Project Final Report

Project Title: Get It Sorted, data driven waste management and decision making system for Sarajevo - GIS SARAJEVO

Innovator: T-MAPY spol. s r.o.

Local Partner: Kantonalno javno komunalno preduzeće "Rad" d.o.o., Sarajevo, Bosna i Hercegovina

Project Location: Bosna a Hercegovina

Start Date:	**11/2022**		**End Date: 10/2023**
Funding (USD):	**Total**	**70 050**	
	UNDP Award	**39 900**	
	Co-funding	**30 150**	

I. SUMMARY

The executive summary is a concise brief on the progress towards the expected results during the reporting period. The section should include context and key developments of the project; progress against expected results; key challenges and risks faced in the implementation (and what has been done to mitigate them); lessons learned as appropriate; utilization update - mention the total project budget (as proposed in the application); report on cumulative utilization of budget; key recommendations.

Suggested length – 1 page maximum

Progress was achieved fully in accordance with the plan. Another training on GIS Data collection and training of system administrators was organised in September. According to user feedback the test operations and modifications were made. During this time the project team of KJKP RAD continued to collect data in the field and transfer available information in the office. This provided a lot of elements for data visualisation in the system. KJKP RAD staff was very active (they have dedicated two months to our system alone, and have provided many useful suggestions in order to improve and adapt our system to local specifics. System was enabled for use by end users.

The launch of the project for the public, media and partners was organised on 31.10.2023 KJKP RAD office. It was a capacity event, with more than 50 attendees including the Prime minister of Sarajevo Canton and other cantonal officials (see attachment Popis prisutnih 31.10.2023.pdf). The ceremonial launch of the system was also held during the event. The event received significant media attention - more information in Chapter VI.

Communication channels worked well and all the uncertainties and potential risks were addressed and resolved in a timely manner. All activities ran according to the plan. The utilisation of the budget ran according to plan and the budget was fulfilled according to the plan.

KJKP RAD received a GIS solution that will enable them to significantly improve their decision making, asset management, report production and general planning. The solution is fully adapted to local conditions, but T-MAPY remains in contact with KJKP RAD in order to further improve the system and eventually address ssues that were not yet identified by the user. The project also benefits the public by providing transparent information about

container locations, collection times and other relevant information regarding activities of public utility company. Information is freely available via the internet and enables and improves the participation of the public. Link for the public part of the project

II. BACKGROUND

This section should provide a short introductory of the project, including an overview of the situation analysis, objectives and changes in the context/situation. It should be kept brief, expand only on key changes that might affect implementation. This part should include brief background of project and its rationale; context including linkage to other ongoing projects/programs; Project Approach, including Project Set up and management and coordination arrangements. List the main responsible parties.

The goal of the project is to provide KJKP RAD a modern GIS solution (www.assetino.com, https://www.tmapy.com/smartcity) as a basis for smart waste management and a tool to improve and upgrade its operation and planning. GIS is a very powerful tool for creating, managing, analysing, and mapping all types of data. This improves communication and efficiency, improves management and decision making.
Current situation of the waste management sector in Sarajevo Canton is not up to the EU standards. System is not up to environmental standards and is not economically feasible. Main goal of the project is to improve the current situation and in synergy with other current or future interventions establish a sustainable waste management system. T-MAPY has held a number of meetings and exchanged documentation and requirements with KJKP RAD and have together identified the priorities that need to be addressed.
GIS for KJKP RAD will record the data of all waste container locations and to keep this data up-to-date (big shipment of new containers is planned for the end of 2022) and mapping of current waste collection routes. The software solution is used to inform the general public about the location of collection niches, timetable of waste collection and provide other information of public interest. All this is not available at the moment and implementation of project activities will greatly improve the current situation.
GIS solutions and connected database with up to date entries enable company management to perform informed decisions regarding future development while simultaneously detecting anomalies, bottlenecks and non-feasible practices. All the information available in the system will enable KJKP RAD to greatly optimise its operation in waste management, waste bins and collection route management therefore achieving significant savings. This alone is enough to ensure the financial sustainability of the intervention, T-MAPY is also providing a 36 months licence and support for KJKP RAD to have time to recognise all the benefits of the system.

It can only be concluded that all the goals of the project, as listed in previous reports and above have been achieved, and that the project was a huge success.

III. MAIN ACTIVITIES KEY RESULTS ACHIEVED

This section should focus on results backed by evidence of achievements. Give an overall and clear sense of the 'before-and-after' of the project intervention. Describe and analyse activities but emphasis on linking them more solidly to expected results by also including references and evidencing how the total number of activities helped to reach the results of the project.

Suggested length – approximately 2-3 pages.

In the first stage of the project the architecture of the project was designed. The new system was based on technology Assetino – an Asset inventory and management system by T-MAPY. Assetino is a web-based GIS system,

all applications run on server, end-users need only web browsers. The applications run on all devices (PC / laptop / mobile phone / tablet), so users can work also in the field without any software limitations. Assetino for RAD waste management runs in a cloud hosted by T-MAPY, in the future it can be moved to local Bosnian cloud provider or on RAD's server. The system contains all necessary user rights and roles for system administration and data editing and viewing.

After the system installation, the waste location sites data will be imported into the new GIS system. At the same time a visualisation of the data was created. The system was also translated to bosnian/croatian/serbian (bcs).

In April, the first version of the system was presented to KJKP RAD representatives. Together, T-MAPY and KJKP RAD staff went through all the tools and modules of the new system in detail. There was also a detailed debate about the structure of the data and the meaning of the individual attributes in the original RAD data. The translation of the application has also been discussed and modified.

In July, the first training was held. The training was divided into three parts. In the first part the editors were trained - the basic map control, adding new location and container, coordinates change, attributes modification etc. In the following part internal users were trained - map and application control, data filtering and viewing etc. In the final part the system administrators were trained - creating new users, setting user rights and roles,main portal administration etc. During all training sessions the translation has been modified.

The final training on GIS Data collection and training of system administrators was held in September. Together with the training activities the system was also enabled for the end users. At the same time, the data was updated in the application and new data was collected in the field.

On October 31, 2023, the GIS portal and resource management system of KJKP Rad Sarajevo were launched. The system will enable modern management and record keeping of resources - primarily waste collection containers and collection routes. The new modern system will enable further development of the company's services, better planning and communication with users. In the section freely accessible to the public, people can find container locations on the Sarajevo Canton map, days and crews that collect, green islands, recycling yards, as well as other tools for working with the map. The waste map will be constantly supplemented and updated on line with the resource mapping of KJKP Rad Sarajevo. In the initial phase, mapping and recording of containers for sorted waste was carried out, while in the next phase, all waste collection containers under the jurisdiction of KJKP Rad Sarajevo will be added.

Presentation of project results to the public, media and partners was held on October 31 2023 at RAD office. Key representatives of Sarajevo Canton, UNDP, Embassy of the Czech Republic in Sarajevo, People in Need, KJKP RAD and T-MAPY participated in this event.

Feasibility Study for further activities in the region was produced.

Link for the public part of the project

IV. PARTNERSHIP AND SUSTAINABILITY

Briefly describe all partnerships, including new ones built in the course of the project duration. Report on the major impact that these partnerships have on project results. How stakeholders, counterparts and/or local communities are/were engaged in the planning, implementation, monitoring and evaluation of the project to ensure sustainability of the project. How the project created visibility for knowledge and lessons learned

generated by the project's activities. What are the transition arrangements carried out to scale up or sustain the project results.

Suggested length – 1 page

Partnership with local partner KJKP RAD was exceptional. All required actions by the local partner were done in a timely manner and according to the agreement. KJKP RAD as main stakeholder of the project was fully engaged in implementation of the project all the time. The team established by project manager on behalf of KJKP RAD, Ms. Maida Čukojević was very engaged and motivated. All the planned training activities were concluded. All the other employees of KJKP RAD (IT personnel, technical and crew chiefs, etc.) that will be affected by the new system were present on the portions of the education that was intended for them, and they have got a grip of the concept, that can be further explained to them by system administrator, or by studying the manuals that were translated, adjusted to local language and available upon registration on the system

During the course of the project T-MAPY was also addressed by Sarajevo Canton officials who were very interested in the possibility of the Smart City solutions. Prime minister of Sarajevo Canton was also present during the final presentation, and expressed the interest for the further expansion of the system. T-MAPY are certainly going to pursue this possibility and stay in contact with the Canton administration.

There is significant potential for growth and expansion of the system. T-MAPY can provide extension of the system to other topics concerning city management - registration and management of roads, winter maintenance, public lighting, management of greenery etc. Extensions can be potentially interesting not only for RAD but also for Canton Sarajevo.

The whole solution is "open" and other institutions can be included in order to provide a full city management solution (see gis.brno.cz as reference). Localised version will allow its swift and efficient transition and replication in other locations in Bosnia and Herzegovina or even to neighbouring countries.

Project has its outreach towards the general public and involvement of the public is desirable in order to achieve sustainability of the intervention. T-MAPY has also established contact with People in Need organisation (https://www.peopleinneed.net/) that implements a large-scale three year Czech Development Agency project "Support for the development of waste management in the Canton of Sarajevo". The agreement was made to work more closely in the next period in order to enable both projects to work in synergy in order to provide best results for the local partner.

V. KEY CHALLENGES LESSONS LEARNED AND RECOMENDATIONS

Mention key challenges encountered during project implementation and lessons learned as well as the way forward. For each of them, describe successful approaches taken to address challenges and highlight recommendations for future consideration in implementing the Project. This should include any modifications that needed to be made to proposed targets as well data collection and monitoring to track progress.

Suggested length –1 page

The Project implementation was very smooth and went according to plan. The main challenge was finding a suitable timetable for all relevant stakeholders and sticking to a plan. KJKP RAD partners were flexible enough, and employees of T-MAPY provided enough capacity to successfully address all the objectives. It must be said that we have found a great partner in KJKP RAD that was on the same page during the whole duration of the Project and that their professional and human capacities have made implementation of this Project an

enjoyable team effort. All technical challenges were addressed in a timely manner and all suggestions were discussed and implemented if they have proved to be beneficial to the system. We assume that the main reason for this is that the problem/issue to be addressed by the Project was identified correctly in cooperation with the Beneficiary, and that benefits of the Project implementation were recognised early by KJKP RAD. It was somewhat more challenging, but necessary to be more detailed and define the needs and possibilities in the very beginning because the system that was to be implemented was something completely new. But after agreeing on the details of the desired outcome and taking into account available resources, all the capacities were engaged towards achieving a joint goal.

It can be said that need for intervention was well identified and also recognised by the UNDP and the capacities of the local partner were in place to make it happen. We can only recommend KJKP RAD (or al least its technical department) for future cooperation.

VI. MEDIA COVERAGE AND PUBLIC OUTREACH

(Please summarize the media coverage and public outreach; include links to relevant articles and media)

At the end of the project implementation a media conference and public launch of the system was organised on 31.10.2023 at the KJKP RAD premises. Press statement was also released (see attachment Press release and invitation.pdf).

The event received significant media attention from both local and state wide media, TV (TV Sarajevo, NOVA BH), radio and printed media.

Articles on KJKP RAD channels.

Facebook

Instagram

Television of Sarajevo Canton, main news

Main news (from 23:00)

The launch of system was also the main theme of State radio - BH RADIO Eko Eho radio show on 6.11.2023

Facebook

Eko Eho radio show

VII. PROJECT'S FINANCIAL PERFORMANCE

Please insert original budget and add report current utilization of budget

The project was generally completed according to plan. No significant changes were made.

Czech-UNDP Challenge Fund 2022

Proposed Budget

Get It Sorted - data driven waste management and decision making system for Sarajevo - GIS SARAJEVO BUDGET

Lead Applicant/Innovator	T-MAPY spol. s r.o.
Country of Implementation	Bosnia and Herzegovina

Award	$39 900,00
Co-financing (USD)	$30 150,00
Co-financing (%)	43,04%
Total Budget	$70 050,00

Activity 1 | Chapter 1	**Analyses, Design**					
Type of Expenditure	Unit	Number of Units	Award (USD)	Co-financing (USD)	Spent Units	Spent (USD)
1.1 Personal Expenses	man/day					
1.1.1. Expert 1 - T-Mapy	man/day	3	$810,00	$324,00	3	$810,00
1.1.2. Expert 2 - T-Mapy	man/day	4	$1 080,00	$432,00	4	$1 080,00
1.1.3. Expert 3 - T-Mapy	man/day	4	$1 080,00	$432,00	5	$1 350,00
1.1.4. Expert 4 - T-Mapy	man/day	4	$1 080,00	$432,00	5	$1 350,00
1.1.5. Expert 5 - KJKP RAD	man/day	9		$2 250,00		$0,00
1.2 Travel Expenses						
1.2.1 Flight	person	2	$800,00			$550,00
1.2.2 Accomodation	night	2	$400,00			$190,00
1.2.3 other local costs						
1.2.3.1. taxi	lump sum		$150,00			
Activity 1 (Total)	NA	NA	$5 400,00	$3 870,00		$5 330,00

Activity 2 | Chapter 2	**Implementation**					
Type of Expenditure	Unit	Number of Units	Award (USD)	Co-financing (USD)		
2.1 Personal Expenses						
2.1.1. expert 1 - T-Mapy	man/day	4	$1 080,00	$432,00	4	$1 080,00
2.1.2. expert 2 - T-Mapy	man/day	6	$1 620,00	$648,00	6	$1 620,00
2.1.3. expert 3 - T-Mapy	man/day	5	$1 350,00	$540,00	5	$1 350,00
2.1.4. expert 4 - T-Mapy	man/day	5	$1 350,00	$540,00	5	$1 350,00
2.1.5. expert 5 - KJKP RAD	man/day	12		$3 000,00		$0,00
2.2. other local costs						
2.4 Other						
2.4.1 licence			$6 000,00	$2 400,00		$6 000,00
Activity 2 (Total)	NA	NA	$11 400,00	$7 560,00		$11 400,00

Activity 3 | Chapter 3	**Training**					
Type of Expenditure	Unit	Number of Units	Award (USD)	Co-financing (USD)		
3.1 Personal Expenses	man/day					
3.1.1. expert 1 - T-Mapy	man/day	3	$810,00	$324,00	1	$270,00
3.1.2. expert 2 - T-Mapy	man/day	4	$1 080,00	$432,00	2	$540,00
3.1.3. expert 3 - T-Mapy	man/day	4	$1 080,00	$432,00	3	$810,00
3.1.4. expert 4 - T-Mapy	man/day	4	$1 080,00	$432,00	2	$540,00
3.1.5. expert 5 - KJKP RAD	man/day	11		$2 750,00		$0,00
3.2 Travel Expenses						
3.2.1 Car	person	2	$800,00		3	$650,00
3.2.2 Accomodation	night	2	$400,00		3	$310,00
3.2.3 other local costs			$150,00			
3.2.3.1. taxi	lump sum	1	$150,00			
3.2.3.2. Training premises	lump sum	1		$620,00		
Activity 3 (Total)	NA	NA	$5 550,00	$4 990,00		$3 120,00

Activity 4 | Chapter 4	**Test Operation**					
Type of Expenditure	Unit	Number of Units	Award (USD)	Co-financing (USD)		
4.1 Personal Expenses	man/day					
4.1.1. expert 1 - T-Mapy	man/day	3	$810,00	$324,00	4	$1 080,00
4.1.2. expert 2 - T-Mapy	man/day	4	$1 080,00	$432,00	5	$1 350,00
4.1.3. expert 3 - T-Mapy	man/day	3	$810,00	$324,00	4	$1 080,00
4.1.4. expert 4 - T-Mapy	man/day	3	$810,00	$324,00	3	$810,00
4.1.5. expert 5 - KJKP RAD	man/day	12		$3 000,00		

4.2.3 other local costs						
Activity 4 (Total)	NA	NA	$3 510,00	$4 404,00		$4 320,00
Activity 5 | Chapter 5	**System start, promotion, evalutation**					
Type of Expenditure	Unit	Number of Units	Award (USD)	Co-financing (USD)		
5.1 Personal Expenses	man/day					
4.1.1. expert 1 - T-Mapy	man/day	5	$1 350,00	$540,00	7	$1 890,00
4.1.2. expert 2 - T-Mapy	man/day	7	$1 890,00	$756,00	9	$2 430,00
4.1.3. expert 3 - T-Mapy	man/day	6	$1 620,00	$648,00	7	$1 890,00
4.1.4. expert 4 - T-Mapy	man/day	5	$1 350,00	$540,00	7	$1 890,00
4.1.5. expert 5 - KIKP RAD	man/day	17		$4 250,00		
5.2 Travel Expenses						
5.2.1 Flight	person	2	$800,00		2	$950,00
5.2.2 Accomodation	night	2	$400,00		2	$170,00
5.2.3 other local costs						$30,00
5.2.3.1. local transport	lump sum	1	$150,00			
5.4 Other						
5.4.1 licence			$6 480,00	$2 592,00		$6 480,00
Activity 4 (Total)	NA	NA	$14 040,00	$9 326,00		$15 730,00
In Total	NA	NA	$39 900,00	$30 150,00		$39 900,00

VIII. ANNEXES

Annex (max.2 annexes)

- *Popis prisutnih 31.10.2023.pdf*
- *Press release and invitation.pdf*
- *Photos (photo.zip)*

PREPARED BY:

(Date, name and signature of the responsible person.)

15. 11. 2023
Milan Novotný

Ing. Milan Novotný

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