

# LUCAS 2018 (Land Use / Cover Area Frame Survey)

Technical reference document  
C4 - Quality Control Procedures

# Table of contents

LUCAS 2018 .....	1
1 Scope .....	6
2 Quality control: actors and roles .....	6
2.1 Role of the surveyor (SU).....	6
2.2 Role of the regional / central offices (RO/CO).....	6
2.3 Role of the external quality controller (XQC) .....	7
2.3.1 External quality control .....	7
2.3.2 Photo control.....	8
2.3.3 Control of GPS tracks.....	8
2.3.4 Control of panel points.....	8
2.3.5 Follow-up missions .....	9
2.4 Role of the Commission.....	9
3 Controls prior to the start of the survey .....	10
3.1 Ground documents.....	10
3.1.1 Preparation of ground documents .....	10
3.1.2 Checking for shifts in ground documents.....	10
4 Data control procedures.....	10
4.1 Identification .....	11
4.1.1 Surveyor ID (field A).....	11
4.1.2 Point_ID (field B).....	11
4.1.3 Theoretical elevation (field C) .....	11
4.1.4 Point is part of PI sample.....	11
4.1.5 Point is ex-ante .....	11
4.2 Access to point .....	11
4.2.1 Date (field 1) .....	11
4.2.2 Start time and End time (fields 2, 3).....	11
4.2.3 Car park latitude/longitude (fields 4, 5, 6) .....	12

4.2.4	GPS coordinate system (field 7), GPS precision (field 8), GPS elevation (field 9), Latitude/Longitude (fields 10, 11, 12), Distance to the point (field 13).....	12
4.3	Comments .....	13
4.3.1	Description of the way to the point (field C).....	13
4.3.2	Description of the way to the point (field 14).....	13
4.4	Point observation .....	13
4.4.1	Type of observation (field 15) .....	13
4.4.2	Direction of observation (Field 16).....	14
4.4.3	Remarks about point observation (field 14).....	14
4.5	Land cover and land use.....	15
4.5.1	LC1 (field 20), LC2 (field 23), plant species (fields 21, 24), LU1 (field 29), LU2 (field 32), land use type (fields 30, 33) .....	15
4.5.2	Percentage of land coverage LC1, LC2, LU1 and LU2 (fields 22, 25, 31, 34) .....	15
4.5.3	Parcel area (field 30).....	15
4.6	FAO parameters.....	16
4.6.1	Height of trees at the moment of survey (field 26).....	16
4.6.2	Height of trees at maturity (field 27).....	16
4.6.3	Width of feature (field 22).....	16
4.7	Land management.....	17
4.7.1	Information on ploughing (fields 34, 35, 36), Stone walls (field 37), crop residues (field 38), grass margins (field 39) .....	17
4.8	Special remarks .....	17
4.8.1	Grazing (field 40), Special status (field 41), special remarks (field 42).....	17
4.9	Copernicus.....	18
4.9.1	Point is part of Copernicus module .....	18
4.9.2	Extension of LC1 (fields 43, 45, 47, 49) , next LC (fields 44, 46, 48, 50) .....	18
4.10	INSPIRE .....	18
4.10.1	Point is in urban area (field 51), imperviousness (field 52).....	18
4.10.2	INSPIRE pure land cover components (PLCC) (fields 38 to 45) .....	19
4.11	EUNIS habitat complex.....	19

4.11.1	EUNIS habitat complex .....	19
4.11.2	Remarks on EUNIS habitat complex (field 14).....	20
4.12	Grassland module.....	20
4.12.1	Point is part of grassland module.....	20
4.12.2	Grassland region.....	20
4.12.3	Assess completeness .....	21
4.12.4	GPS track coherent with ground document.....	21
4.12.5	Flower density .....	21
4.13	Water management .....	22
4.13.1	Presence of water management (field 203).....	22
4.13.2	Type of irrigation (field 47), source (field 48) and delivery system (field 49) .....	22
4.14	Erosion.....	22
4.14.1	Assess erosion on point.....	22
4.14.2	Signs of erosion .....	22
4.14.3	Type of erosion (fields 208 – 274) .....	23
4.15	Soil .....	23
4.15.1	Soil point (field J) .....	23
4.15.2	Organic horizon point (L).....	23
4.15.3	Bulk point (M, N, O).....	24
4.15.4	BIO point (P) .....	24
4.15.5	Soil site: percentage of stones .....	24
4.15.6	Soil biodiversity .....	24
4.15.7	Soil bulk density.....	24
4.15.8	Topsoil sample taken (field 50), soil label (field 51) and remarks on soil (field 55) .....	25
4.15.9	Land owner details .....	26
4.15.10	Organic horizon .....	26
4.16	Photos.....	26
4.16.1	Photos (fields 58 - 66), additional photos (field 67) and remarks on photos (field 68) .....	26

DOCUMENT CHANGE RECORD			
ISSUE	DATE	CHANGE AUTHORITY	REASON FOR CHANGE AND AFFECTED ECTIONS
V0.1	2014.05.08	Eurostat E4/LUCAS	
V1.0	2015.02.27	Eurostat E4/LUCAS	Clarifications and changes after Project Managers training
V0.1 (LUCAS 2018)	2017.11.27	Eurostat E4/LUCAS	Review of document from LUCAS 2015
V1.0	20171208	Eurostat E4/LUCAS	Fine tuning

# 1 Scope

This document is part of a series of reference documents defining the framework of the Land Use / Cover Area frame statistical Survey (LUCAS). The LUCAS reference documents are continuously improved and adapted taking into account the lessons learnt from the implemented surveys and the requirements of the LUCAS data and users.

This document addresses one of the most important topics within LUCAS: data quality control. Below detailed information and descriptions are given on which data and the way how data will be controlled, and by whom.

## 2 Quality control: actors and roles

### 2.1 Role of the surveyor (SU)

---

The surveyor (survey contractor) his task is to carry out the field survey according to the LUCAS instructions. He fills in the field form and keeps it until the end of the survey respectively until handing it over to the regional/central office.

The surveyor has to:

- enter the data in the Data Management Tool (DMT),
- control the data,
- validate the data.

The surveyor controls all data for completeness, correctness and consistency during data collection at the point and during data entry, including GPS points and tracks, topsoil samples and the anonymization of the photos. The built-in controls of the DMT support the surveyor in this task. Any problem or inconsistency identified during data entry or data export needs to be verified with the original field form and other means at hand and corrected immediately.

If requested by the regional/central office, the surveyor corrects or completes the data. If necessary, the surveyor has to go back to the field and to survey the point again.

### 2.2 Role of the regional / central offices (RO/CO)

---

The regional/central office (survey contractor) receives the data from the surveyor, including photos, GPS points and tracks. The RO/CO receives the data via the DMT and initiates the quality control. Since there are many quality checks integrated in the DMT, data should be formally correct and complete when received from the surveyor. This means that RO/CO shall concentrate on the trueness or accuracy of the data content (e.g. LC corresponds to the reality shown on the crop photo etc.).

By use of the LUCAS DMT and of any additional suitable software, additional available data and GIS tools, the contractor is requested to apply a systematic internal quality check of **all** surveyed points and to correct them as necessary. This check should be done in the regional and/or central office(s). The following aspects of the data need to be checked and properly reported by the quality controllers of the regional and/or central offices, and sent to the surveyor for correction in case of need:

- Identification of the exact location and correct application of observation rules
- Logical consistency of the data (including change analysis)
- Land cover, land use and agro-environmental data on basis of the photos taken by the surveyors
- Inaccessibility of the points in case of the photo-interpretation in the field.
- Itinerary of the surveyors (using the GPS tracks)
- Photo quality
- Photo anonymization
- Place of collection of topsoil samples.

If any error is identified, RO/CO corrects the data directly if possible or returns the data to the surveyor requesting correction and/or clarification. The RO/CO shall give advice and guidance to the surveyors on how to avoid the type of identified errors in the future.

In case an error cannot be corrected, it is mandatory to add a remark clarifying the circumstances. If such remarks are missing, data will not pass the quality control carried out the external quality controller.

## 2.3 Role of the external quality controller (XQC)

---

### 2.3.1 External quality control

---

The external quality control done by the external quality control contractor (XQC) will have a similar role to play as the RO/CO: it anticipates formal correctness of data and assumes that data already went through RO/CO quality control. Almost identical cross checks as those specified for the RO/CO are done to assess correctness and completeness of the data. For new modules and elements of the LUCAS survey the goal of the quality control is to assess the plausibility of the data.

#### **Check photo-interpreted points up to a maximum of 10,000**

Points of the in-situ survey that were photointerpreted in the field (observation type 3) will be checked by the XQC contractor up to a maximum of 10,000 points. On this set of points, the contractor will do a full quality control, focusing especially on the reasons why the point has not been reached in the field. If the reasons don't comply with the instructions and rules, these points will be refused and sent back to the survey contractors for correction or re-visit. The survey contractor shall provide correction or further justification within 15 days. XQC contractor re-checks these points for approval or rejection. In case of a second rejection, the point will be classified as "rejected twice".

#### **Check 76,660 points that have been visited in the field**

During the first weeks of the XQC contractor has to perform full quality checks on all points visited on the field by all the surveyors. This applies to points that were visited on the field (observation type 1 or 2) and that have passed DMT in-built checks and were validated by the CO. 20% of points coming from each surveyor will be checked. The remaining points will be selected by the Commission. The XQC contractor will perform the full quality checks as soon as those points are released by the Commission.

If any error in the submitted LUCAS data is detected by XQC, data are sent back once to the RO/CO for correction. The XQC accepts only one re-submission of data. If the XQC control still detects errors the point is classified as rejected twice. The point is sent to the survey contractor only for comments, not corrections. After that the data is forwarded to the Commission (via the DMT) with a status indicating that the data contains errors.

### 2.3.2 Photo control

---

Photos will be checked by the contractor to assess whether:

- all mandatory pictures have been taken (e.g. landscape, point, crop/coverage, irrigation, soil – if any)
- the quality of photos is good
- the photo size is within the requested range and the proportions are correct
- the photo is taken in landscape mode
- whether any anonymization is necessary

Under the framework of LUCAS, anonymization is a procedure where individual recognizable elements (persons and/or vehicle identification plates) are identified and blurred in such a way that they are no longer recognizable. Photos containing any recognizable elements are not accepted. The survey contractors take strictly the responsibility that such recognizable elements are blurred before transmission to the Commission. As breaking this is considered a serious breach of the contract, the XQC contractor has to inform the Commission immediately when such a case is identified. If one of these features are found on the photos, the point is rejected and sent back to the survey contractor for blurring. In case one (or more) non anonymized picture is identified, the survey contractor will be requested to perform a complete verification of all photos for the relevant country and to correct as necessary.

#### **Additional checks for picture anonymization**

In addition to the checks that have to be performed to the pictures belonging to the points included in the quality control sample, an additional check of 20.000 point and landscape photos selected by the Commission will be performed by the XQC contractor, since all eventual personal information on the photos needs to be blurred before transmission to Commission. The survey contractor is responsible for anonymizing all images. The XQC contractor will check the above mentioned images to verify if all features (faces and vehicle identification plates) are properly anonymized. In case at least one non anonymized picture is identified, the survey contractor will be requested to perform a complete verification of all photos for the relevant country and correct as necessary. Non-compliance with the anonymization of all pictures is considered a breach of contract.

### 2.3.3 Control of GPS tracks

---

The contractor will use the GPS tracks, recorded by the surveyor when he/she was in the field, to overlay with relevant map products to control the following issues and to compare with the ground documents:

- completeness of tracks (track from each working day available)
- compliance with declarations of surveyors
- compliance with general remarks

### 2.3.4 Control of panel points

---

Panel points are points that have been visited in two different LUCAS campaigns. Checks can be divided in 3 groups: checks on points with plausible changes, checks on points with unplausible changes and checks on points where no changes were identified. For example, a point where no change has occurred in the terrain should not be classified in a way that a change in land cover or land use is identified. Likewise a point where a change has occurred should be adequately classified in both campaigns.

### **2.3.5 Follow-up missions**

---

In addition to the data control, experienced experts in land cover / use information & statistics will visit the survey contractors to supervise and assess the sound application of quality assurance measures. These so-called “follow-up missions” of 3-days per country will be organised in the early stage of the survey implementation to enable the detection of possible systematic errors due to misunderstanding of instructions or any other reason whatsoever. The expert will check the “office” phase as well as the survey implementation in the field. During the office phase of the mission, the set-up and the organisation of the survey at the central (or a regional) office of the relevant country will be subject of the assessment. A specified checklist will be executed. The in-situ survey implementation will be assessed based on a field trip accompanying a surveyor on a sample of points selected. The survey contractor is requested to provide any assistance the expert might need to carry out his task, including putting relevant documentation at disposal of the expert timely in advance of the visit. The report of the expert serves the Commission as input to their quality assessment of the survey implementation. In case deemed necessary, the Commission will request the survey contractor to assist to a second ad-hoc visit of the expert of the duration of one day.

## **2.4 Role of the Commission**

---

Eurostat, on behalf of the Commission, supervises the whole quality control process and intervenes if systematic errors are detected at any step.

Eurostat also makes random checks to the data received from the XQC.

# 3 Controls prior to the start of the survey

## 3.1 Ground documents

### 3.1.1 Preparation of ground documents

---

While preparing the ground documents, special care has to be taken in coordinate conversions and the application of national projections to the images.

The panel approach of LUCAS, in which a large number of points are visited in different campaigns to assess changes in land cover and land use, depends heavily on the fact that the surveyor correctly identifies the location of a point on the orthorectified imagery. Any shifts that may occur in the apparent location of the point on the images from one campaign to the next will heavily impact the quality of the final results.

It is advisable to define a minimum scale for the orthophoto overview of 1:5000 with an area size coverage of at least 49 ha (700 m x 700 m).

### 3.1.2 Checking for shifts in ground documents

---

Role	Check
QC RO/CO	<p>Compare a sample of ground documents of points that have been visited in previous campaigns with the documents prepared for the current campaign, so that an assessment of any existing shift can be made and possible corrective measures are taken before the final ground documents are printed. Selected points shall be very distant from each other in cardinal directions to detect changes due to projection conversion of the points;</p> <p>The Commission's approval of the ground document is dependent on the result of this assessment.</p>

## 4 Data control procedures

Quality checks to be performed include, but are not restricted to, correctness of location, land cover and land use data and associated agro-environmental parameters, in the current year and in comparison with previous campaign data, existence of mandatory photos, evaluation of photo quality, cross check position with GPS tracks. Mistakes and problems found during this control will be duly reported in the appropriate fields of LUCAS DMT.

The quality control distinguishes between the control of information collected also in previous LUCAS surveys and the new modules and elements (grassland module, new soil modules, EUNIS, erosion and Copernicus). For the new modules the controls are less strict and aim to assess the plausibility of the data, not the exactness.

See below more details on control procedures being applied. Please note that this is not an exhaustive list and other additional checks can and will be carried out.

## 4.1 Identification

---

### 4.1.1 Surveyor ID (field A)

---

To be defined by central offices. For each surveyor an individual ID should be assigned to enable tracing the surveyor and respective data.

### 4.1.2 Point\_ID (field B)

---

Fixed through the sample design. Correctness is checked automatically by means of the GPS geographical coordinates and the “observation distance” entered by the surveyor.

### 4.1.3 Theoretical elevation (field C)

---

Pre-filled from LUCAS database..

### 4.1.4 Point is part of PI sample

---

Pre-filled. If "yes" skip the section on "Access to the point"

### 4.1.5 Point is ex-ante

---

Pre-filled. If "yes" skip the section on "Access to the point"

## 4.2 Access to point

---

### 4.2.1 Date (field 1)

---

Role	Check
QC SU	Check correctness
QC RO/CO	Cross check with creation date of photo file if questionable
QC XQC	Cross check with creation date of photo file if questionable

### 4.2.2 Start time and End time (fields 2, 3)

---

Role	Check
QC SU	<p>Check if the survey time is within the average range: 10 min – 1h15.</p> <p>Give reasons for a shorter time in the remarks (Field 14).</p> <p>Points where some soil sample and/or grassland module takes place will usually need a longer survey time. This is expected and does not need to be added to the remarks.</p> <p>However if other causes determine a longer survey time a remark needs to be</p>

	<p>added (Field 14).</p> <p>Expected time for different parts of the survey are as follows:</p> <ul style="list-style-type: none"> <li>- 10 - 15 minutes for the basic assessment on land cover and land use, including the related environmental parameters and photos,</li> <li>- 5 min for Copernicus</li> <li>- 20 – 50 min for the soil sample, depending on the types of sample to be taken,</li> <li>- 15 - 30 min for the grassland survey.</li> </ul>
QC RO/CO	Duration of survey/point < 10 min: check remarks and field documents and have a close look to the data.
QC XQC	Duration of survey/point < 10 min: check remarks and field documents and have a close look to the data. Add surveyor to the watch list in case of problems.

#### 4.2.3 Car park latitude/longitude (fields 4, 5, 6)

Role	Check
QC SU	Check whether lat/long is given in decimal degrees, with six decimals.
QC RO/CO	<p>Check whether lat/long is given in decimal degrees, with six decimals.</p> <p>Check with GPS tracks/waypoints on orthophotos.</p> <p>Add comments if needed.</p>
QC XQC	<p>Check whether lat/long is given in decimal degrees, with six decimals.</p> <p>Check with GPS tracks/waypoints on orthophotos.</p> <p>Add comments if needed.</p>

#### 4.2.4 GPS coordinate system (field 7), GPS precision (field 8), GPS elevation (field 9), Latitude/Longitude (fields 10, 11, 12), Distance to the point (field 13)

Role	Check
QC SU	<p>Check whether lat/long is given in decimal degrees, with six decimals.</p> <p>Check together with pointID and precision (field 8) if distance to the point, lat/long, W/E are correct.</p>
QC RO/CO	<p>Check whether lat/long is given in decimal degrees, with six decimals.</p> <p>Check whether observation position/location is reasonable in the given context: cross-check with distance to the point (field 13), precision (field 8), as well as with the field documents and orthophotos.</p>

	<p>Check with GPS tracks/waypoints and orthophotos.</p> <p>Check with previous LUCAS survey data.</p> <p>Add any comment if needed.</p>
QC XQC	<p>Check whether lat/long is given in decimal degrees, with six decimals.</p> <p>Checks whether observation position/location is reasonable in the given context, together with distance to the point (field 14), precision (field 13) as well as with the field documents and orthophotos.</p> <p>In case, check if photointerpretation is justified.</p> <p>Check with GPS tracks/waypoints and orthophotos.</p> <p>Check with previous LUCAS survey data.</p> <p>Add comments if needed.</p>

## 4.3 Comments

---

### 4.3.1 Description of the way to the point (field C)

---

Pre-filled field, with information relative to the description of the way to the point in a past campaign.

### 4.3.2 Description of the way to the point (field 14)

---

Role	Check
QC SU	Check that the comments are reasonable. Preference should be given to the use of standardised comments. If free text is used, English is mandatory. Special characters should be avoided. SU shall make sure that the comments are clearly understandable.
QC RO/CO	Check if free text can be transformed in standardised comments and do so.
QC XQC	<p>Check whether comments are reasonable.</p> <p>Add comments if needed.</p>

## 4.4 Point observation

### 4.4.1 Type of observation (field 15)

---

Role	Check
------	-------

QC SU	If Type of observation is 2, 3 or 4, add a comment.
QC RO/CO	In case, check if photointerpretation is justified.  Check if needed comments exist.  Add any comment if needed.
QC XQC	In case, check if photointerpretation is justified.  Check if needed comments exist.  Add any comment if needed.

#### 4.4.2 Direction of observation (Field 16)

---

Role	Check
QC SU	Check adequacy against the ground document. Check with the landscape photos.  Add remark, if orthophoto differs from reality (e.g. outdated), or if the decision on direction of observation is different than in a previous campaign.
QC RO/CO	Check with the landscape photos, ground document and remarks.
QC XQC	Check with the landscape photos, ground document and remarks.

#### 4.4.3 Remarks about point observation (field 14)

---

Role	Check
QC SU	Check that the comments are reasonable. Preference should be given to the use of standardised comments. If free text is used, English is mandatory. Special characters should be avoided. SU shall make sure that the comments are clearly understandable.
QC RO/CO	Check if free text can be transformed in standardised comments and do so.
QC XQC	Check whether comments are reasonable.  Add comments if needed.

## 4.5 Land cover and land use

### 4.5.1 LC1 (field 20), LC2 (field 23), plant species (fields 21, 24), LU1 (field 29), LU2 (field 32), land use type (fields 30, 33)

Role	Check
QC SU	<p>Check LC1 and LC2 combination for consistency.</p> <p>Check LU and LC combination for consistency.</p> <p>Check if plant species and land use types are used when needed.</p> <p>Cross-check with LC/LU from the previous survey (if available) for consistency.</p> <p>Add a remark if necessary (e.g. different decision, real change).</p>
QC RO/CO	<p>Check all LC and LU against photos and ground document for accuracy.</p> <p>Check combinations of LC1xLC2 and LCxLU for consistency.</p> <p>Check consistency with previous data (if available), and justification if different decision or change exist.</p> <p>Add a remark if necessary.</p>
QC XQC	<p>Check all LC and LU against photos and ground document for accuracy.</p> <p>Check combinations of LC1xLC2 and LCxLU for consistency.</p> <p>Check consistency with previous data (if available), and justification if different decision or change exist.</p> <p>Add a remark if necessary.</p>

### 4.5.2 Percentage of land coverage LC1, LC2, LU1 and LU2 (fields 22, 25, 31, 34)

Role	Check
QC SU	Check with the ground documents, landscape photos and crop/cover photo.
QC RO/CO	Check with the ground documents, landscape photos and crop/cover photo.
QC XQC	Check with the ground documents, landscape photos and crop/cover photo.

### 4.5.3 Parcel area (field 30)

Role	Check
QC SU	<p>Check adequacy against the ground document. Check with the landscape photos.</p> <p>Add remark, if orthophoto differs from reality (e.g. outdated).</p>
QC RO/CO	Check with the landscape photos, ground document and remarks.

QC XQC	Check with the landscape photos, ground document and remarks.
--------	---

## 4.6 FAO parameters

### 4.6.1 Height of trees at the moment of survey (field 26)

Role	Check
QC SU	Check that it is filled in case needed (LC=CXX or D10 or E10 and Plot area $\geq$ 0.5ha) Check against the photos and ground document.
QC RO/CO	Check that it is filled in case needed (LC=CXX or D10 or E10 and Plot area $\geq$ 0.5ha) Check against the photos and ground document.
QC XQC	Check that it is filled in case needed (LC=CXX or D10 or E10 and Plot area $\geq$ 0.5ha) Check against the photos and ground document.

### 4.6.2 Height of trees at maturity (field 27)

Role	Check
QC SU	Check that it is filled in case needed (LC=CXX or D10 or E10 and Plot area $\geq$ 0.5ha) Check against the photos and ground document.
QC RO/CO	Check that it is filled in case needed (LC=CXX or D10 or E10 and Plot area $\geq$ 0.5ha) Check against the photos and orthophotos.
QC XQC	Check that it is filled in case needed (LC=CXX or D10 or E10 and Plot area $\geq$ 0.5ha) Check against the photos and orthophotos.

### 4.6.3 Width of feature (field 22)

Role	Check
QC SU	Check that it is filled in case needed (LC=CXX or D10 or E10 and Plot area $\geq$ 0.5ha) Check against the ground document. Add remark, if orthophoto differs from reality.
QC RO/CO	Check that it is filled in case needed (LC=CXX or D10 or E10 and Plot area $\geq$ 0.5ha) Check against ground document, photos and remarks. Check if remark exists, if orthophoto differs from reality. Add remark if needed

QC XQC	<p>Check that it is filled in case needed (LC=CXX or D10 or E10 and Plot area &gt;= 0.5ha)</p> <p>Check against ground document, photos and remarks.</p> <p>Check if remark exists, if orthophoto differs from reality. Add remark if needed.</p>
--------	---

## 4.7 Land management

### 4.7.1 Information on ploughing (fields 34, 35, 36), Stone walls (field 37), crop residues (field 38), grass margins (field 39)

---

Role	Check
QC SU	<p>Check that it the fields are filled in case needed (LC = BXX, CXX, DXX, EXX, FXX, HXX)</p> <p>Check against the photos and ground document.</p> <p>If needed add additional photo(s).</p> <p>Add remark, if orthophoto differs from reality.</p>
QC RO/CO	<p>Check that it is filled in case needed (LC = BXX, CXX, DXX, EXX, FXX, HXX)</p> <p>Check against ground document and photos.</p> <p>Check if remark exists, in case orthophoto differs from reality.</p> <p>Add remark if needed</p>
QC XQC	<p>Check that it is filled in case needed (LC = BXX, CXX, DXX, EXX, FXX, HXX)</p> <p>Check against ground document and photos.</p> <p>Check if remark exists, in case orthophoto differs from reality.</p> <p>Add remark if needed.</p>

## 4.8 Special remarks

---

### 4.8.1 Grazing (field 40), Special status (field 41), special remarks (field 42)

---

Role	Check
QC SU	Check with crop/cover photo and landscape photos. If needed add also additional

	photo.
QC RO	Check with crop/cover photo and landscape photos. Also with additional photos if existing.
QC XQC	Check with crop/cover photo and landscape photos. Also with additional photos if existing.

## 4.9 Copernicus

---

### 4.9.1 Point is part of Copernicus module

---

Pre-filled. If "No" skip section on COPERNICUS

### 4.9.2 Extension of LC1 (fields 43, 45, 47, 49) , next LC (fields 44, 46, 48, 50)

---

Role	Check
QC SU	Check if correctly filled in. If needed add additional photo(s). Add remark, if orthophoto differs from reality.
QC RO/CO	Check against ground document and photos. Check if remark exists, in case orthophoto differs from reality. Add remark if needed
QC XQC	Check against ground document and photos. Check if remark exists, in case orthophoto differs from reality. Add remark if needed.

## 4.10 INSPIRE

### 4.10.1 Point is in urban area (field 51), imperviousness (field 52)

---

Role	Check
QC SU	Check against the photos and ground document. If needed add additional photo(s).

	Add remark, if orthophoto differs from reality.
QC RO/CO	Check against ground document and photos. Check if remark exists, if orthophoto differs from reality. Add remark if needed
QC XQC	Check against ground document and photos. Check if remark exists, if orthophoto differs from reality. Add remark if needed.

#### 4.10.2 INSPIRE pure land cover components (PLCC) (fields 38 to 45)

Role	Check
QC SU	Check if filled for points where LC1=CXX,DXX,EXX or FXX. Check if LC1, LC2 and respective percent land cover are compatible with the values entered.
QC RO	Check if filled for points where LC1=CXX,DXX,EXX or FXX. Check if LC1 and percent land cover are compatible with the values entered. Add remark if needed.
QC XQC	Check if filled for points where LC1=CXX,DXX,EXX or FXX. Check if LC1 and percent land cover are compatible with the values entered. Add remark if needed.

### 4.11 EUNIS habitat complex

Only plausibility check needed at XQC level.

#### 4.11.1 EUNIS habitat complex

Role	Check
QC SU	Check if filled for points with trees (permanent crops included). Check if compatible with LC1, LC2 and respective percent land cover values entered.
QC RO	Check if filled for points with trees (permanent crops included). Check if compatible with LC1, LC2 and respective percent land cover values

	<p>entered.</p> <p>Add remark if needed.</p>
QC XQC	<p>Check if filled for points with trees (permanent crops included).</p> <p>Check if compatible with LC1, LC2 and respective percent land cover values entered.</p> <p>Add remark if needed.</p>

#### 4.11.2 Remarks on EUNIS habitat complex (field 14)

Role	Check
QC SU	Check that the comments are reasonable. Preference should be given to the use of standardised comments. If free text is used, English is mandatory. Special characters should be avoided. SU shall make sure that the comments are clearly understandable.
QC RO/CO	Check if free text can be transformed in standardised comments and do so.
QC XQC	<p>Check whether comments are reasonable.</p> <p>Add comments if needed.</p>

## 4.12 Grassland module

Quality checks are limited to assessing the following fields:

- Completeness
- GPS track coherent with grassland transect on the GD (photo)
- Plausibility of flower density (photo)

Only plausibility check needed at XQC level.

A full quality check will be done in a separate project.

#### 4.12.1 Point is part of grassland module

Pre-filled. If "Yes" the section on grassland (fields 62 – 202 (+ relevant comments)) needs to be completed.

#### 4.12.2 Grassland region

Pre-filled.

### 4.12.3 Assess completeness

Role	Check
QC SU	Check if all fields have been correctly completed.
QC RO	Check if all fields have been completed. Add remark if needed.
QC XQC	Check if all field have been completed. Add remark if needed.

### 4.12.4 GPS track coherent with ground document

Role	Check
QC SU	Check that the grassland transect has been depicted correctly on the GD and that a photo of the GD has been taken.
QC RO	Check that the grassland transect depicted on the GD (photo) is compatible with the GPS track. Add remark if needed.
QC XQC	Check that the grassland transect depicted on the GD (photo) is compatible with the GPS track. Add remark if needed.

### 4.12.5 Flower density

Role	Check
QC SU	Check that the flower density is correct and that a photo of the grassland transect has been taken.
QC RO	Check that the flower density is coherent with the grassland transect photo. Add remark if needed.
QC XQC	Check that the flower density is coherent with the grassland transect photo. Add remark if needed.

## 4.13 Water management

### 4.13.1 Presence of water management (field 203)

Role	Check
QC SU	Checked if filled when needed (LU=U111 or U112) Check that the irrigation photo has been taken, if needed.
QC RO	If relevant, check whether irrigation photo taken and water management is visible on the photo. Check if the code coincides with feature on the photo.
QC XQC	If irrelevant, check whether irrigation photo taken and water management is visible on the photo. Check if the code coincides with the feature on photo.

### 4.13.2 Type of irrigation (field 47), source (field 48) and delivery system (field 49)

Role	Check
QC SU	If applicable, check that the irrigation photo has been taken. If relevant add additional photo.
QC RO	Check photos if relevant
QC XQC	Check photos if relevant

## 4.14 Erosion

Only plausibility check needed at XQC level.

### 4.14.1 Assess erosion on point

Erosion is assessed in all grassland and in all soil points. Pre-filled.

If "Yes" the section on erosion (fields 207 – 274) is to be filled.

### 4.14.2 Signs of erosion

Role	Check
QC SU	Check against the photos and ground document. If needed add additional photo(s). Add remark, if orthophoto differs from reality.
QC RO	Check against ground document and photos. Check if remark exists, if orthophoto differs from reality.

	Add remark if needed
QC XQC	Check against ground document and photos. Check if remark exists, if orthophoto differs from reality. Add remark if needed.

If "Yes" all the section on erosion (fields 208 – 274) is to be filled. If "No" the remaining section on erosion can be skipped.

#### 4.14.3 Type of erosion (fields 208 – 274)

---

Role	Check
QC SU	Check against the photos and ground document. If needed add additional photo(s). Add remark, if orthophoto differs from reality.
QC RO	Check against ground document and photos. Check if remark exists, if orthophoto differs from reality. Add remark if needed
QC XQC	Check against ground document and photos. Check if remark exists, if orthophoto differs from reality. Add remark if needed.

## 4.15 Soil

### 4.15.1 Soil point (field J)

---

Pre-filled field, used to indicate whether a point is part of the soil sample and therefore has to be considered for collection of topsoil , organic horizon, bulk density, soil biodiversity).

If "Soil point" is "Yes" (field 275), the section on "Standard soil sample" (fields 328, 329 and remarks as needed) and the section on "land owner details" (fields 331 – 335) need to be filled in.

### 4.15.2 Organic horizon point (L)

---

Pre-filled. If "Yes" the section called "Soil organic horizon for peat or organic rich soils" (fields 336 – 346) needs to be filled in.

### 4.15.3 Bulk point (M, N, O)

Pre-filled. If "Yes" the section called "Soil bulk density" (fields 279 – 327) needs to be filled in.

### 4.15.4 BIO point (P)

Pre-filled. If "Yes" the section called "Soil biodiversity" (fields 276, 277 and relevant remarks) needs to be filled in.

### 4.15.5 Soil site: percentage of stones

Role	Check
QC SU	Check if filled in appropriately. If relevant add additional photo.
QC RO	Check if value is coherent with photos.
QC XQC	Check if value is coherent with photos.

### 4.15.6 Soil biodiversity

Role	Check
QC SU	Cross-check label number on the form with the label number on the sample. If relevant add a remark. If sample not collected, or not collected according to standard procedure a remark is needed.
QC RO	Check if filled appropriately. Check that the label photo has been taken. Check if biodiversity expedition date according to rules. Check for remarks.
QC XQC	Check if filled appropriately. Check that the label photo has been taken. Check if biodiversity expedition date according to rules. Check for remarks.

### 4.15.7 Soil bulk density

Role	Check
------	-------

QC SU	<p>Cross-check label number on the form with the label number on the sample.</p> <p>If relevant add a remark.</p> <p>If sample not collected, or not collected according to standard procedure a remark is needed.</p>
QC RO	<p>Check if filled appropriately.</p> <p>Check that the label photo and the soil collection photo have been taken.</p> <p>Check for remarks.</p>
QC XQC	<p>Check if filled appropriately.</p> <p>Check that the label photo and the soil collection photo have been taken.</p> <p>Check for remarks.</p>

#### 4.15.8 Topsoil sample taken (field 50), soil label (field 51) and remarks on soil (field 55)

Role	Check
QC SU	<p>Check if filled appropriately. Cross-check label number in the field form with the label on the sample.</p> <p>Check that the soil photos (bag and holes, label, additional photos in case of change in procedure, others as needed) have been taken.</p> <p>If relevant add additional photos.</p> <p>If sample not collected, or not collected according to standard procedure a remark is needed.</p>
QC RO	<p>Check soil sample photo and field form for label number.</p> <p>Check other photos (bag and holes, additional photos in case of change in procedure, others as needed) if relevant.</p> <p>Check for remarks.</p>
QC XQC	<p>Check soil sample photo and field form for label number.</p> <p>Check other photos (bag and holes, additional photos in case of change in procedure, others as needed) if relevant.</p> <p>Check for remarks.</p>

#### 4.15.9 Land owner details

Role	Check
QC SU	Check if filled appropriately.
QC RO	Check if filled appropriately.
QC XQC	Check if filled appropriately.

#### 4.15.10 Organic horizon

Role	Check
QC SU	Check if filled appropriately. Check if relevant photos (measurements in the 5 holes) have been taken. If sample not collected or not collected according to standard procedure a remark is needed.
QC RO	Check if filled appropriately. Check if relevant photos (measurements in the 5 holes) have been taken. Check for remarks.
QC XQC	Check if filled appropriately. Check if relevant photos (measurements in the 5 holes) have been taken. Check for remarks.

## 4.16 Photos

### 4.16.1 Photos (fields 58 - 66), additional photos (field 67) and remarks on photos (field 68)

Role	Check
QC SU	Check that all required photos are taken and of good quality. Rename the photos and take care that the photos are correctly assigned. Check whether photos need to be anonymised, and do so if necessary. Check the physical size of the photo and compress if necessary.
QC RO/CO	Check completeness of photos, whether taken/not taken coincides with photos available. Check that the quality of the photos is good.

	<p>Check whether photos have been correctly assigned to each category.</p> <p>Check whether not relevant fields are correctly ticked or whether photo should have been taken.</p> <p>Check whether photos are in correct format.</p> <p>Check the physical size of the photo and compress if necessary.</p> <p>Check whether photos have been multiplied/copied. It is not allowed to use the same photo in two different fields.</p> <p>Check whether photos that need to be anonymized have been checked and anonymized. Check for photos that were not anonymized, but should have been.</p>
QC XQC	<p>Check completeness of photos, whether taken/not taken coincides with photos available.</p> <p>Check that the quality of the photos is good (focused, light conditions OK etc.).</p> <p>Check whether photos have been correctly assigned to each category (e.g. irrigation photo not marked as W landscape photo).</p> <p>Check whether not relevant fields are correctly ticked or if photo should have been taken.</p> <p>Check whether photos are in correct format.</p> <p>Check whether photos have been multiplied/copied.</p> <p>Check whether photos that need to be anonymized, have been checked and anonymized. Check for photos that were not anonymized, but should have been.</p>