

The Cadastre of Public-law Restrictions on landownership (PLR Cadastre) in Switzerland

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SUMMARY

Owning land, in Switzerland and in many other countries, does not mean we can use it as we want. Landowners are subject to various laws, ordinances and regulations established by the competent authorities: the public-law restrictions on landownership. These restrictions, which are around 150 in Switzerland, come from various departments. This spread of the information leads to a loss of time, a risk of forgetting, but above all, a lack of legal safety. These aspects had initially been discussed in the publication of “Cadastre 2014” in 1998 by the FIG. As an answer to this problem, it has been decided to create the Cadastre of Public-law Restrictions on landownership (PLR Cadastre). It is an official information system which gathers the most important restrictions on landownership at one place. The process is the following: visiting an official geo-portal and getting dynamic information on whole areas with the possibility to choose which restrictions to display, or getting a static extract as a PDF file summarizing the elements concerning the plot of land considered. But what really separates the PLR Cadastre from classical geo-portals, is the fact that the information is completed by the legal provisions and legal bases which are sources to the restriction.

The project started in 2012 and today, beginning of 2021, the PLR Cadastre is available on almost the whole territory of Switzerland (24 cantons out of 26). The implementation had to face several challenges. One of these is the fact that the public-law restrictions are composed of various elements, like geodata or texts, and come from different sources under the responsibility of various professional bodies. It was mandatory to be able to standardize the data, and this has been possible thanks to the framework model and the minimum data models. The project is still young and will be subject to improvement. A concrete return on investment is hard to make, nonetheless, benefits have already been witnessed. The different users of the cadastre, either professional or individual, confirmed the necessity of the PLR Cadastre and have observed time savings. The use of the tool is constantly increasing throughout the country and is now essential for all the operators who work with the landowner property.

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1. INTRODUCTION

Owning land, in Switzerland and in many other countries, does not mean we can use it as we want. Not only are the landowners subject to private law restrictions, but also to various laws, ordinances and regulations established by the competent authorities: the public-law restrictions on landownership. For example, we can quote the restrictions concerning spatial planning as the municipal land use plans, the reserved zones along the national railways or the airports, etc. As a matter of fact, the number of public-law restrictions has been estimated at more than 150 in the country. Getting a general overview of all the restrictions concerning your land can be a fastidious task, especially for someone who is not in the business. As a reminder, Switzerland works as a federalist system at three levels: the federal government, the cantons (states) and the municipalities. The restrictions can come from various departments of these three levels. This spread of the information leads to a loss of time, a risk of forgetting, but above all, a lack of legal safety. These aspects had initially been discussed in the publication of “Cadastre 2014” in 1998 by the FIG. (cf. Kaufmann/Steudler, 1998)

As an answer to this problem, it has been decided to create the Cadastre of Public-law Restrictions on landownership (PLR Cadastre). It is an official information system which gathers the most important restrictions on landownership at one place. Everyone can now easily and quickly access to legally binding information about plots of land in Switzerland. The process is the following: visiting an official geo-portal and getting dynamic information on whole areas with the possibility to choose which restrictions to display, or getting a static extract as a PDF file summarizing the elements concerning the plot of land considered. The generation of PLR information is carried out entirely automatically by geographical and administrative queries from structured information. But what really separates the PLR Cadastre from classical geo-portals, is the fact that the information is completed by the legal provisions and legal bases which are sources to the restriction.

This document will describe the PLR Cadastre in detail: its content, some technical aspects, the benefits, the limits of the concept and the return on investment. A quick reminder about the mission “Cadastre 2014” will also be included.

2. CADASTRE 2014 – A VISION FOR A FUTURE CADASTRAL SYSTEM

At the XX FIG Congress 1994 in Melbourne, Australia, Commission 7 initiated three working groups. One of these was given the task to study how the cadastral systems would have to work and what it will look like in twenty years. The mission was named “Cadastre 2014 – a vision for a future cadastral system” (cf. Kaufmann/Steudler, 1998).

One of the conclusions of their work is that the Cadastre 2014 will have to show the complete legal situation of land, including public rights, and restrictions. Indeed, just as the population of the world is growing, there are more public law restrictions. The land property is not fully guaranteed anymore. Their conclusion is the necessity to create an official public register which inventories these restrictions. (cf. Kaufmann/Steudler, 1998)

The PLR Cadastre presented in this document is, in fact, the concrete swiss realization of this vision.

3. CONTENT OF THE PLR CADASTRE

3.1 PLR cadastre and Land Register

In Switzerland, the cadastre is organized as a Title Registration System, meaning the land property is guaranteed, as inscribed in the Swiss civil code since 1912. This guarantee is implemented by two tools directed by the Confederation: the cadastral surveying and the Land Register. The cadastral surveying provides the geometrical information defining the landownership, and the Land Register, an official record, lists the owner and all substantive rights pertaining to plots of land. Thus, through these two tools, the private law restrictions, which especially regulate purchase of land property and the rights between private individuals, are easily accessible to everyone. The aim of the PLR Cadastre is to complete these two tools in the management of landownership, as it now covers the public-law restrictions. With the cadastral surveying as a reference, the generation of PLR information can be performed entirely automatically by geographical and administrative queries.

(cf. swisstopo, Distinction between PLR Cadastre & land register)

3.2 The most important public-law restrictions on landownership

At the beginning of the project, The Federal Council has decided to incorporate the 17 most important public law restrictions on landownership at the federal level from 8 sectors. Then from this year, the PLR Cadastre have been expanded to 6 supplementary restrictions and 1 new sector. The image below shows the original restrictions (red) and the new ones in preparation (blue). (cf. swisstopo, The most important public law restrictions on landownership)

The cantons and municipalities can also add their own landownership restrictions, as long as they meet the following requirements:

- Be legally binding
- Safeguard public interest
- Be clearly designed (have a distinct geometry)
- Have a certain duration of applicability (at least 2 years)
- Fully comply with the applicable federal legislation

(cf. Cornette/Iskandar/Käser/Niggeler, 2018)



Figure 1: the 9 sectors of the most important PLR. In red: original restrictions. In blue: restrictions in preparation.

3.3 Components of a PLR

Concretely, each object of the PLR-cadastre is composed of four elements:

- Official geodata (map), defines the area where the given restriction is applied
- Legal provisions, which with the official geodata directly describe the landownership restriction
- Legal bases, on which the given restriction is based
- Additional information and other references to ensure a good understanding of the landownership restriction

(cf. Eisenhut, 2016: p7) (cf. Swisstopo, Components of a public law restriction on landownership (PLR))

4. TECHNICAL ASPECTS

The project took place in several steps. In 2012, the setting up started in eight pilot cantons and in 2014, the first PLR Cadastre were online. Then, based on the experience gained from these 8 cantons, the others followed.

Two laws regulate the PLR Cadastre:

- The Federal Act on Geoinformation (GeoIA), of October 5, 2007¹, and its ordinance (OGéo²).
- The Ordinance on Public-law Restrictions on landownership (OPLR), of September 2, 2009³

These two elements define the PLR Cadastre. They include requirements for the legal provisions and the references to legal bases.

4.1 Modelling of field activity

The PLR described in the precedent section is composed of various elements like geodata (map) or texts (legal provisions), and come from different sources under the responsibility of various professional bodies. Therefore, the PLR Cadastre encountered a first challenge, as it is not easy to overlay all these different data having always the same content extent. To be able to guarantee the interoperability between all the actors and have a general view, it is mandatory to create a standard, and this standard is the framework model.

The framework model has the objective to be applicable to each technical area and contains the minimal content of the data models. Hence, every specific model data contains at least this communal base (see image below).

Based on the framework model, the involved authorities then create the minimum data models for the official geodata. They determine the structure and the content's degree of definition. These models are legally binding for the authorities and allow an exchange of information among the administrative levels. They are unified throughout Switzerland, making it possible to standardize and automate processing. (cf. Eisenhut, 2016: p7-8)

The minimum data models of the 23 available public-law restrictions can be found on the website of the Swiss Confederation: models.geo.admin.ch.

The modeling language is INTERLIS (cf. swisstopo, INTERLIS). It is a textual modeling language used to describe, integrate and exchange geodata, and its use is mandatory in Switzerland. This tool has the advantage to be independent of all proprietary systems and software. (cf. swisstopo, Modèles de géodonnées minimaux)

Concretely, the framework model is composed of 5 parts (partial models):

- **Transfer structure:** defines the basic structure of exchange between the involved authorities responsible of the official geodata and the cantonal organization of the PLR Cadastre.
- **Cadastre extracts:** defines the data structure related to a demand of extract of the PLR Cadastre related to a singular property.
- **Basic structure for data models:** contains the legal provisions and the associated official geodata which define the public law restriction. Form the base of the minimum data models.

¹ Loi fédérale sur la géoinformation (LGéo)

² Ordonnance sur la géoinformation (OGéo)

³ Ordonnance fédérale sur le cadastre des restrictions de droit public à la propriété foncière (OCRDP)

- **References to legal bases:** contains references to general legal bases when necessary.
- **Metadata:** managed by the cantonal organization of the PLR Cadastre.
(cf. Eisenhut, 2016: p12-13)

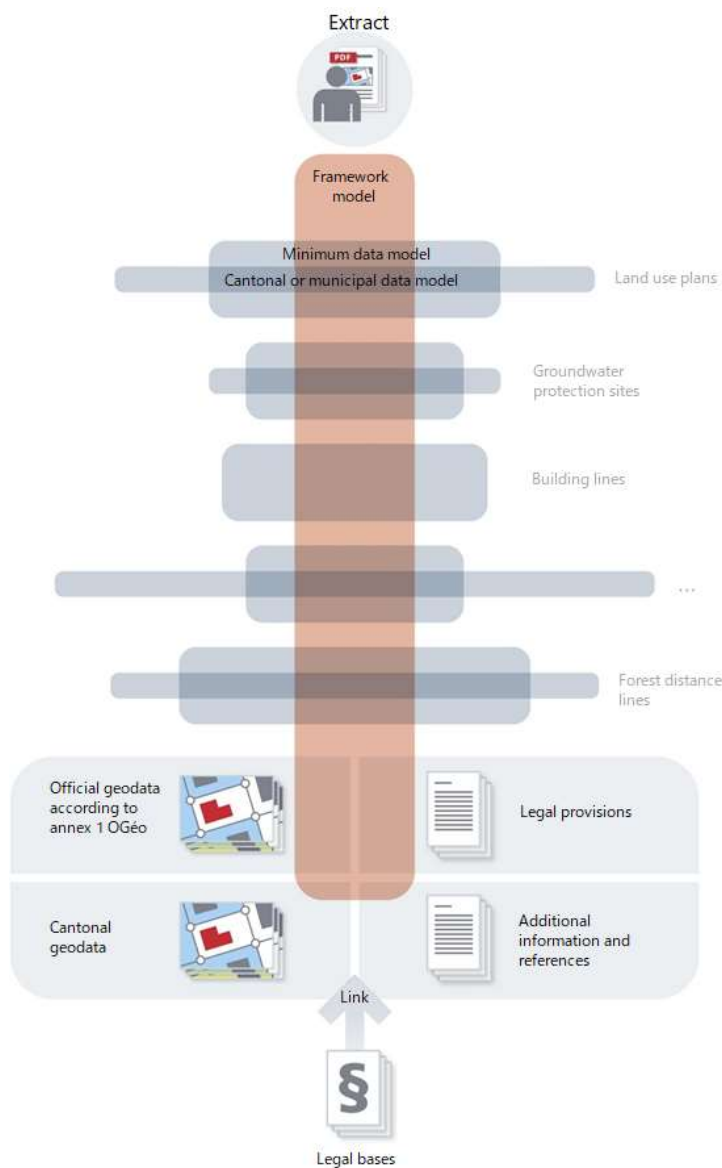


Figure 2: Schematic representation of the framework model, as the common core of the PLR Cadastre's information layers (cf. Eisenhut, 2016: p8, freely translated)

4.2 Dematerialization of the information

Another challenge the PLR Cadastre had to face is that most of the data was not available in digital forms yet and only in paper format or the digitalized version had only an information purpose. This problem concerns most of municipalities' documents of land use planning. They had been elaborated before the developments of the current digital tools, and the municipalities

had never felt the need to digitize or renew it. However, it is now vital to proceed with the digitalization of the data in order to introduce it in the PLR Cadastre.

The digitalization process is delicate. Not only must the contents of the paper plans be accurately transcribed into the corresponding digital data, but also be adjusted to the data of cadastral surveying. Indeed, some plans are not as precise as the current cadastral surveying for various reasons. Their scale is small (1:5000, for example), or they date from a time when the cadastral surveying was not as accurate as today. An adaptation is then necessary.

The Jura Canton, one of the eight pilot cantons who first started their PLR Cadastre, describes how it proceeded (cf. Schaller/Beuret/Crausaz/Iskandar, 2015):

The involved authorities responsible to digitize their data can follow two types of procedure: the ordinary or the simplified procedure. When possible, the simplified procedure is applied. It consists to digitize the plans and integrate the data in the PLR Cadastre, without abolishing the documents in force. It is used when no interpretation of the original intentions of the authorities that adopted the document is required. However, the paper document is still valid; the PLR Cadastre will not enjoy public faith. When the simplified procedure is not possible, meaning that we cannot ensure that the digitized data is consistent with the paper plan in force, the authorities must follow the ordinary procedure. The digitalization takes place as if a new document was created (public inquiry, replacement of the old plans, ...).

The digitalization of the land use plans was not difficult when area boundaries corresponded with the parcel boundaries. But when it was not the case, they had to digitize based on the paper plan, scanned and adjusted to the cadastral surveying.

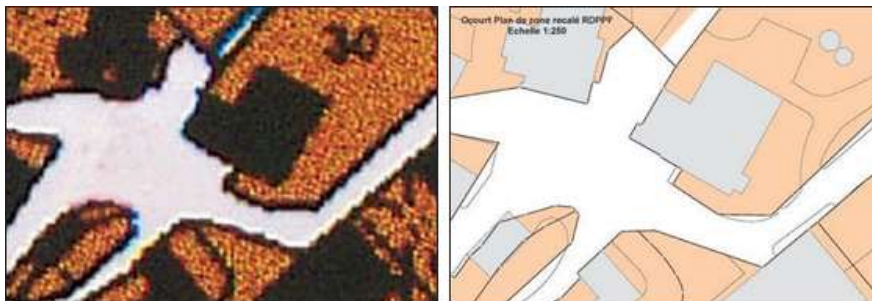


Figure 3: On the left: extract of the original land use plan of the village of Ocourt (scale: 1:5000). On the right: digitized land use plan (scale 1:250)

As for particular areas where the parcel boundaries can't help (such as nature protection zones), they resorted to old aerial photography from closed to the date of establishment of the plan, if available. They also used the official survey information levels "ground covers" and "single objects".

To approve the digitalization, two controls were conducted:

- Automatic controls to detect problem of non-adjustment of the PLR on the Cadastral Surveying.
- Visual inspection by an operator, who ensures that the digitized data is similar in every way to the paper plan in force.

Finally, the digitalization process in the canton of Jura lasted 3 year and the total hours of work has been estimated at 444 working days (approximately 7 day by municipality). The cantonal

authorities are globally satisfied by the operation. They retain several benefits including high-quality digitized land use plans and new working procedures between different professional bodies.

(cf. Schaller/Beuret/Crausaz/Iskandar, 2015)

4.3 Mode of operation of the PLR Cadastre: Organization and financing

As already introduced, Switzerland works as a federal system. The PLR is co-managed by the confederation and the cantons. The implication of the municipalities is done by the cantons. The federal government is responsible for defining the strategic orientation of the PLR Cadastre, specifying the minimum requirements, and supervising the works of the cantons. Each canton is then responsible to manage its own PLR Cadastre. They collect the data from the relevant authorities and place them at the disposal of the public via the cantonal PLR geo-portal. A centralized access is possible over the webpage of the confederation.

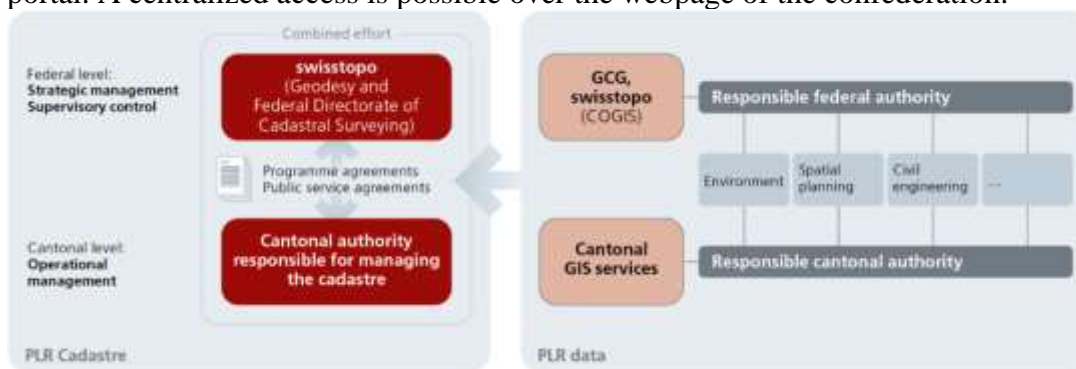


Figure 4: Tasks between the federal government and the cantons

(cf. swisstopo, Organisation of the PLR Cadastre: federal government & canton)

The costs of the PLR Cadastre are also shared between the federal government and the cantons authorities. They can vary a lot depending of the canton (size, organization, technical integration into the cantonal infrastructure, ...). We distinguish three types of cost:

- Operating costs: regroup all the operations around the use of the system (acquisition of suitable hardware, training and provision of personnel, supervision and verification processes, ...).
- Development costs: Also concern the development of new PLR and new functions.
- Control and updating costs: are under the responsibility of the relevant authorities (federal, cantonal or municipal level).

(cf. swisstopo, Financement)

5. CURRENT SITUATION OF THE PLR CADASTRE IN SWITZERLAND

The PLR Cadastre is now, beginning of 2021, available in almost all cantons. Out of 26 cantons, only 2 have yet to introduce their PLR Cadastre. Some cantons are also not completely covered,

mainly because of the lack of required restrictions data. For example, a lot of municipalities have not digitized their land use plans yet. Nonetheless, the introduction is planned in the coming years.

The map below demonstrates the actual state of the PLR Cadastre. Dark green means it is available, and light green that the introduction is planned.

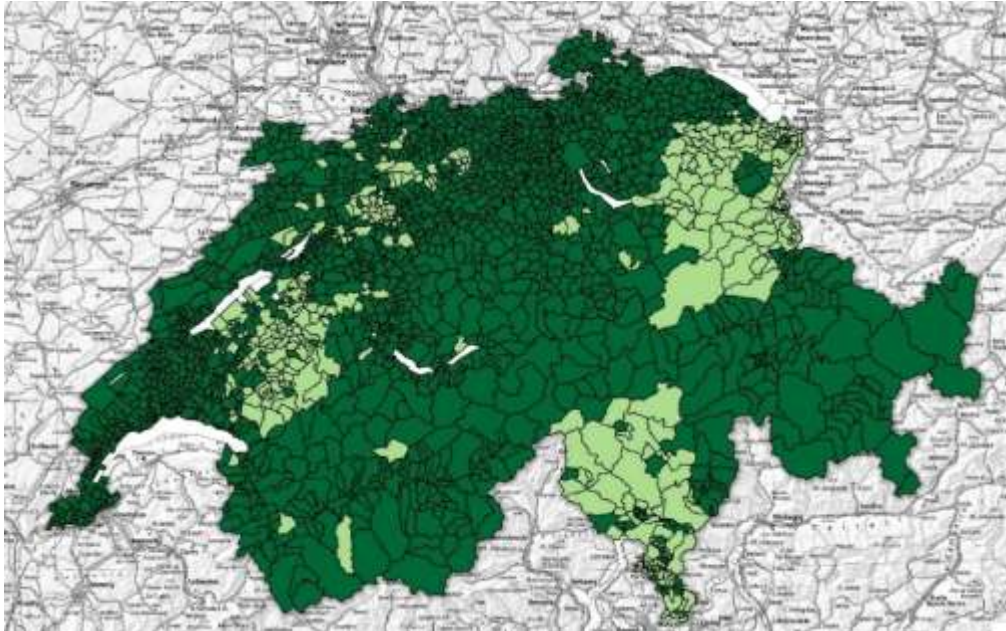


Figure 5: Availability of the PLR Cadastre in the municipalities. Dark green: available. Light green: planned introduction.

(cf. swisstopo, Cadastre of Public Law Restrictions on Landownership (PLR Cadastre))

6. ILLUSTRATION OF THE USE OF THE PLR CADASTRE

6.1 Comparison between an ordinary geo-portal and the PLR Cadastre

Before the introduction of the PLR Cadastre, most of the cantons already had a geo-portal, where we can find various elements: cadastral surveying, information about the localization, the roads, the natural hazards, the land planning, etc. Thus, some public-law restrictions already figured there for illustrative purposes. However, there is no information about the legal provisions, therefore it is hard to have a full view of the restriction. What does the type of zone allow constructing? Can I construct near my neighbor's house? To answer these questions, it is necessary to search for the official documents in other places: this can take from a couple of minutes per restriction if it is available on the municipality's website, to a few days if we have to wait for the response from the relevant authorities. This is where we can truly appreciate the power of the PLR Cadastre. The legal provisions are directly available via a link, whether on the geo-portal or in the extract.

Here is an illustration of the differences between a classical geo-portal (on the left) and the cantonal PLR Cadastre (on the right). The focus has been made on urban planning, as the theme is present in both geo-portals.

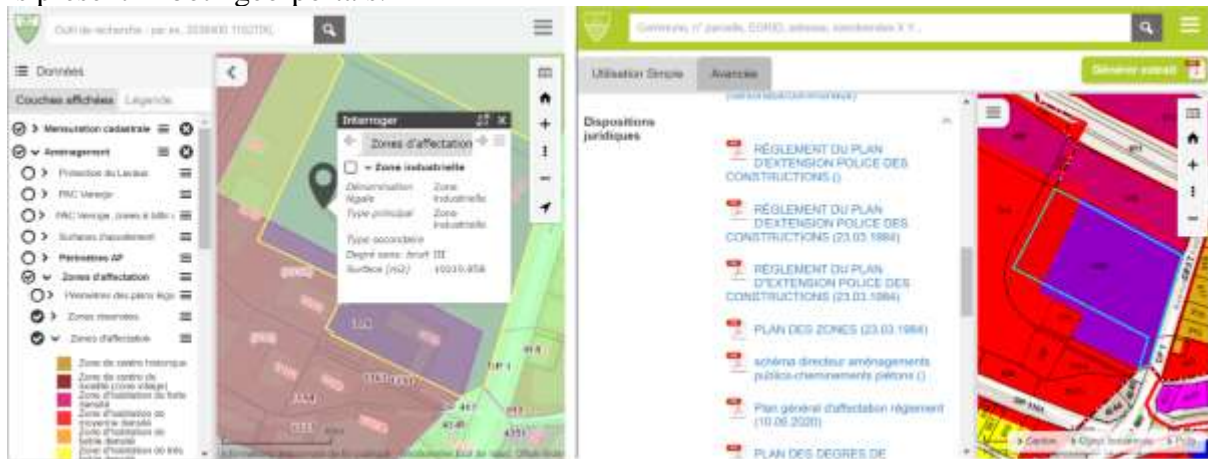


Figure 6: On the left: extract of the geo-portal from Vaud, theme: urban planning. On the right: extract of the PLR cadastre, with a focus on the land use plan's restriction and its legal provisions (“dispositions juridiques”).

(Geo-portal of Vaud: <https://www.geo.vd.ch/>)

(PLR Cadastre of Vaud: <https://www.rdppf.vd.ch/>)

6.2 Presentation of a PLR extract

An extract, from any cantons, is presented like this: the first page gives general indications on the plot of land (id, area, ...). The second page summarizes the public-law restrictions which are classed as the following: restrictions which touch the plot of land, restrictions which do not touch the plot of land, restrictions for which no data is available. Finally, each restriction is described in detail on one or two pages, including the legal provisions and legal bases. Here is an example with the extract considering the same land as the previous image:



Figure 7 : three first pages of a static extract on the PLR Cadastre from the canton of Vaud.

All the PLR Cadastre geo-portals can be found on the website :

<https://www.cadastre.ch/en/oereb.html>.

To have more examples of extracts, I kindly invite you to visit this same website, and to select “Content & Products of the PLR Cadastre” in the left menu.

7. BENEFITS, LIMITS OF THE CONCEPT AND RETURN ON INVESTMENT

7.1 Benefits

The PLR Cadastre gathers the most important restrictions on landownership at one place. Without the help of this tool, the interested individuals would have to collect the information in different federal, cantonal or municipal departments, which leads to a loss of time, a risk of forgetting, but above all, a lack of legal safety. The PLR Cadastre provides reliable, transparent, and dynamic information. Access to information is now easier, quicker, and the legal security of the land property is increased. Furthermore, the PLR Cadastre is in accordance with the current strategy of the federal government and the cantons in the field of digital transition, as they require a better availability of geoinformation to make administrative processes more efficient and closer to the population (e-government).

(cf. swisstopo, 2020: p2) (cf. swisstopo, Costs & benefits of the PLR Cadastre)

7.2 Limits of the concept

We can identify a few flaws to this tool:

First, the PLR Cadastre has yet to introduce all eligible restrictions. Furthermore, there are restrictions only described in a law like a distance to respect to a road and not visible on the PLR or any other portal.

Then, having a federalist organization has a lot of benefits, but also some disadvantages: Each canton manages its own PLR Cadastre, thus there is 26 different geo-portals. The heterogeneity of the geo-portals' interfaces can be a little confusing at first for the user who needs to switch from one to another. But it is possible to download the static extract from www.cadastre.ch.

Finally, as quickly mentioned previously⁴, in its current state of development, the PLR Cadastre does not enjoy public faith. The paper documents, legally adopted and signed by the relevant authorities, are still valid and must be consulted. However, these paper plans have the advantage to have seen their quality and precision improved.

Despite everything, the PLR Cadastre remains a powerful decision support tool. It offers great opportunities in terms of acquisition modeling and modern management.

7.3 Return on investment

The costs incurred in the PLR Cadastre are different for each canton. The development costs varied from 360'000 to 6.4 million euros per year between the cantons, and the average amount per canton was 1.34 million euros. The operating costs vary between 27'000 and 440'000 euros,

⁴ Technical aspects: Dematerialization of the information

and is on average per year and per canton around 177'000 euros. (cf. swisstopo, Costs & benefits of the PLR Cadastre)

It is, however, harder to quantify the direct cost savings from the PLR Cadastre. The greater market transparency should give rise to greater economic prosperity. Especially for the mortgage business, owners of real estate, the property evaluation sector and private engineering companies, the positive effects are estimated from 50 to 100 million Swiss francs a year. (cf. swisstopo, Costs & benefits of the PLR Cadastre)

End of 2016 and beginning of 2017, a survey has been realized by a society appointed by the Federal Office of Topography swisstopo to evaluate the necessity, appropriateness, efficacy, and economic efficiency of the PLR Cadastre. This survey only concerns the 8 pilot cantons, but another study will take place this year in 2021 to evaluate the second step. (cf. Schwenkel/Knubel/Schwegler/Rieder, 2017)

To conduct the survey, they relied on queries on PLR information sampling, telephone survey of the population, and online with eight professional target groups of the cadastre (municipalities, notaries, land registers, real estate sector, urban planners and architects, surveyors, cantonal authorities). They also gathered information from the cantons about the costs and utility of the PLR Cadastre.

Their conclusion is that, where the PLR Cadastre was already operational in 2016, the goals are achieved for the most part. The target groups confirmed the necessity to have a service which centralizes the information, and the PLR Cadastre is an appropriate tool. The economic efficiency is mostly observed by time savings by the professional target groups. It has been estimated as the following (cf. Schwenkel/Knubel/Schwegler/Rieder, 2017: p7): “

- For the municipalities: 500 working hours of time saving per month (approximately 820'000 euros per year)
- For the notaries: 515 working hours of time saving per month (approximately 850'000 euros per year)
- For the surveyors: 74 working hours of time saving per month (approximately 120'000 euros per year)”

Finally, the efficacy of the PLR Cadastre also seems to be confirmed. Target groups from cantons with and without PLR Cadastre have been compared, and it has shown that the tool has had an impact. (cf. Schwenkel/Knubel/Schwegler/Rieder, 2017: p8)

8. CONCLUSION

The PLR Cadastre in Switzerland can be considered as a success. It meets the needs of the different users of the cadastre, either professional or individual, and solves the problem raised in “Cadastre 2014” (cf. Kaufmann/Steudler,1998). The implementation of the tool in the different cantons is going well and the majority has completed it within the allotted time and will still see improvement. The Federal Office of Topography swisstopo planned three focuses in its strategy 2020-2023 (cf. swisstopo, 2020: p3):

- 1st focus: Introduction of all public-law restrictions on landownership in the whole territory of Switzerland. The cantons and the municipalities must complete their PLR Cadastre with the 17 most important PLR.

- 2nd focus: Expansion of the content of the PLR Cadastre. Supplementary PLR will be introduced, as it has already started.
- 3rd focus: Punctual development of the PLR Cadastre in the view of the strategy 2024-2027. It concerns, among others, the manipulation of other kind of restrictions.

A concrete return on investment is hard to make. Nonetheless, it is unreservedly positive, and the benefits of the PLR Cadastre can already be witnessed. The use of the tool is constantly increasing throughout the country and is now an essential tool for all the operators who work with the landowner property.

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BIOGRAPHICAL NOTES

Martine BESSE, surveying engineering student in a three-year course in the University of Applied Sciences Western Switzerland, Heig-VD School of Management and Engineering Vaud. Currently in final year of prospective Bachelor's degree in Geomatics. Three years of professional experiences as a surveyor apprentice and an employee in two different cadastral surveying offices in the canton of Vaud, Switzerland.

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