



Standard Observation SOSOC_030

Land-based income

Version 0.3

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NOTE: THIS PROTOCOL IS STILL UNDER REVIEW.



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The protocol has been reviewed mainly for stylistic aspects.

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**By the end of January 2026 the further work on the protocol was handed over to and
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of the emerging eLTER ERIC.**

Version	Status	Date	Authors
0.1	Final draft	Dec 2024	main authors
0.2	Restructured, reformatted	Aug 2026	S. Zacharias
0.3	Thematic Scope forestry added	Oct 2026	B. Hörmann

SO variable overview

Habitat:

Applies to all eLTER habitat groups where farming activities are present (excludes areas without agricultural activity)

Variable(s):

- **Information on land-based income:** bundle of statistical variables connected to the economy of agricultural holdings
 - Farm Net Value Added (FNVA)
 - Farm Net Income (FNI)
 - Family Farm Income (FFI)
 - Remuneration of Family Labour
 - Economic accounts for agriculture (aact_eaa, all included variables)
 - Unit value statistics for agricultural products (aact_uv, all included variables)
 - Economic aggregates of forestry (for_eco_cp)
 - Supply and use of products in forestry (for_sup_cp)
 - Monetary supply and use of wood in the rough (for_emsuw)
 - Physical supply and use of wood in the rough, overbark (for_epsuw)
 - Output of forestry by type (for_eoutput)
 - Timber removals, wood products and trade (for_rpt, all variables)
 - Employment in forestry (for_awu)
 - Employment in forestry and wood-based industries (for_emp_lfs)
 - Employment in forestry and wood-based industries by age (for_emp_lfs1)

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1 Introduction

Income is a decisive factor in land-use related decision-making and economic performance indicators of land-use related holdings are used in many socio-ecological studies and models. The SO "Land-based income" thus provides a bundle of statistical variables connected to the economy of agricultural holdings. Farm-level variables account for output, paid and unpaid labour, external production factors, subsidies and taxes.

More detailed and harmonised data and knowledge about the land-based income sector across regions is, however, rather scarce. The Standard Observation "Land-based Income" aims to address this shortfall and to provide a compilation of the most relevant existing statistical data on the regional level.

The aim of this protocol is to define a harmonised and cyclic approach combining quantitative data that allows for temporal analysis as well as cross-case comparison of agricultural economic systems between eLTSEr Platforms.

SOSOC_030 is a mandatory Standard Observation for all terrestrial eLTER Sites and Platforms where agricultural activity is present. Data for corresponding Sites are provided via a centralized eLTER service following the BASIC method.

2 Method

2.1 Thematic Scope

The Land-based Income statistics data to be collected for **Agricultural economics** include:

- **Farm net value added (FNVA)** is equal to gross farm income minus depreciation costs. It is used to remunerate the fixed factors of production (labour, land, and capital), whether they are external or family factors. As a result, agricultural holdings can be compared regardless of whether family or non-family factors of production are used.

$$\text{FNVA} = \text{output} + \text{Pillar I and annual Pillar II payments} + \text{national subsidies} + \text{VAT balance} \\ - \text{intermediate consumption} - \text{farm taxes} - \text{depreciation}.$$

Income taxes are not included. The value is calculated per annual work unit (AWU) to account for differences in farm scale and to provide a better measure of agricultural labour productivity.

- **Farm net income (FNI)** comprises the remuneration of family labour, own land, and own capital. It is calculated by deducting the external factors of production from FNVA and adding the balance of subsidies and taxes on investments:

$$\text{FNI} = \text{FNVA} - \text{total external factors} + \text{balance of subsidies and taxes on investments}.$$

- **Family farm income (FFI)** is expressed per family labour unit. This income indicator accounts for differences in the family labour force to be remunerated per holding. It is calculated as FNI per family work unit (FWU):

$$\text{FFI} = \frac{\text{FNI}}{\text{FWU}}.$$

Only farms that use unpaid labour, which in most cases means family members, are included in the calculation.

- **Remuneration of family labour (RFL):** In the agricultural sector, a substantial share of the workforce consists of family members who do not receive a salary but must instead be remunerated from farm income. Because FNVA is required to finance not only family labour but all fixed factors of production, the remuneration of family labour provides another way of estimating income. It is calculated as follows:

$$\begin{aligned} \text{Remuneration of family labour} &= \text{FNVA} + \text{balance of subsidies and taxes on investments} \\ &\quad - \text{total external production factors} \\ &\quad - \text{opportunity costs of own land} \\ &\quad - \text{opportunity costs of own capital.} \end{aligned}$$

Alternatively, starting from farm net income:

$$\begin{aligned} \text{Remuneration of family labour} &= \text{FNI} - \text{opportunity cost of own land} \\ &\quad - \text{opportunity cost of own capital.} \end{aligned}$$

- **Economic accounts for agriculture (aact_eaa, all included variables):** This dataset tracks the economic performance and value generated by the European agricultural sector, matching the structure of National Accounts. It measures total output, intermediate consumption, and key income indicators like Gross Value Added across EU member states.
- **Agricultural labour input statistics (aact_ali, all included variables):** This collection quantifies the total volume of work performed in agriculture, measured in Annual Work Units (AWUs) rather than a simple count of persons. It allows researchers to evaluate labor productivity trends by capturing both full-time and part-time farm employment.
- **Unit value statistics for agricultural products (aact_uv, all included variables):** These statistics record the average implicit prices of specific agricultural goods by dividing total monetary value by physical volume. They serve as a crucial tool for analyzing real price developments and comparing commodity market values between countries.

The Land-based Income statistics data to be collected for **Forestry economics** include:

- **Economic aggregates of forestry (for_eco_cp):** This database monitors the macro-level economic performance of the forestry and logging industry using current basic prices. It provides essential national accounting indicators, such as total production value, gross value added, and sectoral income.
- **Supply and use of products in forestry (for_sup_cp):** This table maps the balance between the availability of forestry goods (through domestic production or imports) and their final destination (such as industrial use or export). It highlights the economic transaction flows within the broader forestry industry network.
- **Monetary supply and use of wood in the rough (for_emsuw):** This dataset details the economic transactions of raw, unmanufactured timber measured entirely in monetary value. It provides insights into the financial worth, market pricing, and commercial flows of raw wood from harvest to initial industrial consumption.
- **Physical supply and use of wood in the rough, overbark (for_epsuw):** This account tracks the physical volume of harvested timber measured in cubic meters, including the bark, as it moves through the supply chain. It acts as the volume-based equivalent to monetary tables, ensuring raw material flows match resource sustainability limits.
- **Output of forestry by type (for_eoutput):** This dataset breaks down the total production value of the sector into specific types of goods and services, such as wood, non-wood products, and services like wildfire prevention. It allows users to analyze which specific commodities drive the overall revenue of the forestry industry.

- **Timber removals, wood products and trade (for_rpt, all variables):** This comprehensive dataset tracks the physical volume and trade dynamics of raw wood removals alongside the subsequent production and international trade of secondary wood products. It integrates data from the Joint Forest Sector Questionnaire (JFSQ) to monitor the entire supply chain, from the initial harvesting of roundwood to the market circulation of sawnwood, panels, pulp, and paper products.
- **Employment in forestry (for_awu):** This table measures the volume of human labor dedicated to forestry and logging activities, standardizing the data into Annual Work Units (AWUs). It provides the core metric needed to evaluate labor productivity and employment trends within European woodlands.
- **Employment in forestry and wood-based industries (for_emp_lfs):** This dataset tracks the total number of employed and self-employed people working across the wider forestry sector, including logging, papermaking, and furniture manufacturing. Derived from the standardized EU Labour Force Survey (LFS), it allows for cross-country comparisons of demographic traits like gender, age, and professional status within the wood industry.
- **Employment in forestry and wood-based industries by age (for_emp_lfs1):** This specific sub-table breaks down the forestry and wood sector workforce into precise age categories to analyze labor demographics. It is primarily used by researchers to identify structural shifts, such as an aging workforce or youth employment trends, across different branches of European forestry.

2.2 BASIC Method – Sites and Platforms

The BASIC method represents a less elaborate approach for data collection and applies to all eLTER Sites and eLTSEr Category-2 Platforms. Data will be retrieved from European statistical sources (Eurostat) at the NUTS-2 or NUTS-3 level. Datasets will be retrieved and updated annually by eLTER RI central services.

2.3 PRIME Method – Platforms Only

The PRIME method applies to eLTSEr Platforms (Category-1) only. In contrast to the BASIC method, which is based on European statistics, data for the PRIME method are collected at a higher spatial resolution (smallest administrative unit) based on a review of national or regional statistics, with annual temporal resolution.

2.4 Data Processing - BASIC and PRIME

2.4.1 Steps for Raw Data Retrieval

- Identify relevant statistical sources (Eurostat, national repositories)
- Extract data using appropriate tools (e.g., cookie-cutting)
- Document data sources and collection dates

2.4.2 Steps to Process and Harmonise the Collected Data

- Standardise units and currency conversions
- Align temporal resolutions across datasets
- Apply spatial aggregation/disaggregation as needed

2.4.3 Analytical Methods and Concepts

General assumption regarding data sources and collection responsibility for BASIC and PRIME methods: BASIC methods are based upon retrieved data from sources such as Eurostat, and will be delivered by eLTER central services. This means that for the BASIC SOSOC_030, eLTER central

services are responsible for collecting and curating this data (often using, for example, eLTER tools such as cookie-cutting). Nevertheless, this document provides web links to individual data sources to allow LTER scientists to work with statistical data directly. For the PRIME methods, it is necessary for the LTSE platform staff to access and process data from national data repositories and/or generate their own data from on Site.

2.4.4 Site/Platform Boundaries vs. Statistical Reporting Units

The Site/Platform (S/P) boundaries and the boundaries of statistical reporting units (SRUs) can be—and usually are—different. In this respect, the following table can be useful for deciding how to use and interpret statistical data based on the relationship between the Site or platform area and the SRU area.

Table 1: Relationship between Site/platform boundaries and statistical reporting units

Relationship	Method	Extracted/Specified	Interpretation
$S/P \ll SRU$	BASIC/PRIME	SRU value	The Site or platform lies in a region that has the SRU value of the studied parameter.
$S/P \ll SRU$	PRIME	0	The Site or platform manager or scientist knows that the studied parameter does not occur within the S/P.
$S/P < SRU$ and parameter evenly distributed within SRU	BASIC/PRIME	SRU value multiplied by the area ratio (S/SRU or P/SRU)	The value of the parameter for the Site or platform is a calculated value.
$S/P = SRU$ or $S/P \approx SRU$	BASIC/PRIME	SRU value	The value of the studied parameter is equal or approximately equal to the SRU value.
Site or platform contains the entire area of several SRUs	BASIC/PRIME	SRU values; sum or average value	Values of individual SRUs or a sum or average value for the Site/platform.
Site or platform contains parts of several SRUs	BASIC/PRIME	SRU values; SRU values multiplied by the relevant area ratio; sum or average value	Values of individual SRUs or a sum or average value for the Site/platform. The Site or platform manager/scientist should decide which SRU values are used directly, which are multiplied by the area ratio, and which are excluded. Values for SRUs that are only marginally represented within the Site or platform may be excluded.

Legend: S = LTER Site; P = LTSE platform; SRU = Statistical Reporting Unit.

2.4.5 Zero Values Assumption

An assumption regarding zero values in SOs is required. When SO variables are not relevant (such as “population size” for an LTER Site), a value of zero will be accepted as a PRIME measurement. This may create a seeming contradiction, as BASIC methods might yield a value greater than zero.

This discrepancy can arise because BASIC methods may, for example, calculate the LTSE population as a proportion of the population within a larger statistical area. That area may have a substantial population outside the LTSE boundaries. The Site or platform manager, however, may know that the actual value within the Site/platform is zero. This Site-based knowledge is important and is therefore considered the delivery of an SO using a PRIME method.

3 Reporting format and metadata

Reporting is conducted in accordance with the rules and conventions specified in Peterseil and Geiger (2020)¹ regarding file naming, file formats, and metadata scope. The general and the specific metadata for SOATM_030 include the following details set out in Tables 2 and 3.

Table 2: General Metadata for Standard Observations

Field	Description	Notes
SO name/code	Identifier for the standard observation	Mandatory
Included variables	List of all sub-variables covered by the standard observation	For example, SOSOC_030-1
Data collection	Classification of the data sourcing method	Externally sourced or internally collected
Contact person	Name, affiliation, and contact details	If applicable
Keywords	Relevant search terms and classification tags	Used for indexing and discovery

Table 3: Variable-Specific Metadata for the BASIC and PRIME Methods

Field	Description	Notes
Identification Fields		
Variable name	Descriptive title of the variable	Required for all variables
Unit	Unit of measurement	For example, EUR, percentage
Resolution Fields		
Legacy data available	Availability of historical data	Yes/no; include the starting date where applicable
Temporal resolution	Frequency of data collection or update	BASIC: every 3 years; PRIME: every 6 years
Spatial resolution	Geographic level at which the data are available	Area, NUTS level, or administrative unit
Data Format Fields		
Data type	General classification of the data	Tabular, vector, raster, image, text, audio, etc.
File format	Technical file format or extension	CSV/XLS, PDF, TIFF, GPKG, SHP, DOC, analogue, etc.
Geo-reference	Indicates whether the data are geographically referenced	Yes/no
Collection Method Fields		
Data collection	Classification of the data sourcing method	Externally sourced or internally collected
Data holder	Institution responsible for holding or maintaining the data	Institution, agency, or ministry
Data source	Location or source from which the data can be obtained	URL or physical address, where applicable

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¹Document is currently under revision.

Table 3 – continued from previous page

Field	Description	Notes
Specific method	Method used to collect or generate the data	Remote sensing, statistical census, survey, expert judgement, model simulation, interview panel, etc.
Method details	Reference to detailed methodological documentation	URL to a detailed description, where available
Processing Fields		
Data harmonization	Procedures used to standardize data across sources	Harmonization of units, spatial resolution, temporal resolution, classifications, etc.
Data processing	Transformations or analytical procedures applied to the data	Spatial clipping, mathematical operations, statistical analyses, qualitative analyses, etc.
Access and Management Fields		
Contact person	Point of contact for the dataset	Name, affiliation, and contact details
Access	Mode through which the data can be accessed	On-site only, online access, direct download, etc.
Access cost	Cost associated with accessing the data	Free/paid; per dataset, subscription, or price range
Terms of use	Conditions governing the permitted use of the data	Authorized users, permitted purposes, and usage restrictions
Confidentiality	Sensitivity or confidentiality level	Ranging from open data to highly confidential
Data contract	Indicates whether a formal data-sharing agreement is required	Yes/no
Keywords	Terms used to describe and classify the dataset	Search terms and classification tags
Additional comment	Supplementary information not covered by the other fields	Notes, explanations, or clarifications

References

Peterseil, J. and S. Geiger (2020). *eLTER PLUS – Field Specification for data reporting (1.0)*. Zenodo [Technical note]. Version 1.0. DOI: [10.5281/zenodo.6373410](https://doi.org/10.5281/zenodo.6373410).