Standard Report
on
Methods and Quality

for
Output, Input & Income in Agriculture
and
Regional Accounts for Agriculture

This documentation applies to the reporting period:

2014 - Present

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1 Overview

The *Output, Input & Income in Agriculture* release provides detailed estimates of major items of agricultural accounts including livestock and crop production, expenditure on items of intermediate consumption, gross and net value added and operating surplus in a calendar year.

Three estimates are prepared for each calendar year. *See Periodicity in 2.5.*

The estimates are based on data from a combination of sources including administrative data, industry sources and surveys conducted by CSO and Teagasc. The release is both a national and European requirement and the current series includes data back to 1990.

The *Regional Accounts for Agriculture* release provides estimates of major accounting items in each of the NUTS 3 regions of Ireland. The results for each region are derived from the State total by using a specific allocator for each output or intermediate consumption item, e.g. livestock numbers for cattle and sheep, number of dairy cows for milk, etc.

2 General Information

2.1 Statistical Category

The results are compiled based on a combination of administrative data, industry sources and several surveys conducted by CSO and Teagasc.

2.2 Area of Activity

National Accounts, Agriculture

2.3 Organisational Unit Responsible, Persons to Contact

Agricultural Accounts section:

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2.4 Objectives and Purpose: History

The main purpose of the *Output, Input & Income in Agriculture* release is to produce statistics on the economic activities of the agricultural sector over a given accounting period.

The main purpose of the *Regional Accounts for Agriculture* release is to provide an estimate of the economic activity in the agricultural sector by NUTS 3 region.

2.5 Periodicity

Both releases are annual.

Three estimates are prepared for the *Output, Input & Income in Agriculture* release every year:

- The first 'Advance' estimate is generally produced in early December of the reference year, @T-3 weeks, and normally contains the actual data for 9 months of the year. The data for the rest of the year is imputed.
- The second 'Preliminary' estimate is normally published in March, @T+11 weeks' and includes updates to the first estimate where additional data is available.
- In June of the year following the reference year, @T+26 weeks, the 'Final' estimate of agricultural accounts is published**.** By this time the full set of data for the reference year should be available and the need for imputation is minimal.

The *Regional Accounts for Agriculture* release is published in October, @T+42 weeks, once the full set of regional allocators becomes available.

2.6 Client

The Economic Accounts for Agriculture (EAAs) are both a national and European requirement.

2.7 Users

- Eurostat
- CSO - National Accounts
- Department of Agriculture, Food and Marine (DAFM)
- Teagasc
- Bord Bia
- Farming Groups, IFA, ICMSA
- General Public

2.8 Legal basis

The compilation of Economic Accounts for Agriculture (EAA) is governed by Regulation (EC) No 138/2004 of the European Parliament and of the Council of 5 December 2003, which provides complementary information and concepts adapted to the particular nature of the agricultural industry. The EAAs are also a satellite account in the European System of Accounts (ESA2010).

3 Statistical Concepts, Methods

3.1 Subject of the Statistics

The subject of the statistics is to provide a wide range of indicators on the economic activities in the agricultural sector such as gross output, intermediate consumption, gross and net value added, taxes and subsidies, operating surplus etc., as well as their regional breakdown.

3.2 Units of Observation/Collection Units/Units of Presentation

The units of observation are individual agricultural holdings (farms). This means that inter-farm transactions, e.g. sales from one farm to another, are now captured in the statistics both as an output and as an input. This is different from the EAA methodology used prior to 2002 where all agricultural holdings in the country were treated collectively as one 'National Farm' and the flows between different farms were not accounted for as they would cancel each other out in the overall.

3.3 Data Sources

DAFM provides large amounts of administrative data on livestock slaughterings, live trade in animals, commercial sales of poultry, eggs, honey, vegetables, cereals and other output items. They also provide data on the consumption of feeding stuffs, fertilisers, pesticides and the subsidies paid to farmers. The 'Animal Identification and Movement' database supported by the Department is an important source of information for estimating changes in the stocks of cattle.

Surveys of agricultural holdings conducted by the CSO such as the 'June Crop and Livestock Survey', 'Farm Structure Survey' (FSS) and 'Census of Agriculture' provide the data on livestock numbers (sheep, pigs), the area planted and yield of different crops and other items. The CSO's survey of creameries provides data on monthly and annual intake of manufacturing and liquid milk.

Absolute prices of most output and input accounting items are collected by the CSO for the compilation of *Agricultural Price Indices (API).* These are used to estimate the values of the accounting items and ultimately to compile the accounts.

The CSO's 'National Accounts' division provides the data on Gross Fixed Capital Formation (GFCF) and Financial Intermediation Services Indirectly Measured (FISIM).

The 'National Farm Survey' (NFS), conducted annually by Teagasc, is an important data source. The data from this survey is used to estimate multiple items of intermediate consumption including energy costs, expenditure on maintenance and repairs, veterinary expenses, insurance and other services.

Data from multiple other sources such as Bord Bia and ICMSA is also used.

3.4 Reporting Unit/Respondents

See sections.3.2 & 3.3 above.

3.5 Type of Survey/Process

The EAAs are compiled using data from both administrative and non-administrative sources. No survey is conducted specifically for this purpose.

Publicly available data is obtained from printed reports or downloaded from the internet websites of respondents. Any other data is requested via letters or e-mails which are followed up with telephone reminders if necessary.

3.6 Characteristics of the Sample/Process

3.6.1 Population and Sampling Frame

Population estimates are based on the results of the most recent Census of Agriculture, 2010 at present.

3.6.2 Sampling Design

Not applicable.

3.7 Survey Technique/Data Transfer

By post, email, telephone, Internet or from printed media.

3.8 Questionnaire (including explanations)

Survey forms or questionnaires are generally not suitable to collect the required data and are therefore not used.

3.9 Participation in the Survey

The EAAs are compiled using data from both administrative and non-administrative sources. No survey is conducted specifically for this purpose.

3.10 Characteristics of the Survey/Process and its Results

The purpose of producing an annual set of Accounts for Agriculture, disseminated in the '*Output, Input & Income in Agriculture'* release, is to evaluate the performance of the agricultural sector during the reference period. This is done by estimating important economic indicators such as Gross Output, Intermediate Consumption, Gross and Net Value Added, Depreciation, Compensation of Employees and, ultimately, Net Operating Surplus which is a measure of farm income.

While no survey is conducted specifically for the purposes of compiling the EAAs, a large amount of data collected by the CSO for other purposes is used, e.g. price data from Agricultural Prices surveys, CPI and WPI data etc.

Information on the volumes of major output and input items, e.g. livestock slaughterings, trade, fertilisers, feeding stuffs, pesticides and other items are sourced from DAFM and other providers (see 3.3 above). The value estimates are derived by using price data mainly obtained from API together with other sources. For some items, e.g. Cereals, Vegetables & Fruits, the estimated value of commercial sales is provided by DAFM directly.

The data on average expenditure per farm on other items of Intermediate Consumption such as Energy & Lubricants, Maintenance & Repairs, Veterinary and other Goods and Services are based on estimates from Teagasc's annual National Farm Survey. Results from the NFS are grossed to national totals by using the number of farms from the most recent 'Census of Agriculture'.

3.11 Classifications used

The main classifications are a set of harmonized classifications used for the EAAs by all EU and EEA countries and are laid out in Regulation (EC) No 138/2004 of the European Parliament and of the Council of 5 December 2003, on the economic accounts for agriculture in the Community.

3.12 Regional Breakdown of Results

The '*Output, Input & Income in Agriculture'* release series do not provide a regional breakdown of results. A regional breakdown at NUTS 3 level is provided in the annual '*Regional Accounts for Agriculture'* publication which is normally published @T+10 months.

Since no regional breakdowns of volume and price data are available, the general approach for the compilation of regional accounts is to allocate the total estimate for the State to each region by using a set of allocators. An allocator is normally chosen as a variable for which regional values are available and which has the closest correlation with the value of the accounting item in question. For example, the number of dairy cows is the allocator for milk output, total livestock numbers for livestock output and feeding stuffs consumption, total area sown for crop output and fertiliser usage etc.

For some items, such as subsidies and expenditure items sourced from the NFS, no allocators are required as the regional breakdown is provided by DAFM and Teagasc respectively.

4 Production of the Statistics, Data Processing, Quality Assurance

4.1 Data Capture

The data is received by post, email, telephone, Internet or from printed media and is entered and stored in Excel spreadsheets.

4.2 Coding

Not applicable.

4.3 Data Editing

A number of edits such as range and consistency checks are run to check for unusual results or data.

Additional edits called *Implied Price Change* checks are run for all major output and input items. As a normal practice in EAAs, three values are produced for each item: at current, previous year and constant prices. The result of the division of the values for the reference and previous year at constant prices is, in fact, a volume index. The same ratio computed for values at current prices is a value index. Finally, the ratio of value to volume indices describes an implied price change.

Implied price changes may be then validated against the corresponding Agriculture Price Index which is produced independently by the Agriculture Prices section of CSO. Obviously, this exercise can only be carried out for items for which a price index is available.

4.4 Imputation (for Non-Response or Incomplete Data Sets)

Imputation is only used to produce 'Advance' and 'Preliminary' estimates and is necessary because the data at these early stages is incomplete.

Where partial annual data is available, e.g. livestock slaughterings and trade, milk output, consumption of feeding stuffs and fertilisers etc., the values for the missing months (normally Quarter 4 only) are estimated using year-to-date trends, year on year trends and the forecasts of industry experts such as Bord Bia, Teagasc and DAFM. Prices are assumed to remain static at the last known levels (normally September) until the end of year.

Different imputation methodologies are used in the absence of any partial data. For example, cereals and potato output values are estimated by using the area under crop, yields and harvest prices, which are known from the CSO's June survey and API. This only yields an estimate for the total value of the harvest, part of which is used as fodder and never sold commercially. To arrive at the value of commercial sales the average ratio of commercial sales to total harvest value from several previous years is applied.

The value of other items, e.g. wool, current and capital operating expenses etc., are obtained by assuming no change of volume in the year and using API to up/downscale the previous year's value.

4.5 Grossing and Weighting

For most items, national totals are readily available from DAFM and other data providers, so no grossing or weighting is necessary.

However, for input items sourced from the National Farm Survey (NFS), grossing is applied. The NFS provides average estimates of output and expenditure per farm stratified by farm size and type (e.g. dairy, cattle). It samples just over 1% of the total population. The average costs per farm are then grossed up by the number of agricultural holdings in the respective strata recorded 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 costs incurred on pig farms.

4.6 Computation of Outputs, Estimation Methods Used

Different methods are used to compute outputs when preparing the EAAs, depending on the availability and periodicity of price, volume or value data. The methodology used for major inputs and outputs is described below.

a. Livestock

The number of animals slaughtered and meat factory prices are available on a monthly basis. Monthly values can then be easily calculated and further aggregated to provide quarterly or annual values.

Monthly data on trade in live animals are available from DAFM, as are average mart prices for different types of live cattle and sheep. The latter are coming daily from 11 marts surveyed by the 'Agricultural Prices' section of the CSO. Prices for live pigs are not available from marts; instead imputation based on the price of pork and the average carcass weight of a pig is used. Hence monthly, quarterly or annual values of livestock trade can be calculated.

Change in stock numbers can be calculated on a quarterly basis for cattle using AIM data. Pig stock numbers are available on a semi-annual basis from the results of CSO's June and December surveys. Sheep stock numbers are also available semi-annually, the June data also coming from the CSO's June survey with the December stock numbers coming from DAFM's Sheep Census. Mart prices are used to estimate the values of change in stocks.

The total output for livestock items can then be calculated using the following formula:

Slaughterings + Live Exports - Live Imports + Change in Stocks = Total Output at Producer Prices

b. Milk

Intake volumes and prices are available monthly from the CSO's Milk Statistics survey and Agricultural Price Indices (API). Therefore, the same methodology used for livestock can be applied to derive quarterly and annual milk values.

c. Cereals, Vegetables, Fruit, Honey

The total annual value of commercial sales is provided directly by DAFM and other providers.

d. Fertilisers and Feeding Stuffs

DAFM provides quarterly data on the consumption of different types of fertilisers and feeding stuffs in the country, while prices are available from API on a monthly basis. The values can then be produced on a quarterly basis and aggregated into annual totals.

e. Expenditure on Energy & Lubricants, Maintenance & Repairs and Other Goods and Services

The NFS provides average estimates of output and expenditure per farm stratified by farm size and type (e.g. dairy, cattle). This survey samples just over 1% of the total population. The average costs per farm are then grossed up by the number of agricultural holdings in the respective strata recorded 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 costs incurred on pig farms.

Apart from value 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 the prices from the previous year and from a 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.

4.7 Other Quality Assurance Techniques Used

Once received, data is checked for any obvious errors. Large deviations from previous periods or expected values are queried with the respondent and changed if necessary. Otherwise, note is taken of the explanation for the change.

Some of the data received, i.e. slaughterings and exports, can be cross-checked against industry publications, e.g. Bord Bia website.

All completed accounts items are subject to multiple layers of checking. Once an account item has been completed it is passed to the next supervisor for checking. The checking process of the individual account items is escalated upwards to statistician level. The completed release tables together with an explanatory note on significant year-on-year changes is passed to the Senior Statistician in Agriculture for analysis before proceeding to release stage.

5 Quality

5.1 Relevance

Regulation (EC) No 138/2004 of the European Parliament and of the Council of 5 December 2003 on the economic accounts sets the legal basis for establishing a harmonized methodology for the compilation of the Economic Accounts for Agriculture (EAA).
The results produced are widely used by both national and European policymakers and other public and private bodies, e.g. European Commission, DAFM, Revenue Commissioners, Teagasc, Bord Bia and also by media and general public.

5.2 Accuracy and Reliability

5.2.1. Sampling Effects, Representativity

Not applicable.

5.2.2. Non-Sampling Effects

5.2.2.1 Quality of the Data Sources used

The compilation of '*Output, Input and Income in Agriculture'* draws on data from a large number of sources, both administrative and survey based, as outlined in section 3.3 above.

Administrative data provided by DAFM is the main source of volume information for livestock, fertiliser, feeding stuffs and some other items. This is the best data available in the country, in most cases based on a census of producers (e.g. abattoirs) or traders, and are generally of very good quality. Prices for these items are collected by the CSO for the purpose of compiling an API and are of good quality. DAFM also provides value data on cereals, vegetables, fruit and a number of other items, which are the best available and of sufficiently good quality.

Milk volumes are obtained from CSO's Milk Statistics survey, which is a census of creameries, while the prices are collected from a large sample of the latter.

The majority of data on intermediate consumption comes from Teagasc's NFS survey. This is an important source of very detailed information. However, its sample size is small, covering less than 1% of the total farm population. Therefore, the estimates based on NFS data may carry a considerable amount of variability and as a result be volatile and possibly biased. Special measures have to be taken to compensate for this drawback.

5.2.2.2 Register Coverage

Not applicable.

5.2.2.3 Non-response (Unit and Item)

Not applicable.

5.2.2.4 Measurement Errors

Measurement errors are difficult to assess since most of the data comes from administrative sources, external data providers or surveys conducted for different purposes.

5.2.2.5 Processing Errors

Processing errors are kept to the minimal through the rigorous procedures for editing and error checking described in sections 4.3 and 4.7 above.

5.2.2.6 Model-related Effects

Not applicable.

5.3 Timeliness and Punctuality

5.3.1 Provisional Results

An 'Advance' estimate is published in early December of the reference year, @T-3

weeks. A 'Preliminary' estimate is produced in March, @T+11 weeks.

The results are simultaneously transmitted to Eurostat for European publication.

5.3.1 Final Results

The 'Final' estimate, normally published in June @T+26 weeks, is based on an almost complete set of annual data and provides higher levels of detail in comparison to the 'Advance' and 'Preliminary' estimates.

5.4 Coherence

The EAAs are a satellite account of the European System of Accounts (ESA2010) and the results are therefore fully coherent with National Accounts. There are other reports published in Ireland that also attempt to estimate farm incomes and assess economic activity in agriculture, such as the '*National Farm Survey'* publication by Teagasc and the '*Farm Income Review'* by the IFA. However, the methodology and data sources used in these releases differ considerably from those used by CSO and the results are not always directly comparable.

5.5 Comparability

The Economic Accounts for Agriculture (EAAs) are based on a harmonized methodology and results are therefore directly comparable across the EU member states and the EEA.

While the current series start in 1990, the results from different time periods are not always directly comparable. The ceasing of commercial sugar beet production in Ireland in 2005 and turf production in 2013 led to a cessation of these items in the accounts' series with the corresponding effects on output.

Other reasons, such as the timing of the payments of subsidies, may lead to results being incomparable year on year. For example, the considerable increase in Operating Surplus in 2005 in comparison to 2004 was a result of the payment of large arrears for subsidies on product after the introduction of the Single Farm Payment. Consequently, in 2006 a large drop in Operating Surplus was observed as arrears payments were not repeated.

5.6 Accessibility and Clarity

5.6.1 Assistance to Users, Special Analyses

The electronic release containing main tables is available on the CSO's website. Simultaneously, the databank is updated with more detailed information to ensure that the entire series back to 1990 is available through the Database Direct application on the CSO website.

https://www.cso.ie/px/pxeirestat/Database/eirestat/Agricultural%20Output%20Input%20and%20Income/Agricultural%20Output%20Input%20and%20Income_statbank.asp?sp=Agricultural%20Output%20Input%20and%20Income&Planguage=0&ProductID=DB_AE

Historical releases from 1998 are available on the CSO website

https://www.cso.ie/en/statistics/agriculture/archive/

Special data submissions are prepared annually for Revenue, DAFM and Eurostat, and quarterly for National Accounts. Large number of queries from mass media and general public are answered on a regular basis.

5.6.2 Revisions

Revisions are made on regular basis if new sources of information that were not available at the time of the original publication become available, or if data from the original sources are revised by the data provider.

5.6.3 Publications

5.6.3.1 Releases, Regular Publications

Output, Input & Income in Agriculture, Advance, Preliminary and Final Estimate, and *Regional Accounts for Agriculture* are available on the CSO website:

https://www.cso.ie/en/statistics/agriculture/

5.6.3.2 Statistical Reports

Statistical Yearbook of Ireland

http://www.cso.ie/en/statistics/statisticalyearbookofireland/

5.6.3.3 Internet

The release is available on the CSO website:

https://www.cso.ie/en/statistics/agriculture/

5.6.4 Confidentiality

Individual companies' data are treated as strictly confidential under the Statistics Act, 1993. Results are aggregated to industry level. Where one or two companies dominate the national output for a particular sector of agriculture, the results for this sector are never published on its own. They are published only in combination with some other sector(s).

6 Additional documentation and publication

Data for all EU member states and EEA countries can be found and compared on the Eurostat database

http://ec.europa.eu/eurostat/data/database