



Result Of A Pedagogical Experience On Cadastre: Realization Of The Updating Process Of The Urban Area Formation

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ABSTRACT-

Classroom experience compiled on a case study for the application of cadastre. In the development of this article, the implications of teaching applied in methodological actions containing the importance of property updating are presented. The case has as a study area the city of Colombia, since the last update in force in 2013, it has had an important real estate dynamic, which is reflected in the growth of the number of properties, built area and global cadastral appraisal of the municipality. The same is true for the rural area, wherein in 2013 there were 2,987 properties and as of March of this year there were 3,016 properties, in the same way, the growth of the constructed area and the cadastral appraisal is evident.

Keywords: Land registry, Cadastral training, Cadastral updating, cadastral appraisal

I. INTRODUCTION

An analysis of the behavior of cadastral appraisals in the urban area shows that 28% of the properties have a cadastral appraisal of less than \$25,000,000 and 47% between \$25,000,000 and \$100,000,000; 24% of the properties are greater than \$100,000,000, as shown in Table 1.

Table 1: Urban zone statistics distribution of appraisals by appraisal range

Cadastre of the municipality					
Statistics by the rank of urban appraisal effective 01-01-2021					
Urban appraisal range		Property	Consolidated	%	Appraisals
Minors	\$100.000	409	49.338	28	\$13.431.100
\$100.001	\$5.000.000	8.518			\$26.098.751.000
\$5.000.001	\$15.000.000	26.665			\$250.150.895.000

\$15.000.001	\$25.000.000	13.746	125.404	72	\$262.889.943.000
\$25.000.001	\$100.000.000	82.643			\$4.889.467.239.000
Majors	\$100.000.001	42.761			\$12.223.896.326.000
Total		174.742		100	\$17.652.516.585.100

To verify that the properties to be updated constitute 50% or more of the total properties in the municipality, the cadastral statistics for sectors 2, 4 and 5 are shown in Table 2.

Table 2: Statistics by appraisal range effective 15-05-2017 sectors 2, 4 and 5

Cadastre of the municipality					
Statistics by the rank of urban appraisal effective 15-05-2017					
Sectors 2-4-5					
Rural appraisal range		Property	Consolidated	%	Appraisals
Minors	\$100.000	64	20.618	19,7	\$3.817.400
\$100.001	\$5.000.000				
\$5.000.001	\$15.000.000				
\$15.000.001	\$25.000.000	4.206	84.238	80,3	\$8.199.773.486.000
\$25.000.001	\$100.000.000	10.882			
Majors	\$100.000.001	5.466			
Total		104.856		100	\$11.623.741.722.400

According to what was exposed in class and according to the data collected by the groups of students, these three sectors of the area of study and application of knowledge acquired on cadastre, constitute 60% of the total number of properties in the municipality and the value of the appraisals covers 66% of the collections of the same.

The students, on the initiative of a pedagogical proposal, analyze the figures of the real estate dynamics of the city, their results allow establishing a first approximation that, to apply the knowledge acquired in class, allows establishing that in the process of updating the cadastral formation, there is an increase in the property base for sectors 2, 4 and 5 of the urban area, it

will be around 7%, that is, once the update is done, the property base would increase to approximately 111,938 properties. The results can be seen in Table 3.

Table 3: Statistical estimation of properties sectors 2, 4 and 5

Statistics 2017	Current blocks	Current properties	Projected properties 7%	TOTAL
Sector 2	523	34.899	2.443	37.342
Sector 4	833	30.868	2.161	33.029
Sector 5	990	38.848	2.719	41.567
Total	2346	104.615	7.323	111.938

Figure 1, shows the location of the sectors to be analyzed in the process of updating the cadastral formation within the city.

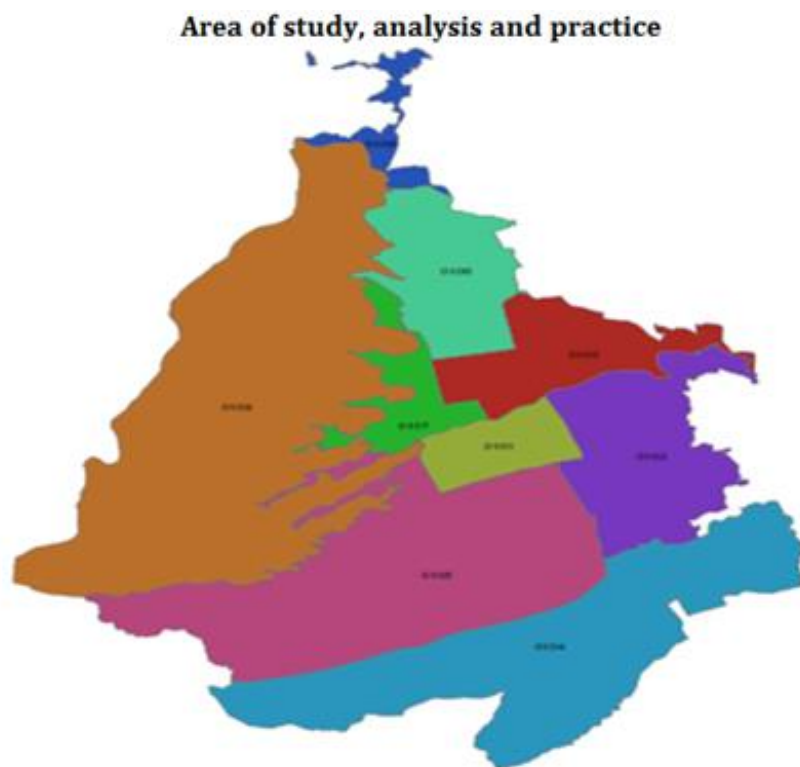


Figure 1: Cadastral formation within the study area. Source: (Instituto Geográfico Agustín Codazzi)

II. METHODOLOGY

In class, students are asked to follow the institutional guidelines of the Instituto Geográfico Agustín Codazzi (IGAC), for the development of an updating process of the cadastral formation of a municipality in Colombia, adapted to the needs of each city in the country, for which five (5) lines of work are proposed, namely: property survey, conservation, cartographic digitalization, cadastral interrelation -registry - ICARE-, data recording (Figure 2). This makes it possible to establish working groups with all the students in the class.

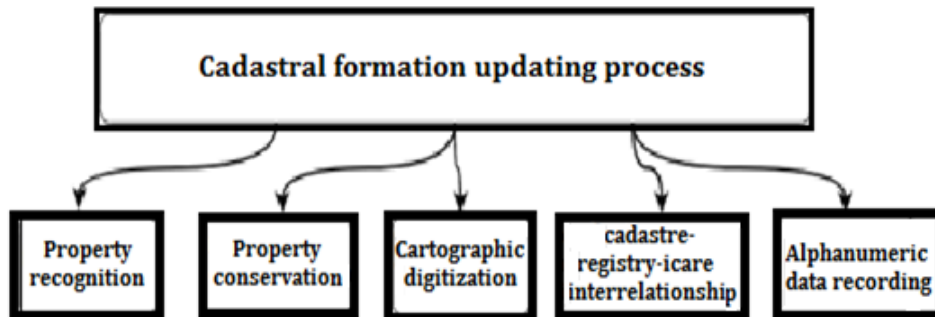


Figure 2: Process of updating cadastral formation. Source: Authors

Concerning the lines of work proposed for the project, 12 activities were identified and are described below:

- Programming and preparation of the basic information required for the process of updating the cadastral formation, as well as the schedule for the process.
- Conduct legal research, through direct consultation in the offices of the Registry of Public Instruments, to eliminate the disparities found in the information that appears in the cadastre database.
- Identification of each of the properties is made using a technical visit by the personnel to each of the properties in the municipality of Bucaramanga; during this visit the area of the construction, its use, the type of finishes and their conservation, and the economic use of the property are identified, generating evidence using photographs. Additionally, the legal information of the above is verified.
- Identification, location and numbering of the property within the cadastral chart.
- Fill out the property card, either in analog or digital media, dated and signed by the authorized person. All data obtained in the field must be filled out in the form, identifying the construction, the uses, and the qualification of each of the purposes that compose the construction.
- After identifying the property and filling out the cadastral card, the cadastral card will be digitalized.
- Support in the determination of physical and geoeconomic homogeneous zones.
- Support in the determination of the value of land and constructions and/or buildings.
- Support in the creation of the cadastral database.

- Support the liquidation of the cadastral appraisal for each property.
- Support in the preparation of cadastral cartographic documents, statistics, list of owners or possessors in analog or digital media.
- Other activities are inherent to the planning and development of the activities derived from the purpose of the agreement.

Taking into account the activities described above, the number of projected properties of the sectors of the project that was developed as a pedagogical activity, also taking into account the standard established for the yields established by the Instituto Geográfico Agustín Codazzi in resolution 435 of April 11, 2016 "Whereby Resolution 1269 of 2015 is modified and added, which establishes the table of yields of the Subdirection of Cadastre of the Instituto Geográfico Agustín Codazzi" was determined the number of personnel needed for each line of work of the project.

III. PROPERTY SURVEY

In the cadastral inspection to be carried out on Non-Horizontal Property (NPH) properties, the physical (economic use, uses, qualification, areas) and legal (boundaries, owners and/or possessors, legal data) aspects will be verified.

For properties elevated to Horizontal Property Regulations (PH), the same work must be done as in the NPH, but, although the fieldwork is less, the office work requires more time since more documentation must be verified. In this sense, the total number of people for this work was determined (Table 4).

Table 4: Total staff for office work

RECOGNITION GROUP				
Description	Projected Properties	No. People	Yield/Predio/Day	Days Performance
DESCRIPTION	39.481	57	8	86
URBAN PH	72.453	28	30	86
RECOGNITION	111.934	85	--	--

IV. QUALITY CONTROL RECOGNITION

For this type of project, the idea is to work in a 1 to 5 ratio, that is to say, for every 5 land surveyors there should be 1 supervisor, who will guarantee the quality of the information (Table 5).

Table 5: Quality control work team recognition

QUALITY CONTROL RECOGNITION		
Description	Projected	No.

	Properties	People
URBAN NPH	39.481	11
URBAN PH	72.453	6
RECOGNITION	111.934	17

V. CADASTRAL CONSERVATION

According to the information provided by the Instituto Geográfico Agustín Codazzi (IGAC), at the moment there are approximately 594 conservation requests, and taking into account that the work of the cadastral updating process does not interrupt the cadastral conservation activities, and the dynamics that it has, a team of 4 people should be available, as shown in Table 6.

Table 6: Cadastral conservation work team

CONSERVATION GROUP (OFFICE AND WINDOW FILINGS)		
Description	# IGAC Requests	No. Staff
PROFESSIONAL RADICATIONS CONSERVATION	594	3
CONSERVATION SUPERVISOR		1
CONSERVATION	594	4

VI. DIGITALIZATION

The workgroups for the total number of students enrolled are given the task of establishing the specific activities for this work are: archiving, scanning, digitalization, editing, quality control, product generation, and to determine the time of duration of this activity, the yields presented in Table 7 were stipulated.

Table 7: Group required for the digitization work

DIGITIZATION GROUP				
Description	Projected Properties	No. People	Yield/Predio/Day	Days Performance
URBAN NPH	39.481	8	60	86
URBAN PH	72.453	11	80	86
DIGITALIZATION	111.934	19	--	--

VII. QUALITY CONTROL DIGITIZATION

This activity includes the review of the digitized cadastral cartographic information and guarantees that the information complies with the defined cartographic specifications and ensures the consistency of the data and correspondence with the information coming from the field. The ratio for the quality control of this activity was determined as 3 to 1, i.e. 3 digitizers for 1 quality control (Table 8).

Table 8: Group required for the quality control digitalization

QUALITY CONTROL DIGITALIZATION		
Description	Projecte d Properti es	No. People
URBAN NPH	39.481	3
URBAN PH	72.453	4
DIGITALIZATI ON	111.934	7

VIII. LAND REGISTRY-ICARE INTERRELATIONSHIP

This activity carries out the purging of the registry information in the cadastral bases for the cadastral updating and conservation processes. Considering the importance of this activity, it was decided to create a working group comprising nine professionals (Table 9).

Table 9: Professionals required for this stage of the process

CADASTRE -REGISTRY- ICARES- INTERRELATIONSHIP	
Description	No. Peopl e
COORDINATOR	1
SUPERVISOR	1
TECHNICAL ADVISOR	2
ANALYSTS	5
ICARE	9

IX. DATA RECORDING

The students of the class have determined their calculations for the data recording task, it can be determined that for this activity the alphanumeric information of all the cadastral mutations that come from the updating process of the cadastral formation is recorded (Table 10). Quality control requires that for every three (3) recorders, one (1) supervisor must be hired.

Table 10: Professionals required for this stage of the process

DATA RECORDING		
Description	Projected Properties	No. People
UPDATE RECORDING	111934	9
RECORDING CONSERVATION - WINDOW	594	9
SUPERVISOR OF RECORDING		6
RECORDING	112.528	24

Notwithstanding the above, to start the work it is necessary, in a real case, that the Instituto Geográfico Agustín Codazzi - IGAC - has delivered to the work team all the cadastral information, files, registers 1 and 2, cartography, satellite images and others that are necessary for the realization of the project.

X. DISCUSSION AND CONCLUSIONS

For a real case of contracting, it would be fulfilled in the established times, making addition and an extension in Common Agreement by the intestate parties in the execution of the contract.

At the end of the course, the final report was delivered to the tutor professor with the approval of the group of students who act as the auditor, which shows that the Universidad Distrital has a high commitment to training professionals capable of executing the work to which they are committed, who become professionals graduates of their classrooms.

As a pedagogical experience, the contractor, who is formed with the working groups of students of cadastral engineering and geodesy of the Universidad Distrital Francisco José De Caldas present their final report, which was open to the considerations of the observations of the same working groups and the professor of the subject, these of course were adjusted, resolved and delivered in the established times during the teaching time.

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