

**Ecosystem Extent Accounts:
Data validation rules and checks 2026**

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The structure of the document

This document presents a compilation of rules and checks for the validation of data reported in the EU Ecosystem Extent Accounts (ECOEXT) questionnaire by countries to Eurostat, and informs compilers about the process.

A validation rule is a logical statement applied to data, which may result, in case of this data collection, in three possible outcomes:

- **PASS/OK** – data meet the condition of the validation check, i.e. no issues detected and no action needed from the reporting country.
- **WARNING** – thresholds have been exceeded, i.e. the reporting country has to confirm the data and briefly explain for what reasons (e.g. country-specific circumstances) data do not confirm with pre-agreed rules and thresholds. Data may be accepted based on the explanation.
- **ERROR** – data do not conform with well-established accounting / mathematical rules, i.e. the reporting country has to correct and resubmit the data.

The document presents validation rules from two perspectives: (i) the total of Annexes 1-3 presents the complete set of validation rules; (ii) Annex 4 then presents the same complete set of validation rules, but grouped according to the validation tool that performs them (regardless of their grouping in Annexes 1-3). Annex 4 is included in this document for information, to help compilers understand the validation process and required action on their part.

The document is structured in five annexes:

- **Annex 1: examines the general content of cells in the questionnaire in terms of validity of used symbols (data cells, cells intended for flags, reference years and country code) without considering the relationship with content with other cells.**
- Annex 2: includes internal consistency checks within and between ECOEXT tables 1 (asset account) and 2 (conversion matrix).
- Annex 3: includes four types of plausibility checks: (i) examination of the time series, (ii) consistency of ECOEXT data with data from other related fields (e.g. CORINE Land Cover), (iii) plausibility of conversions as agreed in the Task Force on ecosystem accounting and presented in Table 2.3 of the Handbook on ecosystem accounts, and (iv) a plausibility of reporting for countries without a coastline (i.e. land-locked countries.).
- **Annex 4: summarizes the process and steps in the validation. Each dataset submitted to Eurostat needs to pass through a series of validation points (“gates”). Each point is associated with a specific validation tool using a subset of validation checks presented in earlier annexes. The objective of the step-wise validation is to filter out obvious errors in submitted data and inform the compiler about the need for correction as fast after the submission as possible (the immediate “bounce-back checks” implemented at the earliest validation points) so that only datasets cleaned of obvious errors reach the database where a more time-consuming plausibility takes place. This section helps compilers understand what to expect during the validation.**
 - **Validation step 1: Built-in macro function in the questionnaire to be used by countries before submitting data to Eurostat (i.e. pre-validation).**
 - **Validation step 2a: STRUctural VALidation of the questionnaire. Datasets failing these STRUVAL checks are automatically rejected by Eurostat’s IT system. Country receives an immediate error report via EDAMIS listing issues that need to be corrected before the content of the dataset can reach Eurostat and be examined further.**
 - **Validation step 2b: CONtEnt VALidation of the questionnaire. Datasets failing these CONVAL checks are automatically rejected by Eurostat’s IT system. Country receives an immediate error report via EDAMIS listing issues that need to be corrected so that the dataset can be loaded to Eurostat’s internal database for further validation.**
 - **Validation step 3: SQL-based validation performed in Eurostat’s internal database after data upload. The output of this step is the Ms Excel validation (and revision) report, sent to countries via EDAMIS channel – ‘ENVDATA_EEXTVR_N’.**

- Annex 5: lists Eurostat codes for all items reported in the ECOEXT questionnaire; they are also used in the validation report, i.e. the annex is the reference list of codes for national compilers.

Annex 1 – ECOEXT – validation of general content of questionnaire cells /correctness of symbols used

Worksheet ‘GETTING STARTED’

Rule 1 – CONTACT DETAILS	
Coded format	
Description	The cells designated to include compilers’ ‘Name’, ‘Institution’ and ‘e-mail’ must not be blank.
Threshold	NA
Notification	WARNING

All data tables

Rule 1b – COUNTRY ¹	
Coded format	
Description	The content of cells designated for the code of the reporting country must be equal to one of the 2-letter country codes defined by the EU.
Threshold	NA
Notification	ERROR

Rule 2 – REFERENCE YEAR ²	
Coded format	
Description	The content of cells designated for the reference year must be filled in with a valid reference year.
Threshold	NA
Notification	ERROR

Rule 2b – REFERENCE YEAR – EDAMIS ³	
Coded format	
Description	The reference year entered in the cells designated for the reference year must be equal to the reference year entered in the EDAMIS submission system, i.e. the one appearing in the EDAMIS file name ‘ENVDATA_ECOEXT_3_xx_YYYY_0000_V000x’.
Threshold	NA
Notification	ERROR

¹ In reality, countries only fill in the country code on worksheet ‘GETTING STARTED’ (and it is copied to all tables). However, the validation check examines the correctness of the country code in all table (all worksheets), therefore the check is listed here as applicable to ‘All tables’.

² As above.

³ As footnote above.

Rule 3 – COMPLETENESS

Coded format	
Txt code	(i) (QC_COMPLETENESS_01_T1-1) (ii) (QC_COMPLETENESS_01_T2-1)
Description	The dataset must include all mandatory characteristics as specified in Regulation (EU) 691/2011, Annex IX for: (i) Questionnaire Table 1 (ii) Questionnaire Table 2
Threshold	NA
Notification	ERROR

Rule 4 – FLAGS

Coded format	
Txt code	(i) (QC_FLAGS_01_01) (ii) (QC_FLAGS_01_03) (iii) (QC_FLAGS_01_P_Flag)
Description	(i) The content of cells designated for flags and footnotes must not differ from predefined entries (i.e. 'b', 'e', 'p' for cells for standard footnotes and 'a number' for cells for country-specific footnotes). (ii) The content of cells designated for flags and footnotes and related cells for data must be a valid combination of symbols. (iii) Provisional flag from previous data collection (must be removed – final data)
Threshold	NA
Notification	(i) ERROR (ii) ERROR (iii) WARNING

Rule 5a – NUMERIC

Coded format	
Description	The content of cells designated for data must be a number.
Threshold	NA
Notification	ERROR

Rule 5b – MUST NOT BE NEGATIVE	
Coded format	
Txt code	(QC_SELECT_WHERE_NEG)
Description	The content of the cell after rounding to 0 decimal places must not be a negative number. This applies to all reporting items from Table 2 and all reporting items from Table 1 except for item 'Net change' (STK_CHG).
Threshold	NA
Notification	ERROR

Annex 2 – ECOEXT – internal consistency checks

Table 1 – Asset account (1000 ha)

Rule 6a – AGGREGATION – ECO01	
Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO01 > ECO0101 + ECO0102 + ECO0103 + ECO0104 + ECO0105 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO01 = ECO0101 + ECO0102 + ECO0103 + ECO0104 + ECO0105 (iii) If one addend missing: calculation missing
Txt code	(i) QC_ADDITIONS_ECO01_sum_notall (ii) QC_ADDITIONS_ECO01_sum ; QC_ADDITIONS_ECO01_STK_CH_sum (iii) QC_ADDITIONS_ECO01_comp
Description	Values for level 1 ecosystem type 'Settlements and other artificial areas' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO01xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO01xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6b – AGGREGATION – ECO02	
Coded format	(i) STK_CL, STK_OP: If not all addends available: ECO02 > ECO0201 + ECO0202 + ECO0203 + ECO0204 + ECO0205 + ECO0206 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO02 = ECO0201 + ECO0202 + ECO0203 + ECO0204 + ECO0205 + ECO0206 (iii) If one addend missing: calculation missing
Txt code	(i) QC_ADDITIONS_ECO02_sum_notall (ii) (QC_ADDITIONS_ECO02_sum ; QC_ADDITIONS_ECO02_STK_CH_sum (iii) (QC_ADDITIONS_ECO02_comp)
Description	Values for level 1 ecosystem type 'Cropland' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO02xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO02xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6c – AGGREGATION – ECO03

Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO03 > ECO0301 + ECO0302 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO03 = ECO0301 + ECO0302 (iii) If one addend missing: calculation missing
Txt code	(i) (QC_ADDITIONS_ECO03_sum_notall) (ii) (QC_ADDITIONS_ECO03_sum ; QC_ADDITIONS_ECO03_STK_CH_sum (iii) (QC_ADDITIONS_ECO03_comp)
Description	Values for level 1 ecosystem type 'Grassland' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO03xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO03xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6d – AGGREGATION – ECO04

Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO04 > ECO0401 + ECO0402 + ECO0403 + ECO0404 + ECO0405 + ECO0406 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO04 = ECO0401 + ECO0402 + ECO0403 + ECO0404 + ECO0405 + ECO0406 (iii) If one addend missing: calculation missing
Txt code	(i) (QC_ADDITIONS_ECO04_sum_notall) (ii) (QC_ADDITIONS_ECO04_sum ; QC_ADDITIONS_ECO04_STK_CH_sum (iv) (QC_ADDITIONS_ECO04_comp)
Description	Values for level 1 ecosystem type 'Forest and woodland' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO04xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO04xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6e – AGGREGATION – ECO05

Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO05 > ECO0501 + ECO0502 + ECO0503 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO05 = ECO0501 + ECO0502 + ECO0503 (iii) If one addend missing: calculation missing
Txt code	(i) (QC_ADDITIONS_ECO05_sum_notall) (ii) (QC_ADDITIONS_ECO05_sum ; QC_ADDITIONS_ECO05_STK_CH_sum (iv) (QC_ADDITIONS_ECO05_comp)
Description	Values for level 1 ecosystem type 'Heathland and shrub' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO05xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO05xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6f – AGGREGATION – ECO06

Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO06 > ECO0601 + ECO0602 + ECO0603 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO06 = ECO0601 + ECO0602 + ECO0603 (iii) If one addend missing: calculation missing
Txt code	(i) (QC_ADDITIONS_ECO06_sum_notall) (ii) (QC_ADDITIONS_ECO06_sum ; QC_ADDITIONS_ECO06_STK_CH_sum (iv) (QC_ADDITIONS_ECO06_comp)
Description	Values for level 1 ecosystem type 'Sparsely vegetated ecosystems' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO06xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO06xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6g – AGGREGATION – ECO07

Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO07 > ECO0701 + ECO0702 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO07 = ECO0701 + ECO0702 (iii) If one addend missing: calculation missing
Txt code	(i) (QC_ADDITIONS_ECO07_sum_notall) (ii) (QC_ADDITIONS_ECO07_sum ; QC_ADDITIONS_ECO07_STK_CH_sum (iv) (QC_ADDITIONS_ECO07_comp)
Description	Values for level 1 ecosystem type 'Inland wetland' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO07xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO07xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6h – AGGREGATION – ECO08

Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO08 > ECO0801 + ECO0802 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO08 = ECO0801 + ECO0802 (iii) If one addend missing: calculation missing
Txt code	(i) (QC_ADDITIONS_ECO08_sum_notall) (ii) (QC_ADDITIONS_ECO08_sum ; QC_ADDITIONS_ECO08_STK_CH_sum (iv) (QC_ADDITIONS_ECO08_comp)
Description	Values for level 1 ecosystem type 'Rivers and canals' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO08xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO08xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6i – AGGREGATION – ECO09

Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO09 > ECO0901 + ECO0902 + ECO0903 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO09 = ECO0901 + ECO0902 + ECO0903 (iii) If one addend missing: calculation missing
Txt code	(i) (QC_ADDITIONS_ECO09_sum_notall) (ii) (QC_ADDITIONS_ECO09_sum ; QC_ADDITIONS_ECO09_STK_CH_sum (iv) (QC_ADDITIONS_ECO09_comp)
Description	Values for level 1 ecosystem type 'Lakes and reservoirs' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO09xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO09xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6j – AGGREGATION – ECO10

Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO10 > ECO1001 + ECO1002 + ECO1003 + ECO1004 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO10 = ECO1001 + ECO1002 + ECO1003 + ECO1004 (iii) If one addend missing: calculation missing
Txt code	(i) (QC_ADDITIONS_ECO10_sum_notall) (ii) (QC_ADDITIONS_ECO10_sum ; QC_ADDITIONS_ECO10_STK_CH_sum (iv) (QC_ADDITIONS_ECO10_comp)
Description	Values for level 1 ecosystem type 'Marine inlets and transitional waters' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO10xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO10xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6k – AGGREGATION – ECO11

Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO11 > ECO1101 + ECO1102 + ECO1103 + ECO1104 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO11 = ECO1101 + ECO1102 + ECO1103 + ECO1104 (iii) If one addend missing: calculation missing
Txt code	(i) QC_ADDITIONS_ECO11_sum_notall (ii) QC_ADDITIONS_ECO11_sum ; QC_ADDITIONS_ECO11_STK_CH_sum (iv) QC_ADDITIONS_ECO11_comp
Description	Values for level 1 ecosystem type 'Coastal dunes, beaches and wetlands' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO11xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO11xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6l – AGGREGATION – ECO12

Coded format	(i) STK_CL, STK_OP: if not all addends available: ECO12 > ECO1201 + ECO1202 + ECO1203 + ECO1204 + ECO1205 + ECO1206 + ECO1207 + ECO1208 (ii) STK_CL, STK_OP, STK_CHG: if all addends available: ECO12 = ECO1201 + ECO1202 + ECO1203 + ECO1204 + ECO1205 + ECO1206 + ECO1207 + ECO1208 (iii) If one addend missing: calculation missing
Txt code	(i) QC_ADDITIONS_ECO12_sum_notall (ii) QC_ADDITIONS_ECO12_sum ; QC_ADDITIONS_ECO12_STK_CH_sum (iv) QC_ADDITIONS_ECO12_comp
Description	Values for level 1 ecosystem type 'Marine ecosystem' have to be: (i) For stocks, if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO12xx (see the list of codes). (ii) For stocks and net change, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 2 ecosystem types ECO12xx (see the list of codes). (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 6m – AGGREGATION – TOTAL	
Coded format	(i) STK_CL, STK_OP, INCR, DECR: if not all addends available: TOTAL > ECO01 + ECO02 + ECO03 + ECO04 + ECO05 + ECO06 + ECO07 + ECO08 + ECO09 + ECO10 + ECO11 + ECO12 (ii) If all addends available: TOTAL = ECO01 + ECO02 + ECO03 + ECO04 + ECO05 + ECO06 + ECO07 + ECO08 + ECO09 + ECO10 + ECO11 + ECO12 (iii) If one addend missing: calculation missing
Txt code	(i) QC_ADDITIONS_TOTAL_sum_notall QC_ADDITIONS_TOTAL_sum; QC_ADDITIONS_TOTAL_STK_CH_sum QC_ADDITIONS_TOTAL_comp
Description	The sum of values for all level 1 ecosystem have to be: (i) For stocks and flows if not all addends available: greater or equal to the sum of values reported for the respective stocks and flows for level 1 ecosystem types. (ii) For all items, if all addends available: equal to the sum of values reported for the respective stocks and flows for level 1 ecosystem types. (iii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 7a – OTHER – ECO01	
Coded format	$STK_CL(ECO0105) / STK_CL(ECO001) * 100 < 10$
Txt code	QC_VALUES_SAME_DIM_ECO0105
Description	Value reported for level 2 ecosystem type 'Other artificial areas' should not exceed 10% of the value reported for level 1 ecosystem type 'Settlements and other artificial areas' for all stocks.
Threshold	0.01
Notification	WARNING

Rule 7b – OTHER – ECO02	
Coded format	$STK_CL(ECO0206) / STK_CL(ECO002) * 100 < 10$
Txt code	QC_VALUES_SAME_DIM_ECO0206
Description	Value reported for level 2 ecosystem type 'Other farmland' should not exceed 10% of the value reported for level 1 ecosystem type 'Cropland' for all stocks.
Threshold	0.01
Notification	WARNING

Rule 8a – STOCK-FLOW

Coded format	$STK_CL = STK_OP + INCR - DECR$
Txt code	(QC_ADDITIONS_STK_CL_sum)
Description	Values reported for 'Closing area' have to be equal to the sum of values reported for 'Opening area' and 'Additions' less 'Reductions' for all ecosystem types of level 1 and level 2.
Threshold	0.01
Notification	ERROR

Rule 8b – NET CHANGE – STOCKS

Coded format	$STK_CHG = STK_CL - STK_OP$
Txt code	(i) QC_ADDITIONS_STK_CHG_sum (ii) QC_ADDITIONS_STK_CHG_comp
Description	(i) Values reported for 'Net change' have to be equal to 'Closing stock (area)' less 'Opening stock' for all ecosystem types of level 1 and level 2. (ii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Rule 8c – NET CHANGE – FLOWS

Coded format	$STK_CHG = INCR - DECR$
Txt code	(i) QC_ADDITIONS_STK_CHG_2_sum (ii) QC_ADDITIONS_STK_CHG_2_comp
Description	(i) Values reported for 'Net change' have to be equal to 'Additions' less 'Reductions' for all ecosystem types of level 1 and level 2. (ii) If one addend missing, it can be calculated.
Threshold	0.01
Notification	ERROR

Table 2 – Conversion matrix (1 ha)

Rule 9a – AGGREGATION – ADDITIONS	
Coded format	(i) If not all addends available: TOTAL > ECO01 + ECO02 + ECO03 + ECO04 + ECO05 + ECO06 + ECO07 + ECO08 + ECO09 + ECO10 + ECO11 + ECO12 (ii) If all addends available: TOTAL = ECO01 + ECO02 + ECO03 + ECO04 + ECO05 + ECO06 + ECO07 + ECO08 + ECO09 + ECO10 + ECO11 + ECO12 (iii) If one addend missing: calculation missing
Txt code	(i) (QC_ADDITIONS_additions_ecosyst_TOTAL_sum_notall) (ii) (QC_ADDITIONS_additions_ecosyst_TOTAL_sum) (iii) (QC_ADDITIONS_additions_ecosyst_TOTAL_comp)
Description	Values for 'Total additions' for an ecosystem type in the conversion matrix have to be: (i) If not all addends available: greater or equal to the sum of values reported for 'Additions' for the given level 1 ecosystem type. (ii) If all addends available: equal to the sum of values reported for 'Additions' for the given level 1 ecosystem type. (iii) If one addend missing, it can be calculated.
Threshold	1
Notification	ERROR

Rule 9b – AGGREGATION – REDUCTIONS	
Coded format	(i) If not all addends available: TOTAL > ECO01 + ECO02 + ECO03 + ECO04 + ECO05 + ECO06 + ECO07 + ECO08 + ECO09 + ECO10 + ECO11 + ECO12 (ii) If all addends available: TOTAL = ECO01 + ECO02 + ECO03 + ECO04 + ECO05 + ECO06 + ECO07 + ECO08 + ECO09 + ECO10 + ECO11 + ECO12 (iii) If one addend missing: calculation missing
Txt code	(i) (QC_ADDITIONS_reductions_ecosyst_c_TOTAL_sum_notall) (ii) (QC_ADDITIONS_reductions_ecosyst_c_TOTAL_sum) (iii) (QC_ADDITIONS_reductions_ecosyst_c_TOTAL_comp)
Description	Values for 'Total reductions' for an ecosystem in the conversion matrix have to be: (i) If not all addends available: greater or equal to the sum of values reported for 'Reductions' for the given level 1 ecosystem type. (ii) If all addends available: equal to the sum of values reported for 'Reductions' for the given level 1 ecosystem type. (iii) If one addend missing, it can be calculated.
Threshold	1
Notification	ERROR

Table 1 (1000 ha) x Table 2 (ha) – Cross-table checks

Rule 11a – CROSS-TABLE – ADDITIONS	
Coded format	$\text{INCR (Table 1)} = \text{INCR (Table 2)}/1000$
Txt code	QC_ECOEXT_XTABLES_INCR
Description	'Additions' for a given ecosystem type at level 1 in Table 1 (asset account) have to be equal to 'Total additions' for the given ecosystem type in Table 2 (conversion matrix).
Threshold	0.01
Notification	ERROR

Rule 11b – CROSS-TABLE – REDUCTIONS	
Coded format	$\text{DECR (Table 1)} = \text{DECR (Table 2)}/1000$
Txt code	QC_ECOEXT_XTABLES_DECR
Description	'Reductions' for a given ecosystem type at level 1 in Table 1 (asset account) have to be equal to 'Total reductions' for the given ecosystem type in Table 2 (conversion matrix).
Threshold	0.01
Notification	ERROR

Rule 11c – CROSS-TABLE – NET CHANGE	
Coded format	$\text{INCR (Table 1)} - \text{DECR (Table 1)} = (\text{INCR (Table 2)} - \text{DECR (Table 2)})/1000$
Txt code	QC_ECOEXT_XTABLES_NET
Description	'Net changes; in for a given ecosystem type at level 1 in Table 1 (asset account) have to be equal to 'Net changes' for the given ecosystem type in Table 2 (conversion matrix).
Threshold	0.01
Notification	ERROR

Rule 11d – CROSS-TABLE – TOTAL NET CHANGE	
Coded format	$\text{TOTAL STK_CHG (Table 1)} = \text{STK_CHG (Table 2)}/1000 = 0$
Txt code	QC_SELECT_WHERE_T1_NET
Description	Total 'Net change' of ecosystem area in Table 1 (asset account) and 'Net change' in Table 2 (conversion matrix) must be equal to 0.
Threshold	0.01
Notification	ERROR

Rule 11e – CROSS-TABLE – ADDITIONS – CONVAL⁴	
Coded format	INCR (Table 1) = (+/- 100%) (INCR (Table 2)/1000)
Txt code	-
Description	'Additions' for a given ecosystem type at level 1 in Table 1 (asset account) have to be within +/-100% of the value of 'Total additions' for the given ecosystem type in Table 2 (conversion matrix).
Threshold	100%
Notification	ERROR

⁴ This is a check to be implemented as an automatically reject-upon-submission document in case of error. Its purpose is to automatically reject questionnaires using incorrect units (e.g. 1000 ha in both the asset table and conversion matrix). The submissions using incorrect reporting units would be rejected upon submission.

Annex 3 – ECOEXT plausibility checks

Time-series analyses Table 1

Rule 12 – TIME SERIES – OP VS CL STOCK ⁵	
Coded format	STK_OP(period n) = STK_CL(period n-1)
Txt code	QC_ECOEXT_OPENING_VS_CLOSING
Description	Values reported for the 'Opening area' at the beginning of the accounting period have to be equal to the values reported for the 'Closing area' for the previous accounting period.
Threshold	0.01 (1000 ha)
Notification	ERROR

Rule 13 – TIME SERIES – SAME STOCK	
Description	The values reported for the same variable – either (i) opening or (ii) closing areas (i.e. STOCK) of ecosystem types in Table 1 for two consecutive reporting periods should not exceed a specified threshold, in %.
Txt code	For reporting frequency triennial (A3): (i) (QC_ECOEXT_RULE13_A3_i) (ii) (QC_ECOEXT_RULE13_A3_ii) (iii) (QC_ECOEXT_RULE13_A3_iii) For reporting frequency annual (A): (i) (QC_ECOEXT_RULE13_A1_i) (ii) (QC_ECOEXT_RULE13_A1_ii) (iii) (QC_ECOEXT_RULE13_A1_iii)
Threshold	For reporting frequency triennial (A3): (i) 5% for ecosystem types with a total national extent (closing stock) >100 thousand ha (ii) 5% for level 1 ecosystem types (if closing stock ≤ 100 thousand ha) (iii) 10% for level 2 ecosystem types if closing stock ≤ 100 thousand ha For reporting frequency annual (A): (i) 3% for ecosystem types with a total national extent (closing stock) >100 thousand ha (ii) 3% for level 1 ecosystem types (if closing stock ≤ 100 thousand ha) (iii) 5% for level 2 ecosystem types if closing stock ≤ 100 thousand ha
Notification	WARNING

⁵ In case of revisions of data submitted in previous years (e.g. as a result of an improved method), the compilers are asked to submit a revised dataset of past data in a separate ECOEXT questionnaire, via EDAMIS during any subsequent data collection (i.e. a compiler may submit separate questionnaires for reference year n, n-1, n-3, n-6, etc at any data collection). Each questionnaire is to be labelled with correct reference year.

Comparison with national '[Area by NUTS 3 region](#)'

Rule 14a – PLAUSIBILITY – reg_area3 – warning	
Coded format	STK_CL (ECO01_ECO09 + ECO11) = (i) (+/- 0.1%) Total area (Eurobase 'reg_area3') for: AT,'SK','CZ','LU', 'HU', 'SI', 'LT','RO','BG','CH','RS','BA','MK','ME','LI' (ii) (+/- 0.5%) Total area (Eurobase 'reg_area3') for: IE,'ES','PT','FR – metropolitan area', 'BE','NL','DE','IT','DK','PL','SE','FI','NO', 'LV', 'EE', 'EL', 'HR', 'TR','AL','IS'
Txt code	(QC_ECOEXT_EB_AREA_reg)
Description	Values reported for the sum of 'Closing area' for terrestrial (including freshwater) ecosystem types must be close to values for 'Total area' published in Eurobase dataset on countries' 'Area by NUTS 3 region', as follows: (i) For land-locked countries and countries with a coastline relatively short to the total length of the national border, the threshold is 0.1% (ii) For countries with a relatively long coastline to the total length of the national border, the threshold is 0.5%
Threshold	(i) (+/- 0.1%) for: AT,'SK','CZ','LU', 'HU', 'SI', 'LT', 'RO', 'BG', 'CH', 'RS', 'BA', 'MK','ME','LI' (ii) (+/- 0.5%) for: IE,'ES','PT','FR – metropolitan area', 'BE','NL','DE','IT','DK','PL','SE','FI','NO', 'LV', 'EE', 'EL', 'HR', 'TR', 'AL', 'IS'
Notification	WARNING

Rule 14b – PLAUSIBILITY – reg_area3 – error	
Coded format	STK_CL (ECO01_ECO09 + ECO11) = (+/- 10%) Total area (Eurobase 'reg_area3') for all countries (for FR, metropolitan area)
Txt code	-
Description	Values reported for the sum of 'Closing area' for terrestrial (including freshwater) ecosystem types must be within +/-10% of values reported for 'Total area' published in Eurobase dataset on countries' 'Area by NUTS 3 region'.
Threshold	10%
Notification	ERROR

Comparison with CORINE Land Cover – experimental status

Rule 15a – PLAUSIBILITY – CLC by area – error (CLC approach)	
Coded format	-
Txt code	(QC_ECOEXT_EB_AREA_lc_err)
Description	For countries whose compilation is based on CLC, values reported for 'Closing area' must be consistent with values derived from CORINE Land Cover accounting layers, by ecosystem type.
Threshold	(i) More than 10% difference (ii) Difference between 5% and 10%, and absolute difference ≤ 50 thousand hectares (iii) Difference between 2% and 5%, and absolute difference between 50 and 200 thousand hectares
Notification	ERROR

Rule 15b – PLAUSIBILITY – CLC by area - warning (national approach)	
Coded format	-
Txt code	(QC_ECOEXT_EB_AREA_lc_warn)
Description	For countries whose compilation is based (largely) on national datasets, values reported for 'Closing area' should be close to values derived from CORINE Land Cover accounting layers, by ecosystem type.
Threshold	(i) More than 10% difference (ii) Difference between 5% and 10%, and absolute difference > 50 thousand hectares (iii) Difference between 2% and 5%, and absolute difference > 200 thousand hectares
Notification	WARNING

Rule 15c – PLAUSIBILITY – CLC by class ⁶	
Coded format	(i) $STK_CL(ECO01) \geq CLC(ECO01)$ (ii) $STK_CL(ECO02) \leq CLC(ECO02)$ (iii) $STK_CL(ECO08) \geq CLC(ECO08)$
Txt code	(QC_ECOEXT_EB_AREA_lc15c)
Description	Values reported for 'Closing area' must be consistent with values provide by CORINE Land Cover, by ecosystem type: (i) Value reported for 'Settlements and other artificial areas' $> CLC$ (ii) Value reported for 'Cropland' $< CLC$ (iii) Value reported for 'Rivers and canals' $> CLC$
Threshold	0
Notification	WARNING

⁶ This check is based on experience from ECOEXT 2023 voluntary data collection. These rules held for the whole subset of countries who participated in the data collection. It presumes that national approaches estimate the extent of the respective three ecosystem types consistently smaller / greater than CLC.

Plausibility of conversions⁷

Rule 16a – PLAUSIBILITY – Conversions – rare⁸	
Coded format	-
Txt code	(QC_ECOEXT_MATRIX_VALUES_warning)
Description	Values reported in the conversion matrix (ECOEXT Table 2) for the following conversions should be zeros: • From ECO01 to ECO02 – ECO09 • From ECO02, ECO03 to ECO06, ECO08 – ECO11 • From ECO04 to ECO05 – ECO11 • From ECO05 to ECO06, ECO08, ECO09 • From ECO06 to ECO01, ECO02, ECO04, ECO05 • From ECO07 to ECO01 – ECO11 • From ECO08 to ECO01, ECO04, ECO07, ECO10, ECO11 • From ECO09 to ECO01, ECO08 – ECO11 • From ECO10 to ECO01, ECO08, ECO11, ECO12 • From ECO11 to ECO01, ECO04, ECO05, ECO10, ECO12 • From ECO12 to ECO01, ECO10, ECO11
Threshold	0
Notification	WARNING

Rule 16b – PLAUSIBILITY – Conversions – cumulative⁹	
Coded format	-
Txt code	(QC_ECOEXT_MATRIX_VALUES_warning)
Description	Values reported in the conversion matrix (ECOEXT Table 2) for the following conversions should be zeros: • From ECO02, ECO03 to ECO05, ECO07 • From ECO05 to ECO03
Threshold	0
Notification	WARNING

⁷ This set is presented graphically in the Handbook on ecosystem accounts in Table 2.3.

⁸ If non-zero values are reported, these need to be explained by a footnote inserted in the respective cells in ECOEXT Table 1

⁹ If non-zero values are reported, these need to be explained by a footnote inserted in the respective cells in ECOEXT Table 1

Rule 16c – PLAUSIBILITY – Conversions – implausible ¹⁰	
Coded format	-
Txt code	(QC_ECOEXT_MATRIX_VALUES_error)
Description	Values reported in the conversion matrix (ECOEXT Table 2) for the following conversions must be zeros: • From ECO01 to ECO10 – ECO12 • From ECO02, ECO03, ECO04, ECO07 to ECO12 • From ECO05 to ECO07, ECO10 - ECO12 • From ECO06 to ECO07 – ECO12 • From ECO08 to ECO02, ECO03, ECO05, ECO06, ECO12 • From ECO09 to ECO02 – ECO06, ECO12 • From ECO10 to ECO02 – ECO07, ECO09 • From ECO11 to ECO02, ECO03, ECO06 – ECO09 • From ECO12 to ECO02 – ECO09
Threshold	0
Notification	ERROR

Plausibility – land-locked countries

Rule 17a – PLAUSIBILITY – land-locked – Table 1	
Coded format	-
Txt code	QC_SELECT_WHERE_LL_T1
Description	Values reported in the asset table (ECOEXT Table 1) for ecosystem types ECO10 - ECO12 for countries AT, SK, CZ, HU, LU, CH, LI, XS, MD, MK, RS must be zeros.
Threshold	0
Notification	ERROR

Rule 17b – PLAUSIBILITY – land-locked – Table 2	
Coded format	-
Txt code	QC_SELECT_WHERE_LL_T2
Description	Values reported in the conversion matrix (ECOEXT Table 2) for the following <u>combination</u> of ecosystem types for countries AT, SK, CZ, HU, LU, CH, LI, XS, MD, MK, RS must be zeros: • ECO10&all • ECO11&all • ECO12&all
Threshold	0
Notification	ERROR

¹⁰ In exceptional cases, national circumstances might allow for 'implausible' conversions to occur. These need to be justified by a footnote inserted in the respective cells in ECOEXT Table 1

Annex 4 – Validation tools for ECOEXT, error reporting to countries and requested action

Validation tool step 1: Built-in macro functions in the ECOEXT questionnaire – pre-validation by countries using button ‘Validate questionnaire’	
Summary	This step is to be performed by countries (or a similar, alternative of pre-validation is to be conducted if macro functions cannot be executed) <u>before the questionnaire is submitted to Eurostat.</u>
The tool examines compliance with rules	The following rules from Annex 1 of this document: • Rule 1a – CONTACTS DETAILS • Rule 1b – COUNTRY • Rule 2a – REFERENCE YEAR • Rule 3 – COMPLETENESS • Rule 4 – FLAGS • Rule 5a – NUMERIC • Rule 5b – MUST NOT BE NEGATIVE All rules from Annex 2 of this document, <u>except for</u> • Rule 7a – OTHER – ECO01 • Rule 7b – OTHER – ECO02 • Rule 8a – STOCK-FLOW • Rule 8b – NET CHANGE • Rule 11c – CROSS-TABLE – NET CHANGE • Rule 11d – CROSS-TABLE – TOTAL NET CHANGE
Reporting of issues	Outcomes of pre-validation are shown in the questionnaire in two ways: cells associated with an issue are (i) shown as red (ERROR; yellow for WARNING) and (ii) listed in the ‘ErrorLog’ worksheet.
Required action by countries	Identified issues must be corrected before submitting the dataset via EDAMIS.
Consequence of corrections not implemented	In case of a country code or reference year missing (in the cells designated for this purpose), the dataset will be automatically rejected upon submission (i.e. it does not reach Eurostat’s database and no further examination can be performed). The country will receive an automated message via EDAMIS within a few minutes after the submission. In case of issues that are also covered by the CONTENT VALIDATION tool (see below), the dataset will be automatically rejected (i.e. it does not reach Eurostat’s database and no further examination can be performed). The country will receive an automated message via EDAMIS within a few minutes after the submission. In case of issues that are also covered by the SQL-based validation tool, these will be reported to the country in the validation report (see below for further steps) within a few weeks after the submission.

Validation tool step 2a: STRUctural VALidation tool	
Summary	This step takes place automatically upon the submission of data by countries via EDAMIS to Eurostat and incompliance results in an automated rejection of the dataset. Errors of this kind should not occur unless countries have manipulated the questionnaire structure, deleted codes or formulas copying country code or the reference year from the 'GETTING STARTED' cover sheet to the data-reporting sheets ¹¹ , or copy-pasted items beyond reporting cells.
The tool examines compliance with rules	Correctness of the data structure (using predefined codes for data dimensions) The following rules from Annex 1 of this document: • Rule 1b – COUNTRY • Rule 2 – REFERENCE YEAR • Rule 4 – FLAGS • Rule 5a – NUMERIC
Reporting of issues	Outcomes of this validation step are summarized in an automated message ('FEEDBACK TRANSFER FOR DATASET ENVDATA_ECOEXT') sent to the compiler via EDAMIS containing text either 'ACCEPTED' or 'REJECTED'. Error details are available in the EDAMIS report available at the generated link.
Required action by countries	Errors must be corrected and dataset resubmitted via EDAMIS. Countries must not manipulate the structure of the questionnaire. This means adding or removing rows or columns in the reporting table, deleting hidden codes (which serve for structural validation and upload to Eurostat's internal database), or deleting formulas that copy the country code and reference year from the 'GETTING STARTED' cover sheet to the data-reporting sheets.
Consequence of corrections not implemented	Dataset is rejected (i.e. it does not reach Eurostat's database and no further examination can be performed).

Validation tool step 2b: CONtEnt VALidation tool ¹²	
Summary	This step takes place automatically upon the submission of data by countries via EDAMIS to Eurostat and incompliance results in an automated rejection of the dataset.

¹¹ The questionnaire is locked to reduce the risk of these issues occurring.

¹² Currently, this step is limited to a small number of simple checks. The vision for the future is that checks currently performed in Eurostat's internal database using SQL will be performed by the CONVAL tool, as it is done for advanced domains of statistics. (i.e. the step of SQL-based validation in Eurostat's internal database will be discontinued/converted to the above.)

The tool examines compliance with rules	The following rules from this document: • Rule 2a – REFERENCE YEAR • Rule 2b – REFERENCE YEAR – EDAMIS • Rule 5b – MUST NOT BE NEGATIVE • Rule 11e – CROSS-TABLE – ADDITIONS – CONVAL • Rule 14b - PLAUSIBILITY – reg_area3 – error
Reporting of issues	Outcomes of this validation step are summarized in an automated message ('FEEDBACK TRANSFER FOR DATASET ENVDATA_ECOEXT') sent to the compiler via EDAMIS containing text either 'ACCEPTED' or 'REJECTED'. Error details are available in the EDAMIS report available at the generated link.
Required action by countries	Errors must be corrected and dataset resubmitted via EDAMIS.
Consequence of corrections not implemented	Dataset is rejected (i.e. it does not reach Eurostat's database and no further examination can be performed).

Validation tool step 3: Database validation (in Eurostat's internal database)

Summary	This step takes place after the data had been loaded to Eurostat's internal database (i.e. after a successful validation in steps 2a and 2b described above). The SQL-based validation comprises (i) internal consistency check within and between ECOEXT table 1 and 2; (ii) plausibility checks examining plausibility of the time-series; and (iii) plausibility checks comparing reported data with data from related domains – land area published by Eurostat and CORINE Land Cover provided by the European Environment Agency.
The tool examines compliance with rules	The following rules from Annex 1 of this document: • Rule 3 – COMPLETENESS • Rule 4 – FLAGS • Rule 5b – MUST NOT BE NEGATIVE All rules included in Annex 2 except for 11e. All rules included in Annex 3 except for 14b.
Reporting of issues	Outcomes of this validation step are summarized in the MS Excel validation report sent to countries via EDAMIS channel 'ENVDATA_EEXTVR_N' .
Required action by countries	Data points associated with WARNINGS need to be explained and justified. Data points associated with ERRORS need to be corrected. They can be accepted temporarily if the country and Eurostat agree on corrective measures to be implemented in future data collections or if duly justified reflecting special national ecological circumstances.
Consequence of corrections not implemented	Data points reported by the validation report as ERRORS may be excluded from publication by Eurostat unless a satisfactory explanation is provided by the national compiler.

Annex 5 – List of codes

STK_OP – opening stock/area

STK_CL – closing stock/area

STK_CHG – net change/change in stock

INCR – increases/additions to stock

DECR – decreases/reductions in stock

ECO01 – 1. Settlements and other artificial areas

ECO0101 – 1.1 Continuous settlement area

ECO0102 – 1.2 Discontinuous settlement area

ECO0103 – 1.3 Infrastructure

ECO0104 – 1.4 Urban greenspace

ECO0105 – 1.5 Other artificial areas

ECO02 – 2. Cropland

ECO0201 – 2.1 Annual cropland

ECO0202 – 2.2 Rice fields

ECO0203 – 2.3 Permanent crops

ECO0204 – 2.4 Agro-forestry areas

ECO0205 – 2.5 Mixed farmland

ECO0206 – 2.6 Other farmland

ECO03 – 3. Grassland

ECO0301 – 3.1 Sown pastures and grass (modified grasslands)

ECO0302 – 3.2 Natural and semi-natural grasslands

ECO04 – 4. Forest and woodlands

ECO0401 – 4.1 Broadleaved deciduous forest

ECO0402 – 4.2 Coniferous forests

ECO0403 – 4.3 Broadleaved evergreen forest

ECO0404 – 4.4 Mixed forests

ECO0405 – 4.5 Transitional forest and woodland shrub

ECO0406 – 4.6 Plantations

ECO05 – 5. Heathlands and shrub

ECO0501 – 5.1 Tundra

ECO0502 – 5.2 Scrub and heathland

ECO0503 – 5.3 Sclerophyllous vegetation

ECO06 – 6. Sparsely vegetated ecosystems

ECO0601 – 6.1 Bare rocks

ECO0602 – 6.2 Semi-desert, desert and other sparsely vegetated areas

ECO0603 – 6.3 Ice sheets, glaciers and perennial snowfields

ECO07 – 7. Inland wetlands

ECO0701 – 7.1 Inland marshes and other wetlands on mineral soil

ECO0702 – 7.2 Mires, bogs and fens

ECO08 – 8. Rivers and canals

ECO0801 – 8.1 Rivers and streams

ECO0802 – 8.2 Canals, ditches and drains

ECO09 – 9. Lakes and reservoirs

ECO0901 – 9.1 Lakes and ponds

ECO0902 – 9.2 Artificial reservoirs

- ECO0903 – 9.3 Geothermal pools and wetlands (Iceland)
- ECO10 – 10. Marine inlets and transitional waters
 - ECO1001 – 10.1 Macrophyte communities and biogenic reefs
 - ECO1002 – 10.2 Transitional waters
 - ECO1003 – 10.3 Intertidal areas
 - ECO1004-10.4 Anthropogenic structures and modified ecosystems
- ECO11 – 11. Coastal beaches, dunes and wetlands
 - ECO1101 – 11.1 Coastal dunes and fine sediment shorelines
 - ECO1102 – 11.2 Rocky, boulder and coarse sediment shorelines
 - ECO1103 – 11.3 Coastal halophytic wetlands
 - ECO1104 – 11.4 Artificial shorelines
- ECO12 – 12. Marine ecosystems
 - ECO1201 – 12.1 Marine macrophyte communities
 - ECO1202 – 12.2 Biogenic reefs and animal forests
 - ECO1203 – 12.3 Sublittoral sediment substrates
 - ECO1204 – 12.4 Sublittoral rocky substrates
 - ECO1205 – 12.5 Continental and island slope
 - ECO1206 – 12.6 Deep-sea ecosystems
 - ECO1207 – 12.7 Coastal inlets
 - ECO1208 – 12.8 Anthropogenic structures and modified ecosystems