EFFECTIVE COST MANAGEMENT IN AGRICULTURAL SECTOR BY LEVERAGING ACTIVITY BASED COSTING

The Perspective

The landscape of agriculture is fast evolving with an increased focus on enhancing farmers' incomes. The flagship schemes of the government are targeted towards improving purchasing power at the bottom of the pyramid to accelerate overall economic growth. At the same time, advanced technology is providing solutions to tackle the traditional challenges faced by agriculture towards improving the overall efficiency from farm to fork. The business dynamics of the agricultural sector generally call for a system of calculation and cost management that goes beyond output assessment and profit determination, and coordinates a tool that supports the decision-making process, thus facilitating the evaluation of different cultivation techniques, varieties and so on.

As far as cost calculation and management is concerned, the sector presents four characteristics in its productive system that condition cost model design: nature of output, multi production, self-supply, and heterogeneity. To sum up, there is a qualitative diversity (multi production) of products that consume common productive resources and which it is necessary to assess in order to reach an overall and individual determination of the cost and profit generated, and a suitable cost management system to back up decision-making related to production planning

The structure of the agriculture sector is seen to be unorganized and fragmented in nature and thus lack of effective regulation in the given sector is also seen as one of the reasons why farmers seem to be exploited and have been operating at very low margins. One of the key reasons seen for the lack of appropriate cost management in the given sector is with regards to the lack of prioritization of the cost management among farmers becauseof lack of knowledge with regards to the same.

Cost management architecture in Farm Sector

A sound Cost management system improves the data and information base for a wide range of issues related to farm operations, including farm accounts' data on farm cash receipts and farm expenses, net and gross farm incomes, and the degree to which farms are capitalized. It also provides information on farm profitability, household food security and the myriad forms of farm labor, such as hired and self-supplied labor by gender and age group.

The farming process has many costs involved. There are some constant expenses that are considered to be direct costs. It is determined that these costs will be present as long as the farming process is in occurrence. The process itself also creates indirect costs. In order to properly account for these costs, an accounting system must be used. There are many different uses and applications of accounting throughout the industry. Although there are many different fields of accounting in practice, cost accounting is a field of accounting that measures, records, and reports information about costs and the one that is most applicable to a farming operation.

Cost accounting allows farmers to see their farm as more than “x” amount of acres that costs “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. Being able to break the income and expenses down per acre gives the farmer a basis for comparing performance of different fields, determining why one field may be producing more than another, analyzing optimal use of land, experimenting with agricultural practices to improve yields, and reducing expenses. Some of the farming process will incur the same costs, and other processes will incur process-specific costs. Iowa State University Extension and Outreach has a valuable spreadsheet that calculates the costs incurred all the way through the net proceeds for individual farms

Some typical fixed and variable costs associated with a farming operation are discussed below:

- The fixed costs remain the same even when the acres being farmed increases. The variable costs change in proportion to the amount of acres farmed. Having the ability to track and break down variable costs gives farmers field specific knowledge on the cost per acre.

- Seed, chemicals, and fertilizers are variable costs. They will change in proportion to the acres farmed. Common sense suggests the more acres farmed, the greater are these variable costs.

- A fixed cost is determined for each of the farming processes. Custom hire is not always a part of the farming process, therefore, was not discussed as part of the farming process. Custom hire is the process of hiring a third party company to custom plant, applicate, spray, and harvest crops. This process has unique accounting concerns that are beyond the scope of this paper.

- Labor is also broken into fixed costs and variable costs. In farming, an operator is considered to be the supervisor. For each farming activity, there is usually an operator assigned to each crew. An operator will have many job titles. He or she might work on paperwork, report field conditions to the owner, or even drive a piece of farming machinery. Regardless of the job being done, an operator's labor is considered to be manufacturing overhead and will be treated as a fixed cost.

- Hired labor is an hourly paid employee. Hired labor works directly with the production of the crops and their labor will be a variable cost. This cost will change in proportion to the amount of hours these employees work, which should vary by the acres farmed.

- Land rent will be a fixed cost for each field rented. This is fixed because the cash paid for rent will not change until a new negotiation is agreed upon between the farmer and the landowner. Once the variable costs have been calculated, they are multiplied by the number of acres being farmed. Fixed costs are added to that total to arrive at total costs. To compute a net return, those total costs are then deducted from the calculated total returns.

Uses of an effective Costing System in Farm Sector

At the farm level, Cost of production (CoP) data contributes to improve the economic assessment of farm operation. They allow the producer to question his own operation and to benchmark it against the best practices of farms in the same region with similar characteristics. This, in turn, can lead to better informed decisions at the farm-level and improved market efficiency and performance. Some specific examples of how a robust CoP system can be used at the farm level are as follows:

- Enterprise mix decisions: analysis can illustrate which farm enterprise (commodity) is positively contributing to the whole farm financial picture and lead to reallocation between enterprises, as appropriate.

- Purchasing and marketing decisions: pricing targets for inputs and outputs can be set at different cost break-even levels. Knowing the break-even points allows farmers and policy-makers to take advantage of growing, buying or selling opportunities when they arise. The following formulas can assist in determining break-even points.

- Break-even price to cover variable costs (or gross margin): Total variable costs ÷ expected yield = Amount / unit produced. This is the minimum price needed to cover variable costs

- Break-even price to cover total costs (or net margin): Total costs ÷ expected yield = Amount /unit produced. This is the minimum price needed to cover all costs.

- Break-even yield: Total costs/expected price = unit produced (minimum yield required to cover all costs).

- Investment decisions: Making the right investments in capital assets, such as land, machinery and buildings, is critical to long-term success. CoP information shows the amount the farm can afford to pay for those assets. It is useful when conducting reviews of investments in enterprises that fail to meet total costs in the long run and determining where to redirect resources to more profitable enterprises.

- Total Costs per unit of production or unit of land area (depending on the product) Defined as:

  [Cash-costs + non-cash costs + land costs + capital costs (replacement and opportunity cost of capital) + farm overhead expenses] / Total land area in ha.

- This indicator can also be expressed in terms of total area planted or operated, weight or volume of product, animal head for livestock activities or any other unit of relevance, especially local or customary units. Subsets of the cost indicators can be produced. A common sub-aggregate is to display cash costs or purchased inputs only or to add cash costs and land rental costs. When reliable data are available, indicators are often displayed for individual cost items, such as feed costs per animal unit, seed cost per land area or labor cost per MT of output quantity

Environmental indicators

A wide range of indicators that relate farm activity to environmental variables can be compiled through a costing system These indicators can be useful to characterize the environmental profile of farms within a country or region and to provide some indications on the expected costs for farmers associated with the adoption of environmental policies, such as shifting to less input-intensive practices. Some of these indicators are described below.

- Energy use per hectare Defined as: [Fuel and lubricants use + electricity use] / Land area. This indicator can also be expressed in terms of production unit. The energy used could be converted to standard energy units, such as joules, or into their monetary equivalents. The individual items summed can be tailored to the uses and include the cost (or volume) of fuel used by machinery, equipment and buildings only, excluding electricity costs.

- Fertilizer use per hectare Defined as: [Fertilizer use] / Land area. This indicator measures the intensity in fertilizer application for the production of a given commodity. To be relevant for environmental analysis, data on the type of fertilizer used, especially on the concentrations of the different active components, is necessary

- Pesticide use per hectare Defined as: [Pesticide use] / Land area. The comments made for the fertilizer use indicator also apply for this indicator.

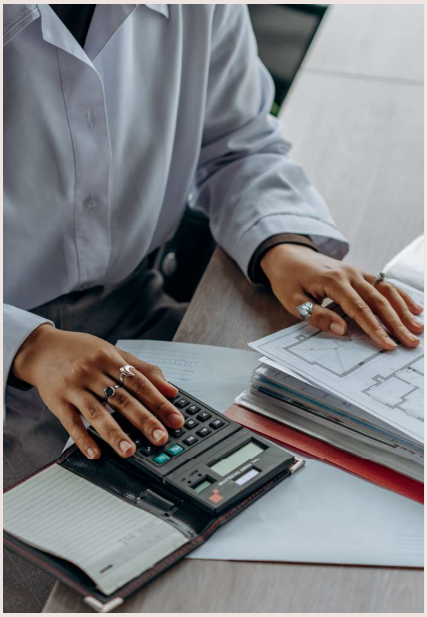
- Environmental Pressure Index Defined as: [Input use x emission factor] / Land area. This index measures the emissions for a given pollutant associated with the use of a specific input. For example, the quantity of nitrogen application can be translated into nitrous oxide emission using an appropriate emission factor and expressed on a per ha basis

- In addition to indicators that can be used for environmental purposes, a wide range of statistics measuring returns on the different inputs used can be established. These statistics contribute to measuring and identifying the structural changes taking place in agriculture, in which, for example, higher returns on fixed capital are a well-known feature of more sophisticated production technologies.

- Input productivity Defined as: [Value of output] / Input use. This indicator measures the gross output in monetary terms generated by a given unit of input (return on inputs). A well-known indicator is labor productivity, which measures the value of output generated by a given unit of labor use (hour, day or month-equivalents).

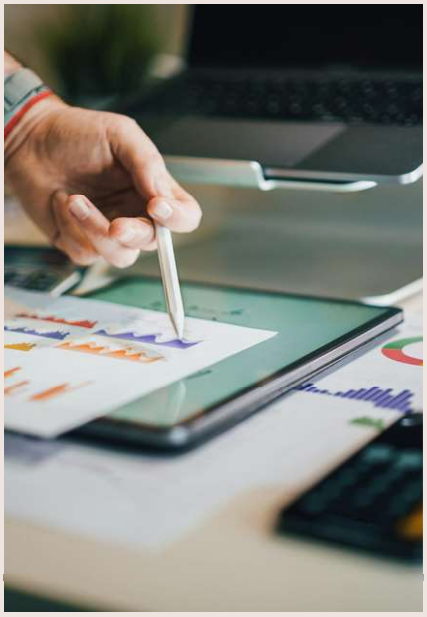
Activity Based Costing : A useful Cost Management technique for Farm Sector

Cost Management focuses upon all the activities internal and external to the value chain process in order tohelp in cost reduction and cost control. In relation to the agricultural sector, the Activity Based Costing techniqueis being increasingly accepted for the purposeof cost management. ABC costing can help in allocation of the costs in relationto the various activities associated with the production based upon the cost drivers identified in relation to each production activity. Benefits of using ABC for cost management in the agricultural sector are : Adjustable costing technique, Faster and more accurate. Enables carrying out more detailed analysis.



- ·An ABC system is based on the idea that products make use of certain general activities and these activities require some resources to be done. It means that, first, the cost of the resources are allocated to the activities and, then, the costs of activities are allocated to the products (costs objects) using specific activity drivers for each activity. In this way, it is possible to assign overheads to products in a more accurate and precise way. This logic enables managers to have a deeper control on how products or services, brands, customers, channels of distribution, or facilities consume resources and generate costs.

- ·Furthermore, this logic fosters the understanding of patterns of resource consumption at the micro level. Framers can have access to a deeper level of information that enables corrective actions directed to the enhancement of revenues, profitability and cost reduction. ABC prevents some distortions related to product cost information that arise from traditional accounting systems where the overheads (indirect costs) are arbitrarily attributed, usually in proportion to an activity's direct cost. Traditional systems create higher distortions when there are sophisticated production structures, with a wide range of products or services that require the assignment of large amount of general costs.



- ·An important element which makes Activity-Based Costing on one hand more useful and on the other hand more accessible/ feasible to farms and farming-related companies is that agriculture-based businesses are making increasingly intensive use of information in several production and management processes (e.g., for quality management or food safety. Activity-Based Costing offers the considerable advantage of improving decision making processes, providing a reliable method to process the wealth of data collected from the field, also with the aid of Precision Agriculture technologies. Farmers face many complex decisions, ranging from crop choices to machinery renewal and the use of external services. In many cases, indirect costs play a pivotal role in a decision, as more and more activities are completed using expensive equipment.

- ·Another important area could be product pricing, although for most agricultural firms price is an exogenous variable rather than a variable decided by the manager. However, by comparing market price information and forecasts with a more accurately quantified cost of the single product, the farm manager increases the chances of making the right decision. Another relevant area where Activity Based Costing could impact the agricultural supply chain is the possibility for associated farmers organizations (such as cooperatives, consortia, etc.) to better plan their production and marketing activities and to provide more insightful advice to their associates.

- ·If cost allocation procedures return a misleading representation, the company is more exposed to risks. Applying Activity-Based Costing, farm managers can achieve greater control on the consumption of resources and improve their decision-making processes. Furthermore, the accounting process itself can be positively influenced. The scope of the Activity-Based Costing system allows fine and accurate adjustments to be made to the company cost structure, reducing overhead cost. In addition, farm management is increasingly requiring greater flexibility and adaptation to rapidly changing market conditions; this makes it necessary to avoid under and over costing situations due to inaccurate allocation of overheads and common costs with concurrent activities, which is a typical problem of traditional costing methods As stated before, the high degree of data intensity required by Activity-Based Costing has been (and still is) an important barrier to adoption.

Adaptation of the general ABC model to the farm sector is not complex. It basically consists of determining the direct consumption and demand of activities and tasks required by each product. So, the central axis of the proposed model is based on the follow-up and control of these two components. For activity control, it is proposed a system of daily work reports in which each worker or group of workers related to the productive activities record the tasks undertaken throughout the day. In this sense, a highly significant aspect is the correct identification and grouping of the activities and tasks associated with the productive process.

Conclusion

In tough economic times, farmers must be aware of all costs, which fields are profitable, and which fields are producing a loss. Sadly, not all farmers make use of a software system that may help assign their costs to fields. In fact, many farmers are not fully aware of what costs are being incurred, the behavior of these costs, what yields are being produced on each plot of land, and the profitability of those plots of land.

By using cost accounting that measures, which records, and reports information about costs, farmers can establish a relationship between costs and the stages of the farming process. Farmers would also be able to distinguish a cost from an expense, an outlay cost from an opportunity cost, and a direct cost from an indirect cost. The ability to categorize these costs essential to the farmer's long-term financial success. With this ability, farmers could determine their value-added and nonvalue-added inputs. In addition, farmers are able to determine the relative importance of each input and assign a spending limit for each activity.

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