accounting and its varied techniques are largely applied in agricultural firms with the prime intents of allocating production costs successfully and maintaining an optimum equilibrium amid the expenses being incurred during the conduct of operations and the profits obtained at the end of every fiscal year. Based on these outcomes, it is quite apparent that cost accounting in agricultural firms is determined based on certain significant aspects. A few of these aspects typically embraced yield units, production sizes, and the products being produced at the finish of the financial years (Fisher, 2012). Concerning the study findings of Dogan et al. (2015), the agricultural sector has gone through significant transformations over the previous few years. One of such transformations could be witnessed in the traditional system of cost accounting, wherein utmost importance is placed over-controlling as well as maintaining stocks to the maximum possible degree and ensuring optimum execution of the available

resources among others (Dogan et al., 2015). Barg and Swanson (2004) pointed out the fact that the problem concerning Value being inherited within the economic valuation system makes the accounting procedure in a sustainable agriculture process quite undeveloped. This, in turn, eventually poses threats to the financial conditions of the respective agricultural firms at large. Moreover, in this context, Pawlowska-Tyszko and Soliwoda (2016) inferred that the undeveloped nature of the accounting system in a sustainable agriculture mechanism can be determined from having limitations in the financial reports being delivered to the farmers and ensuring more execution of farm cash/accrual methods.

Fatah and Mat-Zin (2013) asserted that manufacturing and service firms receive far greater attention than agricultural firms in terms of cost accounting structure development. The researchers also pointed out that there are distinct differences and there must be a greater focus placed on agricultural accounting systems. The reason for the lack of attention could be the assumption that agriculture is sufficiently close enough to manufacturing, wherein manufacturing cost accounting principles are sufficient enough to undermine the costs being involved in the production procedures. Researches, thus, should be focused on developing new ways in which cost accounting could be performed in the agricultural setting. This could also include accounting for externalities such as those suggested by Tegtmeier and Duffy (2004) to gain a sufficient understanding of how cost accounting works to measure the true costs incurred by the agricultural farms and enable them to safeguard the underlying environment.

CONCLUSION

Based on the above discussion, the use of cost accounting in agriculture must be delineated in terms of its approaches and processes. It is similar to that of manufacturing; however, some factors make the cost accounting mechanism in the domain of agriculture different from the procedure being followed in other industries. The fact cannot be ignored that utilization of cost accounting systems, specifically within the agricultural firms, is increasing thereby intending to earn more profits by controlling variable expenses being incurred during the making of any definite product. The outcomes being retrieved from this research indicated

that cost accounting in agriculture is similar to that of manufacturing because there lays a method through which raw materials can be converted into ultimate products. Nevertheless, there still exists an undeveloped accounting method in a sustainable agriculture system due to the problem having in Value and limitations towards presenting monetary reports to the farmers among others. To conclude, in the agriculture domain, the execution of cost accounting is dissimilar and can be complex when the costs are analyzed from a valuation standpoint.

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