VillageWaters

Interreg Baltic Sea Region

EUROPEAN UNION
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Documentation of the usage of the virtual platform

VillageWaters internal report

Jari Heiskanen, Virpi Vorne (Eds.*), Niina Dulova, Tiit Paabo, Loreta Urtāne, Laima Česonienė, Michał Kuźniar, Marja-Liisa Vieraankivi

FINDING THE BEST FITTING SOLUTIONS FOR WASTEWATER MANAGEMENT IN VILLAGES

VillageWaters Project
Research about Wastewater
Treatment Systems

Report of the activity platform and collaboration

VillageWaters internal report

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Natural Resources Institute Finland (Luke), Helsinki, 2019

VillageWaters Project Research about Wastewater Treatment Systems

Partner organizations that took part of writing and editing and also producing data for this report:

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This internal report titled as 'Documentation of the usage of the virtual platform', as a part of the activity 4.2 'Establishment of activity platform and collaboration' in VillageWaters –project (1st of March 2016-28th of February 2019), was published on 28th of February 2019 (period 6 of the project) only for project usage. This report is a summary of the work how communication via the platform was conducted in the project.

The main challenge of this VillageWaters -project ('Water emissions and their reduction in village communities – villages in Baltic Sea Region as pilots') is to find out the most sustainable technological wastewater treatment solutions to decrease wastewater emissions of sparsely populated areas locally but also into the Baltic Sea to the level set by ongoing implementation of the forthcoming EU water legislation. The main objective is to support the needs of households to avoid unnecessary investments and operating costs when shifting to improved waste water treatment and thus encourage them to implement new treatment systems. The work is conducted in 13 activities under four work packages in this project by 13 partners from Estonia, Finland, Latvia, Lithuania and Poland. The project's schedule is 1st of March 2016 until 28th of February 2019, including 6 periods. The budget is about 3 million euros that is mainly funded by The Interreg Baltic Sea Region (BSR) Programme 2014-2020.

Keywords: communication, 'Connect and share'-platform, the information tool, wastewater treatment solutions, VillageWaters, VillageWaters –data, VillageWaters -media, VillageWaters-information tool, virtual platform

Abbreviations and definitions

'Connect and share'-platform = experts can communicate with users and all target groups via platform

VillageWaters = Water emissions and their reduction in village communities – villages in Baltic Sea Region as pilots-VillageWaters –project (1st of March 2016 - 28th of February 2019)

Information Tool = is an electronic system that offers for users to choose the most effective, practical, cost-effective and environmentally friendly wastewater treatment solutions for homeowners in sparsely populated areas - the main output of VillageWaters project

WWTS = Wastewater treatment solutions

SME Small and medium-sized enterprises

1. Introduction

The VillageWaters project was actively collaborating with users and other target groups and experts. Communication was publicly available through the VillageWaters webpages (www.villagewaters.eu). An active collaboration between people of households and other platform users and experts were carried out. In addition, different trainings, seminars and workshops were organized in the project for different target groups, which way dissemination was done.

Target groups of the project were households in sparsely populated areas, municipal authorities, SME entrepreneurs in wastewater treatment, researchers in environmental science and policymakers and authorities who work in environmental fields. Household owners and other end-users can find via the VillageWaters –Information Tool the most effective, practical, cost-effective and environmentally friendly wastewater treatment solution for their home in sparsely populated areas. They can also use the media to acquire information according to their interests, for example, when looking for solutions to potential problems in wastewater treatment system issues they might have encountered. Households and other end-users, such as schools and kindergartens, which take upon the renewal of their waste water treatment system either in the context of the project or elsewhere, or other time, will benefit from the information given in the webpages. However, also those end-users who have already implemented a new system may utilize the data, for instance, when they are looking for help to a problem that appeared in the operation of the system.

Municipal authorities have a possibility to follow the technological trends, as well as learn from experiences of other municipalities and end-user's from their own regions, own countries, and from other countries of the Baltic Sea region. This may give new ideas ways of action for their daily work. Companies that manufacture waste water treatment systems or their components, those who plan or implement them, as well as those who provide maintenance services for the systems may make use of the discussions and the information available on VillageWaters -webpages when developing of their business. Additionally, water companies and environmental organisations can use the media to get material and ideas for their teaching and training courses. Policymakers and other authorities can find newest information from the media**.**

The project webpages were published in English and also some parts were translated into national languages of the project partners i.e. in Estonian, Finnish, Lithuanian, Latvian, Polish and Swedish. The project webpage is one of communication platforms of project. Its English part is used for dissemination of project results and for communication on international scale, while national parts were foreseen for communication on national scale. Therefore the national languages parts of website are country-specific and is not to simultaneous with English version. The exception is Information Tool, which is simultaneous according to its structure and country-specific according to its content.

The first version was available since the end of period 3 (=31st of August 2017) of VillageWaters project, but webpages were actively developed during the whole project until the end of period 6 (=28th of February 2019). Project webpage and some content published there will available at least 9 years after the project. VillageWaters project has also internal site for project partners to save and maintain data and communicate with each other.

2. Project webpage

VillageWaters project has public website on https://villagewaters.eu/. Project web pages are in English and in each partner language: Estonian, Finnish, Latvian, Lithuanian, Polish and Swedish. The main content of web pages after the project implementation is the Information Tool, including instruction how to use it. The information tool is also translated to each partner languages. The web pages include also the information of the project and pilots activities, connect and share platform and project reports.

Website is one of most important project mediums for publishing project outputs. Besides of Facebook and YouTube channel, website integrates various materials like project reports, news, blogs, Information Tool, and most of the Connect and Share functionalities (Figure 1).

Figure 1. Screenshot of VillageWaters website.

Website is built on FastLion platform, which is well known by its speed, quality and durability. Besides of good qualification with today's web standards and Google Webmaster Guidelines, website platform has also powerful content management system, which enables to edit content easily.

Web editor toolbox consist powerful editing tools for modification of website structure and content. It is possible to add new pages and edit existing ones. For text editing, there is easily usable text editor, which offers various text formatting functionalities, which are similar to desktop word processing programs like Microsoft Word of OpenOffice Write. There is possible to upload illustration files to create variety on pages and expand texts with illustrative material. Website supports uploading of illustration files on .jpg, .jpeg, .png .gif, .tif, .tiff, .bmp and .eps format images, uploaded images will are converted automatically to proper sizes for website layout (uploaded images may be up to 16 MB size). Additionally there is possible to upload documents files on .pdf, .txt, .rtf, .odt, ods, ott, .sdc, .sxi, .doc, .docx, .dot, .xls, .xlsx, .htm, .html, .ppt, .pptx, .pot, .potx, .pps, .pub, .mdb, .zip, .rar, .tar, .accdb, .cdr, .ai, and .psd format. Uploadable files extension list may be expanded easily, if there is need for some additional document formats.

Important feature of website are, that there are multiple language sections for each participating country - Estonian, Finnish, Latvian, Lithuanian, Latvian, Polish and Swedish. Finnish project partners maintain information on Swedish language section. Each project country has at least one website administrator, who has rights to edit particular language section. In this way, each country is comparatively independent on editing their content on particular language section and to make editorial decisions based on their own content strategy. Website has all essential publishing tools to support creating compelling stories and creating useful content for end-users.

Website structure has been on dynamic development during the project. Most of virtual platform elements were adjusted to fit best for project partner and end-users real needs. Information tool were added during second half of project period, developed and filled with information by the end of project. All important elements, which have long-lasting value for end-users will be maintained at least 9 years after the end of project on February 2019. To ensure flawless work and availability of website, IT-contract consists guarantee terms, which give all project counterparts confidence, that important project outputs will be available for end-users beyond the project duration.

2.1. Information Tool

VillageWaters –Information tool (https://www.villagewaters.eu/945#1|4|1|1,2,7|6.2;4.9||1-100|49-420|1|0|0|en) is an electronic system that offers for users to choose the most effective, practical, cost-effective and environmentally friendly wastewater treatment solutions for homeowners in sparsely populated areas. It is a user interface to the public part of the database and to the fitness assessment system, which utilizes the data for searching best-fitting wastewater treatment solutions for user-specific needs. This is the main output of VillageWaters –project.

The information tool was planned and built among the partners from each partner country. The information tool was launched for public at the end of the year 2018, but the modification will continue to the end of February 2019. The information tool helps local authorities, water advisers and households to choose correct wastewater treatment system by taking account environmental, economic and social factors (Figure 2).

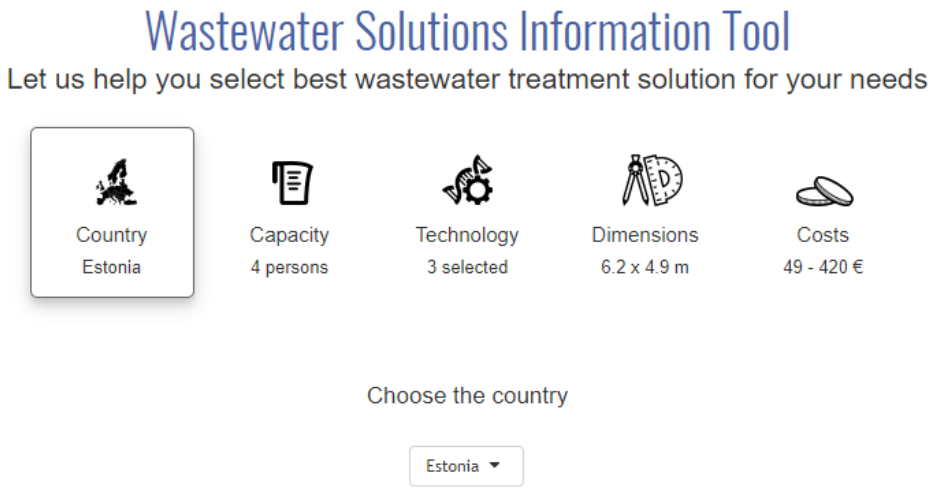


Figure 2. Screenshot of the Information Tool.

VillageWaters –information tool, with user interfaces to the database and to the fitness assessment system, which utilizes the data for searching best-fitting wastewater treatment solutions for user-specific needs. It is an easy-to-use information retrieval, exchange and processing system designed to

help users to find appropriate, specific and helpful information on the small scale wastewater treatment solutions for their needs. That engine includes all data that has been collected by the surveys carried out in the project, subsequently processed, calculated and summarized within the project. The core of the information tool is a software system embedded in, and accessible through, the website of the project which acts as the broad platform of the VillageWaters -media.

Using the fitness assessment interface, the user first describes the operating environment for the particular case (Table 1). This description is mainly quantitative and is used as constant boundary condition for the treatment systems to be sought. The description includes the necessary data for estimating the characteristics of the load entering the treatment system, as well as the characteristics of the surroundings of the system including the location of the information tool. After the operating environment is defined, the user gives the search criteria for numeric criteria variables of the system as desired value ranges, and for text criteria variables as text definition sets (Table 1). Numeric criteria may be given for the total investment, operation and maintenance costs, carbon footprint, etc. Text criteria may be defined for the main technological type, type of function and so on. The information tool seeks the specific technologies which would be potentially best-fitting for the user's operation environment and the criteria setting. The information tool displays the obtained results for the user-selected variables as the potentially best-fitting systems with estimated fitness grades.

The Information Tool was published internally for project use in period 4. The first version of it was published in public in period 5 to obtain feedback from the target groups. The Information Tool was developed during the whole project.

Table 1. Example of selection criteria, possible options and their importance in the VillageWaters – Information Tool.

Criterion	Options	Importance
Country	Estonia, Finland, Latvia, Lithuania, Poland, Sweden	General requirements are set by Urban Wastewater Treatment Directive, while site specific depends from the national legislation and therefore differs with respect to purification degree and discharge limits.
Capacity	Hydraulic load/Number of inhabitants, max an min inflow	
Dimensions and space requirements	Available land area and underground volume, N/A	Optional
Economic requirements	Installation and maintenance costs	
Need of the regular maintenance	A lot, rather much, not very much, not at all, N/A	Optional
Expected service-life	Period in years, N/A	Optional
Type of technology	Prefabricated: Septic tank, Holding tank, Package plant, Septic filter; Site assembled: Soil filter, Infiltration bed, Constructed wetland; N/A	Optional
Cost	0-xxxx €	

N/A = not available

From technical viewpoint VillageWaters – Information Tool consists of three main components - database for storing all data, editing functionalities for adding and modifying data, and user interface for selecting, filtering and searching data. Since the Information Tool is closely integrated with website framework, it will use also similar database platform, which will be MySQL, 10.1.21-MariaDB.

Database structure were created to contain all important equipment parameters (like capacity, dimensions, space requirements, maintenance needs, type of technology and cost) as well as cross references to other related data like equipment manufacturers, installation services, maintenance providers and financing plans.

VillageWaters - Information Tool consist of editing functionalities, which allow inserting new data and editing existing ones. Similar to website editor´s structure, there is one chief administrator, who is able to create co-editors and assign editing rights to them. Information Tool end-user interface consists selecting, filtering and searching functionalities. Since end-users are projected to be from all participating countries, all user interface dialogs will be translated from original English also into Estonian, Finnish, Latvian, Lithuanian, Latvian, Polish and Swedish languages.

2.2. Guidelines

This section at Village Waters webpage (https://www.villagewaters.eu/Guidelines_850) provides instructions for more efficient use of Information Tool, both in video and written format, as well as other useful readings to help on planning, installing, and maintaining of small wastewater treatment systems. Guidelines page includes:

- VillageWaters animation video - 3 minute video introduction shows basic principles and describes briefly main functionalities of the Information Tool.
- Information Tool guideline page - describes in more detail, what are the elements of Information Tool and how it was made. You may download and see brief user manual in case you have any questions arising during using the Tool.
- Technology types descriptions - describes differences and limitations of particular wastewater technologies.
- Training Material Part 1, *Considering the future of the Baltic Sea* – explains the status of the Baltic Sea and consequences of eutrophication;
- Training Material Part 2, *Consider before flush* – explains the origination of domestic wastewater and types of wastewater treatment systems;
- Training Material Part 3, *Consider and act* – summarize historical development of wastewater treatment solutions and explains the origination of wastewater treatment system costs;
- Wastewater Treatment Guide, A guide to wastewater – describes on-site wastewater treatment alternatives;
- Wastewater Treatment Guide, A guide to summer cottage wastewater – describes the treatment of wastewater at a summer cottage both for small and large quantities of wastewater.

Under the guidelines section is also available the project reports:

- A2.1, A survey of available wastewater treatment technologies for sparsely populated areas - User's manual – report contains information about the EU and national legislation from Estonia, Finland, Latvia, Lithuania and Poland concerning the wastewater treatment in sparsely populated areas, and the summary of waste water treatment systems on the market in these countries.
- A3.2, Installation of technological systems for waste water treatment – documentation report includes descriptions of the implementations of the technological systems at the end users. Report describes how contracting process was organized and put to practice, how related official processes were carried out, technical description of implemented systems, problems encountered during the building and their solutions and overall conclusions on the building process;
- A4.2, Report of the activity platform and collaboration – report includes an overview how and to which extent the features of the platform were used and synopsis of contents of the discussions, blogs, questions asked, and answers given
- A4.5, Guidelines for the best technical solutions and practices for the waste water treatment in scattered dwelling areas – report summarize the best practices and solutions found by the project pilots into guidelines. The guidelines will consider the key issues of procurement of a waste treatment system, such as how to buy new technology, how to evaluate its inputs and costs compared to other systems, how to operate with the maintenance, how to co-operate within village water cooperatives and how to communicate on the intentions, options and results. The guidelines also give basic information of the waste water treatment systems and describe why they are used and how they impact local waters and the Baltic Sea, as well as the global environment. The guidelines give also tips on how to decrease waste water emissions and climate impacts at the same time.
- There is also link to the VillageWaters Public Seminar materials and 'Read more' section to the 'Guides how to handle wastewater from households'.

2.3. ‘Connect and Share’ –platform

‘Connect and Share’ –platform (https://www.villagewaters.eu/Connect_and_Share_835) includes following sections:

- Send your feedback
- Read expert answers
- Open discussion forum
- Facebook page
- YouTube channel
- News and Blogs
- Open Blogs
- Calendar of events
- Links to useful WWW sites.
- Send your feedback

2.3.1. Send your feedback

Through the feedback section (https://www.villagewaters.eu/Send_Your_Feedback_838) users can communicate with project partners and send feedback and questions about any issues. With describing their details of situation, end-users will get free consultation for solving specifically their unique WWTS problems. Users can ask questions related to the waste water treatment technologies privately from the experts. Service is not on the real time, answering time is about few days. Users can also seek answers from the column of answers to ‘Read expert answers.

Multinational experts were available, so feedback was possible to send in English, Swedish, Finnish, Estonian, Latvian, Lithuanian and Polish languages (Figure 3). During the project it was sent nine questions by using international platform, which were answered to the senders by -email.

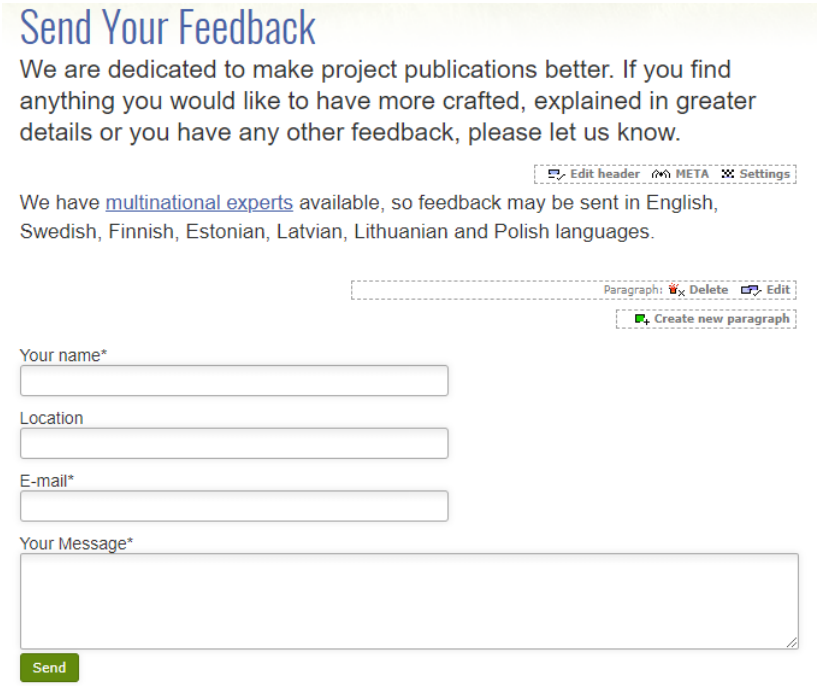


Figure 3. Screenshot of Send your feedback-service that is part of Expert answering service.

The main editor (Luke, Virpi Vorne) were in charge of the whole work and there was partner in each partner country in charge of the work nationally. They were called national contact persons and that were Niina Dulova niina.dulova@ttu.ee in Estonia, Daiva Sileikiene daiva.sileikiene@asu.lt in Lithuania, Uģis Rusmanis ugis.rusmanis@lu.lv in Latvia, Andrzej Eymontt a.eymontt@itp.edu.pl in Poland, and Virpi Vorne virpi.vorne@luke.fi in Finland. The main editor was coordinating the work and the national contact persons acted as national experts of the expert-answering platform.

All questions posted through the service were sent by e-mail to the main editor. She sent national questions to the national contact persons that were answered to the national questions but they were able to consult and use the expertise of other partners of the project. If needed, a national contact person translated the question into English and experts were found from the project to answer to the question in English. After that a national contact person translated the answer to its own language. They also sent important questions in English to the main editor who published the questions on 'Read expert answers -section'. Finnish bilingual experts, who answered questions coming from Åland and from the Swedish speaking people of the continental Finland, also answered the questions of Swedish people. About one to two days was a time to answer to the questions.

It-provider created a web posting form with simple form field structure, like "Name", "E-mail", "Location" and "Question text". Adding links to answers enabled to refer to other questions answered earlier or expand context by linking to research papers published in other web publications.

Similarly, questions were sent also by using national platforms. For example, "Send Your feedback" option was used as a feedback from the international exhibition "Māja I" (House) conducted in Riga (08.03.-11.03), where PP6 (University of Latvia) introduced visitors with Information Tool, developed by VillageWaters project. The mentioned before exhibition is the largest building industry event in Latvia that offers an insight into the recent development tendencies of the building industry. As a direct feedback from the participation in this exhibition more as 20 e-mails were received from the houseowners and small enterprises to discuss best available wastewater treatment solutions or operational problems of existing wastewater treatment solutions. All questions posted through the service were sent by e-mail directly to the national editor and were answered by experts later on. The communication between end-users and project further were conducted via emails and phone communication.

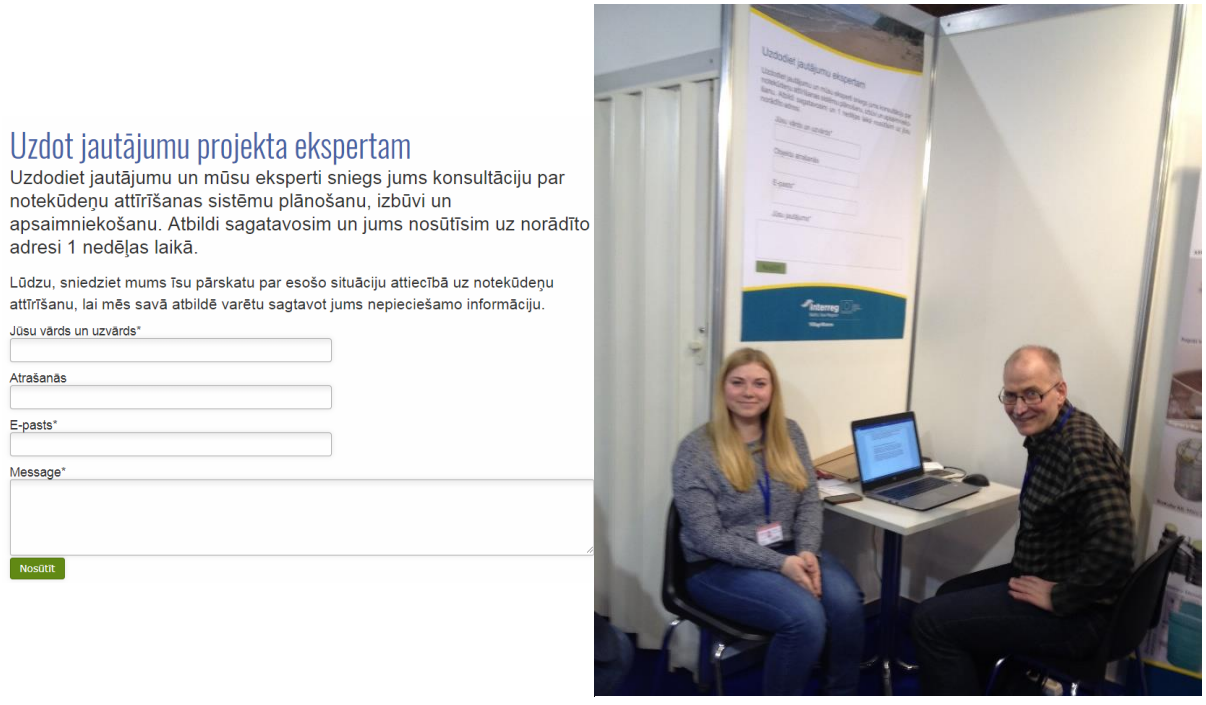


Figure 4. Screenshot of Send your feedback-service in Latvian website.

2.3.2. Read expert answers

The most important or generally asked questions and answers to those were published on 'Read expert answers -section' (https://www.villagewaters.eu/Read_Expert_Answers_839) so that there is no need for experts to answer the same questions again. Homeowners were asking from our experts as an example the following questions: What does it mean small amount?, How soil type determines treatment? and How much wastewater equipment costs? (Figure 5).

Figure 5. Screenshot of VillageWaters 'Read Expert answer`s-service that is part of Expert answering service.

The main editor (Luke, Virpi Vorne) took care of this activity in English. National asked questions were translated into English and backforward. The main editor asked national contact persons to translate answers into English. National contact persons were Niina Dulova niina.dulova@ttu.ee in Estonia, Daiva Sileikiene daiva.sileikiene@asu.lt in Lithuania, UģisRusmanis ugis.rusmanis@lu.lv in Latvia, Andrzej Eymontt a.eymontt@itp.edu.pl in Poland, and Virpi Vorne virpi.vorne@luke.fi in Finland.

It-service provider created special format for answered answers to have visual separation between questions and answers. Publishing tools included formatting answers with text redactor, using bold and italic, various text styles, bulleted and numbered lists, uploading illustrations in various image formats as well as uploading spreadsheets and other documentations in most well-known document formats. Adding links to answers enabled to refer to other questions answered earlier or expand context by linking to research papers published in other web publications.

2.3.3. Open discussion forum

Open discussion forum (https://www.villagewaters.eu/Open_Discussion_Forum_836) means that registered forum users may create new forum topics and add their comments to existing ones (Figure 6). The best discussions are moved to expert answering part.

Figure 6. Photo of VillageWaters Open discussion forum.

The main editor (TTU, Niina Dulova) was responsible for creating related forum structure, writing rules for posting and assigning editors rights to editors, who will administer the content of forums. She made postings but she also guided national contact persons to do them. All countries made at least one posting per month. National contact persons are Niina Dulova niina.dulova@ttu.ee in Estonia, Laima Česonienė laima.cesoniene@asu.lt in Lithuania, Loreta Urtane Loreta.Urtane@lu.lv in Latvia, Andrzej Eymontt a.eymontt@itp.edu.pl in Poland, and Jari Heiskanen jari.heiskanen@sykli.fi in Finland.

IT-provider (Bekker Coders, may be referred shortly as BC) installed to web server open source forum software phpBB (PHP Bulletin Board), which enabled of creating forums and developing real-time discussions there. Forum software is standalone from website; administration, editing and user registration will be in separate system, only usable in phpBB. Installation and maintenance of open forum systems is not covered by IT contract, and is therefore open-source software is provided "as it is" with all shortfalls of functionalities what may be there. It is important to understand, that it-provider is not main developer of this software package, gives still best on patching and configuring it securely, but will not give guarantee on its functionalities.

The totals of 28 postings were published on 11 topics in 3 main areas: Wastewater Treatment General Topics, Equipment for Wastewater Treatment, and Maintenance and Other Services. Most users ever online were 43 on 3 December 2018. The biggest coverage was for the posting Types of available on-site systems for small scale wastewater treatment in the Equipment for Wastewater Treatment section: 1416 views, followed by the posting ‘How to choose correct system to treat waste water of our villages?’ in the Maintenance and Other Services section: 913 views.

2.3.4. Facebook page

VillageWaters partners have a common Facebook page: https://www.facebook.com/VillageWaters/ where partners have posted pictures and stories from common seminars and other events they have attended, e.g. other projects such as Waterchain and BSR Water (Figure 7). There are also postings of interesting news concerning waste water treatment. The posting rights could be asked from the communication manager.

The biggest coverage was for the posting: VillageWaters in international Dry Toilet conference, Tampere, Finland, 22-24 August: 720 persons and 212 commitments and the second biggest for posting: Lotta Nummelin, is leading panel discussion: 716 persons. The total number of postings was 160.

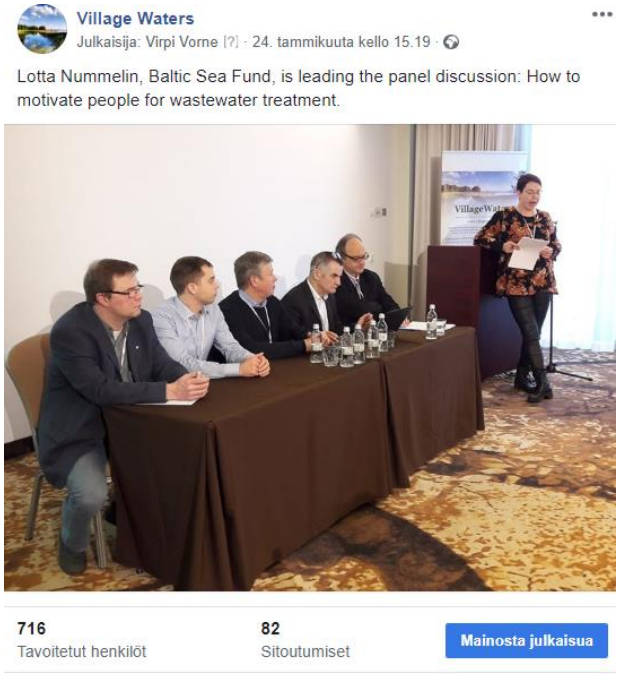


Figure 7. Screenshot of the Facebook posting.

Partners have also social media platforms in local languages, e.g. Finland has Facebook page: https://www.facebook.com/kylavedet/. In the local social media postings are mostly national interests.

Main editor (SYKLI, Jari Heiskanen) posted news actively. In addition, he guided national contact persons that they made their posting also in each month. National contact persons were Niina Dulova niina.dulova@ttu.ee in Estonia, Laima Česonienė laima.cesoniene@asu.lt in Lithuania, Loreta Urtane Loreta.Urtane@lu.lv in Latvia, Andrzej Eymontt a.eymontt@itp.edu.pl in Poland, and Jari Heiskanen jari.heiskanen@sykli.fi in Finland.

Facebook page, YouTube channel and web pages were integrated strongly to each other to be part of VillageWaters webpage. The main editor gave editing rights to the relevant partners. Facebook postings do not need any configuration. The main editor was responsible the content of the material posted to the page.

2.3.5. YouTube channel

The project has a common YouTube channel: https://www.youtube.com/channel/UCCQLs4C-fOU5tVc0BT0Ipyg/featured. There are playlists for each country. The channel contains about 20 videos from every pilot and Village Waters external seminars: Warsaw 10/2017, Riga 3/2018 and Tallinn 1/2019. The seminar materials were shared also in web pages: https://www.villagewaters.eu/Seminar_materials_760.

In the Pilot videos there are construction works, sampling and pilot visits. Partners have also their own channels to share videos; some of them are linked to the VW YouTube channel. The project produced an animation to advertise and instruct the use of the Information Tool (Figure 8). The animation is available in the YouTube channel and it is immersed also to VW web pages.

Figure 8. Screenshot of the Information Tool animation.

The YouTube channel were used not only to introduce with VillageWaters activities – video instruction for Information Tool use, construction of pilot sites, site visitings etc. –, but also for public awareness raising. The video explaining the status of the Baltic Sea, consequences of eutrophication and wastewater impact to water quality was created in close cooperation between University of Latvia and Latvian Institute of Aquatic Ecology. This video was developed both in English and Latvian languages.

Figure 9. Screenshot of the educational video "Thinking about the future of the Baltic Sea".

The username and password for the channel can be asked from the communication manager. The most viewers were for the video: The old Leitgiriai village wastewater treatment plant, 242 times.

The main editor (SYKLI, Jari Heiskanen) collected all video material together and download it to the YouTube. In addition, he guided National contact persons to make videos. National contact persons were Niina Dulova niina.dulova@ttu.ee in Estonia, Laima Česonienė laima.cesoniene@asu.lt in Lithuania, Loreta Urtane Loreta.Urtane@lu.lv in Latvia, Andrzej Eymontt a.eymontt@itp.edu.pl in Poland, and Jari Heiskanen jari.heiskanen@sykli.fi in Finland. The partners were able to upload the video material independently to VillageWaters YouTube channel. The main editor coordinated and made links to the YouTube material and to the project YouTube site. The materials were uploaded during the whole project.

The main editor opened a YouTube channel for VillageWaters, set a background picture and link to the web page. YouTube's or other video editing program was used for editing videos. No configuration was needed. The main editor also created playlists of videos.

2.3.6. News and Blogs and Open Blogs

The partners have written blogs (https://www.villagewaters.eu/Contribute_to_Open_Blog_837) to be shared for target groups in web pages as well as Facebook pages. Lithuanian partners have written a few blogs about people in Leitgiriai village and their experiences during the pilot construction and implementation as well as review from IFAR fair. The blogs from Finland consist of Dry toilet - pipeless option for waste water treatment and water cooperatives as arranging rural water supply and sanitation (Figure 10). In Estonian blog it was pondered nutrients: when there is too much nutrients in water and what can we do about it. The blogs are presented in the Read Articles subpage

Figure 10. Dry toilet – the pipeless option – blog picture.

VillageWaters -webpage included an open blog where people were able to submit their articles to be published (Figure 11). Articles were expert-reviewed before publishing. Discussions had and information gained via the platform considering emerging problems and solutions on the waste water treatment of households are adopted and utilized in the information. In addition, one blog were published by project partners from each country in local language or in English during the project.

Figure 11. Screenshot of the Open blog window.

The main editor (SYKLI, Jari Heiskanen) was responsible for blogs. He guided national contact persons to do blogs but he also will take care of that they are doing their blogs. There was at least one blog/project/country. National contact persons were Niina Dulova niina.dulova@ttu.ee in Estonia, Laima Česonienė laima.cesoniene@asu.lt in Lithuania, Loreta Urtane Loreta.Urtane@lu.lv in Latvia, Andrzej Eymontt a.eymontt@itp.edu.pl in Poland, and Jari Heiskanen jari.heiskanen@sykli.fi in Finland.

Posting to open blogs was open for everyone, but postings were published after experts reviewed the content of blog and news articles. The main editor received the blogs and then asked for experts in the project to review the blog before publishing. National language blogs were sent to national contact persons for review.

In the initial phase, there were web posting form with fields "Header", "Introduction", "Author", "Text content", "About Author" and possibility to add up to 5 files (illustrations and documents) to form. Files were uploaded to web server and content of blog post were sent to administrator by e-mail. Administrator reviewed (contacted with experts, if needed) and published articles on co-editors rights as standard news subpage on website.

News of the project were published in local newspaper, magazines or other relevant media. Each partner country published at least two news: once during the project and once at the end of the project by local language. Each partner posted also news and stories in the project web pages (https://www.villagewaters.eu/VillageWaters_Project_News_505) as well as in Facebook (Figure 12).

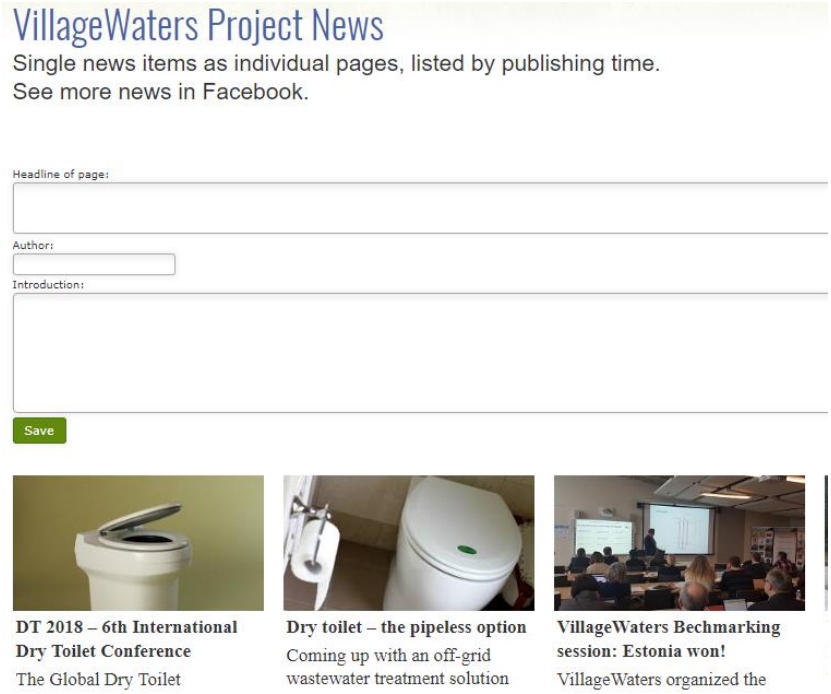


Figure 12. Photo of VillageWaters News service.

The main editor (SYKLI, Jari Heiskanen) guided national contact persons to this work. They were Niina Dulova niina.dulova@ttu.ee in Estonia, Laima Česonienė laima.cesoniene@asu.lt in Lithuania, Loreta Urtane Loreta.Urtane@lu.lv in Latvia, Andrzej Eymontt a.eymontt@itp.edu.pl in Poland, and Jari Heiskanen jari.heiskanen@sykli.fi in Finland.

For publishing timely information, the news section allowed web editors to create new news items. Each news page consisted at least header line and short introduction. For more detailed scope, each news page was able to expand with adding more text paragraphs, illustrating them with photos and uploading supporting documents files.

News section basic format was fairly easy to allow all project partners to publish their news without extensive technical training. Simplicity of news editing was supposed to facilitate all project partners on contributing their share to overall project content creation. However, texts editing includes creating web links, various text formatting techniques, like adding bulleted lists, subheadings, subtitles to illustrations, enabled many advanced tools for creating compelling stories, which were using all important elements of familiar to readers in modern web news format.

2.3.7. Calendar of events

VillageWaters -webpages includes a calendar for events (https://www.villagewaters.eu/Events_Calendar_840) arranged by the project as well as other bodies (Figure 13). This was done in excel format but were changed to the online format.

Figure 13. Photo of VillageWaters Calendar of events.

The main editor (SYKLI, Jari Heiskanen) was updating the calendar. In addition, he was also collecting the event information from national contact persons and other partners. National contact persons were Niina Dulova niina.dulova@ttu.ee in Estonia, Laima Česonienė laima.cesoniene@asu.lt in Lithuania, Loreta Urtane Loreta.Urtane@lu.lv in Latvia, Andrzej Eymontt a.eymontt@itp.edu.pl in Poland, and Jari Heiskanen jari.heiskanen@sykli.fi in Finland.

Since the events were scattered over duration of 18 months, instead of using traditional one-month calendar, there was chronological list of events, which was editable by web editor and co-editor, who is responsible for keeping events list up to date. There was visual difference on coming events and these, which were already in past.

2.3.8. Links to useful WWW sites

VillageWaters -webpage includes links to useful WWW sites (https://www.villagewaters.eu/Useful_WWW_Links_841) (Figure 14), where discussion on legal issues, available technological solutions, performances of the systems and experiences on their running etc. could be found. Web links were listed to separate "WWW-sites" sub-page. It was recommended to have short description why particular link is important from wastewater treatment viewpoint (or otherwise useful for end-users). If there were other specific needs for formatting outside link editing current functionalities on website, formats were able to add by it-provider.

Figure 14. Photo of VillageWaters links to useful WWW sites.

The main editor (TTU, Niina Dulova) was responsible for adding the links. She had full editing rights of this page and she took care of editing. She collected links from project reports and also other sources.

Technically, any links presented on website are using link text and URL-address, which may or may not be visible on link anchor text. All website editors have tools to create and edit links on those pages they have editing rights. Links may be added in any website format, including news and blog sections, expert answers and any other page type, which has editable texts.

However, presenting carefully selected links in separate www-section creates unique collection of links, relevant to wastewater treatment field. List of quality references offer value to the end-users, who are interested about particular topics and will find further readings from linked sources. Since all listed URL's are checked by project experts, only quality sources are presented on project website and it creates confidence on end-users, that they may trust linked sites for their further independent research on wastewater treatment area.

3. Project intranet

VillageWaters project has internal site for project partners to save and maintain data and communicate with each other on https://www.villagewaters.eu/intranet (Figure 15).

Intranet has been used for sharing information and documents internally in the project. The intranet contains project plans, schedules, contact information, templates for office documents, brochures and reports and logos of project and partners. The measurement data were also collected to the intranet as well as internal reports and relevant literature. Training and other materials were saved to the intranet before publishing them in the web pages.

The meeting memos and agendas were saved to the intranet. There are memos from:

- Seminars: 6 internal & 3 external
- Country coordinators & activity leaders Skype meetings: once/month
- Steering group meetings: 5 meetings
- Meetings among Finnish partners: every second month
- IT group meetings (=information tool development)

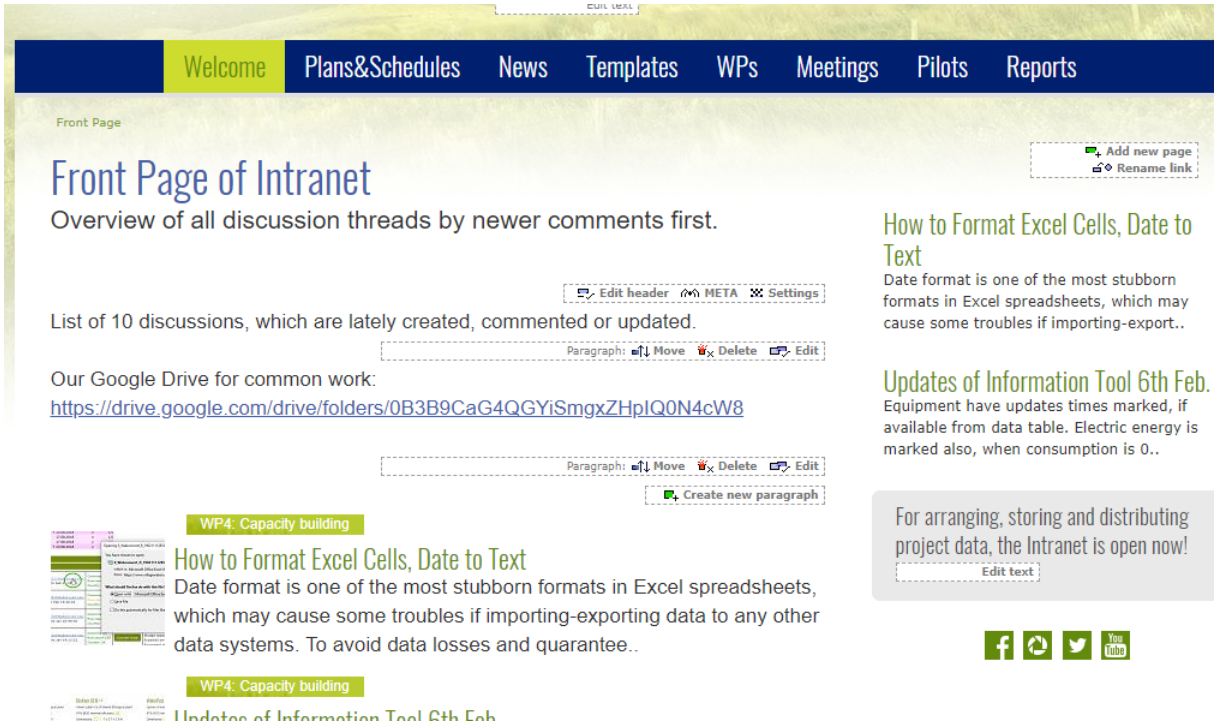


Figure 15. Screenshot of VillageWaters intranet.

For internal communication, the intranet was opened for all project partners and experts participating in project work. Intranet consists of quite similar editing functionalities as public website, including powerful text editors, uploading of illustrations and document files. Important difference with website is that information in the Intranet is available only for project partners. To read and post in the Intranet, everyone needs to log in at first.

The structure of Intranet consists of project plans and schedules, project internal news section, templates, work packages, meetings internal memos and planning materials, pilot´s information and

project internal reports. Intranet helps to keep all project documentation well organized, share all important things between partners and add new information easily in very similar format to website.

Intranet was also important communication channel between project partners and technical personnel during the development of Information Tool. The full work cycle of Information Tool was empowered by Intranet documentation, which helped on planning, designing, creating data structures, developing of editing functionalities as well as for working with user interface elements and testing process.

Information Tool was released for internal reviewing on the beginning of 2018. January and developed during next 14 months in close cooperation with project partners. Documentation available on the intranet offers better understanding of the development process, helps country coordinators on editing data as well as translating various textual elements of Information Tool as well as creates solid foundation for further extensions of technical platform in the future when needed.

4. Documentation of the collaboration

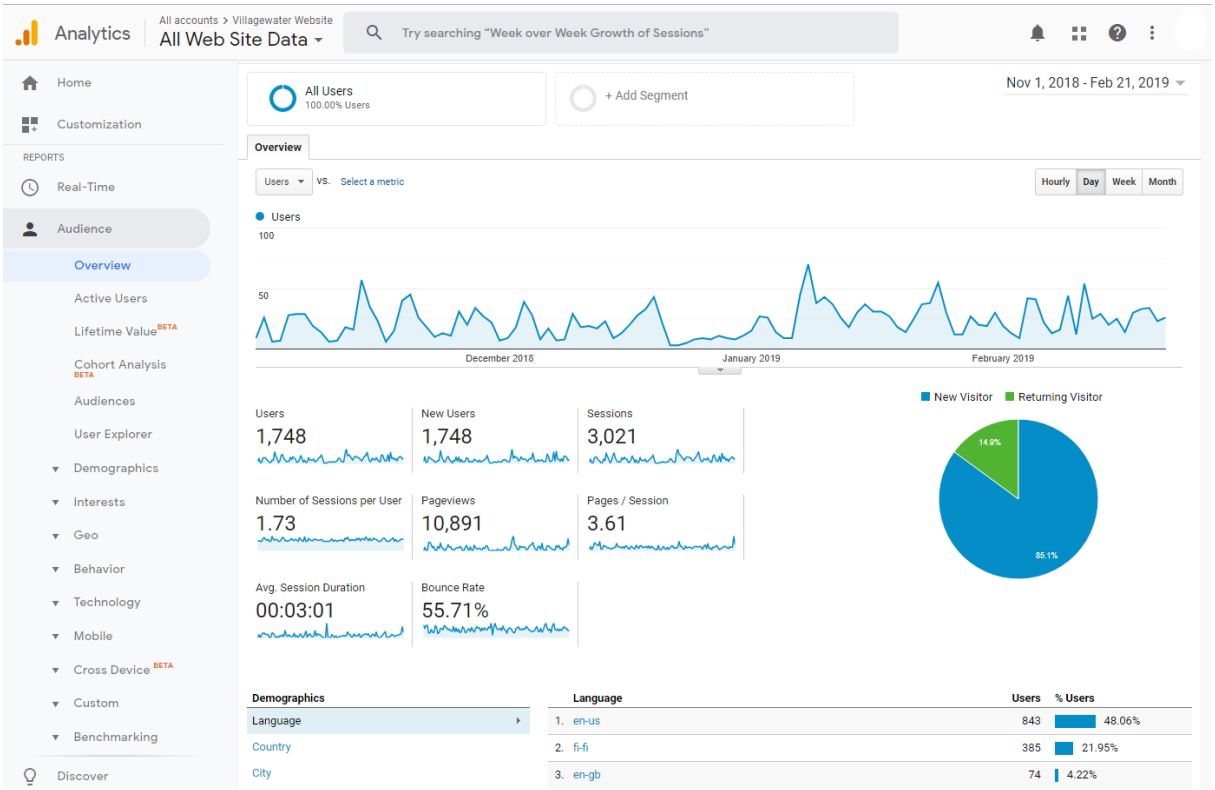
4.1. Pages for logs

Logs are log files, a file for recording events in a computer program. Logs are invisible to users. Only main editors can see the logs (=changes) behind the visible view. They are Jari Heiskanen (SYKLI), Niina Dulova (TTU) and Virpi Vorne (Luke).

4.2. The number of visitors

Visitors statistics was measured with Google Analytics, which enables tracking number of visitors, their behaviour on pages (time spent, number of pages browsed during one visit, revisiting) and also measure effectiveness of various referring mediums (organic search engines, links published in various websites, social media etc.).Visitor statistics will be configured to active measuring mode when there are at least 5 expert answers and 5 blog postings on website English section. There is direct correlation between amount of useful content for end-users and their interest to visit, browse and read web materials published there. During the content creation phase, visitor statistics helps more precisely to determine, which topics are more focused on end-users needs and which areas do not seem to gain traction for readers.

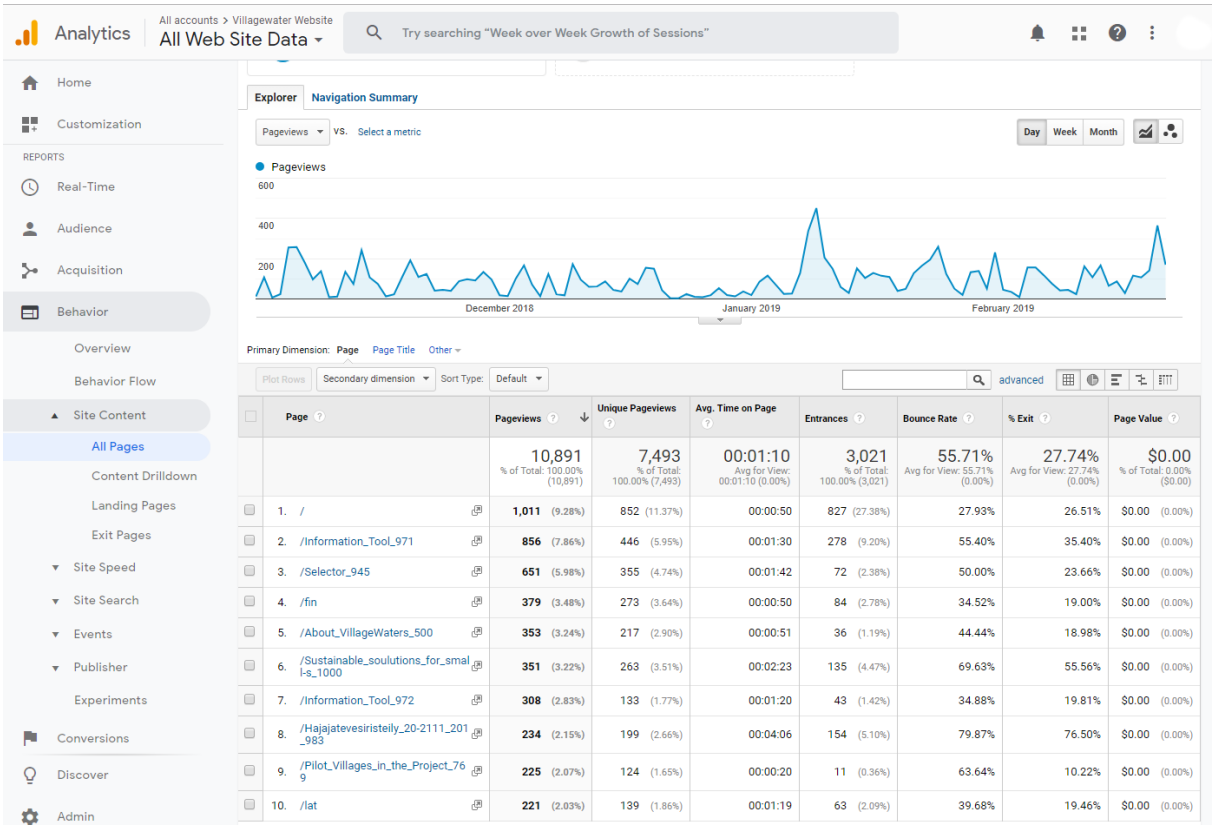
Analytics script was connected with project public website on the beginning of November 2018. The statistics proves that there was thousands of visiting sessions and the users gained considerable interest towards the content published during the project.



Statistics shows correlation between content and visitors number – the more content attracts additional number of visits and also raises the revisiting ratio. High number of revisiting numbers may

indicate that visitors once familiar with content found it useful and saved references or used book-marking functions in their browsers to return back later for another visiting session.

Most used content was the Information Tool and as seen from following screen picture, its numerous language versions in Finnish and Latvian sections were among most visited content. Perhaps it is not big surprise, that on absolute numbers, Information Tool Finnish version was used more than English version, which proves, that on Scandinavian and Baltic countries, users prefer their national languages on first hand to gain information about wastewater systems.



Page	Pageviews	Unique Pageviews	Avg. Time on Page	Entrances	Bounce Rate	% Exit	Page Value
	10,891 % of Total: 100.00% (10,891)	7,493 % of Total: 100.00% (7,493)	00:01:10 Avg for View: 00:01:10 (0.00%)	3,021 % of Total: 100.00% (3,021)	55.71% Avg for View: 55.71% (0.00%)	27.74% Avg for View: 27.74% (0.00%)	$0.00 % of Total: 0.00% ($0.00)
1. /	1,011 (9.28%)	852 (11.37%)	00:00:50	827 (27.38%)	27.93%	26.51%	$0.00 (0.00%)
2. /Information_Tool_971	856 (7.86%)	446 (5.95%)	00:01:30	278 (9.20%)	55.40%	35.40%	$0.00 (0.00%)
3. /Selector_945	651 (5.98%)	355 (4.74%)	00:01:42	72 (2.38%)	50.00%	23.66%	$0.00 (0.00%)
4. /fin	379 (3.48%)	273 (3.64%)	00:00:50	84 (2.78%)	34.52%	19.00%	$0.00 (0.00%)
5. /About_VillageWaters_500	353 (3.24%)	217 (2.90%)	00:00:51	36 (1.19%)	44.44%	18.98%	$0.00 (0.00%)
6. /Sustainable_soulutions_for_small-s_1000	351 (3.22%)	263 (3.51%)	00:02:23	135 (4.47%)	69.63%	55.56%	$0.00 (0.00%)
7. /Information_Tool_972	308 (2.83%)	133 (1.77%)	00:01:20	43 (1.42%)	34.88%	19.81%	$0.00 (0.00%)
8. /Hajajatevesiristeily_20-2111_201_983	234 (2.15%)	199 (2.66%)	00:04:06	154 (5.10%)	79.87%	76.50%	$0.00 (0.00%)
9. /Pilot_Villages_in_the_Project_769	225 (2.07%)	124 (1.65%)	00:00:20	11 (0.36%)	63.64%	10.22%	$0.00 (0.00%)
10. /lat	221 (2.03%)	139 (1.86%)	00:01:19	63 (2.09%)	39.68%	19.46%	$0.00 (0.00%)

On statistics, there are many elements, which may prove to be useful on future enhancements of Information Tool and other project publications on the web. Unfortunately, the content which was published on the very end of project is not reflected properly in current statistics, because the indexing in the search systems may have some technical time lag and various textual postings will appear and gain true attraction just shortly after publishing current report.

For extending future plans specifically on creating well targeted content on wastewater treatment topics, visitor statistics helps more precisely to determine, which topics are more focused on end-users needs and which areas do not seem to gain traction for readers.

4.3. Synopsis of discussions

This internal report is a plan how communication via the VillageWaters webpages was conducted in this project. This was meant only for the usage of project partners and was published internally on the project intranet. The report was published at the end of the project (in period 6, 28th of February 2019).

The report includes 1) an overview how and to which extent the features of the platform were used and 2) synopsis of contents of the discussions, blogs, questions asked, and answers given. The report in English will be published in public on project webpage in electronic format.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