

Improving cadastral data quality

1. Component A: Restructuring data on possessors of parts of cadastral parcels

1.1. Background

The Croatian land cadastre originates from the four partly different systems: Austrian, Hungarian, Italian and French. Their legacy is reflected in the different ways of creating and maintaining municipal cadastral documentation, in terms of both its content and organisation.

In the former Yugoslavia, singular legislation was in place in Croatia, which however allowed an ambiguity in the way co-ownership (co-possession) of the cadastral parcel was registered and maintained.

In the process of municipal cadastral documentation and land register establishment, co-ownership is registered in the cadastre and land register as fractions describing the owners' ideal parts, the sum of which makes the whole unit. Unlike land registers, which constitute and maintain the legal status of real property, the cadastre's primary purpose in the former Yugoslavia was fiscal (e.g. taxation of agricultural land, tax exemptions due to welfare benefits). For this reason, it was the possessors who were registered as rightsholders in municipal cadastral documentation, as persons using the land, who could be different from the owners.

In accordance with this, municipal cadastral documentation is organised into possessory sheets, with one possessory sheet containing all lands that a possessor has in a cadastral municipality.

Cases of co-possession were resolved through co-possessors' possessory sheets, where all users jointly using a parcel of land were listed.

Certain procedures for harmonising the actual and the registered situation – reviewing the state of possession and land use – allowed registration in municipal cadastral documentation of a part of a co-possessed cadastral parcel as a physically separate unit used by one user, by means of registering the possession of the so-called **PART** of a parcel, which was registered as such in the owner's possessory sheet.

This made it possible to register the complete possession of a person in a cadastral municipality on a single possessory sheet, which thus contained all cadastral parcels where the person was the only possessor (1/1), as well as those where the person possessed only a certain part, with a calculation (in most cases estimated) of that part's surface area, along with a special designation – "**PART**".

Applying this methodology, depending on their historical records, some cadastral offices registered parts of cadastral parcels in possessory sheets even in cases when such parts did not make separate units, but were merely expressions of the share of the surface area's ideal part. With the introduction of digitisation in the work of cadastral offices, which was carried out autonomously on office level, the existing data on possessors were initially taken over. Today, however, Croatia is changing the fiscal role of the land cadastre by introducing the ownership-based real property cadastre, which is fully harmonised with the land registry and should result in a new way of maintaining real property data in the Real Property Registration and Cadastre Joint Information System (JIS).

Real Property Registration and Cadastre Project

The establishment of the JIS is the fundamental project related to maintaining real property records in Croatia, one that should lead to increasing legal security in real property transactions and broader application of rights related to real property facilitating business activities. Along with some donations and EU funds, the project is mainly funded by the World Bank. It has two aspects:

- introducing new, centralised IT platform onto which all existing data from LR and cadastral offices are migrated and which enables their maintenance in the existing separate data structure;
- enabling the establishment and maintenance of the Land Database (LDB) in accordance with electronic data processing and the jurisdictions of the land registry and cadastre.

The JIS includes two categories of land registry and cadastral data:

- a) harmonised data maintained in the LDB where there is no redundancy in data on rightsholders and cadastral parcels;
- b) separate land registry and land cadastre records that yet need to be harmonised and migrated into the LDB.

Data quality is the major problem of the JIS as less than 20% of data has been harmonised so far, those resulting from new cadastral surveys and technical reambulments, as well as the procedures of land register establishment. Those procedures are lengthy and financially demanding. Since they are necessarily financed using public funds (state budget and local government), they cannot be considered the only way of data improvement.

Therefore, there are several projects in parallel that should enable quicker and cheaper data migration into the LDB, of which the most important are the following:

1. *Sporadic Transformation of Land Registry and Cadastral Data Project (Component 1 IPA-ILAS/MoJ)*

This project is being pilot-implemented in 240 selected cadastral municipalities where records are kept separately, with the following objectives:

- compare data on cadastral parcels and owners in the land register and cadastre;

- check the identity and similarity of the content;
- depending on the criteria, identify the three groups of parcels:
 - group A, where transformation into the LDB can be done automatically, ex officio;
 - group B, where additional manual activities are necessary and involving clients to transform parcels into the LDB;
 - group C, where the comparison is not possible or special activities are necessary;
- carry out ex officio sporadic transformation for group A parcels, and prepare descriptions of differences for group B, including the activities necessary to remove them;
- develop an applicative solution using which the procedure above can be implemented in the remaining cadastral municipalities not covered by the pilot-project.

2. DCM Homogenisation Project (Component 1 IPA-ILAS/SGA)

The importance of this project is rather high, as the homogenised digital cadastral map of a municipality is a precondition to maintain and manage its data in the real property cadastre, which is also a precondition to allow sporadic transformation into the LDB.

- This project is implemented in a pilot-area covering 106 cadastral municipalities, one of its results being technical specifications for the homogenisation procedure as a basis for carrying out homogenisation within the World Bank loan for the rest of Croatian territory.
- After the homogenisation, the quality of digital cadastral map maintenance will be improved, by introducing a unique procedure on the entire Croatian territory, followed by a harmonisation of the cadastral and land registry situation through individual geodetic reports.

As part of the IPA-ILAS Project (1) above, relation of comparable data existing in both cadastral and land registry records is analysed, with the most important criteria applied as follows:

- parcels' surface areas in the land register and cadastre are within certain tolerance;
- parcels' development status is identical in both records;
- ownership registered in the land register and possession registered in the cadastre is identical or within the limits of tolerance, as well as data on persons.

As described in the introduction, if the cadastral data on possessors are maintained by having parts of cadastral parcels registered in possessory sheets, such comparison is not possible.

In such a case, those cadastral parcels cannot be included in category A, where ex officio sporadic transformation is planned.

A current analysis of cadastral parcel data, based on the 90% of data not exported into the JIS, shows that 13,617,696 parcels are registered in a total of 2,733,965 possessory sheets, out of which:

- the number of cadastral parcels registered in single-owner possessory sheets (1/1) is 9,653,696;
- the number of cadastral parcels registered in possessory sheets with co-ownership shares is 2,604,223;
- **the number of cadastral parcels registered on several possessory sheets is 1,359,249 (9.98%).**

Therefore, nearly 10% of cadastral parcels cannot meet the precondition of comparison and transformation into the LDB ex officio, even though they may meet the identity criterion.

1.2. Project objective

The objective of the project of restructuring data on possessors of parts of cadastral parcels in the cadastral records is to identify cadastral parcel registrations by parts and check whether they meet the criteria to replace the existing registration by cadastral parcel parts with the registration of co-possession, i.e. co-ownership.

As a result, cadastral parcels will be created with shares of co-possession (co-ownership) that will need to be registered in the newly-formed possessory sheets, and lists of possessory sheets with existing registrations of cadastral parcel parts to be written off.

To carry out the planned changes of registration, the Consultant needs to conduct an analysis of the existing regulations and propose a procedure to implement municipal cadastral documentation changes.

That would, with regard to the legal fact of one cadastral parcel being used by several persons, replace the existing system of keeping records with calculations of surface areas of parcel parts with a system of maintaining such cadastral parcels in co-possessory (co-ownership) sheets that would contain registrations of all co-possessors, i.e. co-owners, with their shares of the total surface area.

The Consultant will investigate the parcels in cadastre and

- Identify all possible parcels in the set with potential co-possession;
- Compare these data with data on co-ownership in land registry for the same parcel (where possible);
- Prepare the list of parcels where cadastral records can be modified to comply with corresponding land registry data;
- Prepare the procedures for implementing proposed changes in original cadastral data by cadastral offices.

1.3. Scope of work and tasks

The main activities on the proposed project are the following:

1.3.1. Initial analysis of data on parcel parts

The analysis is conducted through a computer check of all cadastral parcels in a cadastral municipality maintained by parts, and through checking formal conditions to merge the parts into a whole parcel (checking the sum of surface areas and possible differences). Analysis will be conducted for all cadastral municipalities in the Republic of Croatia containing cadastral parcels maintained by parts.

The Consultant shall specify the data required for the comparison and describe the content and format of the data that he/she needs to obtain from the Client. This input data are obtained by export from the existing municipal cadastral documentation and are delivered to the Consultant according to the agreed tempo in digital format by using standard exchange formats (csv, xls,...).

A recapitulation of the number of cadastral parcel parts to be merged is provided for the cadastral municipality, the number of possessory sheets to be written off, and the number of possessory sheets that need to be established to register the possessors and their co-ownership shares.

The procedure needs to be defined of assigning new possessory sheet numbers, whether to continue the municipal cadastral documentation numbering or assign special designations if necessary.

In addition, the analysis will result in a proposal for newly-formed possessory sheets with co-owners, segregating those possessory sheets where such ex officio merger cannot be recommended for some reason (e.g. creating a possessory sheet with an exceptionally big number of co-owners).

1.3.2. Specifications for implementing ex officio changes

The analysis shall be conducted on data from the Central Cadastral Data Repository, which is maintained at the SGA and updated on a daily basis. Those data will also be used for creating modified data on possessory sheets that are ready for use. Based on those data, the implementation shall be done on original locations where data are maintained, in regional and branch cadastral offices.

The Consultant shall conduct an analysis of the possibility to implement changes in the registration of cadastral parcel parts in municipal cadastral documentation, taking into account as follows:

- In principle, the changes should be implemented ex officio;
- Parties (current registered users) should be notified of the change;
- Cases requiring a consent or supplementation by the party should be investigated.

The proposed procedure must be harmonised from the legal point of view with the existing legislation or rather proposals about the changes and amendments should also be given, if necessary, for certain options.

To summarize:

Identifying the set of parcels where co-possession is expressed as a portion of area of the same parcel written in two or more possessory sheets can be unambiguously replaced with one record of co-possession expressed by ratio, Consultant will propose the procedure how to carry out proposed changes by cadastral offices in the simplest manner, *ex officio*, without calling the clients to come personally into the office.

1.3.3. Implementing the solution

This project is aimed at a one-off and systematic improvement of data carried out in coordination with regional cadastral offices.

Consultant will develop an appropriate software tool (the program solution for analysis and monitoring of the procedure) with main functionalities:

- To identify all possible parcels in the given entry data set with potential co-possession;
- Comparison of these data with data on co-ownership in land registry
- Prepare the list of parcels in the entry set where cadastral records can be modified to comply with corresponding land registry data with type of possible action (*ex officio*, UP/I, or not possible)
- Producing appropriate lists and extracts
- Quality control measures of work in tasks assigned to designated regional cadastral office employees are included in SW solution and standardized

The program solution for analysis and monitoring of the procedure is centralised and WEB-based, with implementation at the SGA Central Office.

1.3.4. Deliverables

The Consultant shall prepare and submit the following reports in the format and content agreed with the Client:

- Inception report filed within two weeks from the starting date of the contract and containing the work plan and initial outputs as well as the sequence of data analysis by RCO;
- Monthly progress workshop conclusions that include a description of completed activities and results of working on data for particular RCOs;

- Database with cadastral parcel parts analysis, containing the original data with results of potential mergers, with a possibility to view, search, print out and export data into Excel tables, together with the program solution for analysis and monitoring from Clause 3.3;
- Final report covering:
 - Brief summary of the work performed,
 - List of cadastral parcels maintained by parts that meet the criteria to be maintained in co-possessors' possessory sheets (description with examples, full content delivered in digital form);
 - List of cadastral parcels maintained by parts that do not meet the criteria for merger (description with examples, full content delivered in digital form);
 - List of proposed changes by possessory sheets: parts to be added/written off (description with examples, full content delivered in digital form);
 - analysis of municipal cadastral documentation restructuring options;
- Presentation of Draft Final Report to the Client's representatives on their premises.

The official languages of the main reports are suggested to be Croatian and English.

All draft reports will be delivered by electronic mail in open format (Word document) to the Client's representatives for approval.

The deadline for the Client to review draft reports and send comments is maximum 2 weeks. The deadline to submit the updated report is maximum 2 weeks. After approval, reports will be submitted in digital form, in an open format (Word document), on paper, in one printed copy.

1.3.5. Project results

- After this restructuring, interested parties will get the possibility to have their real property harmonised and transformed into the LDB ex officio, thereby adding to their value.
- With this restructuring, registrations of possession, i.e. ownership of cadastral parcels are transformed into the same structure as in the land registers, the new-survey municipal cadastral documentation and, finally, the LDB.
- Transformation into the standard structure can be done automatically and without changing or losing any of the rights of interested parties.
- The new structure is compatible with the land register, enabling the implementation of all legal changes originating from the land register.
- The project eliminates the situation where co-ownership is replaced by maintaining cadastral parcel parts in different possessory sheets, which provided ground for manipulations in the real property market.

Improving cadastral data quality

2. Component B: Regulating the data on State assets

2.1. Background

Since its creation, the Republic of Croatia has attempted to establish and keep unified and comprehensive records on State assets, especially in the part relating to the real properties, recognised after the proclamation of independence as being inherited from the former communal ownership and later extended also to the assets of companies that were founded, owned or co-owned by the RoC and in which such title has been established in various ways (e.g. inheritance or closure of companies or other legal entities, bankruptcies, seizures et al.).

After the dissolution of communal ownership and through privatising and modernizing the land registry and cadastral system in the legislative, organisational and technological terms as well as by restructuring the local government and self-government systems, significant progress has been made in the manner of recording assets but the quality and, first and foremost, the up-to-datedness of data has not sufficiently followed the afore-mentioned changes in such a way as to allow the RoC assets (hereby we refer to the real property) to be easily and unequivocally identified.

Several attempts at establishing the State Assets Register have not yielded the desired results while the current state is, as a rule, based on the obligation, will or information of the State asset users to report on their own its use to a central point and, equally, changes to status or attributes of the recorded real properties are collected by periodical reporting.

The cadastre has often faced queries from the State bodies or local self-government units to submit the data on the State assets identified from the existing databases according to certain criteria linked to the name of the user or owner but such mechanical tasks are limited precisely by their exactness: incomplete results are obtained that match exactly the set sample but not the various variants of the registration of such a name in cadastral records.

It should be mentioned that (in accordance with the stipulated content of cadastral records) there is no unique identification of all persons for whom the data is kept because the PIN, that would allow it, is just in the phase of being collected.

On the other hand, the link URCN-PIN (unique register citizen's number-personal identification number) is, as a rule, useful with private persons but not the legal entities since URCN was in the past assigned primarily to the household holders who were also liable to cadastral income tax.

In case of regulated and harmonised land registry and cadastral records that would be based on the data that has all been transferred into the Land Database (LDB) as part of the Real Property Registration and Cadastre Joint Information System (JIS)

and, with the registered PIN, with all title holder where the data would be obtained in a simple and exact manner.

However, this is still not the case nor can it be regulated short-term so work is to be done on such data to be regulated for today's needs in order to respond to certain State requests (GAMSA, real property tax...).

Given that the **cadastre** keeps and maintains up-to-date records of all lands in Croatia **in digital format** through two basic datasets: graphic that, on cadastral maps, indicates the position and form of a cadastral parcel, and alphanumerical where descriptive data on cadastral parcels is kept as well as the **data on possessors**, it is possible to use this data for a particular analysis of its content that would enable the data on the name of the possessor for State asset parcels to be identified and regulated.

2.2. Project objective

The objective of the project of regulating the data on State assets in cadastral records is to, by systematically analysing the data on the users, identify the legal entities recorded as possessors of State assets (SA), to standardise their name and manner of writing the name, remove grammatical and other errors and determine the current data on address and name.

After the analysis and completed standardisation, the results obtained would be submitted to the title holders for inspection and verification which would, after obtaining a feedback, enable the name corrections to be implemented in the cadastre ex officio.

The data analysis and processing should be implemented systematically for the data from all cadastral offices while the result should be implemented in the cadastral records in a manner which would be most efficient in terms of duration, price and complexity.

Possessors (or rather: users) recorded in cadastral records of interest for this project are those recorded as legal entities for which, by analysing the content of registrations, the following sub-sets should be determined:

- a) Possessors that are State bodies or institutions, or the State itself recorded as the Republic of Croatia, along with all its name variants,
- b) Potential possessors from the group of State bodies or institutions, primarily those that used to exist but now no longer (FPRY, former SIZ /self-governed interest community/ and other organisations...)
- c) Possessors that are State companies delegated to manage the real properties where they are recorded (Croatian Forests, Croatian Waterways...)
- d) Local self-government recorded as possessor in the cadastre,

e) Other possessors.

Thereby all combinations of name and title variants are determined for groups (a) through (d).

The project objective is to conduct an analysis of the data to enable the identification of identical possessors, assign the current name and address to each of them and, through these criteria, also identify the State assets they possess.

2.3. Scope of work and tasks

The main activities on the proposed project are the following:

2.3.1. Initial data analysis on the possessor (user) names

The name analysis shall be conducted on the data from the cadastral municipal documentation of the initially selected cadastral offices. The Consultant shall specify the data required for the comparison and describe the content and format of the data that he/she needs to obtain from the Client. This input data are obtained by export from the existing municipal cadastral documentation and are delivered to the Consultant according to the agreed tempo in digital format by using standard exchange formats (csv, xls,...).

Thus an initial set of names and their variants typical for a certain setting and tradition should be obtained (including also typing errors, abbreviations, mixed use of capital and small letter, inconsistency in the name et al.).

Based on the results achieved, data analysis for all RCOs will be conducted.

The result of this task is the list of users of State assets by possessory sheet, generated for a particular RCO and grouped by group (a)-(d) described under 2.

2.3.2. Linking different variants of possessors' names (actualisation)

The objective is to group the records on possessors by recognizing the same users and all their variants of recorded names. This linking is performed manually with the help of program support and involves the application of certain criteria when making conclusions whether it involves the same possessors. The result is the list of users of State assets described under 3.1 with the unique name of the user added to the group of records for which it has been established that it relates to the same legal entity. This list is generated for a respective RCO and is grouped according to the groups (a)-(d) under 2, described earlier, within which all records for a particular possessor are listed.

2.3.3. Pairing possessors with the data from external sources

The objective is to subsume various names under one official (that will be determined and double-checked in one of the official records: Commercial Register, PIN, if possible) along with up-to-date data on the possessor's address.

The result is the list of users of State assets that for each of them adds, along with the original data from the possessor's sheet, a unique name of the user to the group of records for which it has been established that it relates to the same legal entity, and the data on that particular legal entity from the Commercial Register and/or PIN Register. This data is stored in a separate database and may be retrieved, viewed and printed, sorted and grouped by various criteria.

2.3.4. Analysis of the implementation options in the cadastral municipal documentation

The results obtained from the previous activities shall yield certain data:

- a) Identification of the possessors of State assets and possessors' sheets where the State assets are recorded,
- b) Name variations for certain possessors of State assets where the sameness could be established,
- c) Current official name of the user or governor or rather the name recorded with the most recent change.

The standardisation of the name of the possessor of the State assets in the cadastral municipal documentation would lead to significant improvements to the data quality that would enable accessing the current state of State assets from the aspect of the cadastre, simplify the search by name leading to comprehensive results and create the preconditions for easier sporadic transformation into the LDB.

Therefore, the Consultant shall perform an analysis of the options to implement the detected improvements and standardise the name of the possessor in the cadastral municipal documentation taking into account that:

- In principle, the changes should be implemented ex officio,
- The parties (current recorded users) should be notified of the change,
- The cases requiring a consent or supplementation by the party should be investigated.

The proposed procedure must be harmonised from the legal point of view with the existing legislation or rather proposals about the changes and amendments should also be given, if necessary, for certain options.

The resulting data describing the corrections of the possessor names will be automatically available for cadastral offices so they can carry on proposed changes in original cadastral data.

Quality control measures of work in tasks assigned to designated regional cadastral office employees are included in SW solution and standardized.

2.3.5. Deliverables

The Consultant shall prepare and submit the following reports in the format and content agreed with the Client:

- Inception report filed within two weeks from the starting date of the contract and containing the work plan and initial outputs as well as the sequence of the data analysis by RCO
- Monthly progress workshops conclusions that include the description of completed activities and results of the pairing activities for certain RCOs and possessors of State assets
- Database of the analysis of possessors of State assets that contains original data of possessory sheets with added standardised names and the official name from the Commercial Register/PIN Register with the option of viewing, searching and printing as well as data export from the Excel table
- Final report covering:
 - Brief summary of the work performed,
 - A list of possessors of State assets by RCO with the added unified name and official name from the Commercial Register/PIN Register,
 - Analysis of the implementation options to standardise names in the cadastral municipal documentation,
- Presentation of Draft Final Report to the Client's representatives on their premises.

The official languages of the main reports are suggested to be Croatian and English.

All draft reports will be delivered by electronic mail in open format (Word document) to the Client's representatives for approval.

The deadline for the Client to review draft reports and send comments is maximum 2 weeks. The deadline to submit the updated report is maximum 2 weeks. After approval, reports will be submitted in digital form, in an open format (Word document), on paper, in one printed copy.

3. Planned duration and Consultant's engagement

The Consultant's involvement is planned to take a total of maximum 6 months from the date of contract signing. The total involvement of the Consultant's staff in the said period is estimated at no more than 270 man/days.

4. Obligations of the Client

The Client will ensure the following to the Consultant:

- Project Manager from the SGA;
- Data, in digital form, on the cadastral parcels maintained by parts on several possessory sheets, by cadastral municipalities, according to the Consultant's specifications defined under 3.1; As a rule, this involves standard data from municipal cadastral documentation.

5. Consultant's Qualifications and Experience

To accomplish the task, it is necessary to hire a Consultant (company or joint venture including several consultants or sub-consultants) with experience in providing services in the field of land administration, with an emphasis on understanding of cadastral data model. The experts must have knowledge in the establishment, management and operation land registry and cadastre systems, and must have proven experience with Croatian Cadastre and data and its history from former Yugoslavia system.

The execution of the required consulting services will be provided by a team of experts who will be engaged for a period of six months. The contracted team of experts will provide the following:

- Team leader for a period of six months - one person, 90 person/days.
- Legal expert - one person, 30 person/days,
- IT expert for data modelling, one person, 90 person/days,
- Cadastral expert, one person, 60 person/days,
- Translators and any other experts proposed and agreed with the Client.

The following skills and experience are needed for key experts:

Team Leader (relevant professional experience):

- Minimum university degree in technical science (land surveying, geoinformatics, mathematics, informatics, electro engineering or similar) with experience working in and establishing the land cadastre on the national level.

- Proven experience in the field of working on land registry and cadastre data for the last 5 years.
- Knowledge of legal requirements of the EU and applicable standards.
- Experience in managing at least two projects related to the field of cadastre.
- Good knowledge of the Croatian system of land administration and the current situation and availability of real estate cadastre and land registry.
- Knowledge of English.

Legal expert (relevant professional experience):

- Minimum university degree in law and at least 10 years of professional experience in the Croatian legal system related to land administration and cadastre.
- Experience in legal matters related to the land registry issues related to civil law.
- Experience in working in the field of land administration in Croatia.

IT expert (relevant professional experience):

- University degree in information technologies, and at least 5 years of working experience in the analysis and design of ICT systems.
- Domain experience in data modelling of real estate cadastre and land registry

Cadastral expert (relevant professional experience):

- Minimum university degree in land surveying
- Proven experience in the field of working on Land Registry and Cadastre data for the last 5 years.
- Knowledge of legal requirements of the EU and applicable standards.
- Good knowledge of the Croatian system of land administration and the current situation and availability of real estate cadastre and land registry.

A consultant will be selected in accordance with the selection of Consultants - Consultant Qualifications (CQ) procedures set out in the World Bank's Guidelines: Selection and Employment of Consultants [under IBRD Loans and IDA Credits & Grants] by World Bank Borrowers (published in January 2011).