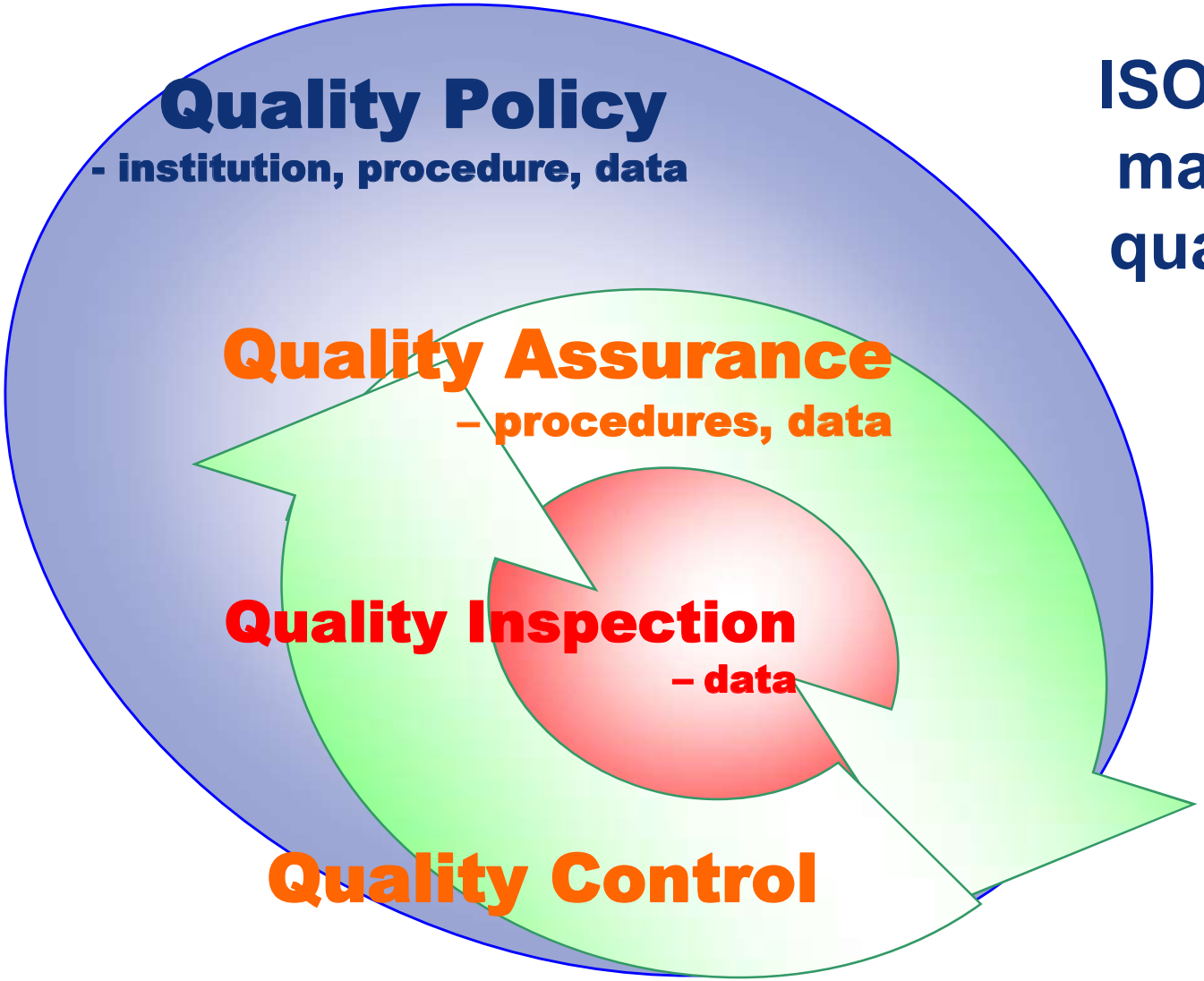
Quality Policy

Basic principles and elements…

Quality Policy
- institution, procedure, data

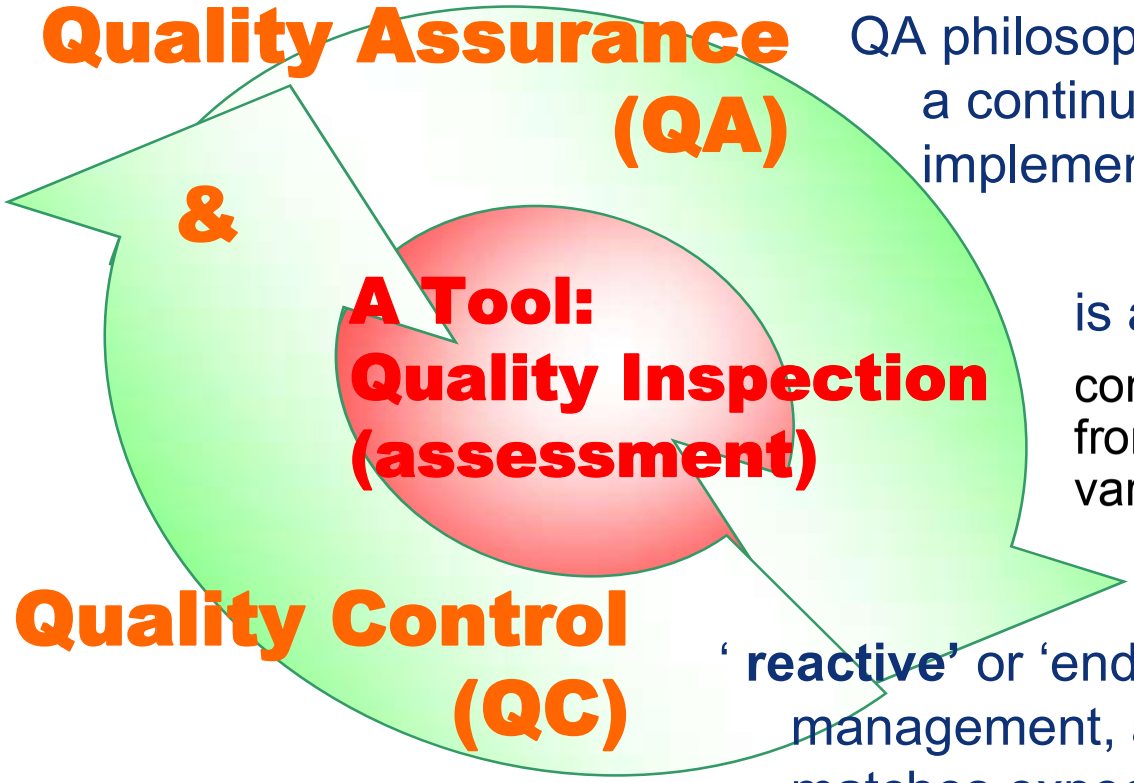
- Quality policy is formalised
- Documentation is available for all personal
- Responsibility of the QP delegated to highest authority

ISO 9000-3 Quality management and quality assurance standards



ISO 9000-3 Quality management and quality assurance standards

Definitions



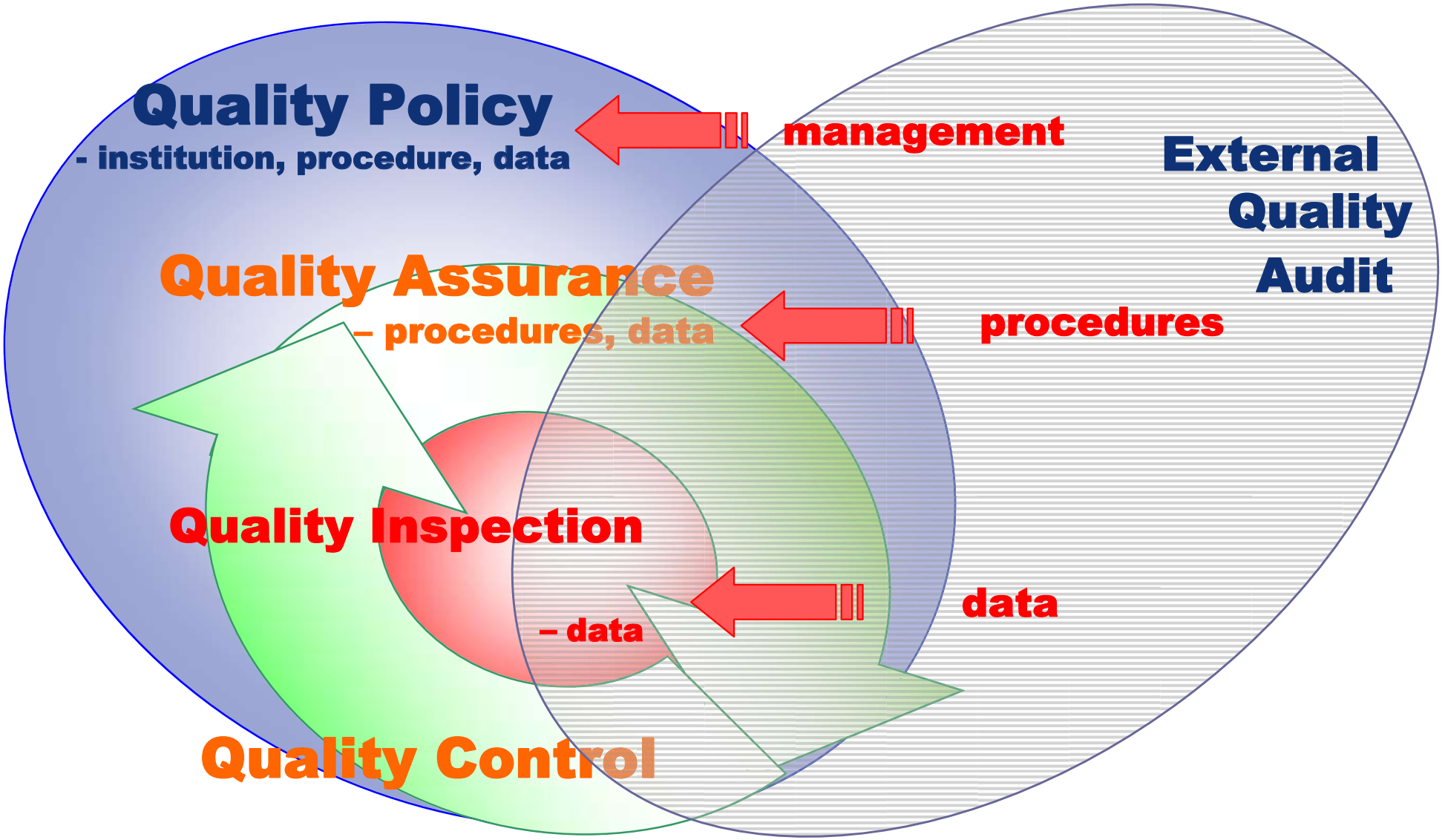
'proactive approach'

QA philosophy is to build quality into the system on a continuous basis, from conception through implementation and update

is a **recurrent activity**

compares deviations of identified attributes from pre-defined values and assesses the variation between the two

' reactive' or 'end user' form of quality management, assess how well product matches expectation of customer


Quality Policy
- institution, procedure, data
management
External Quality Audit
Quality Assurance
– procedures, data
procedures
Quality Inspection
– data
data
Quality Control

Quality Assurance (QA)

consists of:

1. Management of requirements

- Data quality means how well data meets the requirements. The process of QA should be inspired by the desire to demonstrate compliance with the EU and MS Regulatory requirements
- Requirements should be documented and prioritised, the way to meat the (new) requirement should be explicitly described (data layer, table, procedure etc.)
- Each identified requirement should be addressed:

Allocate recourses-nominate responsible-establish deadline

Different ways to document requirements: (1) textual document

3.2. The EU regulatory requirements for LPIS

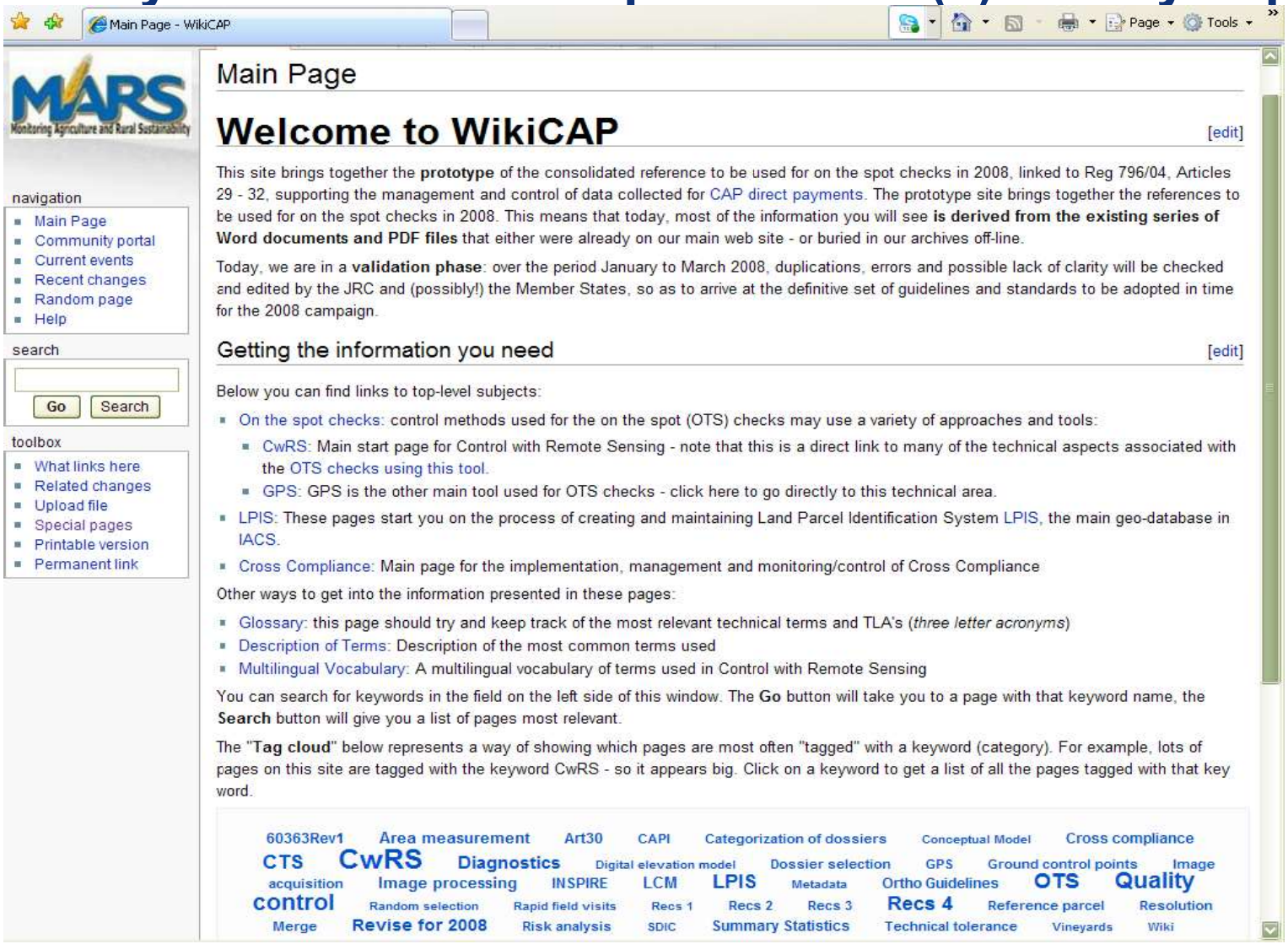
3.2.1. The system for identification of agricultural parcels indicated in point (b) of Art.18(1) the Council Reg (EC) No 1782/2003, also known as LPIS, is the main subject of the modelling efforts. It is part of IACS and it is closely related to other modules. It is often implemented as an independent state register. It has GI content and according to the Art. 20(1) Council Reg (EC) No 1782/2003

> shall be established on the basis of maps or land registry documents or other cartographic references. Use shall be made of computerized geographical information system (GIS) techniques including preferably aerial or spatial orthoimagery, with a homogenous standard guaranteeing accuracy at least equivalent to cartography at a scale of 1:10000
>
> Art 6 (1) of the Comm Reg (EC) No 796/2004
> The GIS shall operate on the basis of a national geodetic system.

3.2.2. The Regulations specify the main purposes of LPIS, which are (i) identification and location of agricultural parcel (ii) determination of area eligible for payment and (iii) furnishing of the farmer's aid application with map information as referred in two following citations[2]:

> Art 12(3) of the Comm Reg (EC) No 796/2004 establishes that:

Different ways to document requirements: (2) e-Encyclopedia



Different ways to document requirements: (3) Database

Annex III. Structure of Requirements' database

LPIS REQUIREMENTS
DATABASE STRUCTURE

Table 1. REG_requir

Table 2. REC_requir

NAME	DESCIPTION	CODE_LIST	TYPE
REQ_AREA	Requerement type	REG- regulatory requirement; REC- recommendation;	code_list
REQ_NR	sequential number for each type		integer
REQ_TYPE	requirement area	FUN- functional requirement; TEC -technical (non-functional) requirement;	code_list
REQ_UID	Complex string -REQ_AREA + REQ_NR + (if applic) REQ_TYPE		text
DECRIPTION	Requirement description		text
REQ_REF	Reference to regulatory/guidlines document		text
CIT_UID	Citation unique identifier (applic for regulatory requirements) in table Regulatory_CIT		text

Managing of the requirements
Example: change in requirement

The Commission Regulation (EC) No 796/2004 Art 2

(1a) 'Agricultural parcel': shall mean a continuous area of land on which a single **crop group** is cultivated by a single farmer. However, where a separate declaration of the use of an area is required in the context of this Regulation that specific use shall further limit the agricultural parcel;

1. Changes in application process? -> New rules for farmer sketch
2. Changes in LPIS code data layer? -> New specification for operator; update cycle
3. Changes in operator application -> New tool for coding during digitalisation
4. New control procedure? -> New guidelines for inspector

Allocate recourses - nominate responsible - establish deadline

Quality Assurance (QA) continued…

2. Data governance - management of data quality

consists of

- Establishing of the Conformance quality level
- Planning*of quality assessment **(inspections)** for the data
- Reporting data quality

*Planning **quality assessment** for the data means establishing of quality assessment frequency and setting up reporting **benchmarks** for different types of data sets

DATA Quality Assessment

A tool for quality policy

ISO standards for GI DATA Quality:

ISO 19113 Quality principals for geographic datasets

ISO 19114 Quality evaluation procedures

ISO 19115 Metadata

ISO 19138 standard providing methodology for Data quality measures

Quality Inspection (assessment)

- a recurrent activity
- both the QC and QA strategies use quality test (assessment)

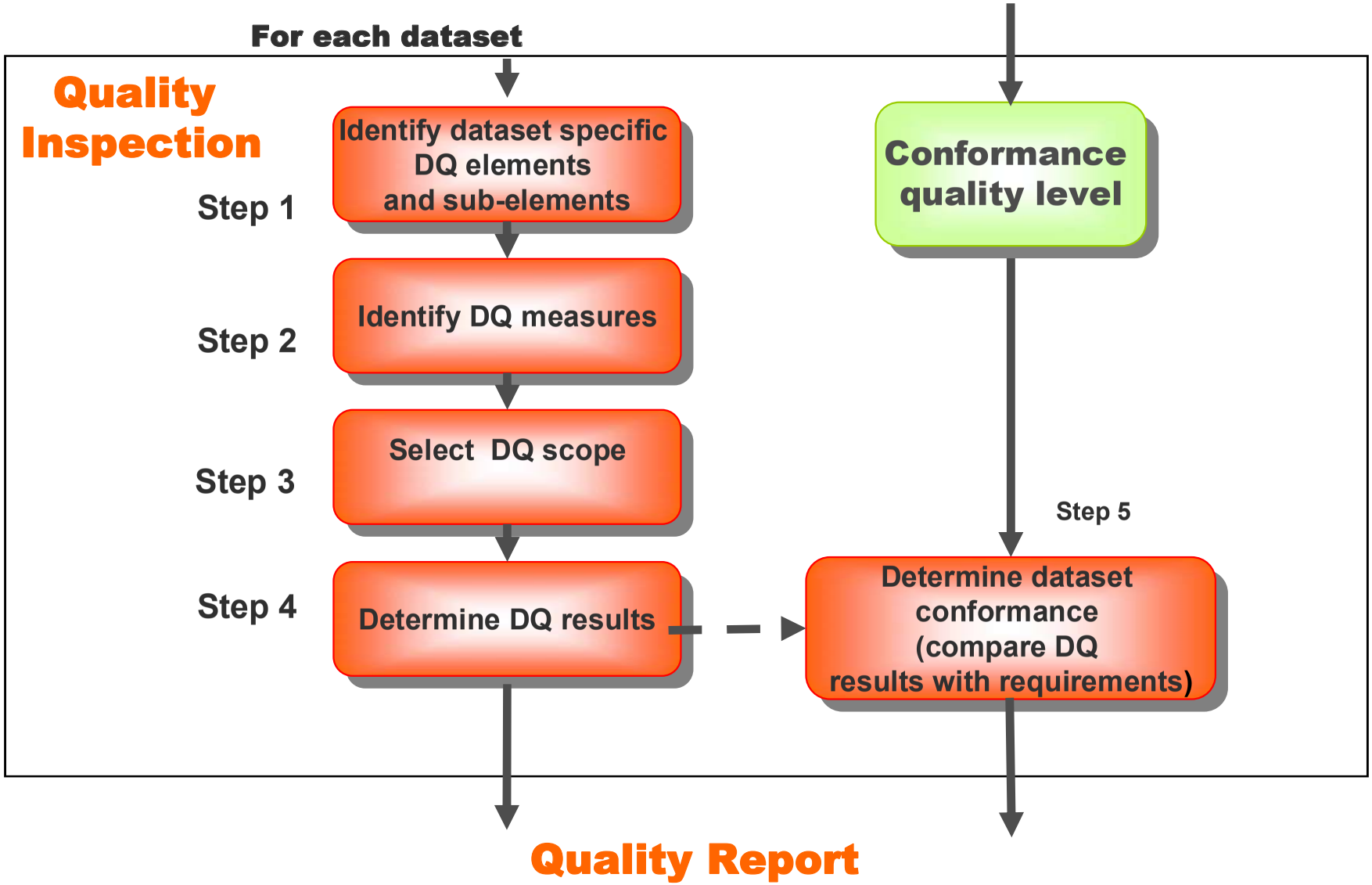
consists of:

- a sequence of steps to produce quality evaluation procedures

and

- report results quality evaluation report


Requirements and Specifications
Conformance quality level
Quality evaluation plan
Data sets
Fail
Quality Inspection: Quality procedures
Quality Inspection: Quality report
PASS


For each dataset
Quality Inspection
Step 1
Identify dataset specific DQ elements and sub-elements
Step 2
Identify DQ measures
Step 3
Select DQ scope
Step 4
Determine DQ results
Conformance quality level
Step 5
Determine dataset conformance (compare DQ results with requirements)
Quality Report

Step 1. Identify Dataset Specific DQ elements

Data Quality Element	Data Quality Sub-elements
completeness	commission/ omission
logical consistency	conceptual consistency codelist consistency format consistency topological consistency
positional accuracy	absolute or external accuracy relative or internal accuracy gridded data position accuracy classification correctness
thematic accuracy	non-quantitative attribute correctness quantitative attribute accuracy
temporal accuracy	accuracy of a time measurement temporal consistency temporal validity

ISO 19113

Example:	**For data set:**	**Reference parcels**
	DQ element:	**completeness**
	DQ sub-elements:	**commission/omission**

Step 2. Specify DQ measure(s)

number of excess polygons/number of missing polygons

% of excess polygons / % of missing polygons in dataset

Step 3. Apply DQ scope

full inspection

sampling

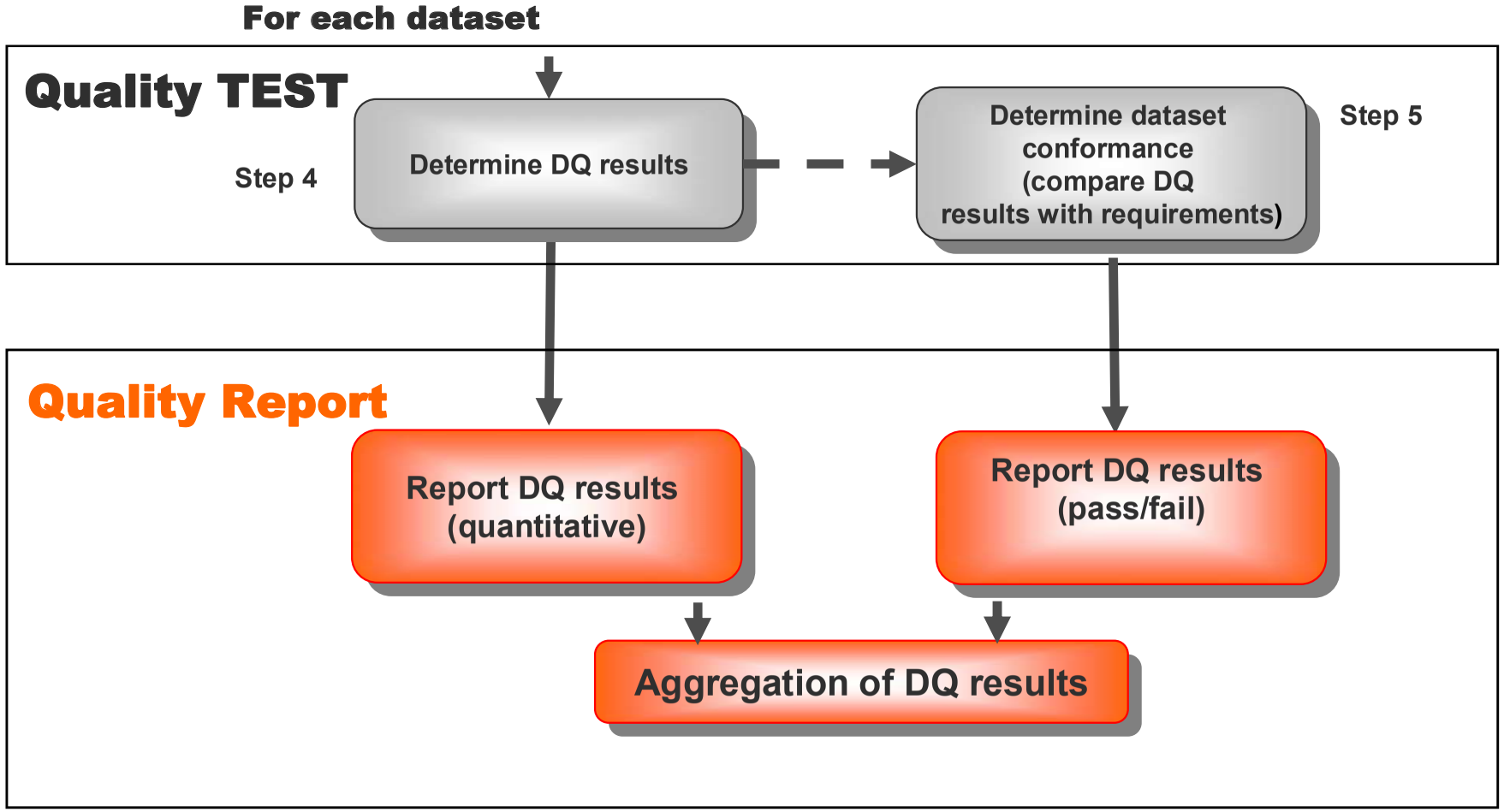
Step 4. Determine DQ results

all evidences of anomalies (excess/missing polygons) are flagged and counted;

total inspection value or set of values is determined

Step 5. Data set conformance

inspection value or set of values from step 4 compared to ***conformance quality level*** - a threshold value(s) for data which has being specified by dataset specification or regulatory requirements


For each dataset
Quality TEST
Step 4
Determine DQ results
Determine dataset conformance (compare DQ results with requirements)
Step 5
Quality Report
Report DQ results (quantitative)
Report DQ results (pass/fail)
Aggregation of DQ results

- combines quality results from data quality evaluations based on different data quality elements and sub-elements, obtained by quality test(s) and methods. There are several way of aggregations the meaning of which should be clearly understood before drawing conclusions

100% pass/fail

$AR = V_1 \times V_2 \times V_3$,
where V_1, V_2 and V_3 DQ evaluation results

Weighted pass/fail

$AR = w_1V_1 \times w_2V_2 \times w_3V_3$

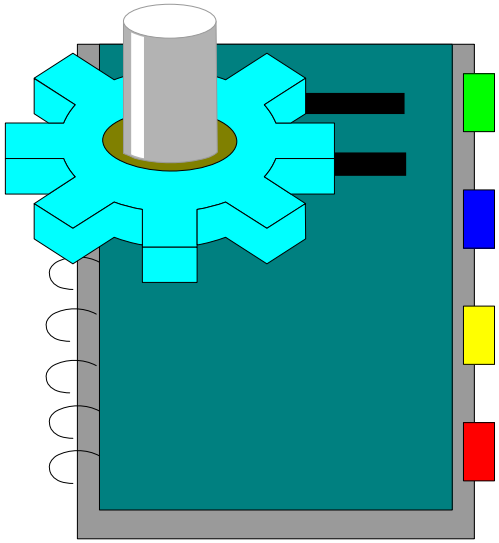
Subset of result sufficient for product purpose

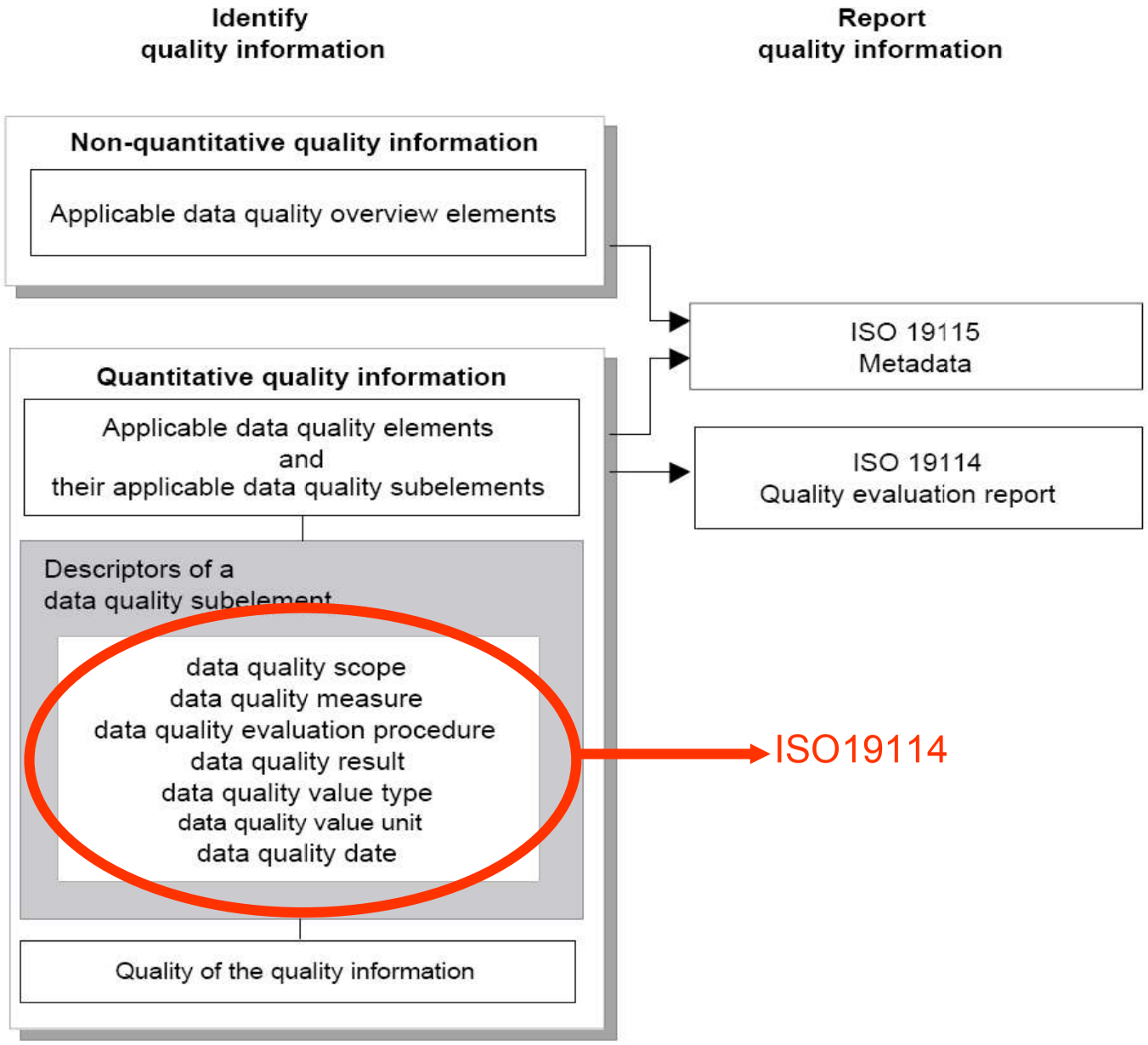
100% pass/fail aggregation for selected DQ evaluation results, when applied selection of DQ evaluation results shall be documented

Maximum/minimum value

Each data quality result is given value based on its significance (by default 1) and AR determined as max (or min) of scores

Quality Metadata
-as part of LPIS Metadata




Identify quality information
Report quality information
Non-quantitative quality information
Applicable data quality overview elements
Quantitative quality information
Applicable data quality elements and their applicable data quality subelements
Descriptors of a data quality subelement
data quality scope
data quality measure
data quality evaluation procedure
data quality result
data quality value type
data quality value unit
data quality date
Quality of the quality information
ISO 19115 Metadata
ISO 19114 Quality evaluation report
ISO19114

Examples of data quality positional accuracy measures (ISO 19114)

Data quality component	*Example 23*	*Example 24*	*Example 25*
DQ_Scope	All gridded elevation point data of DEM in the dataset	All gridded elevation point data of DEM in the area bounded by longitudes +139 +140 and latitudes +36,0 +37,0	All gridded elevation point data of DEM in the city of Bangkok, Thailand.
DQ_Element	3 – positional accuracy	3 – positional accuracy	3 – positional accuracy
DQ_Subelement	3 – gridded data position accuracy	3 – gridded data position accuracy	3 – gridded data position accuracy
DQ_Measure			
DQ_MeasureDesc	RMSE	Percentage of items with coordinate error greater than specification limit	Pass-fail
DQ_MeasureID	30301	30302	30303
DQ_EvalMethod			
DQ_EvalMethodType	2 – external	2 – external	2 – external
DQ_EvalMethodDesc	For each gridded point, measure the difference between absolute height value of the point in the dataset and that in the universe of discourse. Compute RMSE from the height differences.	For each gridded point, measure the difference between absolute height value of the point in the dataset and that in the universe of discourse. Count the number of the points whose height difference exceeds the specification limit (e.g.1 m). Divide the number of the non-conforming points by the number of the points in the data quality scope. Multiply the result by 100.	For each gridded point, measure the difference between absolute height value of the point in the dataset and that in the universe of discourse. Count the number of the points whose height difference exceeds the specification limit (e.g.1 m). Divide the number of the non-conforming points by the number of the points in the data quality scope and multiply the ratio by 100. Compare the percentage of the non-conforming points against the conformance quality level.
DQ_QualityResult			
DQ_ValueType	2 - number	4 - Percentage	1 – Boolean variable
DQ_Value	0,8 metre	8%	False
DQ_ValueUnit	metre	Percent of points with height error greater than the specification limit.	N.A.
DQ_Date	2000-03-06	2000-03-06	2000-03-06
DQ_ConformanceLevel	Not specified.	Not specified.	Less than 5 percent of items may have height error greater than specification limit
Example dataset parameters	Omitted	Omitted	Omitted
Example quality result meaning	RMSE of height is 0,8 m. Since conformance quality level is not specified, only the RMSE is reported	8 percent of the gridded points within the data quality scope have height error more than 1 metre. Since conformance quality level is not specified, only the percentage is reported	Dataset fails. Percentage of non conforming points exceeds the conformance quality level

Example: CR796/2004 art 6.2

DQ_Scope: reference parcels subject to aid application
- DQ_Element: thematic accuracy
  - DQ_SubElement: quantitative attribute accuracy
    - DQ_MeasureDesc: compare eligible land versus reference parcel area for the 75 percentile
    - DQ_EvalMethodType: 2 - external (direct)/ sampling
    - DQ_EvalMethodDesc: via “statistical methods”
    - DQ_ValueType: 4 - percentage
- DQ_Results
  - DQ_Value: 95 %
  - DQ_ValueType 4-percentage

DQ_Date: 2005-01-01

DQ_ConformanceLevel 90% (specified CR796/2004 art 6.2)

- What are the advantages of QA framework over the current system– will it facilitate quality inspections by Commission

- What are components, which are easily targeted and already in place?

- What needs to be done? Proposal for a path.

To DO List

- Implement Quality Assurance as prime strategy for MS
- Manage the requirements
- Formalise quality data governance (an agreement between EC and MS)
- Provide Quality Metadata records on regular basis as part of LPIS Metadata application

Thank you for your attention!