Reliability of the Italian cadastral system
data quality and improvement prospects

Eng. Franco MAGGIO
(Central Director for Cadastral, Cartographic and Land Registration Services)

Eng. Arturo ANGELINI
(Responsible for the Cadastral Operating Methodologies Office)
Agenda

Reliability of the Italian cadastral system

*data quality and improvement prospects*

Data quality characteristics and critical issues

The main data quality improvement activities put in place
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The cadastral information system

It is the component of the Organizing System of the Italian Cadastral Administration that manages the related informative processes.

The cadastral data

It is the informative element of the system: a complex entity consisting of several components different in nature: *technical, economical, juridical, descriptive, geometrical, graphical.*
Data quality characteristics and critical issues

- **COMPLETENESS** – the presence in the DBs of all the expected information is necessary for a correct understanding
- **ACCURACY** – information has to be accurate and consistent with each other
- **UPDATING** – information has to be constantly updated in order to make it useful

The RELIABILITY of the Italian cadastral system is the aptitude to produce over time integrated, consistent and updated information without errors
CRITICAL ISSUE – The Origin

- 22 different Cadastres, only 8 of which based on geometrical data

1. Uniform principles and procedures for the whole national territory
2. Based on geometrical data (parcel based with regard to its shape, size and georeference)
3. Equalization of land taxation

CRITICAL ISSUE – Time necessary for the implementation

1886 Set up
1939 Set up
1956 Start of maintenance
1962 Start of maintenance
CRITICAL ISSUE – The structure and the contents of the cadastral archives

Comprises four archives which are different in nature (alphanumerical or graphic)

**LAND CADASTRE**
- CENSUS ARCHIVE includes technical and descriptive data related to the rural parcels
- CARTOGRAPHIC ARCHIVE includes about 300,000 maps in vector format (344,000 cartographic files)

**URBAN BUILDING CADASTRE**
- CENSUS ARCHIVE includes technical and descriptive data related to the real estate urban units
- PLANS ARCHIVE includes graphic information (plans) related to each real estate urban unit

**LAND (parcels)**
- about 85,5 millions of cadastral parcels

**URBAN BUILDING (buildings)**
- about 73,5 millions of buildings or parts of them
CRITICAL ISSUE – Updating based on the owner declaration

Updating is essentially delegated to real estate or land owners, through technical professionals qualified to draft cadastral updating documents.
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Some of the main activities put in place

a. The identification of “hidden buildings”

b. Activation of the “Register of Holders (AdT)”

c. The national archive of urban streets and house numbers “ANNCSU”

d. Rural buildings to be registered at Urban Building Cadastre

e. Improvement of the quality of the cadastral mapping system
The identification of “hidden buildings”

Automatic identification of buildings not declared to cadastre

Results

- Increase of 825 Milions of € in cadastral income
- Ascription of cadastral income to 1,261,000 real estate units
  - 769 thousands with final value
  - 492 thousands with temporary value
- 7,759 Municipalities involved in detection and regularisation activities
- 2,228,000 Cadastral Parcels detected and come out
The **Register of Holders (AdT)** is part of a wider project for the implementation of the **Integrated Real Estate Register (A.I.I.)**

The main purposes of the activation of the **Integrated Real Estate Register** are the:

- full **integration of the databases** available to the Agency made and historically managed as different systems
- to provide effective support to the general and local real estate taxation, to **correctly identify** **OBJECT** and **SUBJECT**

1. It allows to define the **correct identification of the subjects** holding title to a property for tax purposes

2. improves **data quality** through the qualified representation of their relationships and the full integration of cadastral and land registry archives
The national archive of urban streets and house numbers “ANNCSU”

First **ANSC** establishment, which contains the Street names’ registers of all the Italian Municipalities, was initially carried out on the basis of toponyms contained in the addresses of the housing units registered in the cadastral database, integrated with external sources.

**From ANSC to ANNCSU** (House Numbers and Street Names National Register)

- **Address Archive SGR**: 11.5 millions
- **Address Archive EDI**: 9.5 millions
- **Address Archive RNC**: 9.5 millions
- **Address Archive ANSC (7,585+509) municipalities**: 16.6 millions

**Integrated Archive of street numbers of all the Municipalities**: (more than 26 millions)

**Activity of linkage**

**Strengthening of ANSC in ANNCSU**, through the integration of the archives.
Rural buildings to be registered at Urban Building Cadastre

• Till 1994 the **Rural Buildings** were registered only in the Land Cadastre (representation in the map and description of use)

• By Law n. 133 of 1994 the registration of the Rural Building in the Urban Building Cadastre (that took the name of comprehensive **BUILDINGS CADASTRE**) was provided.

• In order to put in evidence the "rural character" of a building registered in the Buildings Cadastre, for the fiscal advantages close connected to this condition, the law by decree n. 201 of 2011 provided a specific cadastral annotation for the buildings under this condition.

• In order to press the owner for the declaration (mandatory) to the Buildings Cadastre of the Rural Buildings, the Cadastral Administration carried out several communication at national, regional and provincial level.
Till 1998 the rural buildings registered only in the Land Cadastre were about 5,5 millions

At the beginning of 2011, the rural buildings still registered only in the Land Cadastre were more than 3,2 millions

After the coming into force of the law by decree n. 201 of 2011, this number was constantly decreasing:
- 2,5 millions in 2012
- 2,2 millions in 2013
- 1,8 millions at the end of 2016
- 1,3 millions at the end of 2017
- 0,9 millions at October 2018

The rapid decrease observed in the last years depends both from the owners declarations and from activities carried out by the cadastral Administration in order to remove errors in the cadastral DBs
The project activities are aimed at overcoming some critical issues arising from:

- the process of creating the original (historical) maps
- paper cartography computerisation phase
Improvement of the quality of the cadastral mapping system

Evolving projects of the cadastral cartographic system

The carrying out of these activities makes completely usable and interoperable the cartographic information required for achieving the fiscal policy objectives and for the land management policies

The main undertaken projects:

1. Recovery of maps accuracy and topological consistency between adjoining maps

2. Remaking of the cartography in the Lombardia Region
Evolving projects of the cadastral cartographic system
Recovery of maps accuracy and topological consistency between adjoining maps

Causes
The transposing of the cadastral cartography from paper to a digital format, carried out through the acquisition of the cadastral maps raster images, then digitalised to get related files in vector format, caused a deterioration of the map precision, making it necessary to recover the distortions of vector maps.

Goals
 Improve the QUALITY of cartography
 Improve the usability of WMS services and the “Geoportal”

PROJECT ACTIVITIES

Removal of the distortions existing in the digital vector maps

Step 1
Distortions adjustment of the original maps – geo-referencing of the original maps

Step 2
Accuracy recovery of the digital vector maps through calibration on the original maps

Creation of the topological consistency between adjoining maps

Step 3
Automatic creation of the topological consistency between adjoining maps using the raster images of the original maps
Evolving projects of the cadastral cartographic system

Recovery of maps accuracy and topological consistency between adjoining maps

1 Overlapping of the vector map file on the original map before the calibration

2 Overlapping of the vector map files on the original maps before the topological consistency recovery

1 Overlapping of the vector map file on the original map after the calibration

2 Overlapping of the vector map files on the original maps after the topological consistency recovery
Evolving projects of the cadastral cartographic system

Remaking of the cartography in the Lombardy Region

Causes

About 15,000 cadastral maps coming from the cadastres existing before the unification of Italy, included in some Provinces of Lombardy, made using the open perimeter system, not referred to any reference points network and surveyed through the plane table, oriented to the North through a compass.

Goals

To create a new cadastral cartography in these territories

Improve the QUALITY of cartography

Improve the usability of WMS services and the “Geoportal”

Grundbuch system

Ordinary cadastral maps (parcel with close perimeter)

Pre - Unification maps (parcel with open perimeter)

Availability of maps derived by aero photogrammetry in the '90, but not yet under the maintenance phase

Availability of maps derived by aero photogrammetry in the '80, but not yet under the maintenance phase

Availability of maps surveyed on the ground in the '70, but not yet under the maintenance phase
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Many thanks for your kind attention