CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

Cost of Production Guide

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As attempts are made to transform agriculture in the region from a production oriented undertaking to a market driven occupation, the financial and economic aspects are of paramount importance. Understanding and being able to calculate cost of production is a necessary prerequisite for our agribusiness operators in the region.

Cost of production is a term used to describe the average cost of producing one unit of a commodity. The ability to calculate unit cost of production and establish those factors that influence it is vital to all businesses. Only when this is known, can decisions be made on the sale price required and input costs that can be justified to leave a profit margin.

Cost of production represents a type of information that can be used by a wide range of individuals in making decisions in the food and fiber industry, for example:

- By farmers for pricing;
- By extension personnel for educational purposes;
- By lenders as a basis for credit; and
- By researchers to estimate profitability.

At best this information should be used as a first approximation and be adjusted for specific situations.

The methodology for identifying the total cost of doing any business is the same. The following are the major steps to be followed:

(1) Capture the major activities undertaken and costs incurred;
(2) Identify what are fixed and variable costs;
(3) Estimate the costs of each activity within each category;
(4) Sum appropriate cost items.

Calculating the cost of production for many crops in the region has posed numerous problems. One of the major problems is often due to poor record keeping by our farmers. However, there is a trade-off between the degree of accuracy achieved, time available for the exercise, amount of data collected, analytical rigour applied, the financial resources allocated to the exercise, and the purpose for which the exercise is undertaken.

A major problem often encountered is the allocation of costs between the numerous activities undertaken on the farm, especially with most of our farms doing mixed farming. Of particular importance here is the allocation of labour costs between the varied activities undertaken on small farms. The joint product enterprise problem also adds to the confusion for small farmers. A joint product enterprise is one in which two or more products are produced from one production practice and the costs associated with each individual product cannot be easily identified and measured. Determining what are fixed and variable costs also confuses many farmers. For our purposes fixed and variable costs are defined as follows:

Fixed costs: expenses that do not vary with the level of production, such as, depreciation and land taxes;
Variable costs: expenses that vary with the level of production, such as, labour, and seed.

Cost of production of one kilogram or pound of a commodity is important to agribusinesses if they are to sell their produce at a competitive price and make a

profit. Using hot peppers as an example, it is generally accepted that berry production for the fresh or process market differs somewhat based on planting density, stage of maturity at harvest etc., however, for this exercise the technical differences are not too important. Whatever activity is undertaken identifying it and capturing the costs is the focus. In this guide two examples are presented one for crops and one for livestock.

Example for crops

The following tables illustrate one way of categorising the major cost items for a crop such as hot peppers, based on major activities undertaken and costs centres: nursery operations, field maintenance up to harvesting, equipment etc. Whatever method is used to track costs, generally at the end of the day the data is transferred to a template such as the one on page 4.

Items	Unit	No. of units	Cost/unit ($)	Total cost ($)
Seedling production:				
Seeds	Grams			
Seedling tray preparation	Hours			
Planting seedling trays	Hours			
Scouting				
Spraying				
Other				
Subtotal				

Items	Unit	No. of units	Cost/unit ($)	Total cost ($)
Labour operations (manual):				
Land clearing	Manday			
Land cleaning	or			
Land prep. forking, trenches etc.	Hours			
Transplanting				
Fertilising				
Watering				
Spraying (pesticides etc.)				
Weeding (manual)				
Scouting				
Harvesting				
Transport to farmgate				
Transport to seed production unit				
Other (e.g. mulching)				
Subtotal				

Items	Unit	No. of units	Cost/unit ($)	Total cost ($)
Mechanical inputs: Tractor land clearing Tractor ploughing Tractor harrowing Tractor banking Other				
Subtotal				

Items	Unit	No. of units	Cost/unit ($)	Total cost ($)
Material inputs: Seedling trays Seedling medium Fertiliser Herbicide Fungicide Insecticide Water Sticky traps Other				
Subtotal				

Items	Unit	No. of units	Cost/unit ($)	Total cost ($)
Equipment: Cutlass, hoe, fork etc. Knapsack sprayer Irrigation fittings Harvesting crates Agrochemical applicators Other				
Subtotal				

In an attempt to increase the accuracy of our estimate some aspect of fixed costs should be included for such items as land, insurance etc. Also, some consideration should be given to the management/administration costs and an appropriate proxy included. For items such as cutlass, hoe etc. that last for several crops their cost could be spread over the number of crops. The following is an example of what a template for a crop may look like.

Cost of production data template for crop

Plant spacing ……
Plants per hectare ……..

Items	Unit	Quantity	Unit cost	Total cost
Land preparation *Brush cutting* *Ploughing*				
Planting/transplanting *Seeds* *Seedlings*				
Fertiliser				
Weedicides				
Insecticides				
Fungicides				
Labour *Land preparation* *Fertilising* *Irrigation* *Disease control* *Harvesting* *Monitoring field*				
Transportation *Fertiliser* *Produce*				
Fuel				
Water				
Total operating expense				
Yield per hectare				
Marketable yield				

Fixed costs should be added (taxes, insurance, depreciation)
Fixed costs + total operating expense = total costs
Total costs/marketable yield = cost of production per unit
Marketable yield x market price = revenue
Revenue – total costs = profit
N.B: Market price can be wholesale or retail price depending on which outlet the farmer uses.

Example for livestock

To illustrate how to calculate cost of production for livestock, the example of small ruminants will be used. In this case several assumptions must be made while attempting to get a handle of the cost of production in the Region, for example, herd size, for meat and or milk etc. How the capital expenditure items are handled, such as, housing and fences, is of vital importance. The following are some of the common standards used:

Herd size
- Does 25
- Bucks 1

Acres in forage 10
Expected mortality rate 5%

Cost of production data template for livestock

Variable costs

Item	Unit	Quantity	Cost per unit	Total
Feed *Pasture* *Concentrates* *Salt*				
Veterinary cost *Antibiotics* *Deworming*				
Facilities & equipment *Rope* *Tags*				
Labour *Grazing* *Feeding* *Watering* *Cleaning pens*				
Market & transport				
Miscellaneous				
Total variable costs				

Fixed costs

Starting animals				
Depreciation				
Interest on capital				
Total fixed costs				

A goat's reproductive cycle allows a doe to kid about every 8 months or three times every 2 years. Therefore the cost and returns on a yearly basis will require us to assume 1.5 kid crops per year. Further, if we assume twin births and a 5% mortality rate:

Kids per year = (25x2x1.5) - 4 = 71

However, we also have to decide on the time to get the kids to market weight of say 20-30 kgs to see how many we could market per year (remember this has a lot to do with the feed regime and feed conversion ratio). If we assume 50 kids can be marketed each year at $15.00/kg liveweight then this will be the revenue base ($15,000 - $22,500) per year. If the animals are slaughtered then the weight will be reduced, the price goes up and there is the possibility of the sale of by-products such as skins.

This is just a guide and as such is not cast in stone. It is intended to provide a starting point from which users can tailor for their own specific circumstances. Remember, today we are often awash with data but short on information. To transform data into information, processing is necessary and this must be done bearing in mind our objective. Consequently, data collection must commence with a clear end in view.

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