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# The Impact of the Agricultural Land Management Information System

on the Work of Local Self-Government Units and  
Directorate for Agricultural Land



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## List of Abbreviations

AP	Annual Programs for Protection, Development and Use of Agricultural Land
DAL	Directorate for Agricultural Land
DMS	Document Management System
GIS	Geographic Information System
GIZ	Gesellschaft für Internationale Zusammenarbeit GmbH
ITWG	IT Working Group
LSG	Local Self-Governments
MoU	Memorandum of Understanding
RGA	Republic Geodetic Administration
SOAL	State-Owned Agricultural Land

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## Executive Summary

To build a large scale, sustainable agricultural land management system, the Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH implemented the project “Rural Development – Effective Land Management”. The first phase of the project was funded by the European Union, the German Government and the Serbian Ministry of Agriculture, Forestry and Water Management (Ministry of Agriculture) from 2013-2015, and the second phase implemented under Serbian-German Cooperation ends in December 2018.

### Background and Implementation

The Agricultural Land Management Information System was developed together with key stakeholders from the national and local level (Ministry of Agriculture, the Directorate of Land Management (DAL), the Republic Geodetic Agency (RGA), and cities and municipalities) from 2013-2015. An IT working group (ITWG) was established and included representatives of stakeholders (DAL, Ministry of Agriculture, RGA, cities and municipalities). The IT development process included system analysis, establishment of working groups, selection of software vendors, system design and construction, testing, and training. After the IT system was developed, the project focused on providing comprehensive support to DAL and municipalities to ensure all municipalities use the IT system effectively. The system implementation phase ran from 2016 to 2018. In 2018, 120 of 145 municipalities joined the system, created their Annual Programs (APs), and are now in the phase of creating contracts. Approximately 700,000 hectares of SOAL will be in the system by the end of 2018 (total area of SOAL for Republic of Serbia in 2017 was 900,488.8464 hectares), and for the first time, DAL actually has an inventory of all SOAL in Serbia.

### The Impact Study

GIZ commissioned this Impact Study to assess the impact of the IT-solution on the management of state-owned agricultural land (SOAL) by municipalities and DAL. This study assesses the changes brought by the IT system to the local and national level, as well as the influence it had on the clients (lessees of SOAL). It measures the immediate impact of the new system in its first years and provides recommendations to maximize impact going forward.

**Methodology:** Three tools were used to complete this study: 1) document analysis, 2) semi-structured individual interviews of municipal and DAL officials, and 3) an online quantitative questionnaire sent to all 145 LSGs. The semi-structured, in-depth interviews were key to collecting a wide range of information from municipalities about both the positive and negative effects the IT system had on different areas of their work. Deeper and quantifiable information about micro and meso level changes came from an online, quantitative survey asking the 145 municipalities to rate the impact new IT system had on: 1) the time needed to create an Annual Program (AP) and to complete contracts, 2) the number of errors in APs and contracts, 3) the quality of APs, 4) communication between administrations at the local and national level, and communication with clients, 5) the quality of data on (SOAL), 6) the possibility to do analysis and control of SOAL use, 7) farmers access to information relevant to their leasing decision, 8) the transparency of the leasing process, 9.) the reduction of paperwork processes, 10) the reduction of postal expenses, and 11) job satisfaction.

**Impact:** This study demonstrates that real, quantifiable impact has already occurred, and it is likely that impact will grow over time. Specifically, the following impacts were documented:

- **Impact One: Improved efficiency.** The new IT system is already delivering measurable improvements in the process of managing SOAL, in terms of reduction in labor requirements, paperwork, and postal costs, and improvements in control and analysis of the use of agricultural land.

- **Impact Two: Improved quality.** The products of the SOAL management process are already showing signs of better quality of final products (APs and contracts), and the quality of work, in terms of improvement of job satisfaction, and improvements in transparency and accountability.
- **Impact Three: Improved customer service.** Municipalities are already reporting better visualization of parcels for leases, leading to better leasing offers, shorter waits for leases, and easier accessibility of data and more transparency for lessees.
- **Impact Four: Improved communications.** Digitalization has made communications between DAL and municipalities, and between municipalities and clients/citizens, more precise, quicker and easier, improving performance today and making future improvements more likely.

## Recommendations

The Impact Study concludes with a list of seven specific recommendations to maximize future performance and sustainability, as well as general recommendations for improving human and technical resources. Recommendations include:

- Development of a comprehensive and integrated IT strategy
- A mechanism for sustainable data exchange with RGA
- Need for a new systematization of IT job positions in DAL
- Streamlining of existing procedures to get the most out of the new IT system
- Establishing a sustainable training system
- Improving communications with municipalities and citizens
- Further steps to achieve a paperless environment and e-government

Each of these topics will be discussed in detail in the pages that follow.

# PART ONE

## **Introduction to the Agricultural Land Management Information System Project and to the Impact Analysis**

In PART ONE of this report, the assessor will consider the general approach taken to the Impact Analysis and discuss the motivations and goals behind the analysis. A short discussion of the timing of the analysis is included, including the feasibility of measuring impact accurately during the first full year of the system-wide adoption of the new IT solution.

Next, a brief description of the project itself will follow, in order to give adequate background and context for the Impact Analysis. The project goals will be described, and a short history of the implementation phase will follow.

In PART TWO, the assessor will give the full results of the Impact Analysis, based on the results of a thorough document review, a quantitative survey of municipalities, and in-depth interviews with key stakeholders in the system.

## **1. Purpose of the Impact Study**

The development of the Agricultural Land Management Information System was one of the main goals of the “Rural Development – Effective Land Management” project. From the very beginning, an IT-solution was perceived as a highly needed and necessary part of the effective land management future that the Directorate for Agricultural Land (DAL) and Local Self-Governments (LSGs) were aiming for. Development and implementation of the IT system required tremendous effort in various activities, as well as considerable financial outlay to ensure sustainability in the following years. The new system greatly influenced the work of DAL and municipal employees in preparing, controlling, and adopting Annual Programs for Protection, Development and Use of Agricultural Land (APs), and in creating leasing contracts.

The main purpose of the Impact Study was to assess the impact of the IT-solution for the management of state-owned agricultural land on the work of LSG units and DAL. This study assesses the biggest changes brought by the IT system to the local and national level, as well as the influence it had on the end beneficiaries (lessees of the State-Owned Agricultural Land (SOAL)). Did the IT system have an impact on the improvement of framework conditions for effective management of agricultural land? Did it enable DAL and municipalities to be effective, transparent, efficient, accessible and responsive to the needs of individual citizens and businesses?

Data collection for this impact analysis was based on a triangulation of methods involving 1) document analysis, 2) semi-structured individual interviews, and 3) an online quantitative questionnaire sent to all 145 LSGs, to get a broad insight into the changes brought by the new IT system.

The semi-structured, in-depth interviews were a key to collecting a broad range of information from municipalities about both the positive and negative effects the IT system had on different areas of their work, and their general working environment. We used open-ended questions, to learn about their perception of positive and negative impacts, asking municipalities to reflect on their work in the past, and their work now with the new system. The assessor highlighted changes or impacts reported by a majority of interviewed municipalities, as well as collected from the “Analysis of the Experiences of LSGs Adopting the Annual Program and Leasing State-owned Agricultural Land” (document that was used as the base line study). The interviews sought to measure impact that is happening at different levels, from local and personal to national and systemic. That is, the interviews investigated the:

- micro (individual),
- meso (institutional) and
- macro (systemic)-level impacts.

For getting deeper and quantifiable information about micro and meso? level changes, the assessor used an online, quantitative questionnaire, and asked the 145 LSG to rate the impact new IT system had on: 1) the time needed to create an AP and to complete contracts, 2) the number of errors in APs and contracts, 3) the quality of APs, 4) communication between administrations at the local and national level, and communication with clients, 5) the quality of data on SOAL (the situation in the field often differs from the data provided by the RGA, that is, the “legal” status of land and the “factual” use of land are often different), 6) the possibility to do analysis and control of SOAL use, 7) farmers’ access to the information relevant to their leasing decision, 8) the transparency of the leasing process, 9.) the reduction of paperwork processes, 10) the reduction of postal expenses, and 11) job satisfaction.

Macro level changes were investigated through interviews with top management of the DAL and Republic Geodetic Administration (RGA).

Having the OECD’s Development Assistance Committee definition of impact in mind, where impact is: “positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended”, one question rises at the beginning of the work on this study: Has there been enough time for impact to emerge?

### Timing of Study

Within the first phase of the project (2013-2015), an IT system was developed, and tested in pilot municipalities. The second phase (2016-2018) was focused on further IT system development and its nationwide implementation (to include all 145 cities and municipalities). In 2017, out of a total of 145 municipalities, only 17 used the system to produce an AP and create contracts. However, in the following year, 120 municipalities used the system, but not all of them were able to create contracts at the point in time when we conducted the survey. 2018 was the first year that the IT system was used by a majority of cities and municipalities.

During in-depth interviews with project beneficiaries and primary stakeholders, many comments were made that it was perhaps too early to see the “real and full” impact at this early date. Typical of the comments made in interviews was, “It is a bit harder this year to complete the process with the new IT system, but next year will be so much easier.” The first year of using the IT system required considerable data checking, verifying and cleaning for each municipality and DAL employee. Switching from manual to digital working procedures was time consuming and exhausting. For more than 100 municipalities and DAL staff, this was doing things for the first time in entirely new ways. During the first year, municipalities were consumed with data cleaning, learning how to work with the new system, struggling with occasional server issues, and inevitable bugs in the software. Thus, it was sometimes difficult to see the light at the end of the tunnel, and all the benefits that would eventually come from the new technology.

The real impact on farmers (lessees of SOAL) will only be measured fully either when farmers receive higher quality service from the administration than previously (getting their contract more easily and in a shorter period of time), or when the revenue increases after all the payments have been recorded. For the long-term impact to be measurable and recorded, the IT system should be fully in place for at least few years. However, GIZ wanted to complete a preliminary study to assess immediate impact, if any, and to provide recommendations to maximize impact going forward. This study demonstrates that real, quantifiable impact has already occurred, and it is likely that impact will grow over time.

## 2. Project summary/ Rural Development – Effective Land Management

To build a large scale, sustainable agricultural land management system, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ GmbH) implemented the project “Rural Development – Effective Land Management”. The first phase of the project was funded by the European Union, the German Government and the Serbian Ministry of Agriculture, Forestry and Water Management (Ministry of Agriculture) within the period from 2013-2015, and the second phase ending in December 2018 within Serbian-German Cooperation. The main focus of the project was to contribute to urban and rural development in Serbia through cooperation with the local and national actors as partners. The predominant challenges were: 1) insufficient capacities for managing agricultural and urban land on the local and national level, and 2) deficient cross-sectoral cooperation in urban and rural development (GIZ, Impact in Focus, 2017).

One of the primary goals of this project was to develop an IT solution for the management of SOAL for DAL in Serbia. This required tremendous effort in various activities, as well as considerable financial outlay to ensure sustainability in the coming years.

The first challenge of the IT component of the project was to design and build a system that provided transparency and efficiency across a large territory with varying types of land, land use, and administrative capacities. According to data from the real estate cadaster of the RGA, from 2012 there were around 691,000 hectares of state-owned agricultural land. This land was to be administered and managed by DAL through 145 LSGs (cities and municipalities). Every year these municipalities were required to produce (mostly by hand and on paper) Annual Programs for Protection, Development and Use of Agricultural Land (APs) that were to be approved by DAL. Municipalities used cadastral data on SOAL parcels that were provided by RGA (in excel table format) and hard-copy cadastral plans. After the adoption of the APs, agricultural land was used accordingly in a variety of ways: leasing to farmers, giving for use at no charge for educational, social service, and scientific research institutions, and reforestation are some of the ways that SOAL was used. The existing leasing procedures were complicated, unclear, and time-consuming. The leasing process was not seen as accountable and transparent, and lessees were not satisfied with the drawn-out process of securing leases. In 2012, only 106 municipalities created the required Programs, and only 184,646 out of the total 691,000 hectares of SOAL were planned to be leased (Directorate for Agricultural Land, 2012). This inefficient

use of SOAL led to lower incomes for farmers, municipalities and the state; abandonment of agricultural land; depopulation of rural regions; and lower agricultural production.

During the project, it became apparent that three conditions had to be met to ensure sustainability.

### Condition #1

First, there had to be a deep and underlying interest among the stakeholders in the success of the project; *assuring that all key players see their benefits from the future information system, and see themselves as a part of it, increases the chances for the system’s successful implementation.* No progress would have been possible if all stakeholders did not have

### 3 CONDITIONS TO ENSURE SUSTAINABILITY

1. Deep and ***underlying interest among the stakeholders*** in the success of the project.
2. ***Total inclusion of the stakeholders*** in the development process.
3. Assistance should not simply end once the IT system was built and installed; ***further support during the early stages of implementation*** is necessary to ensure the successful organizational change that is implied by reorganization around an IT system.

a direct interest in the success of the project. The state has an interest in increasing revenue from leasing of SOAL. 60 percent of this revenue goes to the budget of the Republic of Serbia and 40 percent to municipal budgets (RS, 2009). A larger income means more resources available for regular improvement, protection and development of agricultural land.

For example, in 2016, an additional 120.000 ha was included in the yearly planning, which increased the state revenues by 27 million Euros (B92, 2016). This land was previously improperly used, that is, it was misused in different ways and no payments were made to the state. DAL's personnel had a direct interest in a successful system as well, as an IT system would mean less time spent in the exhausting, time consuming and mistake-prone process of checking paper-based APs, and more time for planning, monitoring and investing in the SOAL. Similarly, municipal officials would spend more time in the field, and less time on the intensive telephone calls with DAL correcting the APs or reassuring unsatisfied lessees that their contracts will be ready before the seeding season. For farmers, an IT system would mean that "leasing of land is implemented in a timely manner, respecting technical and agro-economic deadlines, and in a clear and universally familiar way" (Čukić, 2014), and that the leasing process is transparent and free of corruption. The relevant Minister and the Director of DAL are counting on "... IT-system, which serves as a valuable input into decision making processes on the level of the municipalities, as well as on the level of the Ministry of Agriculture and DAL" (GIZ, 1st Project Interim Report 2013, 2013).

#### Condition #2

Second, it was essential that each stakeholder be fully included in the development process. "Experience suggests that successful implementation requires not only heavy investment by developers early in the project but also a sustained level of investment in the resources of user organizations" (Kraus, 1985 ). In order to ensure ownership over the IT System, DAL and municipalities took their part within different working groups, from the early stages of defining the requirements of the system, through selection of the development teams, system development, and finally system deployment. *Such involvement of the users ensured their satisfaction with the system, made them responsible for the newly built system, and made them aware of the requirements such a system brings to their organizations. They were able to assess their own strengths and weaknesses, both individual and organizational, and to understand better the changes the new system would bring to their organizations.*

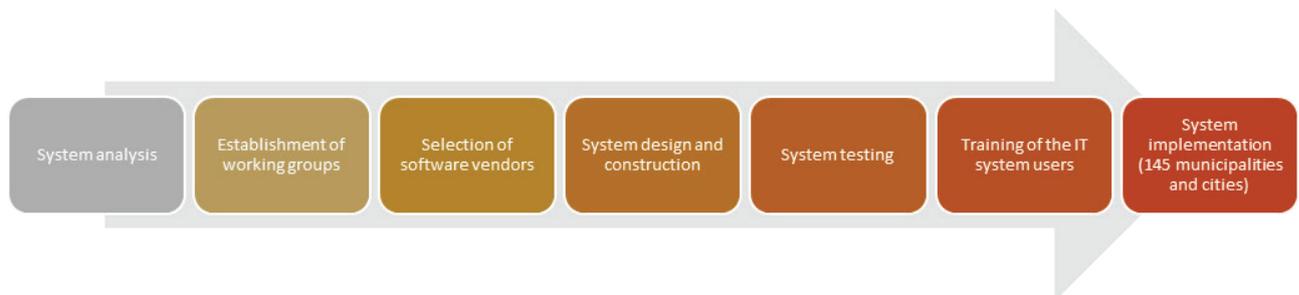
#### Condition #3

Finally, assistance could not simply end once the IT system was built and installed; further support during the early stages of implementation was necessary to ensure the successful organizational change that is implied by reorganization around an IT system. *A change of this magnitude cannot be expected to take hold after the ending date of an assistance project. Even when a system is developed, and delivered to the end users, the majority of the work on system implementation often is still to be completed.* Not all stakeholders are ready to use the system, and some of them will need further support in the area of organizational change, the development of an IT Strategy, and human resources development.

### 3. Development of the Agricultural Land Management Information System

The Agricultural Land Management Information System was developed together with key stakeholders from the national and local level (Ministry of Agriculture, DAL, RGA, and cities and municipalities), during the period from 2013-2015. In order to assure that all relevant information

and requests were taken into consideration, an IT working group (ITWG) was established. The ITWG included representatives of all relevant stakeholders (DAL, Ministry of Agriculture, RGA, cities and municipalities), and was active in all phases of system development. Employees of DAL closely participated in the system development process. The IT development process included system analysis, establishment of working groups, selection of software vendors (vendors), system design and construction, testing, training, and system implementation phase.



*IT System development process (2013-2018)*

The design and features of the IT-solution were based on an assessment of the existing procedures within DAL, cities, and municipalities; the existing technical and human resources; and the data necessary for an effective management and monitoring of agricultural land.

The IT-solution was designed to be a flexible, modular, scalable, web-based solution usable both at the national level in DAL and in all cities and municipalities. It included data from multiple sources, including official data on agricultural land parcels from the RGA, data about existing leasing contracts from DAL, and data from the field from cities and municipalities. The comprehensiveness of the database enabled improvement and updating of cadastral data. Since geo-spatial data were not available for all cities and municipalities, the system was designed to enable work for both those who have geo-spatial data, and those who have only alphanumeric data.

Every system module was tested by the development teams, and after that by relevant personnel from DAL, cities, and municipalities.

Users of the newly-created IT system were trained to maximize the benefits this tool offered. The change from paper-based work to an automated process required good organization and lots of flexibility in implementation. Early trainings were done with pilot municipalities throughout the IT system testing phase, and then gradually expanded to other municipalities. Different training options were planned: regional training, on the job training, *peer-to-peer training*, and online tutorial videos.

### 3.1 Analysis of the Existing System and Procedures

Development of the IT system required a common vision from the start. This vision was to create an Agricultural Land Management Information System for the management and monitoring of SOAL on the national and local level. The vision was clearly stated, and was embraced by DAL, cities and municipalities, and the Ministry of Agriculture.

The next step was to undergo a structured analysis of the existing situation and processes in DAL, cities and municipalities, and RGA, in order to get basic information for designing a future information system. A description of core responsibilities of each department and an analysis of the requirements to improve processes were the starting points for the architecture of the future IT system. Existing workflows, software, hardware, and databases were assessed, first within DAL and then within the municipalities. This inventory showed the current approach to the management of state-owned agricultural land. The architecture of the future IT system, describing its components and a draft cost schedule, was proposed, together with recommendations for the next steps (Wirtz, Stojakovic, 2013).

In order to have an objective overview of the existing procedures for leasing SOAL, GIZ did a survey that included employees in the cities and municipalities, and farmers. Based on this survey, an analysis was prepared that quantified advantages and disadvantages of the existing leasing processes and included recommendations for improvement. Major concerns identified were that the “leasing of land should be implemented in a timely manner, respecting technical and agro-economic deadlines, in a clear and universally familiar way, defined by the Law or a bylaw” (Čukić, 2014). The assessment showed that the procedures are too long and complicated, and suggested that unnecessary or excessive requirements should be removed by new legislation. Another important finding, emphasized in the opinions of lessees, was that “the data in the public call, and therefore in the AP, should correspond to the situation in the field, in order to avoid situations where legally leased parcels are already illegally occupied and used.” (Čukić, 2014). Those recommendations were taken into account while designing the future IT System and updating old procedures.

### 3.2 Establishment of Working Groups

In order to ensure the full involvement of the users, the IT Working Group (ITWG) was established, along with another working group for the improvement of procedures, in the early stage of the project. Relevant stakeholders from the involved institutions (DAL, Ministry of Agriculture, RGA, pilot municipalities and farmers) became members of the working groups. Regular meetings with stakeholders were crucial “to binding the users to the project, by offering first hand demonstrations of progress, providing a forum for issue-specific discussions, and by setting milestones” (Vaughan, 2001). The ITWG participated in every stage of the system development: selection of the development team, system design, and testing and system deployment. Such deep involvement of the users and developers enabled them to set common expectations regarding the future system. Actively involved users spontaneously gained the feeling of ownership of the system from the beginning of the project.

In order to enable the ITWG to make educated decisions, GIZ organized several events and study visits, during which examples of IT systems for land management from different countries were presented. During those events the members of the ITWG had a chance to learn from their colleagues from different countries about the process of developing IT systems, what kind of organizational change they had to go through, and obstacles they had to face.

### 3.3 Selection of the Software Vendors

The selection of the team of developers is very important for an IT project. The users have to be fully satisfied with the technical solution offered by the developers, and the users and developers must be able to work together closely. The development team becomes part of your project, and it is crucial that the users feel fully comfortable working with them. For this reason, GIZ decided to continue cooperation with an IT firm with which DAL already had a positive working relationship. This firm would lead the development of one part of the IT system, the Document Management System (DMS). This firm developed the application for the monitoring of payments according to the lease contracts, and that application was already being used in DAL for a year.

- The selection process for the second part of the IT system, the GIS solution, included several steps:
- Verification of the Serbian Geographic Information System (GIS) market
- Creation of accurate and thorough requirements for the solution
- Trial of test features, benefits and usability of selected products
- Selection of the development firm (Wirtz, 2013)

First, a market analysis of GIS in Serbia was conducted, and a wide range of available information on GIS technologies in Serbia was collected. Several presentations and discussions with well-known and reputable firms were conducted. In addition, GIS solutions in use in Slovenia's Farmland and Forest Fund, Serbia's Vojvodina Provincial Secretariat of Agriculture, Water and Forestry, and Subotica and Pirot municipalities were considered in more detail. During two workshops with Polish and Lithuanian experts, their countries' systems for the management of agricultural land were presented. The basic GIS requirements that all producers had to fulfil were:

- Mapping
- Geocoding
- Data support and interoperability
- Application framework for customization
- Data management and validation
- Data manipulation and analysis
- Web server, Web services
- Layout printing and plotting (Wirtz, 2013)

After several discussions with the IT Department of the Ministry of Agriculture and the IT Department of RGA, a choice of 3 different vendors was made. The selection was based on the following criteria:

- Basis of GIS is a well-known GIS standard
- Company should not be involved in a court case with the Ministry of Agriculture or RGA
- Company should not have delivered an inadequate result in previous projects (Wirtz, 2013)

The three selected companies provided testing solutions which were tested and evaluated by the members of the ITWG. Testing provided information both on the technical possibilities of the GIS product, and about the commitment of the supplier. During the testing, the ITWG had a chance to get answers regarding the scalability of the solution, the integration and communication with already existing and future system modules, maintenance costs, the training of the users, and support during development and deployment of the system. The final decision of the GIS vendor was based on the technical specification of the products, the results/grades of the product testing, additional costs (for e.g. workflow, data processing, and training), the time period to implement a finalized product, positive references in Serbia, and the price. This decision, regarding the selection of the GIS vendor, was strategic in many ways. DAL and the Ministry of Agriculture entered into a strategic partnership with the selected company, not only for the purpose of the successful development of this IT system, but also regarding possible scaling up of the system that will meet the increasing needs of the Ministry and DAL in the future (Wirtz, Kalem, 2015).

### 3.4 IT System Construction

Construction of the IT solution was one of the most intensive and demanding phases in the IT system development. During this phase, engagement of the ITWG and other relevant stakeholders from all relevant institutions (DAL, Ministry of Agriculture, municipalities and RGA) and all management levels (Director of DAL, heads of department, operational level employees) was at the highest level. Communication between development teams and users was extremely tight and regular. They were working on software development and availability of data in parallel.

The IT system for the management of SOAL was designed to cover the procedures for leasing SOAL. The system would have a modular structure and would be built step by step. It is scalable, which means that new or adjusted working procedures can be integrated at any time in the future. The system included already existing IT structures in DAL. It is based on standard products: MS SQL as the database software and Esri ArcGIS for the GIS application. Two local companies were responsible for the development of its modules. One was responsible for development of the Document Management System (Pointsoft), and a second one for the GIS part of the system (GDİ GISDATA).

The main modules are:

- **Module 0:** Monitoring of payments and contracts – already *existing financial module before project started*
- **Module 1:** Control, creation and realisation of the AP used by DAL
- **Module 2:** Web-based application for preparation of the AP used by DAL and municipalities; part of GIS
- **Module 3:** Web-based application for managing information and documents of the leasing procedure used by DAL and municipalities; part of DMS

Each module was developed in close cooperation between development teams and users from DAL and municipalities. This cooperation was especially intense during the development of use case scenarios and the testing phase. For each module, a use case scenario had to be created and then accepted by the ITWG and ultimately by the Director of DAL. Only after all parties had signed off could development teams start programming.

Testing was done for each module, first internally by development teams, and later by relevant users (representatives from pilot municipalities, and different departments from DAL). Based on testing results, modules were formally accepted by DAL, and consequently moved to a production environment. The modular structure of the IT solution enabled the project to build module by module, and in that way to de-stress users, DAL employees, and municipalities who were in parallel doing their everyday jobs and participating in development of modules.

The IT solution was conceptualized as a client-server solution with web applications usable in all 145 municipalities and in DAL (See Figure 1. Client-Server Solution).

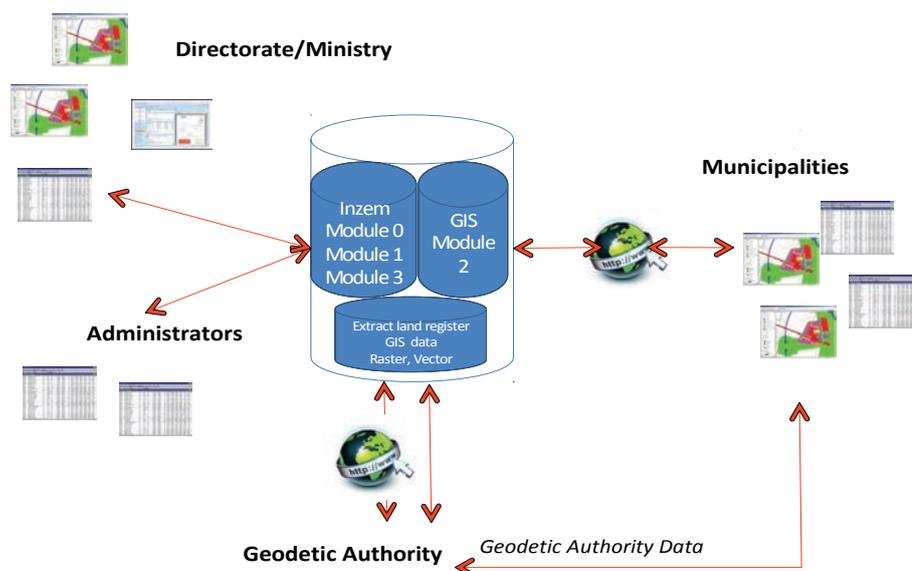


Figure 1. Client-Server Solution

The full IT solution consists of 3 applications: two web-based applications (LOCALIS Web GIS application and InZem Web-based application), and one desktop application (InZem desktop application). Municipalities use the LOCALIS Web GIS application to prepare APs. Those APs are then sent to the InZem desktop application where they are checked and approved by relevant DAL personnel. Finally, based on those approved APs, SOAL is leased (through contracts with farmers). That process is covered by the InZem Web-based application that is used by municipalities. Each of these applications is part of the solution and only in their harmony lays a well conceptualized system (Wirtz, Kalem, 2015).

Two Servers, one for the databases and one for the application, are located in the Joint Services Agency (UZZPRO), and are accessible via internet/intranet by DAL and municipalities (See Figure 2. Agricultural Land Management Information System Scheme).

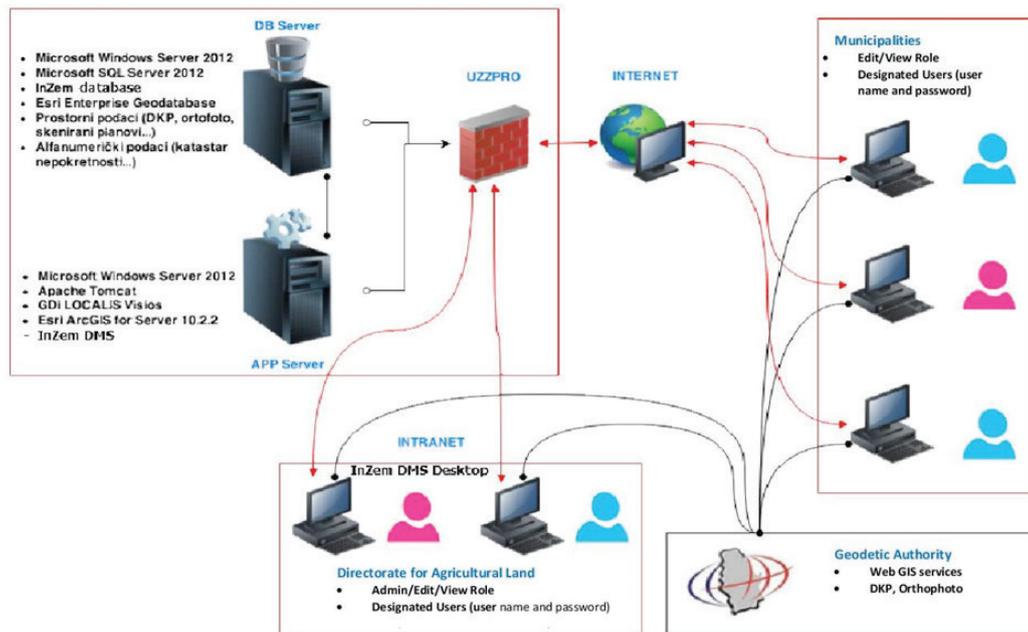


Figure 2. Agricultural Land Management Information System Scheme

The InZem database contains alphanumeric data about all SOAL (real estate cadastre data) and data regarding existing lease contracts, and the geodatabase contains all spatial data received from RGA. All necessary data are centralised on DAL's server, and all users work on the same datasets (Wirtz, Kalem, 2015).

The quality of the IT system depends on the quality of data it includes and produces. The Agricultural Land Management Information System includes data from different sources. Official data on agricultural land parcels come from RGA (alphanumeric and spatial data), data about existing leasing contracts are from DAL, and data from the field come from cities and municipalities (actual situation in the field). The availability of data from RGA, with a clearly defined format, content and timeframe of data exchange, was a prerequisite for the good functioning of the system. DAL and RGA signed a Memorandum of Understanding (MoU) regarding data delivery/exchange. This MoU covered all the data at RGA necessary to run the IT solution of DAL:

- Alphanumeric data from the real estate cadaster (.mdb format);
- Digital cadastral plan (vector format; Geodatabase)
- Available scanned cadastral maps or raster data in TIFF format (for cadastral municipalities for which there is no digital cadastral plan)
- Digital ortho-photo substrate in the form of TIFF / TFW files in Gauss-Kruger projection, resolution 40 cm;

Access to the ArcGIS Map service for spatial data of the cadastral parcels, buildings and addresses for all the municipalities of the Republic of Serbia (Geodetic Authority, 2015)

One of the biggest problem users from municipalities were facing was the difference between official records about parcels and the situation in the field. The new structure of the database enabled improvement and updating of cadastral data. The IT system can produce reports with the list of parcels that need updating (with the current information from the field). DAL has to establish the procedure for regular data updating of SOAL in the real-estate cadaster of RGA, where they change official records accordingly.

Since geo-spatial data were not available for all cities and municipalities, the system was designed to enable work for both those municipalities that have geo-spatial data, and those that have only alphanumeric data. During the transitional phase (2016-2017), not all municipalities were using the Web GIS application to prepare APs. In order to assure that data from all LSGs were included into the new central database, old excel-form APs were imported. In that way, data acquisition for all LSGs was enabled.

### 3.5 Training System

No matter how easy to use and intuitive an IT system is, implementation of the system into an organization will never reach its full potential without ongoing education of users available for everyone, and at any time. “It generally takes 6-12 months after implementation for companies to start feeling comfortable with the new systems. It may take longer to achieve the return on investment from the application. Training is the single most important thing you can do to shorten the learning curve” (Barry, 2017). Trainings will not only provide necessary knowledge about the system, but will also:

- improve the quality of work
- increase productivity
- improve the organizational culture, team work and communication within DAL and between DAL and municipalities
- strengthen the sense of ownership of the system

Users of IT need to be trained. The level of training depends on the complexity of the IT system and the degree of interaction the user will have with it. Levels of training can range from university degrees to daylong courses for user intuitive interfaces. Ideally, for the general user, IT systems will be easy to use, and the amount of training needed will be minimal. This is particularly important where the IT system will be used by large numbers of users, who will have only a brief encounter with it. At the other end of the spectrum, personnel who are involved in systems design, development and maintenance often need to be highly skilled, and therefore highly trained. Such high-level training could take the form of university degrees, extensive hands-on experience, or intensive coursework, and often a mix of all three. In between these two extremes falls the majority of full-time or long-term employees, those who perform clerical, administrative, operational, supervisory and policy work. These staff members often use IT in their daily work, but in their case, IT is a tool to complete a task, rather than a task in itself (Wirtz, Kalem, 2015). It was very important to give proper consideration to the trainings of the involved users of the developed IT solution for management of SOAL and plan them as the process of developing and implementation proceed further. The three major categories of trainees are:

- DAL personnel responsible for IT system development, maintenance and user support (GIS group)
- DAL personnel who are using the IT system in their everyday tasks

- Municipal employees who are using the web-based applications for the creation of APs and for managing information and documents of the leasing procedure (145 LSGs)

A training system for all three categories of users was developed and trainings were organized in parallel with the development of the IT system modules.

A sustainable training system is a prerequisite for successful system implementation, and it is necessary to address training needs in the IT Strategy that has to be developed, and to reallocate the budget of DAL, for the training purpose, accordingly.

### 3.6 System Implementation

The focus of the implementation phase was to provide comprehensive support to DAL and municipalities in order to have all municipalities within the IT System.

This support included:

- Monitoring and supporting municipalities as they adopted the new system
- Further development and updating of the IT Solution (development of applications, hardware upgrade, software update)
- Data exchange and data sharing (between state institutions, central and local level institutions, and all state levels and citizens)
- Establishing a sustainable training system for stakeholders from the national and local level (DAL and cities and municipalities)

IT system was further developed according to the law amendments and produced bylaws on the procedure of leasing the state land. Two additional applications are in the process of development. The first one is an application for the management of the Field Book, tool for planning and monitoring of everyday activities in agricultural production, that will enable better control of land management and use by the farmers who are leasing SOAL. The second one is a SOAL web application, that will allow citizens to have an overview of locations, property, cultures, classes, areas, etc. of all free state plots at any time (according to the Open Source Data principle). This option will greatly facilitate the citizens to decide to rent state-owned parcels because they would provide them with all necessary information for planning the use of certain land. In this way the project is acting according to the Agenda 2030 in terms of food security, better nourishment, sustainable agriculture etc.

In 2018, 120 of 145 municipalities joined the system, created APs, and are now in the phase of creating contracts. Approximately 700,000 hectares of SOAL will be in the system by the end of 2018 (total area of SOAL for Republic of Serbia in 2017 was 900,488.8464 hectares).



## PART TWO

### **Results of the Impact Analysis of the Agricultural Land Management Information System Project, Including Success Factors and Recommendations for Future Improvements**

In PART TWO of this report, the assessor will attempt to judge the impact of this project on the efficiency and accuracy of the land management process in Serbia.

First, a detailed description of the quantitative and qualitative methodology employed will be provided.

Second, the assessor outlines the significant, measurable *Impact* delivered through the implementation of the agricultural land management IT system project, in the categories of:

- Improvements in the Process of Managing State Owned Agricultural Land
- Improvements in the Quality of Work
- Improvements in the Quality of Service to Clients (Lessees)
- Improvements to Communications Between State Bodies, Municipalities, and Clients

Finally, the assessor provides seven specific and achievable *Recommendations* for making the system better, maximizing impact in the future, and ensuring that the IT system is sustainable in the long run.

## 4. Impact Study Approach and Methodology

In preparing this **Impact Study of the IT Solution for Land Management on the Work of Local Self-Government Units and the Directorate for Agricultural Land**, the assessor sought, first, to get a comprehensive picture of the project, its goals, and its outputs from careful study of the documents related to the project (proposals, work plans, activity reports, and reports from municipalities concerning lands available for lease and revenues from leasing). Then, the assessor developed, in consultation with project leaders and stakeholders, quantitative and qualitative surveys to determine whether project goals were met, and to assess the impact the project had on state land use in Serbia. The methodology used for this assessment is described in more detail below.

In the beginning, the assessor conducted a series of meetings with key personnel managing the project, including Project Leader Anne Wirtz, and Project Manager Svetlana Bačanin. Through these interviews, the assessor gained an understanding of the goals of the project, the activities undertaken, and the difficulties encountered from those who managed day-to-day implementation. The assessor also scheduled meetings with key officials from the Directorate for Agricultural Land (DAL), and the municipality Beočin to understand the project better from the recipient side. The assessor also received copies of all project materials, including work plans and activity reports, as well as materials compiled by DAL cataloging yearly statistics on agricultural land available, agricultural land leased, and lease revenues for every municipality in Serbia from 2014-2017. This information helped complete the picture of the environment the project was meant to address.

After completing this preliminary phase, the assessor turned to the development of quantitative and qualitative surveys to collect information from stakeholders in a systematic way. The qualitative survey was conducted first., Using input from the project the assessor developed a discussion guide for in-depth semi-structured interviews to be conducted with representatives from selected LSGs and other key beneficiaries of the project. Each interview was designed to last about two hours, was guided by pre-determined set of open questions and covered topics including 1.) **resources of the municipality** (human and technical) available for SOAL management , 2.) **past experience with SOAL management**

(processes used in developing Annual Programs (APs) and issuing contracts before this project), 3.) **impact of the new IT system** (simplicity and usefulness of the IT system developed by the project, comparison between pre-project and post-project processes, whether the new IT system and related changes led to increased speed, accuracy, and satisfaction among municipal staff and farmers/clients, major issues LSG had with system), 4.) **implementation of the project** (support from GIZ and DAL), 5.) **IT system sustainability** (what more should be done to make the positive impact even stronger, and to ensure its sustainability).

The assessor traveled to 13 LSG from all regions of Serbia in June and July 2018, to conduct the in-depth interviews with the relevant municipal representatives. The municipalities were chosen in cooperation with the GIZ project manager and DAL, on the basis of 1.) whether they used the IT system to create APs and produce contracts, 2.) area of total SOAL, and 3.) area of leased SOAL. The municipalities surveyed were: Srbobran, Mali Idoš, Subotica, Batočina, Zrenjanin, Kovačica, Sremska Mitrovica, Sombor, Bač, Beočin, Ražanj, Niš, Knjaževac and Negotin.

In addition to municipal representatives, the assessor also conducted in-depth interviews with other participants and stakeholders of the project. This included representatives of three DAL “departments”: the GIS group, the group for AP control and the legal department (which is responsible for AP implementation/contract control), as well as with the DAL director, representatives of RGA, and representatives of two IT firms that developed and are maintaining the IT system. Their detailed responses to the survey, combined with those of the representatives from selected Local Self-Government Units, gave a much more complete picture of the implementation of the project, challenges faced, and results achieved.

While the qualitative surveys, in the form of in-depth interviews, gave tremendous insight into the implementation and results of the project, the assessor wanted to have data from all (or most) municipalities in a quantitative format that could be analyzed statistically. Therefore, after the completion of the in-depth interviews, the assessor developed a questionnaire of about 70 questions, based on findings from the interviews. The survey was pre-tested by about 10 individuals, some with knowledge of the project and some without such knowledge, to ensure the questionnaire was clear and understandable to the intended audience. An online survey application was used to deliver the survey to representatives from all Local Self-Government Units and to ensure the completion of the survey would not be a burden to respondents.

The assessor and GIZ sent the questionnaire to all municipalities in mid-August 2018 and followed up with reminder emails and phone calls to encourage all municipalities to respond. After the initial distribution, 45 municipalities responded. A first email reminder prompted a further 36 municipalities to complete the questionnaire. Subsequent emails and phone calls ultimately drove the number of responses to 106 municipalities by mid-September. Therefore, the total sample for our quantitative survey is 106, or 73% of the all 145 municipalities in Serbia targeted by the project. The margin of error for the results of this survey is about 4.95 %. 87 municipalities reported using the new system to develop APs and complete lease contracts, while 19 reported that they did not yet use the system. Of those 87 municipalities, 18 reported that they did not yet use DMS (Document Management System) application for contract creation, and they skipped the questions related to contracts creation. For questions about the DMS system the number of respondents was 69 municipalities (47.58% of total population), making the margin of error 8.6%.

Results of the qualitative and quantitative surveys were analyzed and compared to the project activities and goals outlined in the initial stage of this assessment, and this report is the result.

## 5. Impact of the system

As it was mentioned earlier, it is difficult, if not impossible, to measure the total, long-term impact of a system that has been used only for one year, and by 83% of all municipalities. **Nevertheless, quantitative and qualitative data from the 87 municipalities that used the system at least one year suggest that real, measurable improvements have already occurred.**

For the first time DAL actually has the inventory of all SOAL in Serbia. Our research finds that DAL and municipal officials are spending significantly less time creating APs and contracts. They are printing, filing, and mailing many fewer documents, all while increasing transparency in a previously opaque system. There are already measurable improvements in the quality of products from the new IT system (significant reductions of errors, greater accuracy of parcel data, better lease offers reported). There is evidence that customer service will be enhanced (municipalities anticipate significant gains in transparency in the process, better and clearer overviews of available land, easier and shorter leasing processes) and communications among DAL, municipalities, and clients is easier and clearer, bringing benefits today and making sustainability and improvement in the future more likely.

### 5.1 Impact one - Improvements in the process of managing SOAL

The new IT system is already delivering measurable *improvements in the process of managing SOAL*, in terms of reduction in labor requirements, paperwork, and postal costs, and for the first time, DAL actually has an inventory of all SOAL in Serbia, which brings improvements in control and analysis of the use of agricultural land.

We will measure improvements in the *process of the management of SOAL* under the following indicators:

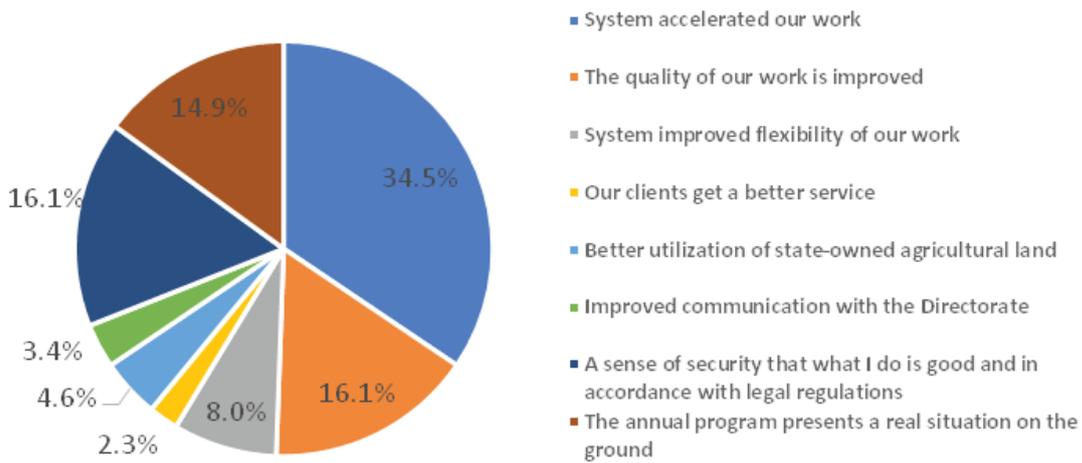
- Length of time required to produce APs and leasing contracts
- Reduction in paperwork and postal costs
- Control and analysis of the use of agricultural land
- Reduction in the specialization of skills required to complete the leasing process

#### 5.1.1 Time required to produce Annual Programs and leasing contracts

***Overall, 78 percent of municipalities reported a reduction in the time required to create Annual Programs, and an impressive 52 percent of municipalities reported a 50 percent or more reduction in the time required. Similarly, 75 percent of municipalities reported a reduction in the time required to create leasing contracts, and 45 percent of municipalities reported a 50 percent or more reduction.***

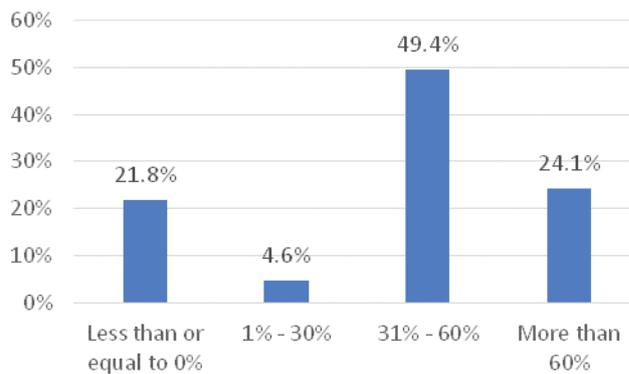
In past surveys and in informal interactions with municipal partners, the top complaint of administrators of SOAL was always frustration with the long process of manipulating non-transparent Excel tables to create APs. According to the 87 municipalities in this current survey who used the new IT system to create APs this year, the previous procedure would take between 7 and 150 days to complete (40 percent had required less than one month, but 29 percent required more than two months to complete APs).

In assessing the Impact of the new IT system on management processes of SOAL, we first asked municipalities to name the greatest benefit of the new IT system. 35 percent of all municipalities named an “acceleration of our work” as the biggest benefit of the system, by far the top answer.



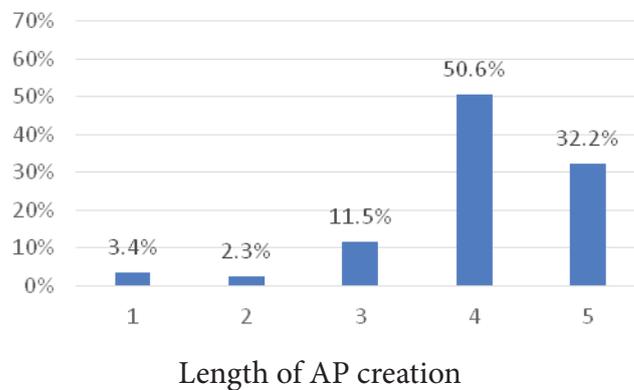
### What is the biggest contribution of the IT system?

Next, we asked municipalities to tell us how much time was required to produce the AP under the new IT system. When that number was compared to the reported time required before the IT system was developed, we could estimate the time saved for each municipality. 78 percent of municipalities reported a reduction in the time required, while 53 percent reported a 50 percent or more reduction, and 24 percent reported a 60 percent or more reduction.



### How faster are you creating annual program now with the new system (%)?

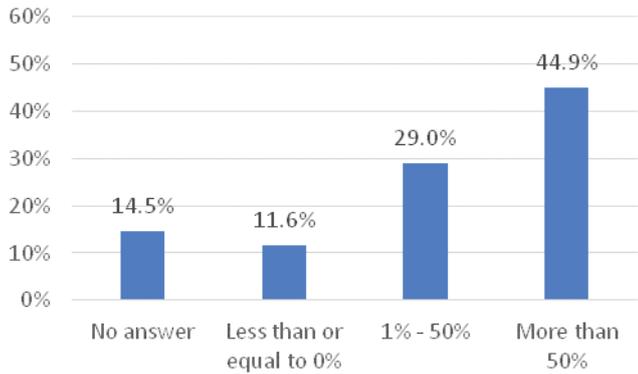
We also asked municipalities to assess the impact of the IT system on their work in relation to the time required to create an AP. 84 percent of municipalities rated the system highly.



Perhaps surprisingly, 21 percent of municipalities reported requiring more time to create an AP. This should not be too much of a surprise, however. First, this was the first year most of the municipalities had used the new IT system, and it was inevitable that there would be some initial difficulties. Evidence suggest, however, that these start-up difficulties will dissipate in future years as municipalities get more

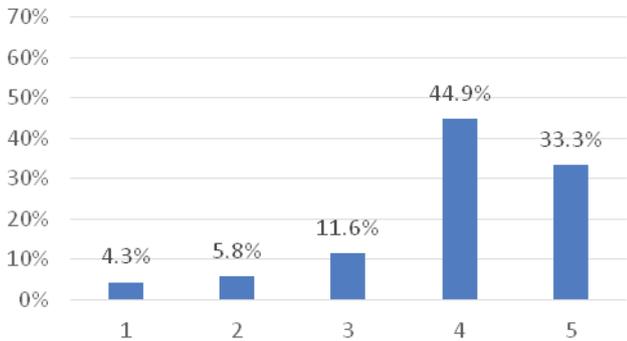
practice with the system (see chapter 7. Indicators of Success of the New IT System from the Municipal Survey- c.). Problems with DAL's server slowed down a majority of municipalities, especially those who were working during February and March 2018. Their work was very slow during working hours, and in order to be able to work on their APs they had to access the system during the night, working from their homes. This technical problem was solved, and hopefully work in the GIS application will be much faster in the following years. Another issue municipalities mentioned that took longer time this year was the process of parcel exclusion. This year they had to process every single parcel and give an explanation why is it excluded, and in many cases document the exclusion (as opposed to previous years when they could just cut and paste whole sections of an Excel database). Also, this year, DAL (the AP control group) had to do control of every single excluded parcel (aprox.350 000 ha), which was the main reason municipalities had to wait longer for their AP to be controlled and validated. In addition, there were some other problems in the overall state management of land that were not directly attributable to the new IT system. For example, some municipalities reported bad information from the real estate cadaster that had to be corrected before work could be done.

Only 59 municipalities in our survey had completed leasing of SOAL by the time we did the survey. These municipalities reported that in the past, the leasing process used to take them between one and 90 days. With the new IT system, municipalities required on average 8.5 working days to create contracts. Overall, 73.9 percent of surveyed municipalities required less time to complete contracts, and among those who did complete contracts faster, the average reported reduction in time required to produce contracts was 63.7percent.



How faster are you creating contracts now with the new system (in %)?

We also asked these 69 municipalities to assess the impact of the new system on the *time in which their clients are getting contracts*. 78 percent of municipalities rated system highly in this area.



Time in which lessees are getting their contracts

11.6 percent municipalities reported they needed more time to create contracts this year. They mentioned that working for the first time with the new system slowed them down. Another issue that was reported to us concerns municipalities Bač, Subotica, Pančevo, and Kikinda that have a legacy system for bidding, managing payments and deposits, and creating relevant documents for the bidding

process (a software package called Agroland). Since the bidding process was not covered in the new IT system (because of the different bidding procedures in different municipalities), these municipalities continued to use their old application. This year they had to do, in parallel, data entry into the old (Agroland) and the new IT application. This was a very time- and resource-consuming process for them. The longer waiting time for DAL to do the validation of contracts was another issue mentioned by municipalities. Representatives of municipalities explained to us that the reason for long waits is the small number of DAL employees who are “overwhelmed” by the large number of documents they received in a short period of time. (See Annex 1. In-Depth Interview Findings for more information about these challenges and how they might be overcome).

At the time the survey was completed in early September, 2018, 19 percent of the municipalities (20 municipalities) reported they still had not used the new IT system to create contracts, and were not able to assess the impact of the system on contract creation.

The findings of the municipal survey are backed up by the feedback received in the in-depth interviews conducted in 13 representative municipalities.

### **In their own words...**

#### Time required to produce Annual Programs and leasing contracts

**Zrenjanin:** We are getting our contracts and decisions done in one to two days, and that is the area where we benefited a great deal. That is also the reason why we decided to start with the system last year.

**Kovačica:** This year we did it first in the old way, it took us 9 days to do it, and then we worked in the system and finish it in 14 hours.

**Mali Idoš:** It (the IT system) has made it much easier for me to make contracts and decisions. Now it's 50% faster. It would be good idea to introduce an electronic signature, so that the contract does not have to travel many times (physically for DAL's Director signature), and that our clients do not have to come to our office several times.

**Srbobran:** Scanning was time consuming, but the well-established foundation is very important.

**Sombor:** The system facilitated our work, and accelerated the production of the AP, but also prolonged our work in certain areas and we have to do things twice.

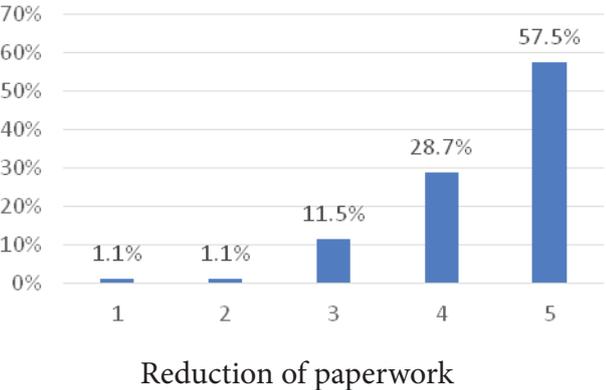
### 5.1.2 Reduction in paperwork and postal costs

**86 percent of municipalities reported that the new IT system led to a significant reduction in paperwork, and 77 percent reported that the new system led to a significant reduction in postal costs.**

Surveyed municipalities were asked to assess how the new IT system impacted their need to print, modify, file, and mail physical documents, and how successful it was to move them to a digitized, paperless system. Previously, every step of the process of creating annual programs and preparing contracts required printing and re-printing documents numerous times, sharing and marking up physical documents, and circulating documents for approvals, both within the municipality and with DAL in Belgrade. This process required a lot of paper to be wasted, as well as requiring a lot of time, complexity, and delays.

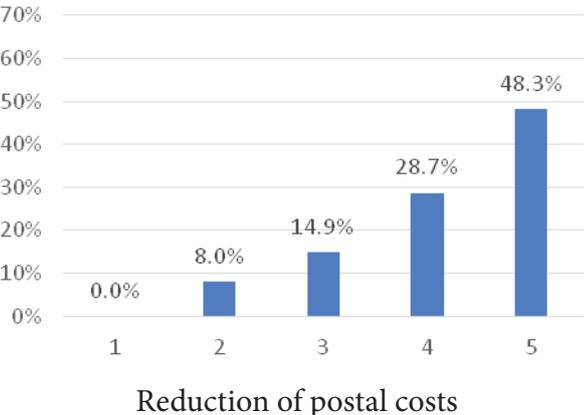
The digital transformation of an organization is a process of moving paper documents and working procedures to a digital way of managing information. With the new IT solution, DAL and municipalities are taking the first steps towards a possible paperless government. Each side is currently evaluating how they receive, store, secure and manage their data. This is not a simple nor fast process, and it can happen that organizations stay in a place somewhere in between physical documentation and full digitalization.

In an effort to gauge how the new IT system is contributing to the transition to a paperless work environment, we asked municipalities to assess the impact of the IT system on the reduction of paperwork. 86 percent of municipalities rated the system highly in this regard of reducing paperwork.



Well-planned and efficient movement of documents can significantly speed up business processes and enhance their quality. For that purpose, in 2018, municipalities were required to scan and store documents they created in the process of AP implementation. A large number of documents had to be scanned, copied, and after that physically sent to DAL. Many municipalities questioned why physical documents had to be sent, rather than sharing scanned documents electronically. They asked that, in the future, there needed to be more clearly defined working processes and rules for handling and storing documents.

Next, we asked them to rate the impact of the new system on reduction of postal costs. 77 percent of surveyed municipalities reported that the IT system reduced postal costs.



Most municipalities recognized the benefits of digital workflows, as reported in the municipal in-depth interviews. Some of the most common benefits they mentioned by municipalities were:

- shorter client response time
- reduced money spent on paper, printers, ink, postage, office space for files and employee time to manage paperwork
- less impact on environment, and
- easier transfer of information.

### **In their own words...**

#### Reduction in paperwork and postal costs

**Srbobran:** We do not have to print proposals of the decisions, and we don't send them to DAL with the post office any more (they are validated in the system). Our commission is working and checking the draft AP on the (computer) screen, and we don't have to print maps and tables for them anymore. No more printing of draft of documents.

**Sremska Mitrovica:** It is a great that we don't have to physically send decisions (to DAL).

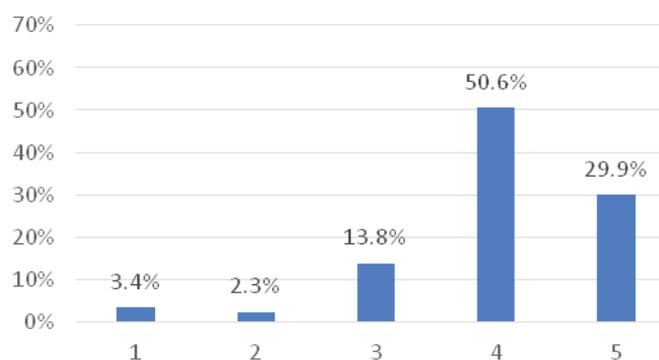
**Sombor:** We need well defined and prescribed instructions regarding workflows and which documents need to be scanned and stored. Why must documents be physically sent to DAL, or from DAL to municipalities, rather than shared digitally?

### 5.1.3 Control and analysis of the use of agricultural land

**80 percent of municipalities think that the system improved the control of the use of agricultural land.**

The IT system was designed, in great part, to ensure better control and analysis of the use of agricultural land. The IT system itself forces a certain level of double control.

In this first year, each municipality had to go through almost every parcel, a process that in most places has not ever been done before. After reviewing every parcel, the AP was reviewed and controlled again by DAL, and finally given approval. This level of control is higher than it ever was in the old system. In order to achieve this goal of better control of the use of SOAL, an accurate and current registry of SOAL had to be completed first.



Control of the use of agricultural land

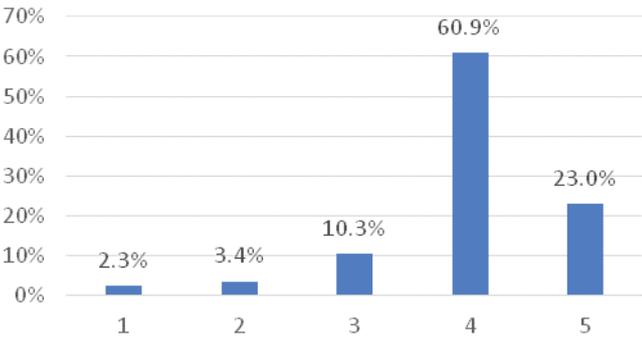
According to the Director of DAL, one of the most important things the system provided is that, for the first time, DAL actually has an inventory of all SOAL in Serbia. The IT system enabled DAL to know the position, state, and use of every single cadastral parcel of SOAL. During this first year of using the new system, the IT solution helped DAL to “discover” thousands of hectares of “new” SOAL in Vojvodina alone, that is, land that was previously never included in APs. As a result of such intensive control of APs this year, DAL has discovered approximately 32,000 hectares of forests in their set of SOAL. This forested land was, for years, “managed” by DAL as agricultural land. Thanks to proper control, this year the land has been registered in real-estate cadaster as state forests and forest land that are managed by the State Enterprise “Srbijašume” (the State Enterprise that manages state forests and forest land).

DAL is planning to enhance the control process further. Currently, DAL is working on a “Field Book” tool for the planning and monitoring of everyday activities in agricultural production, that will enable better control of land management and improve the land use by the farmers who are leasing SOAL.

It is a Software Application that will be integrated in the existing Agricultural Land Management Information System. The Field Book as an instrument was defined in the Amendmend of the Law on Agricultural Land.

**83 percent of municipalities rate the impact of the system highly in the area of analysis of the use of agricultural land**

Because of the ongoing process of restitution, the area of SOAL is decreasing, and with each passing year every single hectare of SOAL will be more valuable. Around 40 percent of the total area of SOAL in Serbia is excluded from agricultural production. 56 percent of the surveyed municipalities report less than 25 percent of SOAL in their municipalities is leased. This is a waste of increasingly valuable resources. Ideally, someone must analyze this information and develop a plan to ensure a higher percentage of SOAL is put to good use. This is just one example of how DAL and municipalities could and should use the new IT system to make informed, data-driven decisions.



Analysis of the use of agricultural land

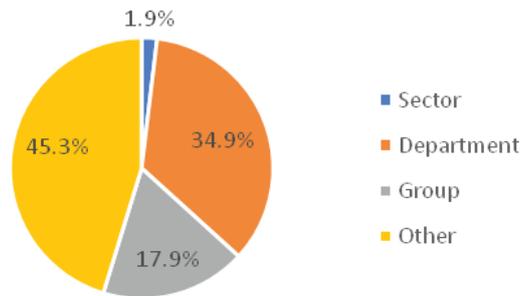
**5.1.4 Reduction in the specialization of skills required to complete the leasing process**

*The new IT system reduced or eliminated the need for lawyers and similar specialists.*

The reduction in the need for specialized staffing can be seen in contract creation in the new DMS application. Municipalities report that the DMS application removed the need to have or to engage a person with a legal background for the creation of contracts. The DMS application has a variety of pre-created, model contracts within the system. Therefore, anyone can create a contract, and municipalities do not have to worry if the legal documents they create are in accordance with legal requirements.

This reduction in the need for specialized skills is important because many municipalities do not have specialized staff. Under the law, municipalities are not required to follow a single model of local organization for SOAL management. What is required by law, however, is the existence of a commission in each municipality to oversee the process of AP creation and implementation. In those municipalities that rely mainly on commissions, most of the work falls on non-specialist municipal staff.

According to the survey, 55 percent of the 106 surveyed municipalities have formed separate organizational units specifically for agriculture (sectors, departments, or groups), employing 1 to 8 employees who are working on SOAL management. In contrast, 45 percent of municipalities have no specific department or unit for agriculture. Instead, in these municipalities, development of the AP is undertaken by one or two municipal staff belonging to some other organizational unit (NOT agriculture, and who have other regular responsibilities), and commissions are supposed to assist them in this task.

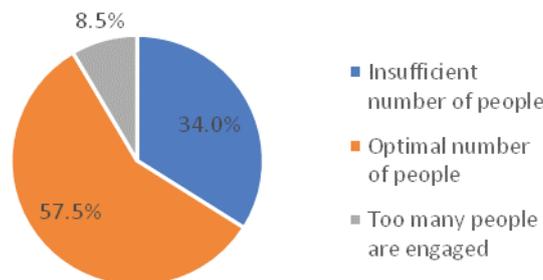


How are you organized in your LSG in terms of AP creation and leasing?

Since so many municipalities do not have specialized staff available for the task of SOAL management, the new IT system is a particular benefit for these municipalities.

Typically, larger LSGs, such as those from the territory of Vojvodina, have dedicated agriculture units, demonstrating the important of SOAL to the municipal economy.

Municipalities were asked whether they had sufficient staff to manage SOAL, too many staff, or an optimal number of people. 58 percent of municipalities report they have an optimal number of staff, while 34 percent have an insufficient number of people. Nine percent of municipalities report they have “too many people engaged.” Most of those municipalities have commissions that support the work of one or two non-dedicated people who otherwise work on non-agricultural projects. These municipalities (without dedicated agriculture staff), are less satisfied with the experience and expertise of the people working on the AP and leasing of SOAL, according to the survey.



Human resources - number of people

**In their own words...**

Reduction in the specialization of skills

**Zrenjanin:** Inzem has empowered us so that anyone can make decisions and contracts, you do not have to be a legal expert.

**Srbobran:** This system makes it easier for us, because now these contracts do not have to be done by a legal expert, we use already prepared contracts and legal acts.

**Kovačica:** It is much easier because there is no longer a need to engage a legal expert in the implementation phase, because there are already prepared models on the system. Everyone can now create decisions and contracts. I did not have a day of training and I managed to master everything through direct work on the system and through communication with GIS group.

## 5.2 Impact two - Improvements in the quality of final products and the quality of work

The new IT system is already delivering measurable improvements in *the quality of final products* (APs and contracts), and *the quality of work*, in terms of improvement of job satisfaction, and improvements in transparency and accountability.

We will measure improvements in the quality of final products and the quality of work under the following indicators:

- Better quality of AP, less errors in AP and contracts, forming a better leasing offer, and harmonization of the cadastral data
- Greater transparency and accountability in the leasing process
- Better job satisfaction

### 5.2.1 Improvements in the quality of AP and contracts

**92 percent of municipalities report the new IT system has already delivered better quality APs and contracts. The top improvements mentioned include:**

- APs with more realistic representation of the true situation in the field
- Fewer errors in APs and contracts
- Forming better leasing offers (better grouping of parcels)
- Improved harmonization of the cadastral data (legal and factual situation)

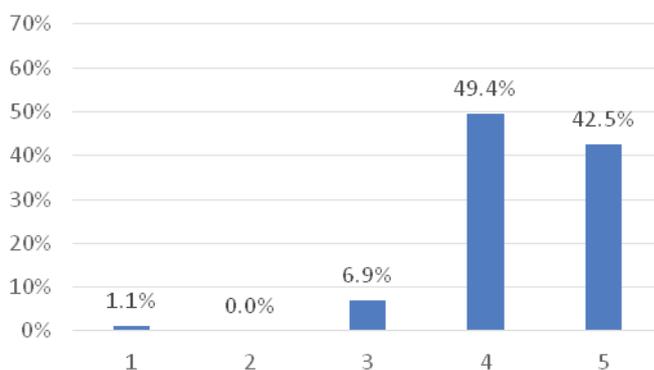
First, a quick review of the process of creating APs: Municipalities create and adopt an AP once a year, and based on this document, the leasing of SOAL is done. The AP should represent the real situation about the state of SOAL in a municipality. The deadline for adoption of the AP is March 31 of each year. The AP gives information about: 1) the type and scope of work to be carried out during the period for which the program is adopted; 2) the dynamics of work and the funds that are to be invested into the SOAL; 3) general information about the total area of SOAL (per municipality and per cadastral municipalities); 4) the users of SOAL; 5) the lessees of SOAL; 6) the area of SOAL that is not given for use (excluded parcels); 7) the total area of SOAL that is planned for leasing, as well as the list of grouped parcels of SOAL to be leased, arranged by number of cadastral parcel, area, class and culture; 8) and the State of protection, arrangement and use of SOAL (Čukić, 2014). After the AP is adopted, the municipality starts the process of AP implementation (leasing of SOAL and creation of contracts with lessees).

Major complaints regarding the quality of the AP and the contracts in the past were:

- The AP not reflecting the real state in the field (the AP was based on outdated information about parcels, or parcels in hard to reach areas – mountains, forests, swampy areas – were difficult if not impossible to determine and check).
- Multiple errors in the AP and contracts due to manual work (data entry errors, calculation errors).
- The AP was created without relevant and real information (the grouping of parcels for leasing offers were done based on the parcel numbers, not their real locations; exclusions of land parcels were done without proper reasons).
- The quality of cadastral data was poor (outdated cadastral data; discrepancy in records in relation to the actual situation in the field; unregulated property-legal relations and entry of rights; hundred years old cadastral maps and plans).

Those quality issues produced problems for DAL and municipalities that had to be solved by: 1) sending agricultural inspectors into the field to make reports, 2) land surveyors measuring the parcels, 3) amending the contracts (requiring farmers to waste their time and come to the municipal office), and in some cases 4) going to court and participating in legal cases (Čukić, 2014). These problems required the expenditure of additional time, personnel and financial resources, all of which are in short supply for both DAL and municipalities.

**When asked to assess the impact new IT system have on quality of the AP, 92 percent of municipalities rated system with two highest grades (49.4 grade 4, and 42.6 grade 5).**

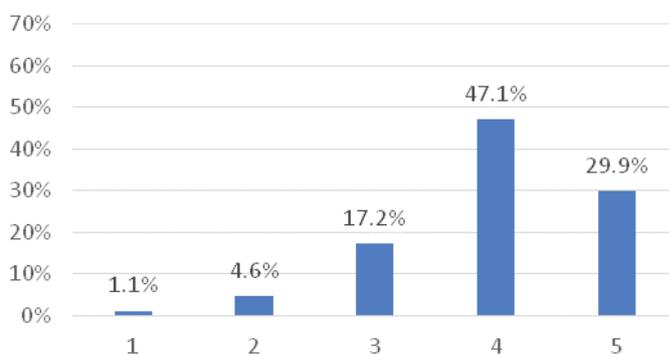


Quality of the AP

During in-depth interviews, municipalities reported that the new APs give a more realistic picture of land in the field. This year, municipalities were required to examine every parcel and check it before they could include that parcel into a leasing offer (or exclude the parcel, if it was not suitable for agricultural production). Since they were able to locate each parcel, with all relevant information including orthophoto and satellite images in the background, municipalities were sure that their AP was done based on verifiable and objective facts. This was a significant improvement from previous years when AP creation involved the simple copying and pasting of data from the previous year's AP excel spreadsheets, without knowing whether any of the old data was accurate.

The automatization of the working process resulted in a reduction of technical errors in both APs and contracts, and according to representative of DAL (the AP control group), APs and contracts were unified and standardized. Municipal officials no longer have to think about forms and technical requirements of the APs or contracts, they can now concentrate on the essence behind the information and data, and produce an AP that represents the real state of SOAL on their territory.

**77 percent of municipalities rate highly the impact of the system on the reduction of errors in APs.**

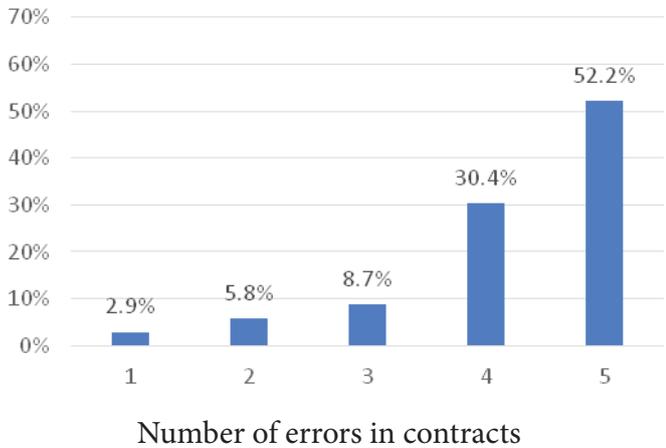


Number of errors in AP

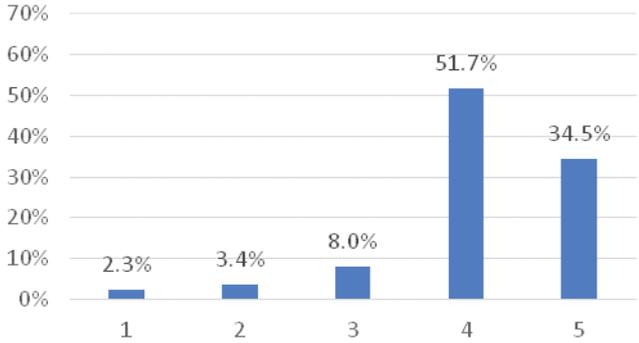
Some of the explanations we got from the municipalities, who rated IT system's impact on errors "1", "2", or "3", was that there are still existing mistakes in data received from RGA, and not up-to dated digital cadaster plans.

**82 percent of municipalities report that the impact of the system on the reduction of errors in contracts is excellent (52 percent) and very good (30 percent).**

According to the In-Depth Interviews, the number of errors in contracts were also reduced due to the automatization of the working process, the intensive data quality check (creation of “zero status”), and the better control of the AP.



**86 percent of municipalities report that the system helped them in forming a better leasing offer (51.7 percent rated system with 4, and 34.5 percent rated it 5).**

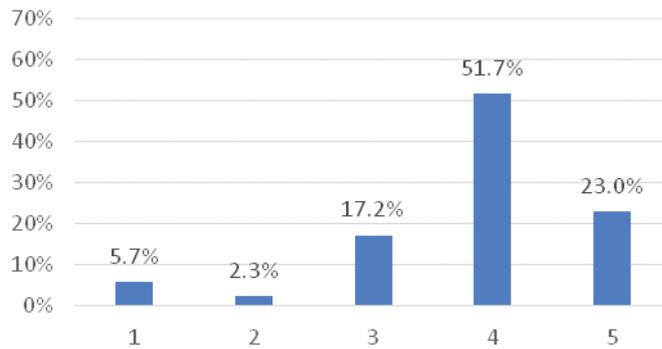


Forming a better leasing offer (grouping of parcels)

The GIS application enabled municipalities to have a better overview of the location and characteristics of the SOAL parcels and to do better grouping of parcels that will be leased to the farmers. With the better visual presentation, and having different layers at their disposal (orthophoto, topographic maps, street view, satellite images, DKP), municipalities were able to see all available SOAL parcels, their positions and relation to each other, their areas, their access to the nearest roads, and whether there are objects in the parcel (for example, some forested areas or other obstacles for agricultural production). They were able to decide to group the whole parcel, or just a part of it. Based on all that information, municipal officials could form the leasing groups best suited for their lessees.

***According to 75 percent of municipalities, the system gives the opportunity to improve the cadastral data they receive from RGA.***

While working on their APs, municipalities have the option to change the attributes about the parcels that are not in accordance with the situation in the field. Those changes are registered in the database and will appear as the correct data the next time they start working on a new AP.



Harmonization of the data (legal and factual situation)

It is important to mention that those changes that are registered in DAL's database had to be officially registered in the real estate cadaster as well. Therefore, DAL should establish a procedure for the regular updating of SOAL data in the real estate cadaster of RGA (see Section 8: Recommendations).

Another example of successful updating of cadastral data (that is the product of this year intensive control process) is that DAL found out approximately 32,000 hectares in 58 municipalities, of forests previously being recorded as state-owned agricultural land in real-estate cadaster. This difference is already communicated with RGA and the land has been registered in real-estate cadaster as state forests and forest lands.

### **In their own words...**

#### Quality of the AP

**Negotin:** We have a more real picture from the field. The DAL now asks for each parcel to be reviewed and therefore this first year went slowly. Before, we were excluding land based on the excel table.

**Srbobran:** The AP is more precise and accurate.

#### Reduced Number of errors in AP

**Niš:** Errors, almost, do not exist any no more, and every data that is entered is checked two times, by municipalities and by DAL.

**Bač:** Automatic work is eliminating errors, we are now sure that the data is correct.

#### Reduced Number of errors in contracts

**Niš:** Our commission is delighted, because the chances to make mistakes are reduced.

#### Harmonization of the cadastral data (legal and factual situation)

**Srbobran:** All the land that I excluded this year because of restitution, I changed its attributes into "exempt", next year this land will not be reported as state-owned land, the program recognizes the word "restitution" as a reason for permanent exclusion. Even if this change is not yet registered through the cadaster, the system remembers it as exempt.

**Zrenjanin:** It's clear to us that the database has to be cleaned for years.

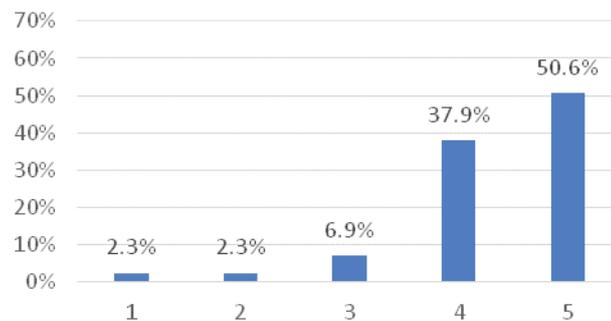
## 5.2.2 Greater transparency and accountability in the leasing process

**89 percent of municipalities reported that the new IT system resulted in greater transparency in leasing procedures. According to responses to the survey and to interviews with municipal officials, transparency is enhanced in the following ways:**

- Possibilities for human errors are minimized,
- Data that are put into the system are checked at two levels (at the municipality and in DAL),

- Commissions (with the representatives of farmers) at the local level have better insight into accurate information on all available SOAL parcels,
- Citizens will have open access to data on SOAL (SOAL web application and sharing four datasets on the national geoportal Geosrbija).

When asked to assess the impact of the system on the transparency of leasing procedures, 89 percent of municipalities rated the system highly. They also reported that the system gives municipal officials a feeling of security that no one will accuse them of giving away state-owned land. They also feel more secure that they will not make mistakes that will lead to misuse of land.



Transparency of leasing procedure

Transparency of the work of public administration is the right of citizens to know how work is done, and how are decisions that influence their lives are made. The availability of timely, accessible, and accurate information is a basic precondition for building citizen trust in the work of government, both on the local and central level. It is the safeguard mechanism that prevents corruption and abuse of power. It is beneficial both for citizens and for the administration.

Several municipalities mentioned that the transparency of the leasing procedure was always at a satisfactory level. The existence of multiple commissions in the procedure of the SOAL leasing process (some commissions must have at least half of their membership be citizens/farmers from the municipality), provides for citizen's representatives to observe, participate, and control the process from within.

According to the interviewed municipalities, the working procedures and control process of the new system are such that no land can be hidden or be misused. The Director of DAL stressed that the new web application makes data on SOAL public and easily accessed. Therefore, citizens themselves will be able to do the control of the use of SOAL and report about the misuse or usurpation of state land.

Municipalities and DAL also mentioned the impact on the accountability of employees. The technical capabilities of the system enable and improve horizontal accountability (accountability within different levels of the public authorities). Each user of the system has well-designed roles and responsibilities, and each action of the users within the system is registered and easily controlled. In that way, it is easy to establish whether employees are completing the tasks they are assigned, whether deadlines are followed, and who is responsible for each action. Under the old system, it was an exhausting and very often fruitless process to establish who did what and when, who was responsible for a delay in the process, or where a certain document was at the time. The new system allows such issues to be identified and corrected easily.

An important step in establishing an accountable workplace is removing as much confusion as possible about who is doing what and how they will proceed. Municipalities stressed that DAL needed to improve on this point. In order for municipalities to be more efficient and productive, DAL should establish well-defined and prescribed instructions regarding the workflow and the management of official documents within the new Agricultural Land Management System (see Section 8: Recommendations).

**In their own words...**

Transparency

**Srbobran:** More transparently, clearer, there is no doubt if someone has miscalculated something.

**Bač:** Everything is transparent and there are no more stories around the city that someone hid thousands of hectares of state land

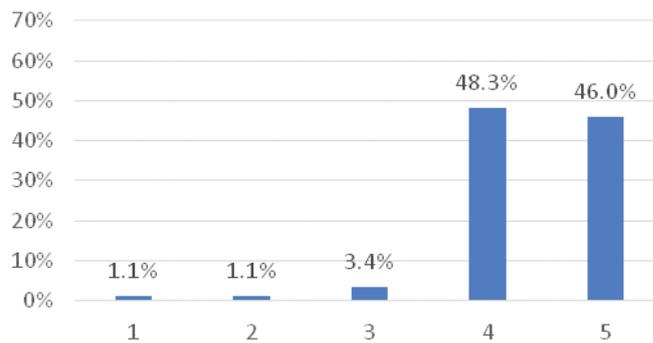
**Srbobran:** You can see (in the System) when someone did something, there is no back-dating.

**Srbobran:** I personally feel better because I am certain there are no mistakes in my work. I can also work from home.

The new IT system does not solve the problem of possible corruption, or guarantee transparency, but it serves as a tool that supports the efforts of DAL and municipalities to build a transparent and accountable system of agricultural land management.

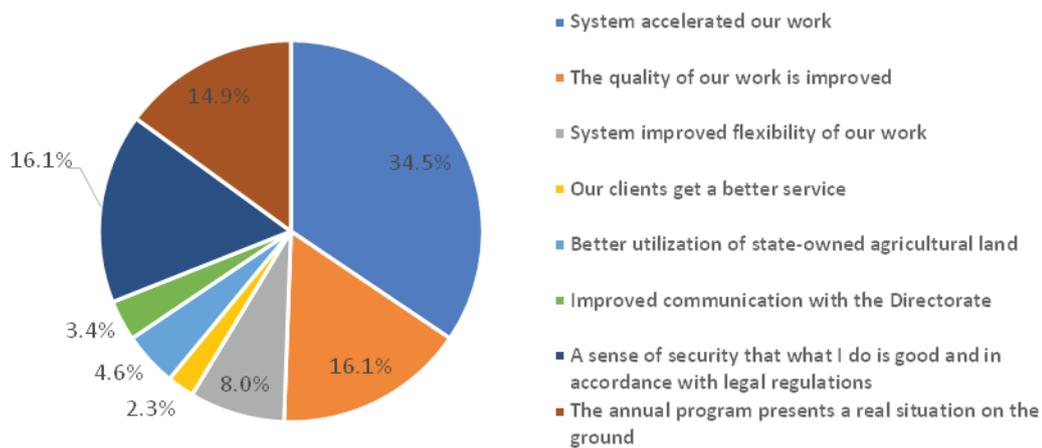
**5.2.3 Better job satisfaction**

***A staggering 94 % of surveyed municipalities think that system improved their sense of security in the quality of their own work.***



A sense of security in the quality of one's own work

Job satisfaction is a big factor in employee engagement and their effectiveness. During the interviews, we asked representatives of municipalities how the new IT system impacted their job satisfaction. One of the major factors that municipal officials mentioned that made them feel good about the job they are doing is a sense of security that what they are doing is of good quality. The new system improved the quality of their work, and 16% of all surveyed municipalities listed that fact as the biggest contribution of the system, while the other 16 percent chose a sense of security that what they do is good and in accordance with legal regulation.



The biggest contribution of the IT system

### 5.3 Impact three - Improved quality of service to clients

The new IT system *improved the quality of service to clients*, in terms of providing better leasing offers, better presentation of offered parcels, faster time in which they are getting their contracts, and improvements in data accessibility.

We measured improvements in the quality of service to clients under the following indicators:

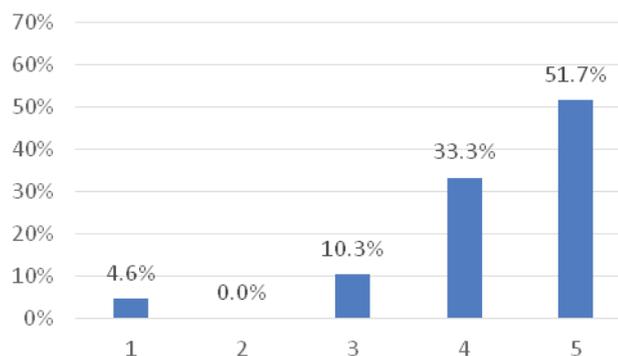
- Forming a better leasing offer (already discussed in Impact Two: Better quality of the final product)
- Overview of the offered parcels
- The time in which lessees are getting their contracts (already discussed in Impact One: Length of time required to produce Annual Programs and leasing contracts)
- Accessibility of data/Open data

#### 5.3.1 Forming a better leasing offer

*See above Impact Two - better quality of the final product*

#### 5.3.2 Better overview of the offered parcels

**85 percent of municipalities recognized that the system provides a better presentation of the parcels available for leasing.**



Presentation of the offered parcels

Before the process of AP realization, farmers usually visit the municipal office to get information about the SOAL that is planned to be leased. They want to see where the parcels of their interest are located, what is their position in relation to their own land, what is their position in relation to access roads, where is the nearest water source, what is their size, what is the leasing fee, and other relevant information. With the new GIS application, all that information is easily available within minutes. Municipalities no longer have to use paper maps with hand colored groups of parcels, and search through different sources of data in order to provide this information. The system provides better visual representation of groups of parcels that are planned for leasing.

**In their own words...**

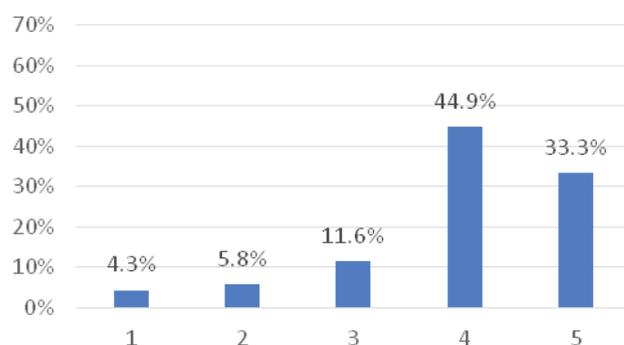
Better overview of the offered parcels

**Knjaževac:** The application improved the communication with users, they now have a better overview, they see parcels in public bidding group. That is very important because of the situation in the field, our public bidding groups can have up to one hundred parcels that are small and scattered. Now everything is clearly visible on the screen.

**5.3.3 Time in which lessees are getting their contracts**

*See above Impact One - Length of time required to produce Annual Programs and leasing contracts*

*78 percent of municipalities think the IT system improved the time in which lessees are getting their contracts (see Impact One - Length of time required to produce Annual Programs and leasing contracts)*



Time in which lessees are getting their contracts

The new IT system enabled 73.9 percent of surveyed municipalities to create contracts in a shorter period. On average, that meant a 64 percent time saving for municipalities who reported creating contracts faster.

**5.3.4 Improved accessibility of data**

Citizens and businesses now expect government information to be readily available online, easy to find and understand, and at low or no cost. Greater use and sharing of public data facilitate increased economic activity and improved productivity. With the new IT solution, DAL is working in this direction in two ways:

- SOAL web application (<http://195.222.96.100/visios/GPpublic>)
- sharing four datasets on the national geoportal Geosrbija

By accessing the SOAL web application, which is being prepared for the Agricultural Land Administration within the Ministry of Agriculture, citizens will have an overview of locations, property, cultures, classes, areas, and more, according to the Open Source Data principle, of all free state plots at any time. This option would greatly facilitate the citizens to decide to rent state-owned parcels because it would provide them with all necessary information for planning the use of certain land.

As a result of cooperation and data exchange between RGA and DAL, data from the DAL database will be available on the national geoportals Geosrbija. Geosrbija is a platform that unites spatial data acquired from different sources, from the local to the national and global levels, in a comprehensive manner. This portal enables state authorities, businesses and citizens to identify and access spatial information. The four DAL datasets that will be visible via Geosrbija are:

1. Parcels planned for public bidding
2. Leased parcels, that is the parcels that are under multi-annual contracts
3. Parcels that are exempted
4. Parcels in co-ownership

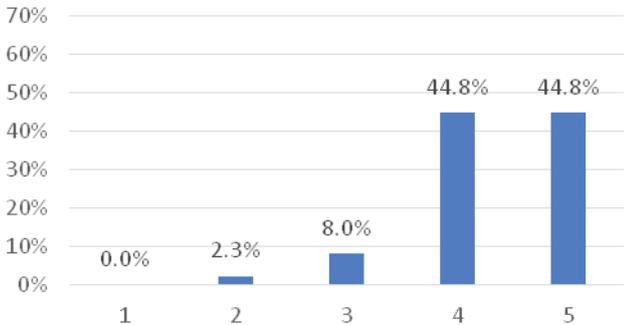
Before any data is shared or released, DAL must ensure data security and privacy is maintained.

**5.4 Impact four - Improved communication**

The new IT system *improved communication between DAL and municipalities*, as well as *communication with clients*.

According to representatives of DAL and municipalities, their mutual communication has been improved in several ways:

- communication between DAL and municipalities is more precise (with the DMS application they all have the same document in front of them, and they know exactly what is requested from them)
- communication between DAL and municipalities is easier (DMS application supports direct communication within each workflow step)
- communication between DAL and municipalities is based on trust (because the system itself enables accountability and transparency)

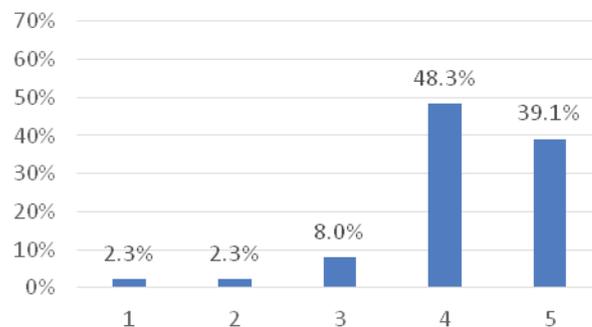


Communication with the Directorate for Agricultural Land

Communication with clients is improved in several ways:

- the quality of the communicated information is improved (more correct, timely and trustworthy information)

- the visual presentation of the leasing offers is improved (zoom in/out, with maps, ortophoto and satellite images as the background, availability of all necessary information about the parcels are one click away)
- the communication channels are improved (clients are getting better information both directly from the municipal office, and recently online via the web application and portal)



Communication between municipal representatives and clients

### **In their own words...**

#### Communication between DAL and municipalities

**Kovačica:** Cooperation is much easier, because now all of us (municipality and DAL) look at the same decision, the same document and data, and we know what we are talking about. Communication is more accurate, precise.

**Srbobran:** I have the feeling that we are in the same office (with DAL). In the system we can communicate with messages on certain documents.

**Sombor:** DAL should organize a meeting with larger LSGs, in order to take into account their recommendations and comments, maybe form a body from municipal representatives in order to ensure the sustainability of the system.

#### Communication with clients

**Knjaževac:** The application improved the communication with users, they now have a better overview, they see parcels in the public bidding group. That is very important because of the situation in the field, our public bidding groups can have up to one hundred parcels that are small and scattered. Now everything is clearly visible on the screen.

## 6. Recommendations

### 6.1. Development of an IT Strategy

There is a big risk that without a strategy for a newly implemented IT system, DAL might end up with an IT system that serves just as a tool for leasing SOAL, and not growing, and spreading into other departments and other tasks in the field of planning, protecting, organizing and using agricultural land. An IT Strategy is a comprehensive plan that shows how the existing technology is supporting the business goals of DAL. It should reflect the unique agricultural land policy needs of DAL and the Ministry of Agriculture, while considering the needs of key stakeholders including employees, municipalities, and citizens. This document should cover all aspects of IT system management, including management of data, hardware and software, human resources, vendors, risk, and financial resources.

The strategy should include DAL's current IT architecture, IT department capabilities and capacities, the IT budget, and future needs and requirements with details about infrastructure, staffing and other necessary resources. It should provide an idea of where IT should head over the next three to five years.

The IT strategy should take into consideration strategic documents of RGA, and the already existing legal framework for the information society in the areas of public administration.

## 6.2. Sustainable data exchange with RGA

The Agricultural Land Management Information System completely relies on real estate cadastral data from RGA. The data model that is the base for the Agricultural Land Management Information System is done in accordance with necessary and available cadastral data from RGA. The whole process of the creation of APs and leasing of state-owned agricultural land depends on the timely delivery of, and the quality of received RGA data. Therefore, close cooperation and two-way data exchange should be maintained between RGA and DAL.

There are two major issues that DAL should consider in the next period: First, the **announced transition to service data exchange in RGA**, and second, **the need to establish a procedure for regular data updating of SOAL in the real estate cadaster of RGA**.

During the interview with RGA representatives, the director of RGA announced that their organization will transition to a service data exchange (a data exchange that is based on a service-oriented architecture with a unique database). In accordance with this information, DAL will have to, at some point in a future (probably within the next two years), adapt both of their applications to this service-oriented data exchange (the existing data model will have to change).

Also, the new Law on the Registration Procedure with the Cadaster of Real Estate and Utilities that entered into force on June 8, 2018, includes changes to the current data structure and changes to the current data model. The next SOAL data set exchange, between RGA and DAL, will include those changes, and for example, the city of Belgrade will be under the new data model. Those changes will require certain changes in the current DAL data model.

Solving this issue will require certain financial resources and will affect the normal working process of both municipalities and DAL. Therefore, it is necessary that DAL, together with the system vendors (Pointsoft and GDi GISDATA), start as soon as possible working on the plan to overcome this issue.

When asked about the most important thing to ensure IT system sustainability, 63 percent of all surveyed municipalities chose “updated cadastral data”. The problem with discrepancies in records, compared to the actual land in the field, is one of the biggest issues mentioned by a majority of municipalities, and DAL. If not addressed properly, it presents a source of frustration for all of them, and a potential threat to the positive perception of the IT system.

During the process of AP creation, all municipalities face the problem of discrepancy in records compared to the actual situation in the field. The IT system enables them to register that discrepancy and make a note about the actual situation. The collection of all these discrepancies should be delivered to RGA, in an appropriate format (that should be established together with RGA), with an official request for correction of state-owned agricultural land data. In this way, DAL is assuring the quality of state-owned agricultural land data and the quality of APs and contracts, as well as supporting RGA in improving the reliability and quality of real estate data.

## 6.3. Need for a new systematization of IT job positions in DAL

There are two glaring deficiencies regarding current staffing of IT positions, the first is that all current GIS staff are temporary employed, and the second is that there is no system administrator position. IT system sustainability depends on IT staff that is responsible for its management and maintenance. These deficiencies could threaten the sustainability of IT system.

The current rule book on internal organization and systematization of work positions of DAL does not prescribe IT related positions. It is of vital importance that DAL includes these positions into its job systematization in order to ensure undisturbed functioning of the IT system. At this moment, the Agricultural Land Management Information System is managed and maintained by 5 staff members (so called GIS administrators). They take care that the system, its applications and programs, function well, handle minor day-to-day IT issues, and deal with IT security issues. They are responsible for communication with system vendors regarding system maintenance and development. They respond daily to different technical requests from the municipal and DAL side. They are in charge of communication and cooperation with RGA, and manage data checking and data corrections. They conduct trainings for both municipalities and DAL employees. They produce maps, and a variety of reports and queries for DAL and the Ministry of Agriculture. All of them are **temporarily employed**. A lot of resources, in the form of highly specialized and expensive education, has been invested in them. They gathered knowledge and experience in developing and maintaining the enterprise GIS. That makes them highly employable in the current job market, and therefore, there is a risk that DAL will not be able to retain them. Without their permanent engagement there is a great risk to system sustainability.

During the discussions with GIS administrators and representatives of vendors, it was stressed that there is an urgent need for the engagement of a system administrator. According to the comments from development companies, the volume of work does not require a full-time engaged **system administrator**, but it is essential for normal system functioning.

#### 6.4. Streamlining and redesigning of existing procedures and creating instructions

DAL must streamline the processes of AP and contract creation, and write standard operating procedures (instructions) that will provide clear directions and better efficiency.

There are several of areas of work that were reported to us as being problematic by a majority of municipalities. The problem with “bottle necks” in the processes of AP and contract control was one of those. Another issue mentioned by municipalities was uncertainty about what are the proper steps in the process of AP realization, and not being able to get the right answer from DAL about it. Those problems could be solved by re-evaluating, and if necessary redesigning, existing processes and developing standard operating procedures (SOP) for the process of AP creation and AP realization through the IT system, for both DAL and the municipal side of work.

The IT system opens wide opportunities for streamlining and redesigning existing procedures, and DAL should think about how to do it. They should start with assessing the existing processes and should involve municipalities by asking for their feedback on what are the problematic areas and what works well. Automatization allows for certain steps to be removed from the working process, and DAL should think hard about which steps are redundant and no longer necessary. They should also evaluate the use of paper in the office, think about what absolutely needs to be printed, what is necessary to be sent in a physical form, and how are documents stored/archived. Streamlining means fewer errors and delays in the work of both DAL and municipalities, and eventually means more satisfied clients.

Standard operating procedures or instructions for AP creation and realization through the IT system will provide municipalities and DAL with the necessary step-by-step instructions on how they should complete each working task, and will ensure the successful outcome of the activity each time it is completed. Those instructions should also prescribe management of documents in the process of AP creation and AP realization (which documents should be scanned and saved in e-form, which documents should be sent via postal service, etc.). With good and precise instructions, DAL will decrease the number of requests and questions municipalities are sending regarding the working procedures in the IT system. The standard operating procedures will help DAL and municipalities to improve

efficiency, quality of output, and uniformity of performance, while reducing miscommunication and failure to comply with the existing legal framework.

## 6.5 Establish a sustainable training system

Continuously assessing and fulfilling the training and education needs of DAL and LSG staff will ensure that each user has the knowledge and understanding of all possibilities this new technology has to offer, and will enable them to reach the full potential of the IT system.

Surveyed municipalities found the IT system easy to use, and they were mostly satisfied with the support they received from their DAL colleagues. When asked about the trainings they received, a majority stated they didn't have enough training. That number is especially large when we asked them about the DMS application (86% of 86 surveyed LSG who used the IT system). Also, we noticed that a certain number of comments and complaints of municipalities regarding problems that arose while using the DMS part of system were in fact due to the lack of knowledge about functionality and capabilities of the application.

No matter how user friendly and intuitive an IT system is, without ongoing training and education of users available for everyone, and any time, implementation of the IT system into an organization will never reach its full potential. Trainings will not only provide necessary knowledge about the system, but will also:

- improve the quality of work
- increase productivity
- improve the organizational culture, team work and communication within DAL and between DAL and municipalities
- increase the feeling of ownership of the system

Municipal staff do not use this system every day. They use the web applications only during the period of AP creation and contract creation. So, after months of not using it, they need to "learn again" and remind themselves how to do it. Also, it happens that municipal staff are often allocated to other duties, and new people without previous knowledge of the system are now responsible for AP and/or contract creation. It is DAL's responsibility to develop training materials and standard operating procedures for municipalities and different departments within DAL. Those trainings should be done annually. Timing should precede the months during which municipalities are engaged in AP creation (before November) and contract creation (before April). Also, online training or on-demand training should be available the whole year round. These could be pre-made and posted on some of the well-known social platforms (e.g. YouTube), as well as on the DAL website.

Concerning trainings of DAL's staff, it is a good idea to train each department head on the application, and then have him or her develop the standard operating procedure and set training for their department.

## 6.6 Improving communication with LSG and citizens

The introduction of the new IT system opens multiple possibilities and necessities to improve both internal and external communication and collaboration. The messages we got from municipalities are consistent: communication with DAL should be persistent, consistent, and frequent. Good communication will provide a feeling of mutual respect and understanding, and ownership of the system. According to municipalities, there is no such thing as too much communication.

Municipalities found that the new system improved their communication with DAL, and that communication is now more precise, more clear, and easier. They want DAL to continue organizing regular annual meetings with municipalities, as well as working meetings. Municipalities also propose to organize a municipal body that will consist of representatives of different regions in Serbia, that will communicate on the behalf of municipalities they represent. Municipalities asked for this forum to address openly possible issues, ask questions, make requests, and at the end to get answers from relevant DAL personnel. Even if the answer to their request is negative, or the problem could not be solved, it should be communicated clearly and openly.

Regular meetings with municipal representatives will provide DAL with feedback, and will ensure the continuous two-way exchange of information. It will also be a chance for DAL to communicate its organizational message.

Another good way to get a sense of the issues that concern municipalities is to organize municipal online surveys. Those surveys can provide valuable information about whether there are some new issues or problems with the system, how people are adjusting to the new technology, and can offer new ideas for further system development and improvement.

With the tools and possibilities available to share and open its data to the wider public (the SOAL web application and sharing data on the national geoportal), DAL should use that chance and shift their focus towards their clients and the quality of services offered to citizens and businesses in the next period. One of the first steps should be surveying their clients (lessees) in order to improve their service quality and user satisfaction. The easiest way to do so is by attaching a questionnaire for assessing the satisfaction of the services together with the contract their clients will receive.

## 6.7 Towards paperless and e-government

A large number of municipalities believe that going digital opens a lot of possibilities to reduce costs, improve turnaround times, and provide better service to the customer. Making progress in this area requires thinking about and improving several issues: 1) using less paper and reducing the printing of documents; 2) introducing e-signatures; 3) clarifying procedures for scanning and digital data archiving; and 4) decreasing the need to physically send documents via postal services. The new IT System presents a chance to make a transition to paperless administration that will function much more efficiently and will offer clearer step-by-step operations and better organization. DAL should investigate those issues and propose how to improve existing procedures.

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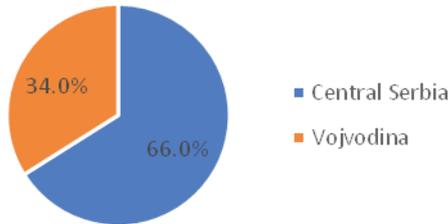


# ANNEX 1

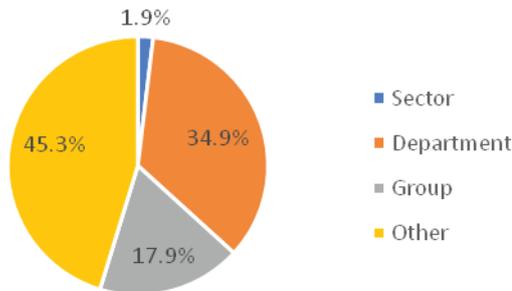
## Questionnaire for local government

\* Required questions.

### 1. The local self-government unit (LSG) you come from. \*106 answers



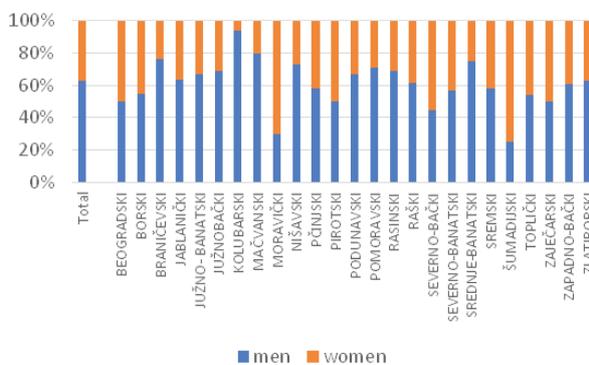
### 2. How are you organized in your LSG in terms of making an annual program (AP) and leasing? \* 106 answers



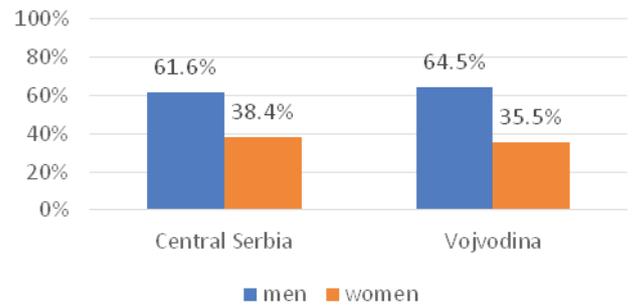
### 3. If you have chosen "Other" for the organization, please explain.

### Human resources (gender structure and experience of people in charge of designing and implementing AP)

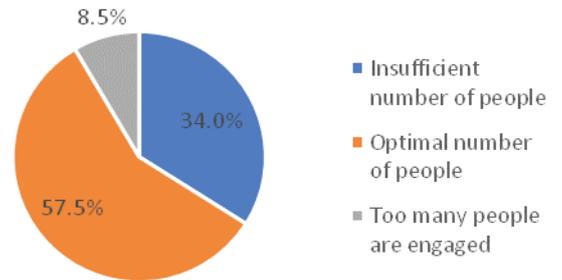
### 4. Total number of persons in charge of development and realization of AP. \*



### 5. Of this, the number of women \*106 answers

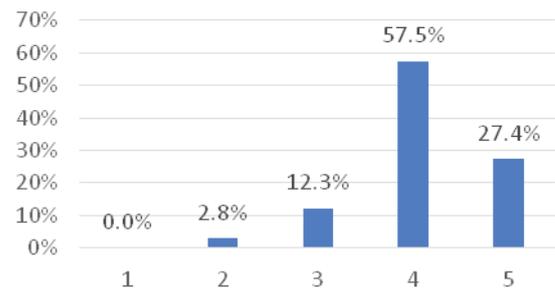


### 6. Human resources - number of people. \* 106 answers



### 7. Human resources - experience and expertise.

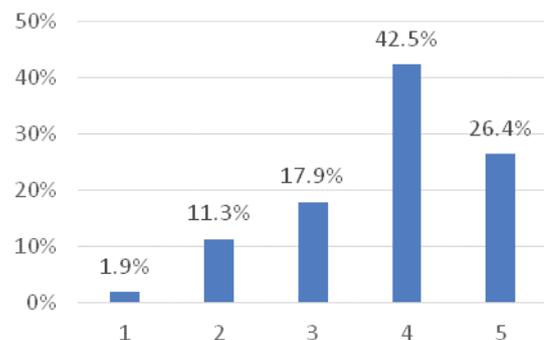
\*106 answers (1-Insufficient, 5- Extremely good)



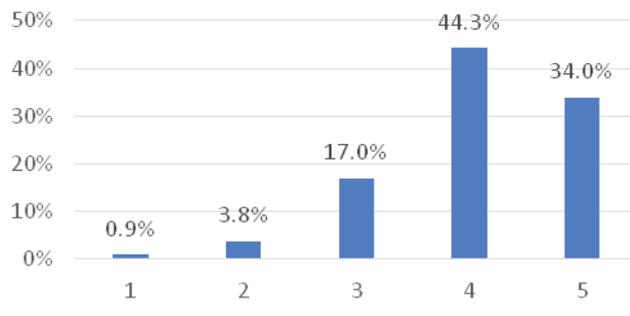
### 8. Human resources- comment

(Open question)

### 9. To what extent are you satisfied with the work and support of your commissions? \*106 answers (1 - dissatisfied, 2-minimal satisfaction, 3-partly satisfied, 4-mostly satisfied, 5 - completely satisfied)



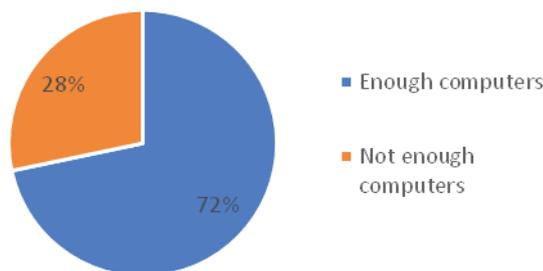
**10. To what extent are you satisfied with the support that you have from the management of your LSG? \*106 answers (1 - dissatisfied, 2-minimum satisfied, 3-partly satisfied, 4-mostly satisfied, 5 - completely satisfied)**



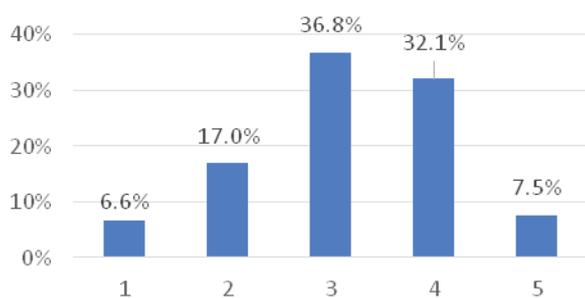
**11. If you have any comments regarding the support of the commission or management of the LSG. (Open question)**

**The level of technical equipment that is available for the implementation of the IT solution**

**12. Number of computers \* 106 answers**

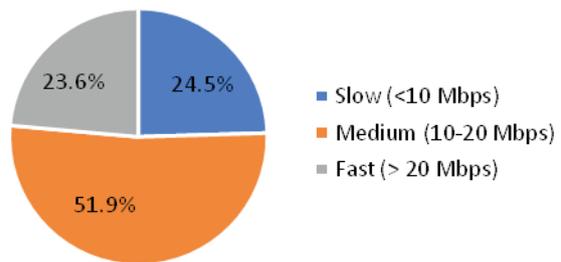


**13. Technical characteristics of the computer \* 106 answers (1-very weak, 5-exceptional)**

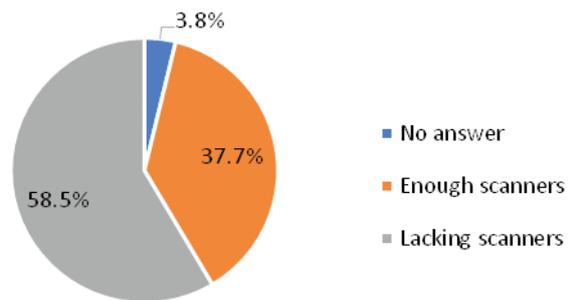


**14. Computer numbers and their technical characteristics (Open question)**

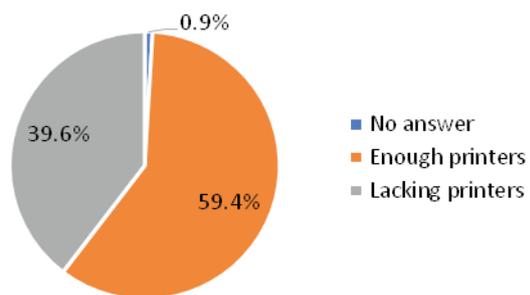
**15. Internet connection and its speed \* 106 answers**



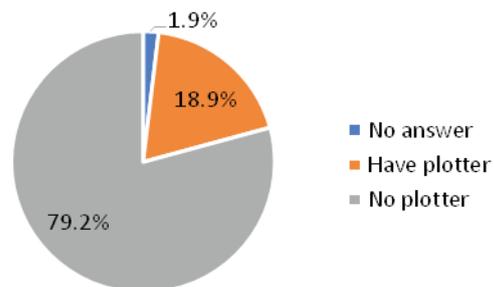
**16. Scanners 102 answers**



**17. Printers 105 answers**



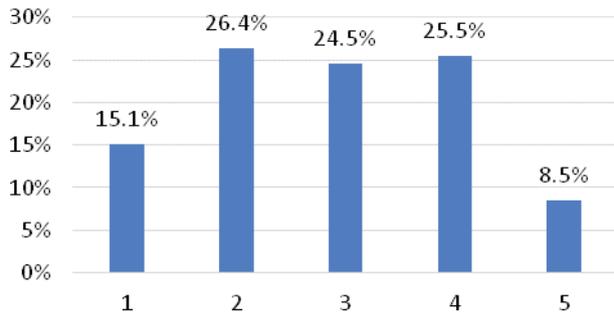
**18. Plotters (for larger prints) 104 answers**



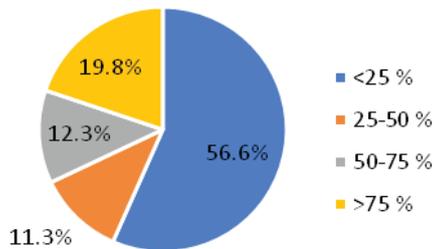
**19. Technical equipment (Open question)**

**Efficiency of agricultural land use**

**20. Evaluate the efficiency of using state-owned agricultural land in your LSG** \* 106 answers  
(1 - inefficient, 2 - insufficiently efficient, 3 - partially efficient, 4 - efficient, 5 - very efficient)



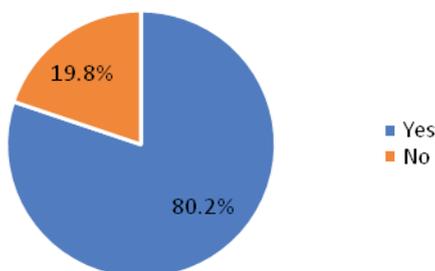
**21. What is the percentage of state-owned agricultural land in your LSG under contracts (leased for a fee and given to use at no charge)?**  
\* 106 answers



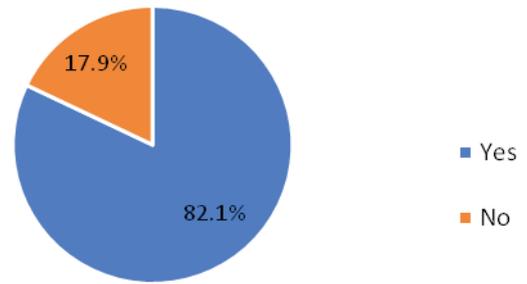
**22. How would you increase the efficiency of using state-owned agricultural land in your LSG?**  
(Open question)

**IT system for creation and realization of annual program (IT system for creation and realization of AP)**

**23. Did you use the IT system to create a “zero” state?** \* 106 answers



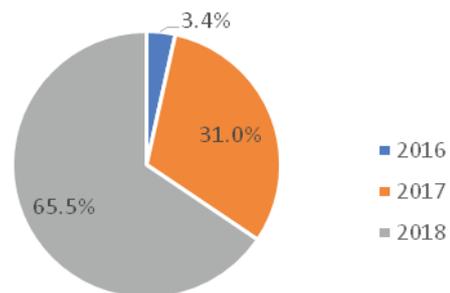
**24. Did you use the IT system for creating and implementing AP?** \* 106 answers



**25. If you did not use the IT system for creating and implementing APs, what are the reasons?** (Open question)

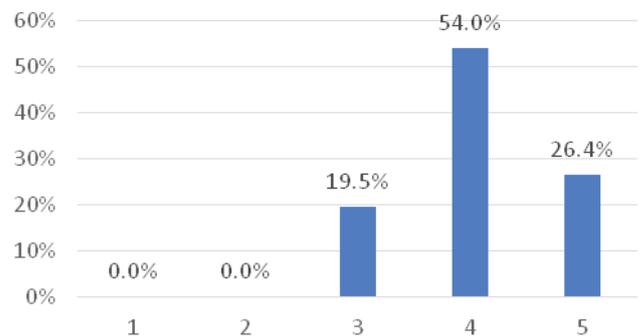
**26. What would, in your opinion, help you to do and realize the annual program through the IT system?** (Open question)

**27. When did you first start using the IT system?** \* 87 answers

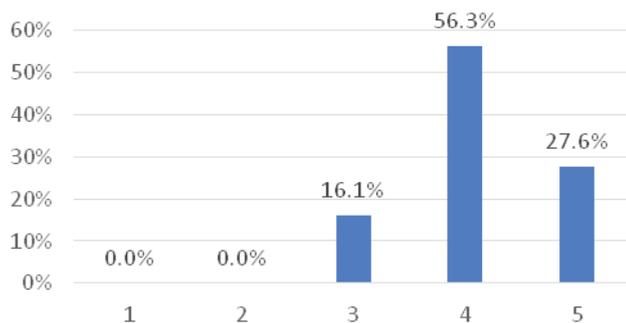


**Part of the IT system for creating of annual program-GIS application**

**28. Assess the extent to which GIS application is simple / intuitive to use** \* 87 answers (1-complicated, 5-very simple)? Average grade 4,07



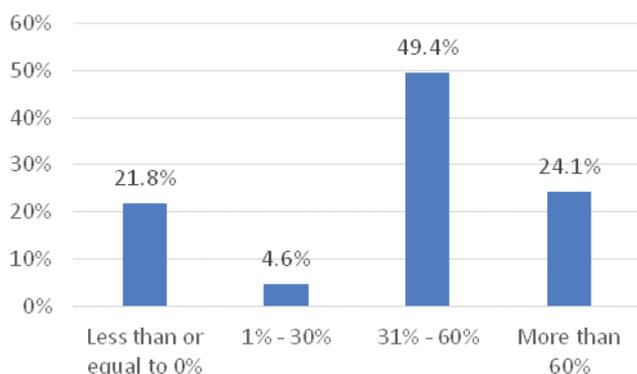
**29. Assess how satisfied you are with the GIS application\*** (1 - dissatisfied, 2-minimum satisfied, 3-partly satisfied, 4-mostly satisfied, 5-completely satisfied) Average grade 4,11



**30. What was the biggest problem in using the GIS application?**  
(Open question)

**31. How faster are you creating annual program now with the new system (%)? \***

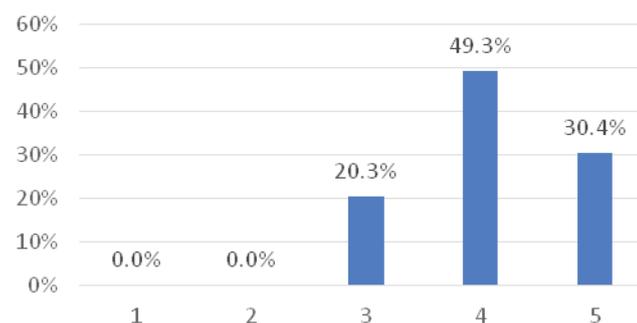
87 answers What is the average length of time needed to create annual program with the IT system and what is without the use of IT system (in days)? (the creation of programs without public calls, and the collection of documentation) (in days) On average 25,9% faster



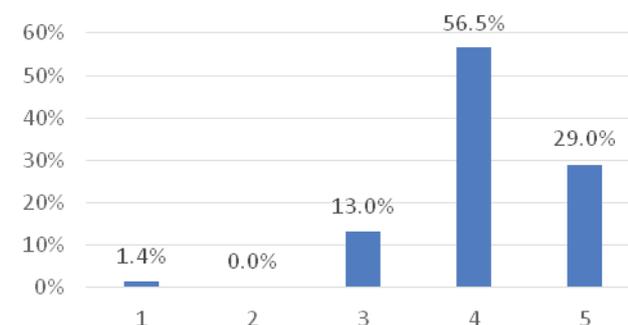
**32. If you took more time to create through the IT system, please explain.**  
(Open question)

**Part of the IT system for the realization of AP (Document Management System-DMS / contract preparation)** - If you have not used this part of the system, please go to the questions about the support from the DAL

**33. Assess the extent to which the DMS application is simple/intuitive to use.** 69 answers (1-complicated, 5-very simple) Average grade 4,1

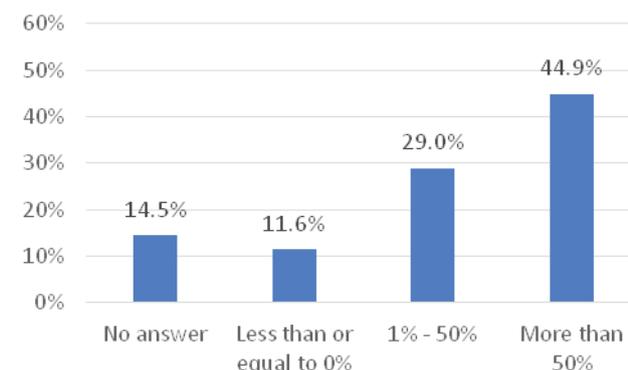


**34. Assess how satisfied you are with the DMS application.** 69 answers (1 - dissatisfied, 2-minimum satisfied, 3-partly satisfied, 4-generally satisfied, 5-completely satisfied) Average grade 4,12



**35. What was the biggest problem in using the DMS application?**  
(Open question)

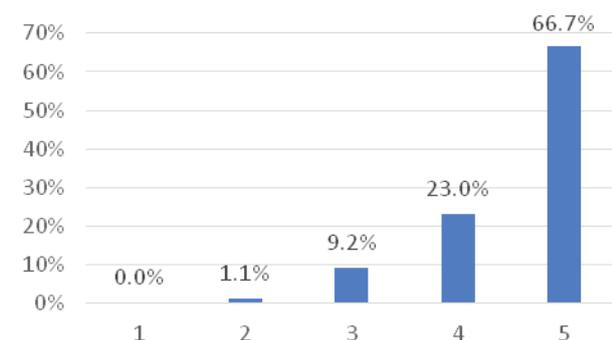
**36. How faster are you creating contracts now with the new system (in %)?** 69 answers What is the average length of time needed to create contracts with the IT system and what is without the use of IT system (in days)? On average 36,6% faster



**37. If you took more time to create a contract through the IT system, please explain.**  
(Open question)

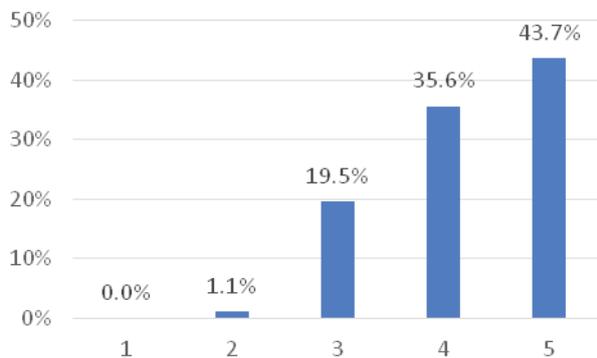
**Support by the Directorate for Agricultural Land**

**38. Please evaluate the extent to which you are satisfied with the support that your LSG received from the GIS Group during the use of this IT solution.** \* 87 answers (1 - dissatisfied, 2-minimum satisfied, 3 partially satisfied, 4-satisfied, 5-completely satisfied)



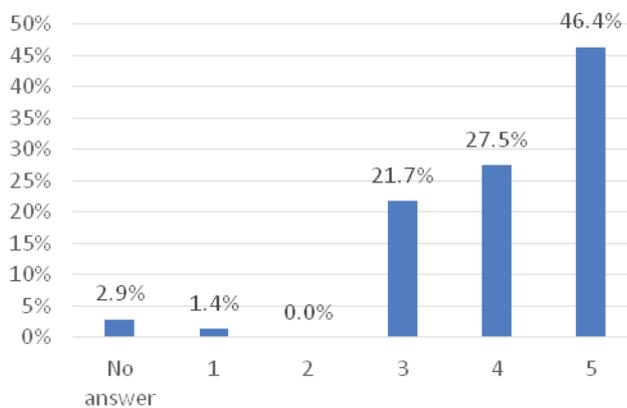
39. If you were not satisfied with the support, please explain. (Open question)

40. Please evaluate the extent to which you are satisfied with the support that your LSG received from the annual program control group during the use of this IT solution. \* 87 answers (1 - dissatisfied, 2-minimum satisfied, 3-partly satisfied, 4-mainly satisfied, 5 - completely satisfied)



41. If you were not satisfied with the support, please explain (Open question)

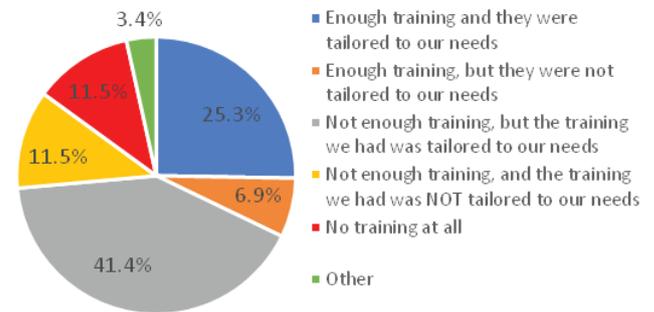
42. Please evaluate the support that your LSG received from “lawyers” during the use of this IT solution: 69 answers (1 - dissatisfied, 2-minimum satisfied, 3-partly satisfied, 4-generally satisfied, 5-completely satisfied)



43. If you were not satisfied with the support, please explain (Open question)

## Trainings / education

44. Did you have enough trainings to use the GIS application for AP development and whether they were tailored to your needs? \*87 answers



45. Enter a comment for “other”: (Open question)

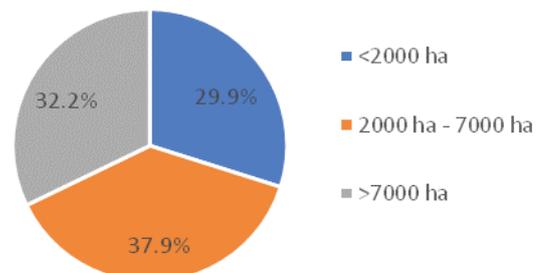
46. Did you have enough trainings to use the DMS application (contract preparation) and were they tailored to your needs? \*87 answers



47. Enter a comment for “other”: (Open question)

## Data on the use of state-owned agricultural land

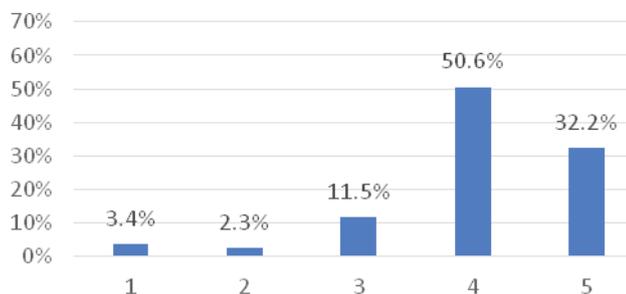
48. Enter the total area of state-owned agricultural land in 2017 (hectares)



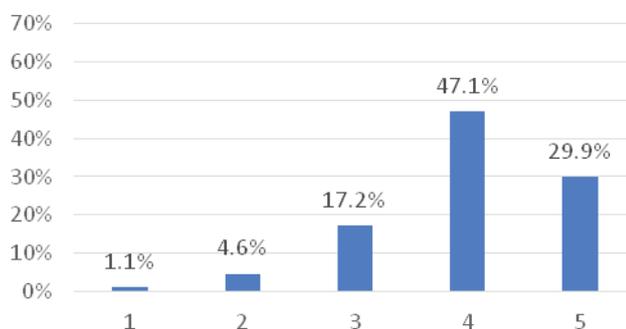
## Impact of the IT system

Assess the impact of the IT system on your work in the following areas \* (1-negative, 2- no impact, 3-small, 4-good, 5-very good).

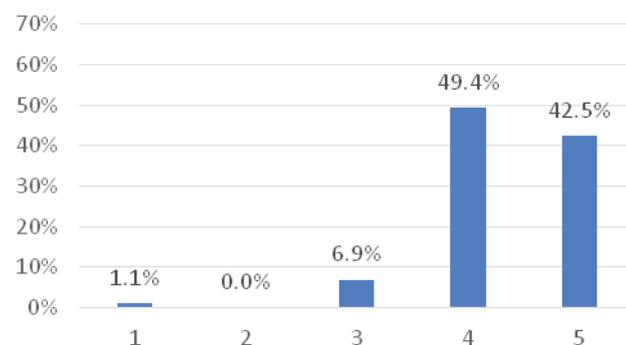
### 49. Length of AP creation 87 answers



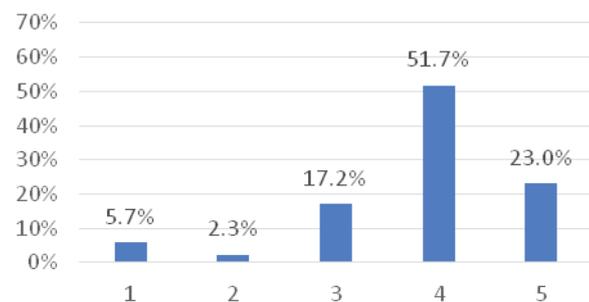
### 50. Number of errors in AP 87 answers



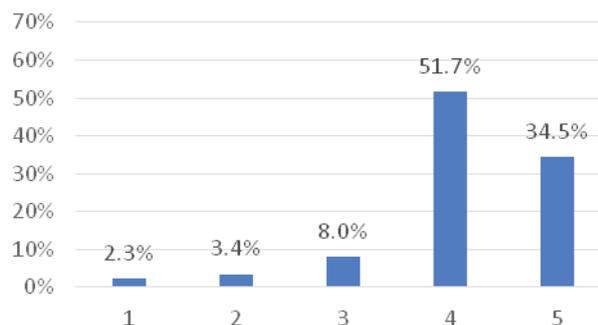
### 51. Quality of the AP 87 answers



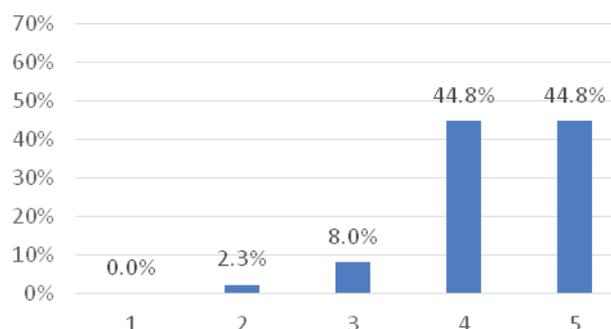
### 52. Harmonization of the data (legal and factual situation) 87 answers



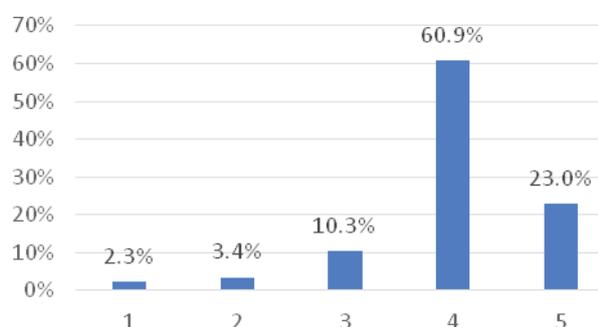
### 53. Forming a better leasing offer (grouping of parcels) 87 answers



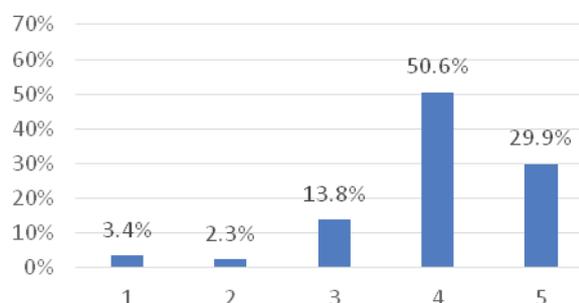
### 54. Communication with the Directorate for Agricultural Land 87 answers



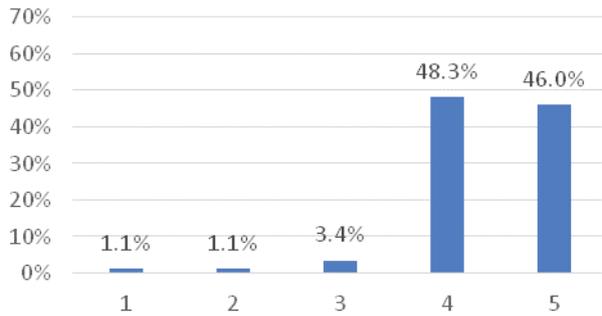
### 55. Analysis of the use of agricultural land 87 answers



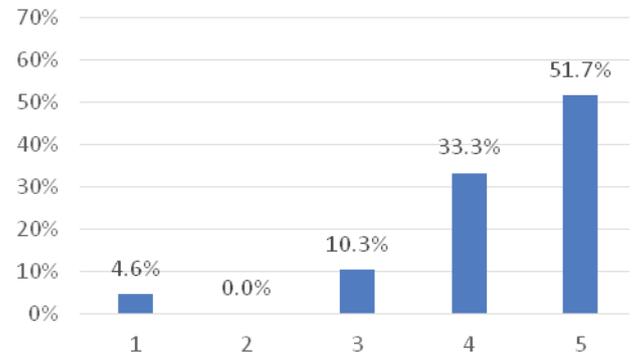
### 56. Control of the use of agricultural land 87 answers



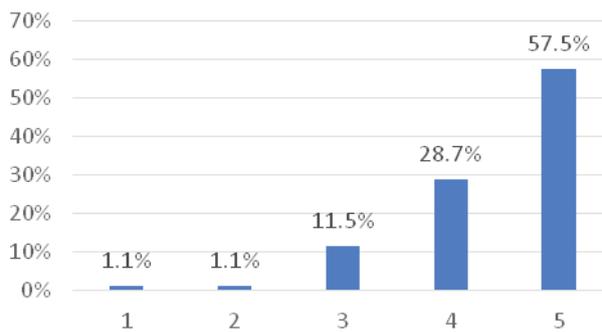
**57. A sense of security in the quality of one's own work** 87 answers



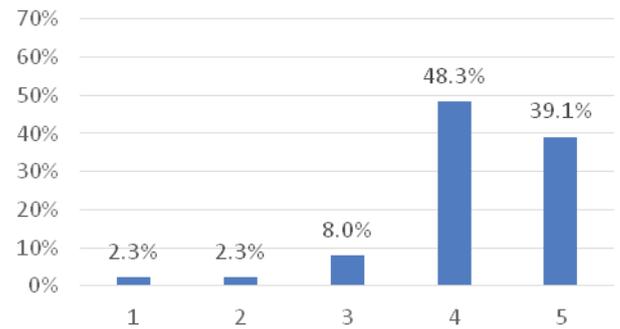
**62. Overview of the offered parcels** 87 answers



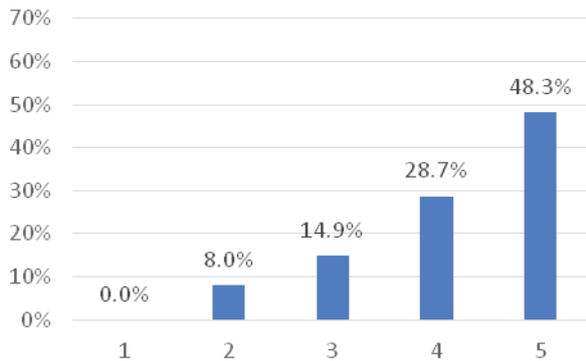
**58. Reduction of paperwork** 87 answers



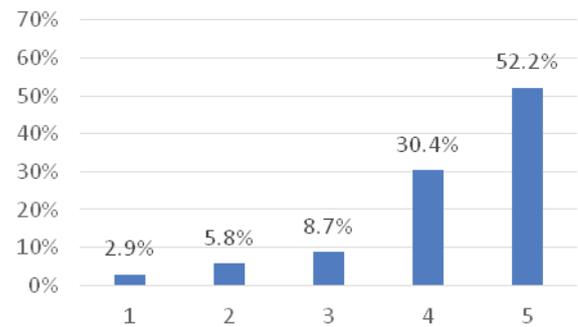
**63. Communication with municipal representatives** 87 answers



**59. Reduction of postal costs** 87 answers



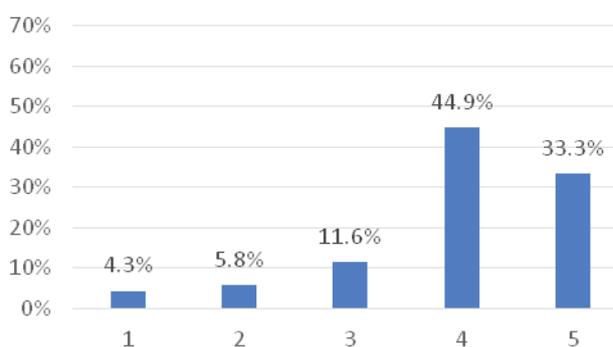
**64. Number of errors in contracts** 69 answers



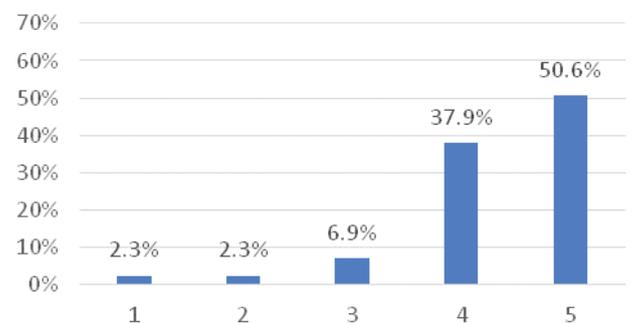
**60** If you gave a grade of 1.2 or 3, please explain it briefly. (Open question)

Assess the impact of IT systems on lessees in the following areas (1-negative, 2-no impact, 3-small, 4-good, 5-very good). \*

**61. Time in which they are getting their contracts** 69 answers



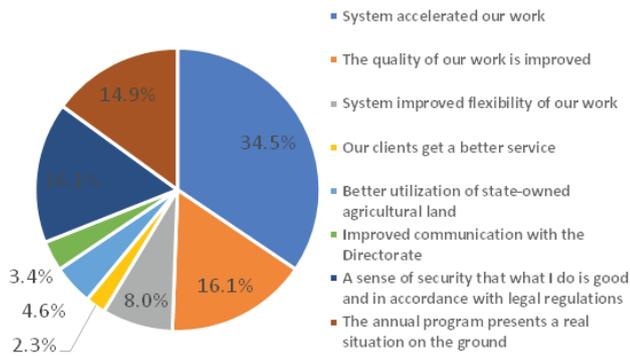
**65. Transparency of leasing procedure** 87 answers



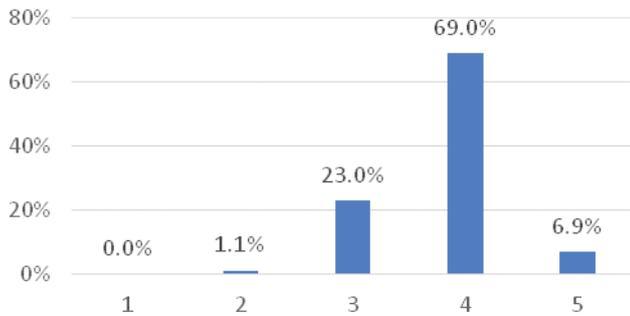
**66.** If you gave a grade of 1.2 or 3, please explain it briefly. (Open question)

**67.** Include other areas of your work to which the IT system had an impact (if not mentioned above): (Open question)

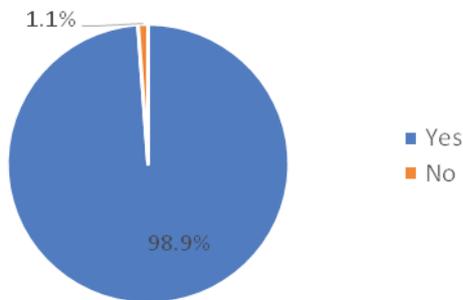
**68. In your opinion, what is the biggest contribution of the IT system? \* 87 answers**



**69. If you imagine the ideal IT solution for efficient management of state-owned agricultural land, how much is the existing IT solution close to that ideal? \* 87 answers (1-far away from ideal, 5-ideal)**

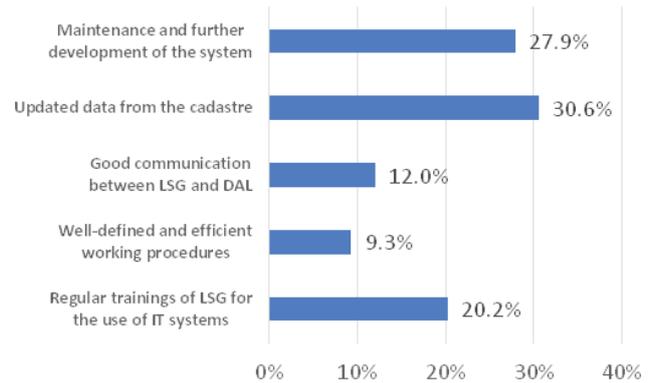


**70. Do you think this system is sustainable? \* 87 answers**



**71. Which are, according to you, the biggest obstacles to the sustainability of this IT system? (Open question)**

**72. What, in your opinion, is necessary for the sustainability of this IT system? Select only the two most important answers \* 87 answers**



**73. Your suggestions for further development and improvement of the IT system (Open question)**