

**Methodology**

**and**

**Data Sources**

**for**

*Agriculture*

*Accounts*

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## Overview

The *Output, Input & Income in Agriculture* release provides detailed estimates of major items of agricultural accounts such as outputs, input costs, gross and net value added and operating surplus. Irish agricultural accounts meet both national and EU requirements and are part of the Economic Accounts of Agriculture (EAA) framework. Published estimates are prepared under Regulation (EC) No 138/2004 of 5 December 2003, which sets the scope and main methodological approaches. Further changes in international methodology were introduced by the acceptance of new European System of Accounts (ESA 2010), but these had little or no effect on the published estimates.

*See Annex 1 for definitions of the main terms and concepts.*

The estimates are based on data from a combination of sources including administrative data, industry sources and several statistical surveys. These surveys are conducted by the CSO, Department of Agriculture, Food and the Marine (DAFM) and Teagasc.

*See Annex 2 for details.*

## Methods used for the computation of outputs and input costs

Different methods of estimating outputs and input costs are used in preparing the accounts, depending on the availability and periodicity of price, volume or value data.

For certain items of output, gross volume and value data is available for use in the production of accounts without further processing.

Alternatively, volume and price data may be available. The value is then obtained as a product of volume and price:

$$\text{Value} = \text{Volume} * \text{Price}$$

This method is referred to below as the ‘production method’.

For some items of intermediate consumption, including expenditure on electricity, maintenance and repairs etc., obtaining accurate volume data is difficult but average expenditure by farm type and size is available from Teagasc’s National Farm Survey (NFS). For such items, ‘grossing’ is applied which means multiplying average expenses by the number of farms in the category and summing up to obtain the overall total.

The methodology used for major inputs and outputs is described below:

### a. Livestock:

The ‘production method’ is used to estimate slaughtering, trade in live animals and change in stocks. The total output is calculated as follows:

$$\text{Slaughtering} + \text{Live Exports} - \text{Live Imports} + \text{Change in Stocks} = \text{Total Output at Producer Prices}$$

### b. Milk:

Intake volumes and prices are available. The ‘production method’ is used to estimate the value of output.

### c. Vegetables, Fruit, Honey:

The total annual volume and value of commercial sales are provided directly by DAFM.

### d. Cereals:

The total annual volume and value of commercial sales are provided directly by DAFM and the commercial price per unit is simply value divided by volume.

Only commercial sales are included under the 'Cereals' heading in the publication. On-farm consumption is included under the heading of 'Forage plants'.

e. Forage Plants:

'Forage plants' includes the value of on-farm consumption of cereals plus estimates of the production of fodder crops such as grass and maize silage, hay, straw and fodder beet. Estimates are obtained using the 'production method'.

The total harvest for each cereal is estimated as a product of area planted by average yield. The volume is then derived from the following equation:

$$\text{Total harvest} = \text{Commercial sales} + \text{On-farm consumption} + \text{Change in stocks}$$

The calculated volume is valued at a reduced price equal to 80% of the commercial price.

The total volume of fodder crops produced is estimated as a product of the area of land utilised multiplied by the average yield. The value is computed using these estimated volumes and the average prices obtained from the results of the National Farm Survey (NFS).

$$\text{Value} = \text{Area planted} * \text{Yield} * \text{Price}$$

f. Fertilisers and Feeding Stuffs:

Quarterly data on the volume consumed and price of different types of fertilisers and feeding stuffs is available. Total expenditure is calculated by multiplying volumes and prices and aggregating by the type of product.

g. Crop Protection Products and Pharmaceuticals:

Up to 2016, data from the 'Animal and Plant Health Association' (APHA) were used for both the volume and value of crop protection products and pharmaceuticals sold in the country by its members during the year together with an estimate of its market share. Combined, these provided an estimate of the total value of these goods. From 2017 onwards, as APHA was no longer able to provide us with data, Teagasc's NFS data was substituted and grossed for national totals.

h. Expenditure on Energy, Maintenance & Repairs, Veterinary Fees and Other Goods and Services:

The NFS provides estimates of average expenditure per farm, stratified by farm type and size. To estimate the total value of these inputs, the average costs per farm per the NFS are grossed up by the number of agricultural holdings recorded in each stratum at the latest Census of Agriculture. As the structure of expenditure on pig farms is considerably different from other farms, separate calculations are carried out to estimate the costs incurred on pig farms.

## **Values at previous and base year prices; volume indices**

Apart from values at current prices, two other values are computed for each accounting item, namely value at previous year's prices and at constant prices. These are calculated using the current year's volume and prices from both the previous year and base year. Comparing values at constant prices allows one to estimate the performance of the agricultural sector not only in value but also in volume terms, i.e. to negate to some degree the effect of price changes. In practice, the results are presented as volume indices, an example of which is as follows:

$$\text{Volume Index 2018 at Base 2015} = \text{Value of 2018 at 2015 prices} / \text{Value of 2015 at 2015 prices}$$

Comparing values at constant prices allows one to estimate the performance of the agricultural sector in terms of production volumes.

## **Annex I. Main variables and accounting concepts**

### **Goods output at producer prices**

This is the total output of goods produced and sold by the agricultural sector during the year valued at producer prices. It does not include the value of any services provided, i.e. it excludes contract work.

### **Producer price**

This is the price received by farmers for their agricultural produce. It is sometimes referred to as the farm-gate or ex-farm price. It excludes VAT but includes taxes or levies on products.

### **Agricultural output at basic prices**

This is a sum of goods output plus the value of services provided (contract work) valued at basic prices.

### **Basic price**

The basic price corresponds to the *producer price* plus any subsidies directly linked to a product minus any taxes on products. VAT is excluded.

### **Subsidies and taxes on products**

Subsidies and taxes on agricultural products are those paid or levied per unit of a good or service produced or exported. Examples of subsidies on products are the Beef Data and Genomics Programme and Sheep Welfare Scheme. The Bovine Disease Eradication Levy is an example of a tax on products.

### **Contract work**

Activities performed by agricultural contractors directly linked to the production of agricultural products (for example harvesting) are an integral part of agriculture. The value of such work is included as both an output and an item of intermediate consumption. Estimates of the input costs incurred by agricultural contractors in the provision of agricultural services are included under the appropriate intermediate consumption categories as well as in the compensation of employees' figure.

### **Intermediate consumption**

This is the value of all goods and services used as inputs in the production process, excluding fixed assets (capital goods) which are recorded as fixed capital consumption (depreciation). Intermediate consumption excludes newly acquired or existing fixed assets, e.g. tractors, agricultural machinery etc. These are recorded as gross fixed capital formation (GFCF). Intermediate consumption includes expenditure on contract work and forage plants, even if they are consumed within the same agricultural holding.

### **Forage plants**

The production of forage plants is valued as part of output. Silage and hay are the main items in this category. Direct sales of cereals between farms and the consumption of cereals within farms are also included under forage plants. These items are also treated as intermediate consumption with minor exceptions such as the sale of straw to racing stables.

### **FISIM**

In addition to charging explicit commissions and fees, financial intermediaries (mainly banks) also charge their customers implicit fees by paying and charging different rates of interest to borrowers and lenders. The revenue from the margin on lending and borrowing by financial intermediaries is described as 'Financial Intermediation Services Indirectly Measured' (FISIM). The inclusion of FISIM in agricultural accounts is in line with recommended EU national accounting conventions. It is a reallocation to intermediate consumption of part of the interest paid by farmers. While the inclusion of FISIM will increase intermediate consumption and decrease gross value added, it will decrease, by the same amount, the figure shown for interest paid.

### **Gross value added at basic prices**

This is the difference between output at basic prices and intermediate consumption. It is a measure of gross income before depreciation, subsidies, taxes and compensation of employees.

**Net value added at basic prices**

Net value added is calculated by subtracting expenditure on fixed capital consumption (depreciation) from gross value added.

**Fixed capital consumption**

This refers to the foreseeable wear and tear and obsolescence of fixed capital goods. It is calculated on the basis of the probable economic life of the asset. It is not calculated for breeding livestock or for non-produced assets such as land.

**Factor Income**

Factor income is the sum of net value added plus other subsidies on production less taxes on production. It is sometimes referred to as 'value added at factor cost'.

**Other subsidies and taxes on production**

Other subsidies on production are subsidies other than those on products. Examples are the 'Basic Payment Scheme', 'GLAS' and the 'Areas of Natural Constraint scheme'. Taxes on production consist of VAT over/under compensation for farmers who have opted for the flat rate VAT system plus motor and machinery tax paid by farmers. Other subsidies less taxes on production are not included in the calculation of output but are included in the calculation of factor income and operating surplus.

**Operating surplus**

The operating surplus is calculated by subtracting compensation of employees from factor income. The figure is comprised of the operating surplus earned by farmers and that earned by agricultural contractors. It is an estimate of income before deductions for interest payments on borrowed capital, land annuities and rent paid by farmers to landowners for the use of their land.

**Compensation of employees**

This includes remuneration in cash and in kind. It does not include the remuneration of work undertaken by the farm owner or by non-salaried family members.

**Entrepreneurial Income**

Entrepreneurial income is comprised of operating surplus less interest payments on borrowed capital and land rental paid by farmers to landowners.

**Valuation of stock changes**

For each category, the difference between closing year stocks and opening year stocks is valued at the average producer price for the year.

**Volume indices**

To obtain these, all items of output and input are valued at constant base year prices (*currently 2015*) by applying base year prices to current year quantities. For example, the volume index for 2018 can be calculated by comparing the value in 2018 at average 2015 prices to the value in 2015 at average 2015 prices. Volume indices allow one to estimate the changes that would have occurred in production and expenditure if there were no price changes since the base year and separate the effects of volume and price changes on output, input and income.

## Annex 2. Data sources

Item	Data source for quantity	Data source for price / value	Frequency
<b>Cattle</b>			
1. Slaughtering (head numbers and weight)	DAFM survey of export factories	DAFM beef price-reporting scheme	Monthly
	CSO survey of Local Authorities	DAFM beef price-reporting scheme	Monthly
2. Live exports	DAFM	CSO trade statistics	Annual
3. Live imports	DAFM	CSO price statistics (survey of livestock marts)	Annual
4. Change in stock numbers	DAFM - Animal Identification and Movement system	CSO price statistics (survey of livestock marts)	Quarterly
Total output at producer prices = 1+2-3+4			
<b>Sheep</b>			
1. Slaughtering (head numbers and weight)	DAFM survey of export factories	DAFM	Monthly
	CSO survey of Local Authorities	DAFM	Monthly
2. Live exports	DAFM	CSO price statistics (survey of livestock marts)	Annual
3. Live imports	DAFM	CSO price statistics (survey of livestock marts)	Annual
4. Change in stock numbers	CSO December Agriculture Survey	CSO price statistics (survey of livestock marts)	Annual
Total output at producer prices = 1+2-3+4			
<b>Pigs</b>			
1. Slaughtering (head numbers and weight)	DAFM survey of export factories	DAFM / CSO price statistics	Monthly
	CSO survey of Local Authorities	DAFM / CSO price statistics	Monthly
2. Live exports	DAFM	CSO estimate based on meat price	Annual
3. Live imports	DAFM	CSO estimate based on meat price	Annual
4. Change in stock numbers	CSO December Agriculture Survey	CSO estimate based on meat price	Annual
Total output at producer prices = 1+2-3+4			

Item	Data source for quantity	Data source for price / value	Frequency
<b>Horses</b> 1. Thoroughbred Horses (public sales) 2. Thoroughbred horses (private sales) Total output at producer prices = 1+2	Public selling points (e.g. Goffs and Tattersalls) CSO estimate	Public selling points CSO estimate	Annual Annual
<b>Poultry</b> 1. Slaughtering (head numbers and weight) 2. Live exports (includes chicks and hatching eggs) 3. Live imports (includes chicks and hatching eggs) 4. Change in stock numbers Total output at basic prices = 1+2-3+4	DAFM survey of factories CSO trade statistics CSO trade statistics CSO Farm Structure Survey (FSS)	DAFM CSO trade statistics CSO trade statistics CSO estimate based on meat price	Monthly Annual Annual Once in 3 years
<b>Milk</b> 1. Domestic intake 2. Own Consumption Total output at producer prices = 1+2	CSO monthly survey of processors. CSO estimate	CSO price statistics (survey of processors) CSO price statistics (survey of processors)	Monthly Annual
<b>Eggs</b> 1. Home sales 2. Own Consumption 3. Exports Total output at producer prices = 1+2+3	DAFM survey of egg producers CSO estimate CSO trade statistics	DAFM DAFM CSO trade statistics	Annual Annual Annual
<b>Wool</b> Total output at producer prices	Sheep numbers - CSO June Agriculture Survey Average fleece weights - Teagasc	CSO price statistics (survey of merchants)	Annual
<b>Honey</b> Total output at producer prices	DAFM	DAFM	Annual

Item	Data source for quantity	Data source for price / value	Frequency
<b>Cereals</b> 1. Commercial sales 2. Changes in stocks Total output at producer prices = 1+2	DAFM CSO December Agriculture Survey	DAFM DAFM	Annual Annual
<b>Potatoes</b> 1. Home sales  2. Own Consumption Total output at producer prices = 1+2	Area data - CSO June Agriculture Survey Yields - Teagasc Monthly sales - CSO estimate CSO estimate	DAFM / CSO price statistics  DAFM / CSO price statistics	Monthly  Annual
<b>Vegetables</b> 1. Commercial Sales 2. Own Consumption Total output at producer prices = 1+2	DAFM CSO estimate	DAFM DAFM	Annual Annual
<b>Fruit</b> 1. Commercial Sales 2. Own Consumption Total output at producer prices = 1+2	DAFM CSO estimate	DAFM DAFM	Annual Annual
<b>Other Crops (nursery plants etc.)</b> Total output at producer prices	DAFM	DAFM	Annual



Item	Data source for quantity	Data source for price / value	Frequency
<b>Fodder Crops</b>			
1. Cereals	(a) Area data - CSO June Agriculture Survey (b) Yields - Teagasc (c) Commercial Sales - DAFM Fodder cereals = (a)*(b) – (c)	CSO estimate based on commercial price	Annual
2. Other crops (silage, hay etc.)	Area data - CSO June Agriculture Survey/DAFM Yields - Teagasc NFS	Teagasc National Farm Survey (NFS)	Annual
Total output at producer prices = 1+2			
<b>Agricultural Services</b>	Teagasc NFS CSO FSS/Census of Agriculture	Teagasc NFS	Annual
<b>Subsidies on products and production</b>	DAFM	DAFM	Annual
<b>Taxes on products</b>	DAFM and Bord Bia	DAFM and Bord Bia	Annual
<b>Feedingstuffs</b>			
1. Straight feeding stuffs	DAFM	CSO price statistics (survey of merchants)	Quarterly
2. Compound feeding stuffs	DAFM	CSO price statistics (survey of merchants)	Quarterly
3. Forage plants	<i>See Fodder Crops above</i>	<i>See Fodder Crops above</i>	
Total expenditure = 1+2+3			
<b>Fertilisers</b>			
1. Straight fertilisers	DAFM	CSO price statistics (survey of merchants)	Quarterly
2. Compound fertilisers	DAFM	CSO price statistics (survey of merchants)	Quarterly
Total expenditure = 1+2			

Item	Data source for quantity	Data source for price / value	Frequency
<b>Seeds</b> 1. Cereal seeds (domestic and imported) 2. Potato seed (domestic and imported) 3. Horticulture and grass seed Total Seeds = 1+2+3	DAFM DAFM and CSO trade statistics CSO trade statistics	CSO price statistics (survey of merchants) CSO price and trade statistics CSO trade statistics	Annual Annual Annual
<b>Energy &amp; Lubricants</b>	CSO FSS/Census of Agriculture	Teagasc NFS	Annual
<b>Maintenance &amp; Repairs</b>	CSO FSS/Census of Agriculture	Teagasc NFS	Annual
<b>Other Goods &amp; Services</b> 1. Veterinary fees 2. Post and telephone 3. Insurance 4. Artificial insemination 5. Teagasc advisory fees and levies 6. Producer protection 7. Other overheads Total other goods and services = 1+2+3+4+5+6+7	CSO FSS/Census of Agriculture CSO FSS/Census of Agriculture CSO FSS/Census of Agriculture DAFM Teagasc Farm organisations CSO FSS/Census of Agriculture	Teagasc NFS Teagasc NFS Teagasc NFS CSO price statistics (survey of AI stations) Teagasc Farm organisations Teagasc NFS	Annual Annual Annual Annual Annual Annual Annual

Item	Data source for quantity	Data source for price / value	Frequency
<b>Crop Protection</b>	Prior to 2017: Animal and Plant Health Association (APHA) 2017 onwards: CSO FSS/Census of Agriculture	Prior to 2017: Animal and Plant Health Association (APHA) 2017 onwards: Teagasc NFS	Annual
<b>Pharmaceuticals</b> (available only for years up to 2016)	Animal and Plant Health Association (APHA)	Animal and Plant Health Association (APHA)	Annual
<b>Fixed Capital Consumption</b> 1. Buildings 2. Machinery and equipment Total fixed capital Consumption = 1+2	CSO National Accounts division CSO National Accounts division	CSO National Accounts division CSO National Accounts division	Annual Annual
<b>Other taxes on production</b> 1. Motor tax 2. VAT over/under compensation Total other taxes on production = 1+2	CSO FSS/Census of Agriculture	Teagasc NFS CSO estimate	Annual Annual
<b>Compensation of employees</b>	CSO FSS/Census of Agriculture	CSO estimate	Annual
<b>Land Rent</b>	CSO June Agriculture Survey	Teagasc NFS	Annual
<b>Interest</b>	Central Bank of Ireland, Rabobank and other commercial banks	Central Bank of Ireland, Rabobank and other commercial banks	Annual