

# **Articulation of the Plan of Social Ordering of Rural Property with the Multipurpose Cadaster**

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**Key words:** Land Administration, Land Tenure, Land Survey, Multipurpose Cadaster, Social Ordering

## **SUMMARY**

The National Land Agency has been building the Route of Social Ordering of Rural Property – ROSPR (by its initials in Spanish), which is consolidated as an instrument that will allow the intervention of a territory in an articulated and effective way in order to achieve access and legal security of the land. It will also provide clarity and organize land tenure in different regions of the country.

Methodologically, three phases have been defined. The first phase is the formulation phase, in which data collection is performed from external sources, such as cadaster and registry, in order to carry out an analysis of the existing information from the physical and legal focus. This allows for a territorial characterization to be generated.

The second phase of the route is the implementation of the plan. In this phase, a full articulation is made with the public policy of the multipurpose cadaster and the product specifications for the physical, legal and technological components. However, the social component defined by the activities in the route has a broader scope. The component of the economic aspect is one of the points where the route is not fully articulated, since within the framework of legal independence this component is out of reach.

The last phase defined in the route is the maintenance of the plan. Here, according to the results obtained in the massive property sweep, an update of the plan document is made with the new physical configuration.

The organizations ANT and USAID of Ovejas, Sucre developed an implementation project of the model of allocation and recognition of rights through a comprehensive property sweep for multipurpose cadaster and formalization purposes. It is a pilot that seeks to test the artifacts defined by the POSPR (by its initials in Spanish) and the multipurpose cadaster to provide legal security and guarantee clear and efficient processes in the allocation of rights. In this regard, for the planimeter component, the ANT has generated a precision table adapted to the needs of institutions.

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## **1. INTRODUCTION**

As part of the economic and growth policy in Colombia, it has been seen as one of the fundamental axes for the development of the country's territorial knowledge from different approaches. This will allow for a broad territorial characterization, as having an updated cadaster is the fundamental basis to providing a consistent source of data for territorial progress and the formulation of projects, such as territorial, environmental, infrastructure, as well as many others.

As presented in (World Bank, 2018), although the country has presented a solid economic performance over the last decade, the benefits have not been distributed equitably. This is why they are not reflected at the territorial level, and it makes gaps at the regional and municipal level even more notable. This clearly presents a problem associated with the processes of territorial decentralization.

This territorial inequality is due to different aspects, such as topography and the lack of an efficient infrastructure that allows connectivity. Among the most significant aspects is the armed conflict that the country experienced for more than 50 years, during which time the most affected population could be found in rural areas, where about 87% of the total number of victims is located. In these areas, different territorial phenomena directly associated with the conflict have occurred, such as abandonment or forced displacement processes, as shown in (CNMH, 2015).

In recent years, the country has been modeling and defining a multipurpose cadaster project. One of the pillars of this project is to ensure that the basic structure characterization of the territorial conformation is raised from the territory. It also aims to ensure that said information in each one of the dimensions defined in this project can be used by different actors according to their needs, and that it can be the main source of consultation by users. This guarantees the principles of efficiency and effectiveness as an articulating axis of public policy.

The public policy document CONPES 3859 (CONPES by its acronym in Spanish, National Council of Economic and Social Policy in English), lays the foundation for the implementation of a public policy aimed at the adoption and implementation of a multipurpose rural-urban cadaster under the vision of a modern cadaster and aligned with the applicable international standards. This guarantees the quality of the information under the vision of a cadaster linked to the property registry that provides legal security.

In the development of the diagnostic chapter in the document CONPES 3859, at the end of 2015 a characterization of the state of the cadaster was made with consolidated figures. The latest statistics reported by the Geographic Institute Agustín Codazzi (IGAC), show that about 28% of the country has no cadastral training. Additionally, more than 51% of the territory formed is outdated and the average time of said outdatedness is 12 years (IGAC, 2018).

As part of the development in the conceptualization and definition of the technical specifications of the multipurpose cadaster, it seeks to guarantee several principles in an articulated manner focused on four dimensions: economic, physical, legal and social (CONPES 2016). Within the framework of this definition, different aspects of the territorial characterization are taken into account to be identified in the development of the Massive Land Survey (MLS). MLS seeks to guarantee, depending on the completeness, a total recognition of the area intervened according to its property structure understood as private or formal properties and the characterization of other forms of possession or application of rights and informal properties.

In this regard, the National Land Agency (ANT) has been focusing important efforts on the consolidation of a service model different from what it had been doing previously. ANT is thinking about the supply model, aligned with the multipurpose cadaster strategy within the framework of the MLS, defined as a fundamental element in the identification of the territorial reality and the characterization of the different forms of tenure present in the territory.

This explains the importance of the Route of Social Ordering of Rural Property, as it becomes the articulating element between the social characterization of the territory and the dimensions defined in (CONPES, 2016). In this regard, the route searches from different phases generate elements that will make it possible to more quickly and efficiently carry out the management for the recognition and assignment of property rights.

## **2. SOCIAL ORDER PLAN OF RURAL PROPERTY**

As it is presented in the diagnosis chapter (DNP, 2015), the problem of rural areas in Colombia revolves around four main axes:

- Informal land tenure
- Messy and insecure land tenure
- Difficult access to land to use as a productive factor
- A poor institutional framework

This diagnosis shows figures of the territorial reality that present the serious state of the land situation in the country. For example, in (UPRA 2014) based on the ICARE data, only 6% of municipalities have a degree of formality between 75% and 100%, and the rest of the municipalities have much lower percentages. This shows that a large percentage of the territory in the rural areas presents informality.

Another problem lies in the lack of information on the nation's properties and their occupation status. Different figures are used on the availability of land in the name of the nation, but the lack of a clear inventory and spatial information of its location generates problems that are reflected in a disorderly possession.

These problems have been studied and clearly characterized in different documents, as part of the policy is the social order of property as a set of processes aimed at recognizing, clarifying, consolidating and protecting the rights of rural property (DNP-, 2015).

As defined in Article 5 of Resolution 128 of the Ministry of Agriculture and Rural Development, *"Social Ordering of Property: It is a planning and management process to order the occupation and use of rural lands and administer the lands of the Nation, that promotes progressive access to property and other forms of tenure, equitable distribution of land, legal security of land tenure, planning, management and financing of rural land, and a transparent and monitored land market, in compliance with the social and ecological function of the property, in order to contribute to improving the quality of life of the rural population."*

Under this premise, in order to respond to the requirements and ensure territorial attention, the ANT proposes a redefinition of its institutional design for the attention of the land issue, incorporating into its traditional mission processes a scheme of attention for supply that responds to the incorporation of the territorial approach in OSPR policy. This new approach proposes the allocation of rights in a massive way and in a planned way according to the specific conditions of each territory.

It is said scheme of attention by offer it is necessary to elaborate a methodological tool that allows to normalize and give the baselines that must be followed in the municipalities for the creation of the plan, this tool is the social ordering route of the property ROSPR (for its acronyms in Spanish), there have been built a series of guidelines and guides that will clearly enable the development of the plans.

## **2.1 Route of Social Ordering of Rural Property**

The elaboration of the Plans of Social Ordering of Rural Property POSPR (for its acronyms in Spanish) and its implementation generate a great challenge at the institutional level. Therefore, it becomes necessary to standardize a series of processes and activities that structure all the elements in a sequential and articulated way for a correct harmonization of the territorial dimensions and that must be reflected in the plan. To achieve this objective the ANT has built a route proposal, which structures a series of instruments and devices that describe step-by-step the activities necessary for the generation of a POSPR.

The route becomes a tool (ANT, 2017), in which the procedures and actions that should be carried out in a given territory are described by the ANT in order to advance the formulation, implementation and maintenance of the POSPR.

The route has been structured from the strategic vision in three major elements. The upper level consists of the phases, which according to resolution 740 of 2017 are defined in formulation, implementation and maintenance as shown in Figure 1. In turn, these phases are divided into stages of components. The structure of the route allows obtaining results based on the execution of the activities defined in each of the components according to the territorial intervention.



Figure 1. Phases of the route. Source. (ANT, 2017)

Below is a brief summary of the conceptualization of each of the phases and the main results you want to obtain in each of them. It is important not to lose sight of the institutional strategic change that you want to have in terms of care by offer, drawing the attention of ANT mission processes to the territory.

2.1.1 Formulation Phase

The Formulation Phase is of great importance in the route. In this phase, a territorial characterization is made from three main components: physical, legal and social. In each of these dimensions is a collection of information from secondary sources. In this phase, information management with other national and regional institutions is of great importance.

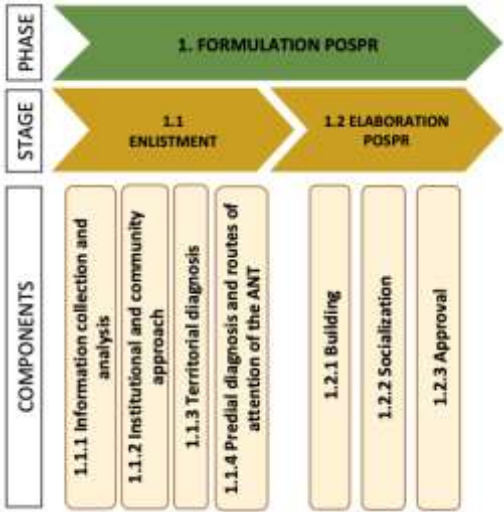


Figure 2. Components of the formulation Phase. Source. (ANT, 2017)

For the collection and review of the physical component information, the request is made to the cadaster office in charge of the municipality of work, which in most cases it is the Agustín Codazzi Geographic Institute. However, given the structure of the cadaster in Colombia, it could be one of the decentralized cadasters or delegates. For legal registration information, the request is made to the Superintendence of Notary and Registry (SNR).

The cadastral and registry information are fundamental sources in the formulation since they are the necessary inputs for the preparation of the property diagnosis to carry out the information crossings defined in the lineament (ANT, 2018). This has been constructed by the Subdirector of Operational Planning with the objective of standardizing the analysis of the physical and legal component of each municipality to be intervened. In this phase, some of the most important information crosses are the constraints, which are spatial analyzes made with layers of information as layers that generate restrictions for adjudication of rights and limit the competition of the ANT. These layers mostly correspond to environmental, mining, energy, indigenous and Afro communities, as well as others.

In this stage, one of the most important activities, the accompaniment for the social territorial characterization, is carried out from the social point of view. Here, several strategies are used for the community accompaniment. The results of this stage are very important because they are part of a strategy to carry out planning of the territorial intervention in a way much closer to the physical composition of the territory.

Once the enlistment stage has been completed, the stage of elaboration of the social property Plan of the Rural Property (POSPR) begins. Here, all inputs elaborated in the previous stages are taken, and the plan is elaborated in function of several important components including the geographical situation and the characterization of the organizational structure in the territory from different elements. Then, an analysis of the land management plan is made.

### 2.1.2 Implementation Phase

The implementation phase as part of the structure of the route is the stage where the territorial intervention is carried out and where the ROSPR makes a full articulation with the public policy of multipurpose cadaster with the activities defined for the massive property sweep (Law 902).

This phase consists of three stages. The first is a field visit, which is the visit to the property through the property sweep methodology. Then there is the POSPR update, which consists of five components: categorization, report to update the plan, consolidation of the RESO, consolidation of the Rural Real Estate Registry (RIR) and the socialization of the POSPR update. The final stage is administrative actions through the single procedure, which consists of opening the administrative procedure, the evidentiary stage, presentation of results and closure of the administrative procedure (ANT, 2017).

Figure 3 shows the components being developed in the field visit stage in the farm trip through the sweeping methodology. The technical specifications defined by the multipurpose cadaster must be met so that the ANT becomes a very important actor in the cadastral operation scheme. It is clear, as defined by the vision of the multipurpose cadaster, that not only will information be collected from private properties, but also the physical reality of the territory will be raised (CONPES, 2016). This implies raising the different forms of land tenure.

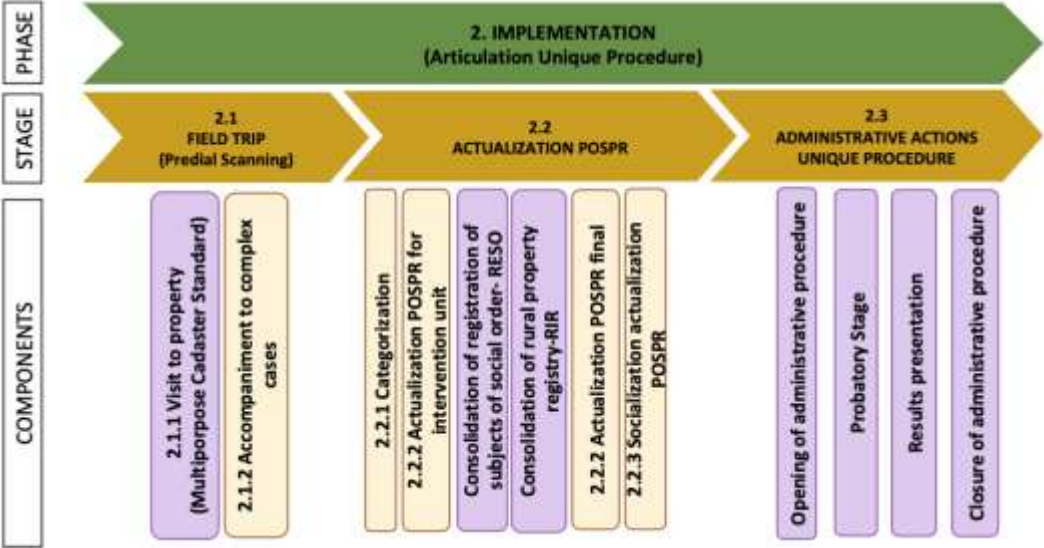


Figure 3. Components of the implementation Phase. Source. (ANT, 2017)

The stage that corresponds to the update of the plan is made based on the results delivered by the property sweep. These changes are based on the final territorial characterization delivered at the end of the field visit stage per intervention unit. This information will be an integral part of the POSPR for purposes of its implementation, monitoring, evaluation and maintenance (Resolution 740, 2017).

At this stage, a full articulation with the missionary areas of the agency must be had, since within the framework of what is established in the single procedure, they will be the ones who will carry out all the legal processes necessary for the assignment of rights in the properties, competence of the ANT.

Once the updated plan is available, administrative actions are carried out under the legal route defined in each case, either by law 160 of 1994 or by the sole procedure defined in decree law 902 of 2017.

### 2.1.3 Maintenance Phase

This phase, which is established in Article 3 of Resolution 740 of 2017, includes the achievement of a strategy from a monitoring and evaluation perspective of the actions of the ANT in the municipalities intervened in the framework of the plans. In this phase, a series of indicators should be calculated and presented according to the goals defined in the implementation framework.

Part of the activities to be developed in this phase are focused on institutional strengthening, which allow the generation of competences at the local level to mitigate the occurrence of elements of informality over time, within the framework of the institutionally defined value chain for the maintenance of the cadastral and registry information. This is always done in order to guarantee the legal security of the territory.

## **3. THE MULTIPURPOSE CADASTER**

The construction of the strategic vision in the public policy of the multipurpose cadaster has been developed by the national government based on the evidences found in different diagnoses made on the territorial situation. These diagnoses, among others, have been taken into account. An example of this is the findings of the mission for the transformation of the Colombian Countryside (DNP, 2016), point one of the Final Agreement for the Termination of the Conflict and the Construction of a Stable and Lasting Peace, where Integral Rural Reform is discussed.

Part of this conceptualization is reflected in the document "Conceptualization and Specifications for the Operation of the Multipurpose Cadaster Version 2.1.1", which was built jointly by the Geographical Institute Agustín Codazzi (IGAC) and the Superintendence of Notaries and Registry SNR. There, a vision on the conceptual scheme of a multipurpose cadaster, its strategic vision 2016 -2023 and the perspective of the implementation of this project oriented to comply with international standards, within the framework of public value. This oriented the value chain in the perspective of having the citizen as an axis articulator of the information of the territory within the framework of a correct land administration.

Figure 4 shows the value chain proposed in (IGAC, 2016). It is seen how it is fundamental to have the cadastral information of the reality of the territory as a basis for the regularization of land tenure. That is why the processes of diffusion and integration generate a change in the vision of the cadaster that until now has been largely for tax purposes.



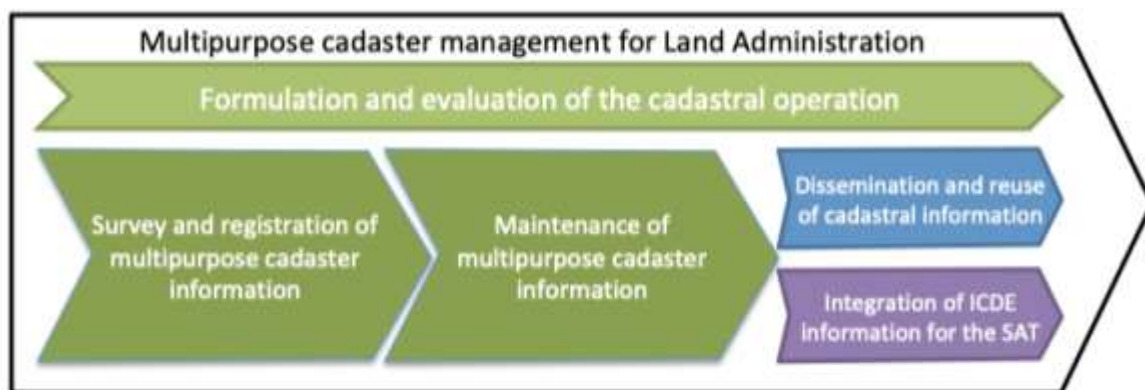


Figure 4. Cadastral management value chain. Source. (IGAC, 2016)

#### 4. THE PILOT

The National Land Agency as a whole, with the support of USAID, have developed a project to implement the model of allocation and recognition of rights through the comprehensive property sweep for purposes of multipurpose cadaster and formalization in Ovejas, Sucre. Since its inception, this project has been identified as the first pilot in the country that focuses its strategy on responding to the information needs of the ANT through the route and responding to the technical product specifications defined by the multipurpose cadaster within the framework of the massive property sweep's processes.

The sheep pilot allows us to take the institutional vision of a macro policy to a level of operational detail in the territory. This allows us to iterate in the set-up of the routing and redefinition of some processes and activities that the conceptual elaboration of each artifact had a purpose in the chain of institutional value. However, when those elements were proven in the approach of massive recognition and field operations, they allowed for the reconsideration of the implementation of said device and the evaluation of the unification of elements of the route. This optimizes the times in favor of the efficiency of the benefit cost of the project.

The results of the project generate a series of lessons learned in the framework of the development of the social ordering route. They also show opportunities for improvement in the definition of the technical specifications of the product consigned in the conceptualization document of the multipurpose cadaster.

Likewise, based on the results obtained from the pilots, the advantages of the implementation of the massive property sweep as a transversal element within the social ordering route in its implementation phase and its articulation with the public multipurpose cadaster policy can be deduced.

Within the framework of the objectives proposed by the ANT and USAID for the definition of strategic institutional lines in the process of expansion and territorial intervention, the pilot developed in sheep generates an added value based on the analysis of the efficiency and effectiveness of the implementation of the route. In relation to the objectives from the edge of the public policy of the multipurpose cadaster, it is very important to be able to have data of the properties in compliance with standards defined or adopted in the consolidation stage.

Figure 5 shows an outline of the Colombian profile of the LADM\_COL standard defined for LA\_Point classes and their generalizations and their dependence on LA\_BoundaryFaceString. In the national profile, particular classes are generated in order to define the points that are part of boundary lines and those that are part of buildings. One of the challenges faced by the operator of the pilot project was to be able to comply with the technical specifications of the product defined by the IGAC and the SNR, especially the one related to the standardized delivery of information according to LADM\_COL.

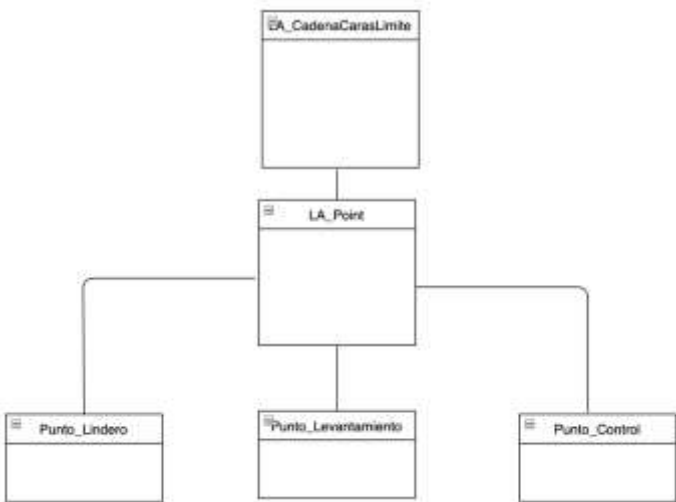


Figure 5. Class LA\_Point in the model LADM\_COL

In the process of data collection by USAID for the delivery to the institutions, at the request of the ANT and USAID, the project of modernization in the land administration of the Swiss cooperation provided technical support for the transfer of knowledge and preparation of the data according to the model through the use of technological tools developed within the framework of said project.

An example of the analyzes that which the compliance of the technical specifications of the product by the sheep pilot project has led to is the definition of a product delivery structure by area of intervention. This is shown in Figure 6 and it guarantees institutions the reception of the information resulting from the sweep in a standardized manner and that of a line to the operators on the delivery structure of each product defined for the multipurpose cadaster and the ordering route.



Figure 6. Constructions and data according to the model LADM\_COL

Figure 7 shows the boundary points, the point of construction `point_construction` and its relationship from the generation of line and polygon type geometries, this spatial information complies with what is defined in the LADM\_COL model and one of the main advantages is that it is associated with all the alphanumeric information that describes the property and its relationship with the parties through the rights, restrictions and responsibilities.



Figure 7. Constructions associated with the terrain according to the model LADM\_COL

## 5. INSTITUTIONAL CHALLENGES

Achieving that the route is articulated with the public policy of multipurpose cadaster and with the massive property sweep in the implementation phase has been very valuable in the institutional vision of the new model by offer. The pilot developed by ANT and USAID in the municipality of Ovejas, Sucre, has shown the great advantage of collecting data in a massive way in the territory and being able to characterize an area of intervention in an integral way, but as a result of this exercise, it is also They show a series of institutional challenges that need to be resolved in order to respond to territorial needs and achieve the expected results

within the framework of the formalization and allocation of rights, under the logic of an inter-institutional value chain.

The challenges that the agency has in the short term to consolidate the service model by offer are:

- Maturation of the mass care process
- Achieve the integration of ANT, IGAC and SNR institutions at the local level
- Consolidate Information Systems

**Maturing of the mass attention process**, this component requires a series of normative and institutional adjustments, which allow the mission areas of the ANT to orient the processes based on a massive intervention of the territory, this is a very important point in terms of optimize the results of the massive property sweep and make use of the information collected in this process.

**The integration of ANT, IGAC and SNR institutions at the local level**, it is very important to achieve the institutional presence within the framework of the execution of activities of the massive property sweep, since it allows to make an assurance of the quality from the moment of the data capture and allows operators to resolve doubts or problems that arise in the operation in the field, in the same way when the local institutional participation is made permanently generates a higher level of confidence in the processes developed by the operator.

**Information systems** that allow and guarantee the quality of the data value chain, to systematize the assurance and quality control processes in a massive way, guaranteeing to the institutions that the validations, both at alphanumeric and spatial level, are supported by automatically, additionally generate applications that allow thematic quality control processes on the information in an assisted manner. One of the main challenges to this component is to be able to achieve that territorial information can be integrated and available at different levels of information.

## REFERENCES

Acuerdo Final. (24 de 11 de 2016). *Acuerdo final para la Terminación del Conflicto y la Construcción de una Paz estable y duradera*. Recuperado el 27 de 01 de 2017, de Mesa de Conversaciones:

[https://www.mesadeconversaciones.com.co/sites/default/files/24\\_08\\_2016acuerdofinalfinalfinal-1472094587.pdf](https://www.mesadeconversaciones.com.co/sites/default/files/24_08_2016acuerdofinalfinalfinal-1472094587.pdf)

Agencia Nacional de Tierras, Subdirección de Planeación Operativa. (2017). *Documento Conceptual de Planes de Ordenamiento Social de la Propiedad Rural*. Bogotá, Colombia.

Agencia Nacional de Tierras, Subdirección de Planeación Operativa. (2018). *Lineamiento técnico conceptual para el diligenciamiento de la matriz de análisis predial - MAPRE*. Bogotá, Colombia.

Agencia Nacional de Tierras. *Resolución 740 de 2017, Reglamento operativo de los Planes de Ordenamiento Social de la Propiedad, el Proceso Único de Ordenamiento Social de la Propiedad*. Bogotá, Colombia.

Centro Nacional de Memoria Historica. (2015). *Una nación desplazada: Informe nacional del desplazamiento forzado en Colombia*. Colombia, Bogotá D.C: CNMH - UARIV.

Decreto Ley 902 de 2017. (2017). *Medidas para facilitar la implementación de la Reforma Rural Integral, contemplada en el Acuerdo Final en materia de tierras, específicamente el procedimiento para el acceso y formalización y el Fondo de Tierras*. Bogotá, Colombia.

Departamento Nacional de Planeación. (2015). *Estrategia de Ordenamiento Social de la Propiedad Rural (CONPES 3859)*. Bogotá, Colombia: DNP.

Departamento Nacional de Planeación. (2016). *Política para la Adopción e Implementación de un Catastro Multipropósito Rural-Urbano (CONPES 3859)*. Bogotá, Colombia: DNP.

Instituto Geografico Agustin Codazzi IGAC, Superintendencia de Notariado y Registro SNR. (2016). *Conceptualización y especificaciones para la operación del Catastro Multipropósito*. Bogotá, Colombia.

Instituto Geografico Agustin Codazzi. (2018). *Estadísticas catastrales, corte a 1 de enero de 2018*. Bogotá D.C., Colombia.

Lemmen, C. (2012). *A Domain Model for Land Administration*. Delft: Nederlandse Commissie voor Geodesie Netherlands Geodetic Commission 78 .

Lemmen, C., Oosterom, P., & Bennett, R. (2015). The Land Administration Domain Model. *Land Use Policy* , 49, 535–545.

The World Bank, Colombia Multipurpose Cadaster Project (P162594), Combined Project Information Documents / Integrated Safeguards Datasheet (PID/ISDS), 19-Nov-2018, Report No: PIDISDSA21443

Unidad de Planificación Rural Agropecuaria UPRA. (2014). *Metodología para la formulación del Plan de Ordenamiento Social de la Propiedad Rural*, Bogotá D.C: CNMH - UARIV.

Williamson, I., Enemark, S., Wallace, J., & Rajabifard, A. (2009). *Land Administration and Sustainable Development*. ESRI Press Academic.

## **BIOGRAPHICAL NOTES**

Andrés P. Guarín López is a cadastral engineer and geodesist with a master's degree in information and communication sciences from the Francisco José de Caldas District University. During his professional occupation, he has been the technical leader in the implementation of several technology projects, from analysis, design and development to the implementation stage. He participated in the drafting of the conceptual design of the new Multipurpose Cadastral of Colombia, participated in the conceptualization and definition of the national profile of the ISO 19152: 2012 LADM and currently works for the National Lands Agency as a consultant to support the implementation of the Integrated System of Land and its conformity with the LADM\_COL model within the framework of public policy for land administration.

Tatiana Santos, Lawyer of the Autonomous University of Bucaramanga, has served as Legal Leader of the Norwegian Refugee Council in the Colombian Caribbean, Advisor to the Directorate of the Unit for Victims and is currently Deputy Director of Operational Planning in the Agency Nacional de Tierras, area in charge of designing and implementing the model of attention for the offer of massive Formalization of land in Colombia, through the articulation of the social order of property and the multi-purpose cadastre.

Kaspar Eggenberger, Geodesta engineer with specialization in land registry and land planning, graduated from the University of Applied Sciences FHNW in Basel Switzerland. With more than 10 years of experience as project manager in the field of Land Management of the Swiss Government (SECO) in Guatemala and in Colombia, he has participated as technical manager in the project of the Swiss Cooperation for the modernization of land administration in Colombia, supporting the definition of multi-purpose cadaster technical specification.

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