

Agricultural Cost of Production Statistics



Statistical Outputs, indicators, and analytical framework

Outline

1. Different dimensions of production cost
2. Normalizing the analytical unit
3. Indicators and statistical tables
4. Environmental indicators



Different dimension of production costs

The type of CoP indicators and outputs that can be produced depends on a series of factors, such as their intended use and the audience to which they are aimed.

The data collection vehicle used as well as the underlying quality and level of detail available from farm-level data will also shape the analytical framework.

Data drawn from representative farm surveys may be used to construct regional or national averages, while constructing indicators using non-representative data collections will likely result in misleading information and conclusions.

Different dimension of production costs

To increase the relevance of CoP estimation to multiple users, different measures of production costs and farm profitability should be presented.

Farmers, for example, might want to know the return of their operations above cash costs in order to estimate available cash available at the end of the production period.

Policy-makers and analysts might want total economic costs by activity to understand the relevance of specialization patterns within agriculture and between agricultural activities and the rest of the economy.

Economists and analysts might require information on trends in variable and fixed costs.

Different dimension of production costs

Different dimensions and segmentations of cost of production

Total costs = Variable costs + Fixed costs	
Cash costs	Capital costs
Purchased seed, feed fertilizers, etc.	Depreciation costs and opportunity costs of capital on owned machinery, buildings and farm equipment
Paid labour	
Custom services (machinery, etc.)	
Non Cash Costs	Farm overhead costs
Unpaid family labour	Unallocated fixed costs
	Farm – level taxes, permits licenses, etc.
	Land Costs
Farm- produced inputs	Land rents and imputed rents, land related taxes
Owned animals and machinery	

Normalizing the analytical unit

The unit of analysis for which the statistical indicators are to be presented must be standardized so that a meaningful interpretation can be made.

The chosen unit is dependent on the type of farm activity, should also make sense from an economic point of view, be consistent with the unit used to value production and be understandable and usable by farmers, analysts and other persons interested in farm economics.

Local or customary units, such as the number of bags of a certain weight or volume, may be selected if that is what is commonly understood in the local market place.

Normalizing the analytical unit

There are three different units which are commonly used in agricultural Cost of Production Statistics:

- Land (area) units
- Production (volume or mass) units
- Value (currency) units

Normalizing the analytical unit

Land

A land unit is commonly used for presenting CoP for cropping activities

The cost per unit of land area is likely to be more stable in the short term as technology and production techniques vary less year to year than, say, crop yields, which are affected by growing conditions and weather events.

Normalizing the analytical unit

Planted area, harvested area or total land area can be chosen, depending on the context in the country

The land unit should also be defined in relation to the standards managed in the region or country: hectares (ha) or acres, for example

Costs can be expressed on a per ha basis, or subsequent multiples, such as 1000 ha, if this better reflects regional or national characteristics, such as average farm size.

Normalizing the analytical unit

Production (volume or mass) units

Describing CoP using production measures is commonly used for crop and livestock products.

Cost expressed on a per unit of production provides a more direct measure of the profitability of the farm

Normalizing the analytical unit

For cropping activities, the production unit that is commonly known and understood by the market can be used.

Examples, 50 kg bags of maize (Zambia) or 50 kg bags of cacao beans (Colombia).

Converting costs expressed in local units to standard units used by data collection agencies at national and international level, such as the metric ton (MT) or 1000 MT, is also useful

Normalizing the analytical unit

For livestock, costs may be expressed on a per head basis, animal live weight basis or another unit commonly used in the region or country.

The MT can be used to express costs in live weight equivalents or a weight that is closer to the average animal weight, such as 250 kg for a calf.

Similar principles can be applied to express costs of livestock products, such as the cost per 1000 litres of fresh milk or the cost of producing 100 eggs.

Normalizing the analytical unit

Value (currency) units

Indicators using values provide direct measures on the profitability and relative competitiveness of the farm operations

Expressing the cost required to produce a certain value of sales measures the share of costs in gross revenues or returns

This indicator must be consistent with the unit chosen for the output quantities.

Normalizing the analytical unit

For example, if for cattle breeding activities the MT of animal live weight is used, the corresponding value has to be used to express costs: costs per MT of animal live weight valued at farm-gate prices.

One of the drawbacks of this measure is that in addition to reflecting production costs, it is sensitive to changes in output quantities and unit prices, which are affected by a wide range of factors, including external market conditions which are not related to production technologies.

Indicators and statistical tables

Although many indicators can be developed and presented, several common examples are noted below. They are grouped by indicator type.

Economic indicators

- Total Cost per unit of production or unit of land area
- Net returns per measure of production
- Break-even price per unit of production

Environmental indicators

- Energy use per hectare
- Fertilizer use per hectare
- Pesticide use per hectare
- Environmental pressure index
- Input productivity

Indicators and statistical tables

Economic indicator

Total cost per unit of production/land area

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.

Indicators and statistical tables

Economic indicator

Total cost per unit of production/land area

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 labour cost per MT of output quantity.

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.

Indicators and statistical tables

Economic indicator

Net returns per measure of production

Defined as: $[Value\ of\ output - total\ Costs] / MT\ of\ output.$

The unit in which it expressed can be chosen among the ones presented before, depending on the type of activity, regional or national standards or audience targeted.

Subsets of this indicator can be displayed, such as returns over cash-costs (gross margin), returns over cash and non-cash costs, returns over cash and land costs.

Indicators and statistical tables

Economic indicator

Break-even price per unit of production

Defined as: *Total Costs / Total production.*

This measure indicates the market price necessary to cover one unit of production.

The cost variable should reflect all (total economic) costs and the production unit should reflect only the marketable output by excluding waste.

If unit farm-gate prices are higher than the break-even price, the farm operation makes an economic profit.

Indicators and statistical tables

Several other quotients make sense as well. For example, one could calculate the price required to cover cash costs or total costs excluding opportunity costs.

Indicators and statistical tables

Environmental indicators

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.

Indicators and statistical tables

Environmental indicators

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.

Ideally, the application rates per hectare of each of the active components should be provided, but this information may be difficult and costly to collect on a regular basis.

Organic fertilizers, such as manure, may also be included

Indicators and statistical tables

Environmental indicators

Pesticide use per hectare

Defined as: $[Pesticide\ use] / Land\ area$

This indicator measures the intensity in pesticide application for the production of a given commodity.

To be relevant for environmental analysis, data on the type of pesticide used, especially on the concentrations of the different active components, is necessary

Ideally, the application rates per hectare of each of the active components should be provided.

Indicators and statistical tables

Environmental indicators

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 labour productivity, which measures the value of output generated by a given unit of labour use (hour, day or month-equivalents).

Indicators and statistical tables

Dissemination and interpretation

The variations in farm practices and organization suggest that level or absolute estimates for cost of production might be less informative than providing information on the distributions of production costs across farmers.

it is recommended that national and regional averages be accompanied with more detailed information on the distribution of costs across farmers. For example, costs broken-down by quartiles, or deciles and plotting the full distribution or cumulative distribution of farms

Indicators and statistical tables

Dissemination and interpretation (Example)

Process of construction of farm classes

Cereals are the major basic food commodity of Morocco. National production covers up to 75 percent of consumption, depending on rainfall levels. Five classes were determined for the Mekens region in the 1991 CoP Survey:

Class I: farms with land area less than 5 ha;

Class II: area between 5-50 ha and yields less than 55 percent of the average yield;

Class III: area between 5-50 ha and yields higher than 55 percent of the average yield;

Class IV: area above 50 ha;

Class V: area above 50 ha and an irrigated area of more than 20 percent



Thank you