



CAPSELLA

COLLECTIVE AWARENESS PLATFORMS FOR ENVIRONMENTALLY-SOUND LAND
MANAGEMENT BASED ON DATA TECHNOLOGIES AND AGROBIODIVERSITY

Deliverable 4.3 Pilot Trials

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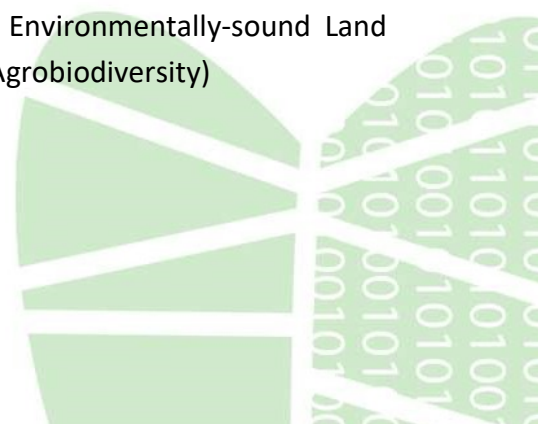
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CAPSELLA(Collective Awareness PlatformS for Environmentally-sound Land management based on data technologies and Agrobiodiversity)

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Executive Summary

The CAPSELLA project objective is to understand agricultural communities' needs and requirements and support them through a variety of innovative ICT solutions. The project follows a bottom up approach where the five agricultural-related communities, examined by five CAPSELLA partners (Agroknow, WDT, ZLTO, RSR and SSSA) leaders in their fields, set the requirements and drive the ICT solutions to be developed.

Deliverables D3.5 and D3.6 High level analysis of bottom up requirements focused on the needs of each community that would define the functionality offered by each pilot. WP4 Pilots and applications focuses on the development and deployment of the pilots. The pilot evaluation is one of the main objectives of WP4 and it is reported in this deliverable, D4.3 Pilot Trials, which focuses on the status of development of the demonstrated pilots and the evaluation activities performed for each, whereas the evaluation results will be reported in D4.4 Integrated evaluation report and recommendations.

This deliverable builds upon the results reported in D3.6 and D4.2 Demonstrator Deployment, and presents in Sections 2 – 8 the following information:

- The current status of implementation of each pilot
- The activities through which the pilot has been evaluated

The last section (i.e. section 9) concludes the report.

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1. Introduction

The CAPSELLA project main objective is to understand agricultural communities' needs and requirements and support them through a variety of innovative ICT solutions. More specifically, the project aims to:

- Offer open data repositories relevant to regional agro-biodiversity.
- Enhance existing data sets on the agrobiodiversity and food domains.
- Develop a number of community-driven pilot data powered ICT solutions, which will be tested by the communities engaged in the project.

The project follows a bottom up approach where the five agricultural-related communities, examined by five CAPSELLA partners (Agroknow, WDT, ZLTO, RSR and SSSA) leaders in their fields, set the requirements and drive the ICT solutions to be developed, enhanced by collective intelligence knowledge sources and open data sets.

Deliverables D3.5 and D3.6 High level analysis of bottom up requirements focused on the needs of each community that would define the functionality offered by each pilot. WP4 Pilots and applications focuses on the development and deployment of the pilots. The pilot evaluation is one of the main objectives of WP4 and it is reported in this deliverable, D4.3 Pilot Trials, which focuses on the status of development of the demonstrated pilots and the evaluation activities performed for each, whereas the evaluation results will be reported in D4.4 Integrated evaluation report and recommendations.

This deliverable builds upon the results reported in D3.6 and D4.2 Demonstrator Deployment, and presents in Sections 2 – 8 the following information (b) the current status of implementation of each pilot and (b) the activities through which the pilot has been evaluated, which are summarized per pilot in Table 1. The last section (i.e. section 9) concludes the report.

Table 1 presents an overview of the pilot evaluation activities that where realized per pilot demonstrator.

Table 1 Summary of pilot evaluation activities

Pilot demonstrator	Evaluation activities	Participants
Food Product Data Analytics – The Case of Stevia Hellas Cooperative	Web-conferencing interviews and face-to-face focus group meetings	59
Personalized Food Systems in Public Food Service	Participatory workshop and pilot demonstrator presentation in press conference	112
Personalized Food Systems in “Meal Prediction”	Participatory design workshop and testing events at Mozaik House Hotel, Prague and HORECA Conference	115

Seed pilot	Testing of the app in the field and demonstration in community events including the CERERE and DIVERSIFOOD project meetings	More than 130
The Storytelling on (food) production pilot	Testing in Workshops, demonstration and focus groups in conferences and other events, individual interviews	202
Precision agriculture pilot	Testing through focus group and demonstration sessions including testing on the field	More than 40
Soil Health pilot	Testing in Workshops, demonstration and focus groups in conferences and other events, individual testing on the field	358

2. Food Product Data Analytics – The Case of Stevia Hellas Cooperative

2.1 Pilot Demonstrator

The Stevia Hellas demonstrator allows the collection, processing and presentation of information from (a) social media about users’ opinions and (b) publications about latest cultivation techniques that can improve the yield. The Stevia Hellas Demonstrator is available at: <http://www.stevianet.gr/dashboard>

The Stevia Hellas demonstrator exploit open datasets from (a) social media (e.g. [Twitter](#)) and (b) repositories with open access publications (e.g. [FAO AGRIS](#)). More specifically, the user is able to explore (a) a vast majority of tweets, which has been sentiment analyzed by the [CAPSELLA Data analytics and Management System](#) according to different aspects such as taste, nutrition and health. Moreover, the user is able to access scientific publications and grey literature regarding latest Stevia cultivation techniques towards improving the yield. Thus, the Stevia Hellas demonstrator allows the Stellas Hellas Coop Community stakeholders to approach the Stevia crop, as well as the product produced by the Stevia Hellas Coop, namely “La Mia Stevia” from different perspectives and aspects. Figure 1 presents the main screen of the demonstrator with access to the different features, whereas Figure 2 presents the aspect-based sentiment analysis of tweets.

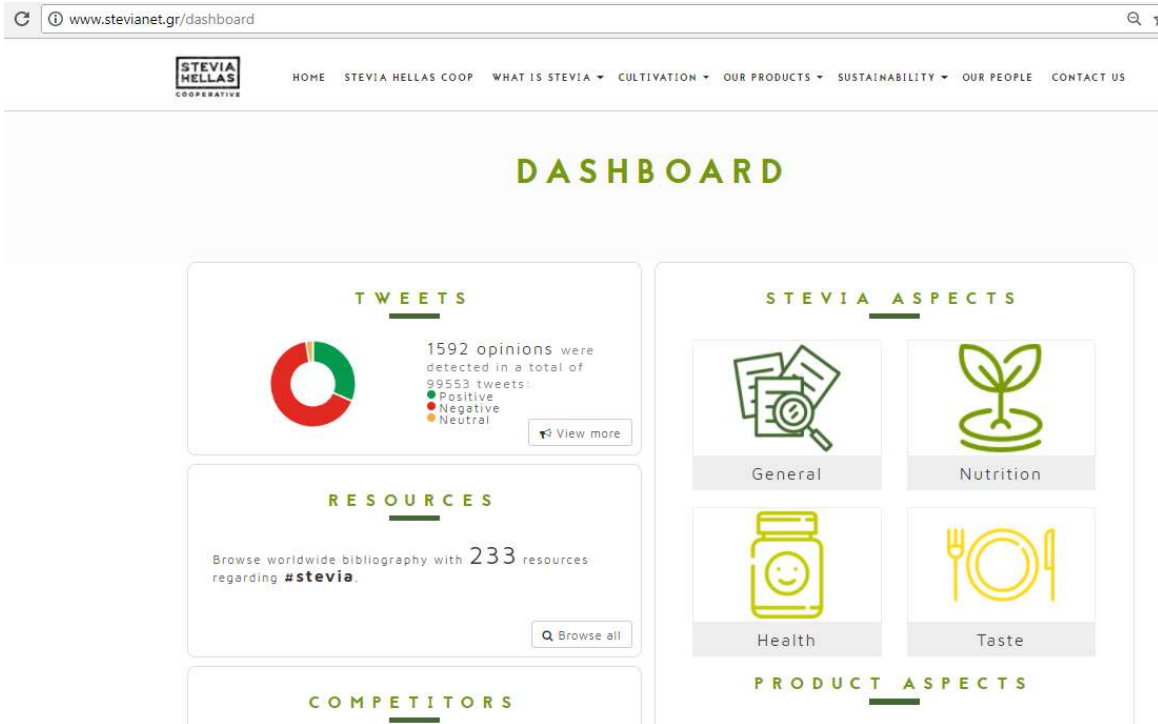


Figure 1 Food Product Data Analytics Pilot - Home Page

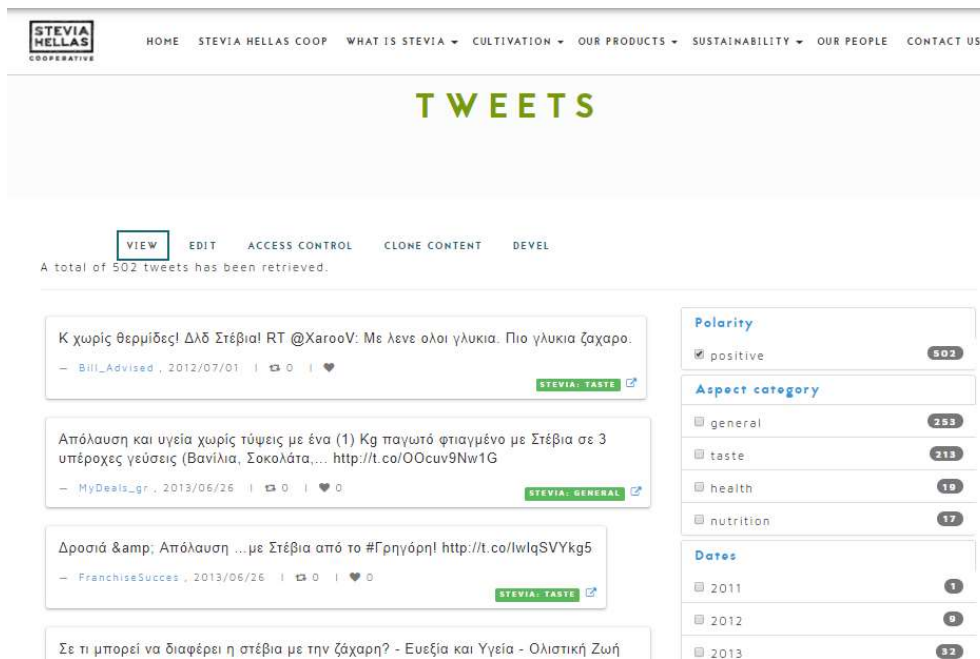


Figure 2 Food Product Data Analytics Pilot - Sentiment Analyzed Tweets

Additional information about the pilot demonstrator can also be found in previously submitted deliverables such as "D4.2 - Demonstrator Deployment" and "D3.6 - High-level analysis of bottom-up requirements 2"

2.2 Pilot Trials

The following table presents the evaluation activities for the pilot, which consisted of interviews and focus group meetings either via web-conferencing or face-to-face. The questionnaire in Appendix **Error! Reference source not found.** guided the discussion in the evaluation sessions.

Table 2 - Food product data analytics pilot – Evaluation events

Event	Date(s)	Brief description	Participants	Personas represented
Interviews and focus group meetings through web-conferencing	10/11/2016	The Stevia Demonstrator has been tested with Stevia Hellas Coop Management team and Stevia Hellas Coop Agronomists via web-conferencing meetings (i.e. Skype, Zoom)	3 Coop Managers	Coop Manager, Agronomist
	13/12/2016		3 Agronomists	
	19/1/2017,		4 Coop Managers and 1 Agronomist	
	23/3/2017		3 Agronomists	
	15/5/2017		1 Coop Manager and 5 Farmers	
	6/9/2017		3 Agronomists	
	16/11/2017		1 Coop Manager and 5 Farmers	
	19/1/2018		3 Coop Managers	
	9/3/2018		1 Coop Manager and 5 Farmers	
Focus group meeting with Stevia Hellas Coop Community, Lamia, Greece	16/3/2018	The Stevia Demonstrator has been tested with Stevia Hellas Coop Management team, Stevia Coop Agronomists and Stevia Hellas	37	Coop Manager, Agronomist, Farmers

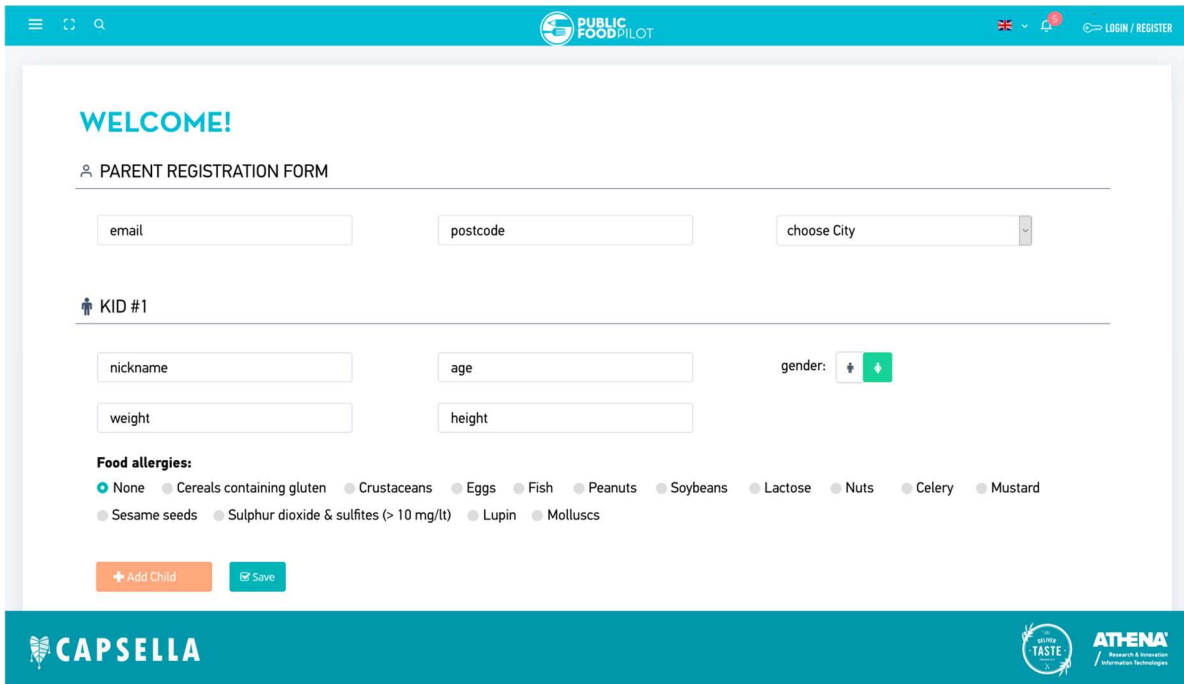
3. Personalized Food Systems in Public Food Service Pilot

3.1 Pilot Demonstrator

The aim of the pilot is to enhance transparency and inform decision making in food supply chain management, public procurement and consumption of meals served at public schools. Based on given food recipes, the application acquires nutritional, health and social data by users and will exploit nutritional, health, social and other data available in open databases. Aggregated data form a geo-located interface informing canteen operators and public food procurement officers about the nutritional background and habits of school children across the city. Parents will receive information about the daily/weekly menu served to their children at school, the presence of allergens in each meal, as well as educational material on better and sustainable diets. More information about the pilot demonstrator can be found in Deliverable D3.6.



Figure 3 Public Food Service Pilot Main Screen



WELCOME!

PARENT REGISTRATION FORM

email postcode choose City

KID #1

nickname age gender:

weight height

Food allergies:

None
 Cereals containing gluten
 Crustaceans
 Eggs
 Fish
 Peanuts
 Soybeans
 Lactose
 Nuts
 Celery
 Mustard
 Sesame seeds
 Sulphur dioxide & sulfites (> 10 mg/l)
 Lupin
 Molluscs

Figure 4 Public Food Service Pilot Parent registration form

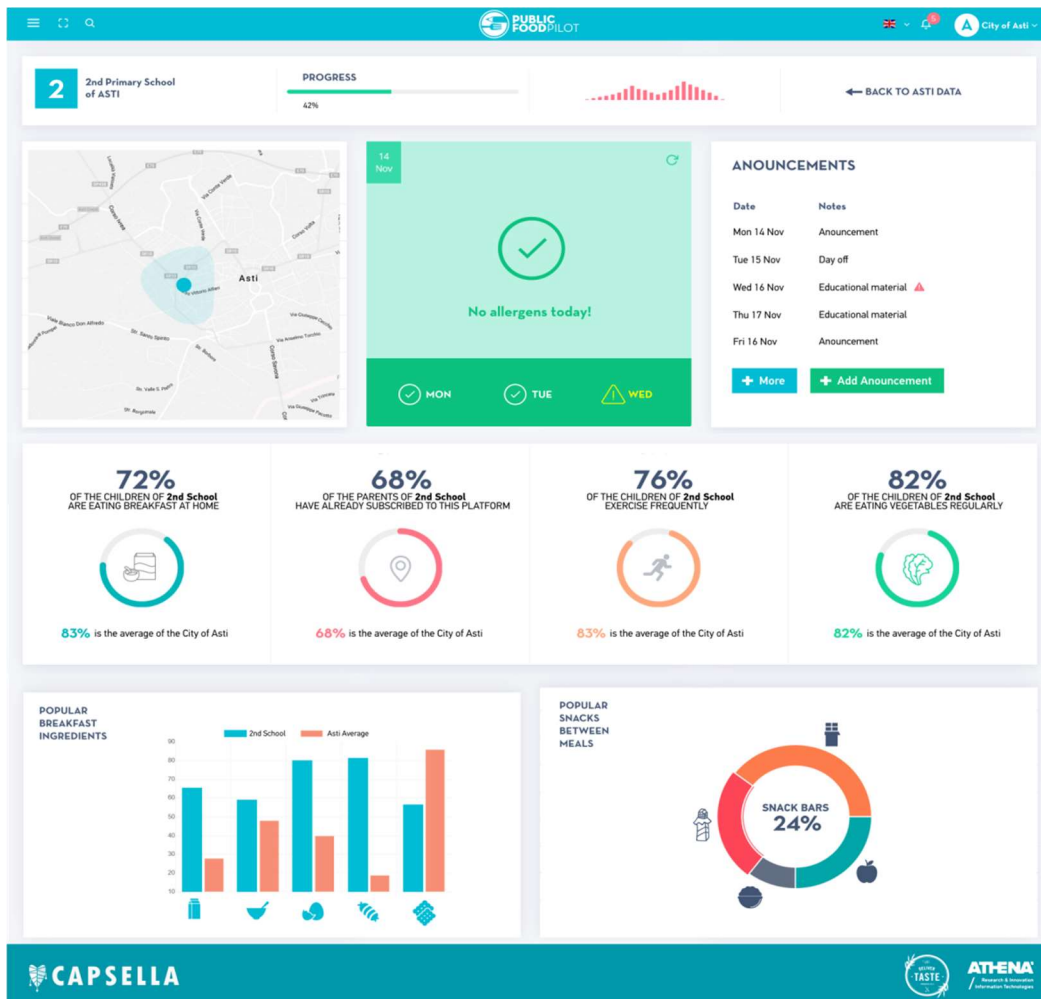


Figure 5 Public Food Service Pilot Statistics screen

3.2 Pilot Trials

The following table presents the evaluation activities performed, which constitute a participatory workshop and a press conference for the demonstration of the pilot app.

Table 3 Personalized Food Systems in Public Food Service – Evaluation events

Event	Date(s)	Brief description	Participants	Personas represented
Development Workshop; Milan, Italy	13.09.2017	Participatory workshop with representatives of the City of Milan and parents associations	12	Parents; City Officers
Press Conference; Asti, Italy	22.03.2018	Press conference announcing the collaboration between the City of Asti and CAPSELLA for the development and deployment of the Public Food Pilot where the pilot was demonstrated and comments were recorded.	100	Parents; City Officers

4. Personalized Food Systems in “Meal Prediction” Pilot

4.1 Pilot Demonstrator

One of the main challenges in the HoReCa sector today, is to cater for the needs of a demanding audience of customers, who are influenced by rapidly evolving food trends and consumption patterns. New technological advances make it possible for HoReCa businesses to accurately predict the consumers’ needs, offering the possibility for personalized service. Web services like Google and TripAdvisor are actively changing the dining sector, offering the possibility for consumers to interact online with restaurants and vice versa. These services are driven by the quality and multitude of data shared by thousands of users, processed in ways that offer various insights on actual consumer needs. This has great potential to increase efficiency in HoReCa service, but also in reducing costs, through better-informed sourcing, menu planning or staff allocation.

We Deliver Taste and ATHENA are developing an innovative Meal Prediction Tool which aims to connect consumers with restaurant operators/managers. The **Meal Prediction Pilot** combines different sets of data coming from actual consumers who are searching for dining options. This data provides insight on the demographics of demand and locations of where these searches are taking

place around the city. By sharing data on their specific demands, consumers receive personalized recommendations on different restaurants which match their preference. This data then becomes useful to restaurants, which now have a way to predict demand, identify food trends in real time and understand the demographics of their audiences. This user generated data is then combined with other data coming from restaurant menus and social media, which are further analyzed to deliver enhanced recommendations that are accurate, personalized and on real time.

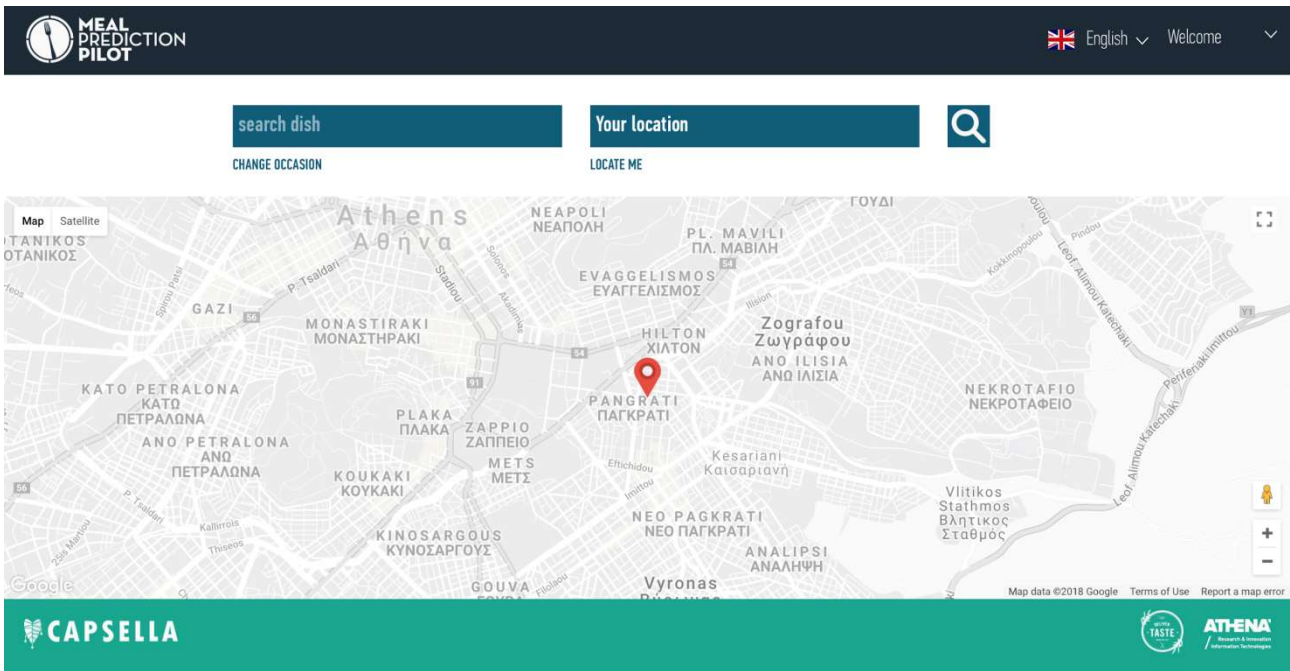


Figure 6 Meal prediction pilot main screen



Figure 7 Meal prediction pilot – ratings screen

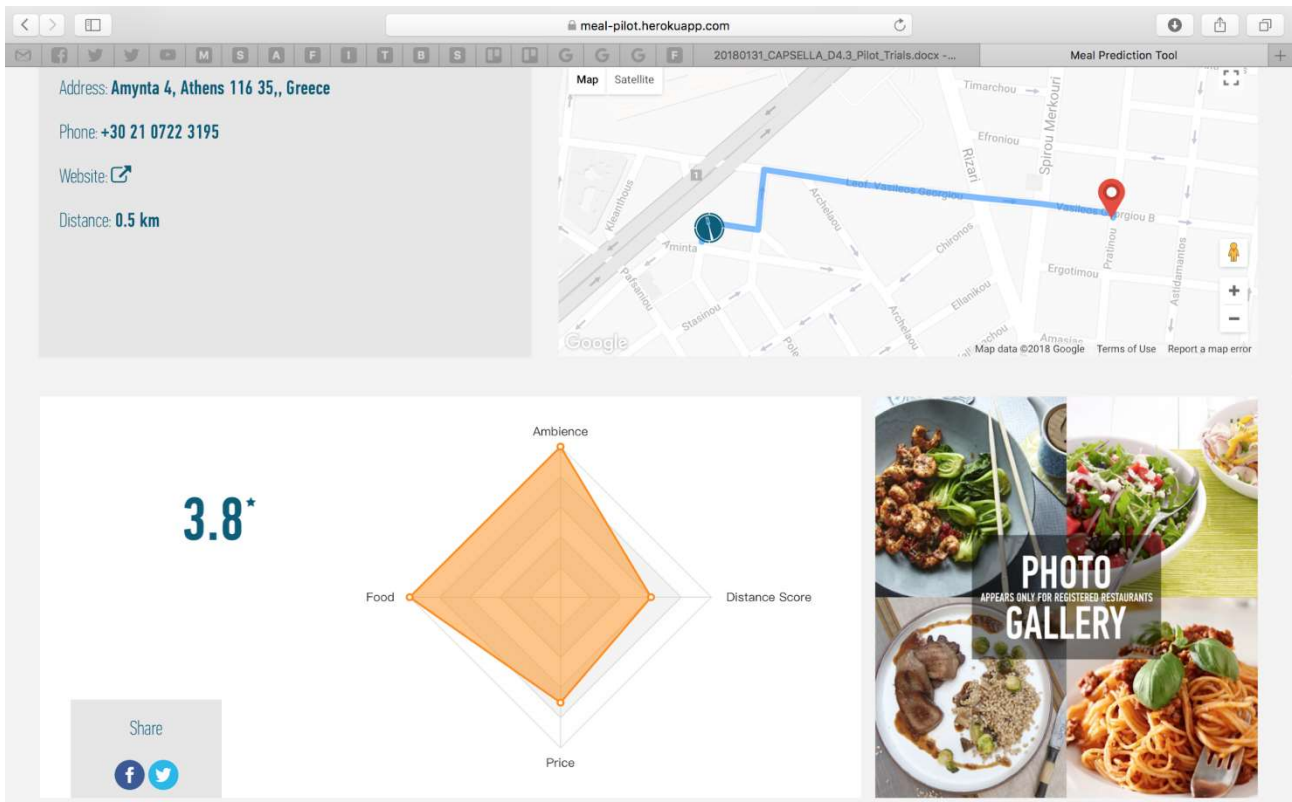


Figure 8 Meal prediction pilot - Restaurant screen

The demonstrator is available online at: <https://meal-pilot.herokuapp.com/#/>. Soon to be transferred in a new url for official launch (expected May 2018).

4.2 Pilot Trials

Table 4 - Personalized Food Systems in “Meal Prediction” Pilot – Evaluation events

Event	Date(s)	Brief description	Participants	Personas represented
CAPSELLA Meal App UX Design Workshop	13.02.2018	Participatory UX workshop, engaging food entrepreneurs and researchers. Introduction of the scientific and technological background of the Meal Prediction Pilot and demonstration of an online version of the pilot for trial by the user audience.	15 participants	Restaurant Operator; Customers

Testing at Mozaik House Hotel, Prague	starting 29.03.2018 for 2 months	Introduction of the Meal Prediction Tool to real users (Customers), in collaboration with MozaikHouse Hotel in Prague.	at least 50 real-life users	Customers
HOREKA 112 conference, Prague	25.4.2018	Testing of the Meal Prediction Tool with real users (Restaurant Operators) and collection of their feedback during a conference. Participants to the event will test on iPad and laptop the key functionalities and evaluate each of them with a questionnaire.	at least 50 real-life users	Restaurant Operators

5. The Seed Pilot

5.1 Pilot Demonstrator

The major outcome of the Seed Pilot is the design of a web interface and an android application for data management for on-field breeding with the direct involvement of researchers and communities.

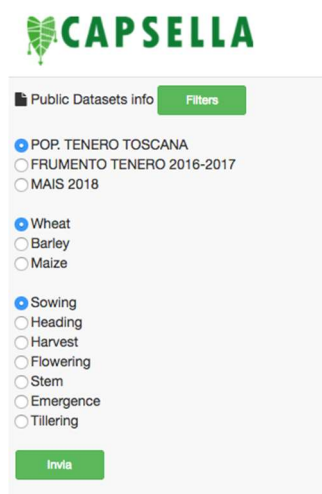


Figure 9 Seed pilot - datasets filters

Public Datasets info Filters

Survey Date:	13-5-2018
Date Submitted:	13-3-2018
Experiment:	FRUMENTO TENERO 2016-2017
Crop:	wheat
Farm Name:	hh
Trial Number:	3
Plot Number:	1

Download
Location
Photo 1
Photo 2
Open

01_DATE	13-3-2018
02_ID_FARM	hh
03_ID	edc
04_IND_BAC	researcher
05_TRIAL	20
06_PLOT	4
07_DATE_PHENOLOGICAL	13-5-2018
08_TRIAL_N	3
09_PLOT_N	1
10_TYPE_OF_EXPERIMENT	FRUMENTO TENERO 2016-2017

CAPSELLA has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688813

This application has been developed in the framework of the related pilot, powered by Rete Semi Rurali and Agroknow



Figure 10 Seed pilot Example dataset

Farmers, technicians and researchers working on the dynamic management of agrobiodiversity in low input sustainable farming systems manage important data with a high level of details on the performance of crop varieties. However, different levels of data details can be of interest within the specific network or outside it for a whole public. Farmers perceive privacy and restricted access to data on genetic resources, landraces and traditional knowledge as extremely important. Variety data collected by seeds networks are not for commercial use. This aspect was a critical part of the app design process and represented an obstacle while designing the app. However, the possibility to have now a demonstrator, following specific needs of researchers, technicians and farmers across Europe in term of data management for on-farm crop breeding will help to continue the discussion and to find solutions for privacy issues and access to data on genetic resources.

The Seed App demonstrator has been discussed and tested with end users in several occasions:

- with researchers, involved in the DIVERSIFOOD project, thanks to the MoU between the two projects.
- With farmers involved in conserving and breed crop varieties in their fields.
- With researchers and technicians involved in farm experiments in public research centres.
- With Rete Semi Rurali technicians coordinating farm experiments in different regions

Pilot trials groups and trials with single farmers have been performed since October 2017 using a simulation approach to data collection as there was not time to do a testing for all phonological phases that goes from October to June/July. However all field data from previous seasons are registered on excel files and on paper so those data have been used to test the app. In other cases, we did a real time data collection for a specific phonological phase, such as the sowing one.

The table below will summarize the evaluation events carried on by Rete Semi Rurali.

Table 5 Seed Pilot – Evaluation events

Event	Date(s)	Brief description	Participants	Personas represented
Discussion with European Seed Networks	Pisa March 2017	The meeting involved partners from DIVERSIFOOD and CAPSELLA partners to discuss about the needs for data management of Seeds' networks at European level.		Farmers, Researchers, Technicians, Consultants.
Testing of the sowing phase on the field with oral feedback	30 October 2017	During the sowing period of wheat experiments, in October 2018, the technicians tested the use of the android app including data directly on the field.	4 technicians and farmers.	Technicians, Farmers
Presentation of the Seed App	15 December 2017	During the RSR annual meeting a specific timeslot was dedicated to present the Seed App and to collect declaration of interest by individual farmers and technicians in being involved in an individual testing process	50 farmers and technicians	Technicians, Farmers, Action researchers.
Single Farmers trials with written evaluation questionnaire	February 2018	With the coordination of the RSR team, the 10 individual farmers and technicians that offered to test the seed app on their field and using their data provided oral comments on the app giving both specific comments on functioning and more general comments and evaluation of the app through the	10 farmers and technicians in different locations in Italy	Technicians, Farmers.

		questionnaire.		
Desk testing of the app	November 2017 – March 2018	The RSR staff was testing the app using last season data and providing comments to Agroknow for the app improvement.	2 researchers	Researchers
DIVERSIFOOD project meeting	March 2018	At the beginning of March 2018 in Wien the annual meeting of the DIVERSIFOOD project took place. This was an opportunity to update DIVERSIFOOD partners on the state of the art of the seed app demonstrator.	48 researchers and seeds' networks representatives.	Researchers Seeds' networks representatives
RSR group evaluation with oral feedbacks and written evaluation questionnaire	22 March 2018	The whole RSR staff will be involved in a general evaluation with open questions on the Seed app. On the same day the single members of the RSR staff, who are involved since many years in managing on farm experiments will test the seed app individually.	8 people	Action Researchers Technicians.
Trial with CERERE project community	May 2018	At the beginning of May 2018 there will be in the south of Italy a meeting of the CERERE project and RSR is planning to organize evaluation activities as well.	To be defined	Farmers, Technicians researchers

6. The Storytelling on (food) production pilot

6.1 Pilot Demonstrator

The pilot demonstrator aims to provide farmers with a technical solution that helps them to inform consumers about their farm and to show how they produce sustainably. The simple-to-use virtual tool has the following characteristics:

- Help farmers to compose and edit stories: easy upload and arrangement of basic media (photos, video, scans from paper), flexible inclusion of connecting story blocks, possibility to include multiple story lines
- Presenting to visitors the edited stories in a flexible way: they can choose from, multiple storylines or skip part of the stories. The presentation works on different platforms (desktop, tablet, etc)
- Collect feedback from farmers and visitors to improve the stories
- Re-use of story blocks (connecting stories, photos, video, etc) for new stories.

Farmers who want to use the tool receive their own log-in credentials, which entitles them to use it. They can create one or more stories and also update them afterwards. There is a manual available about how it works which includes also examples.

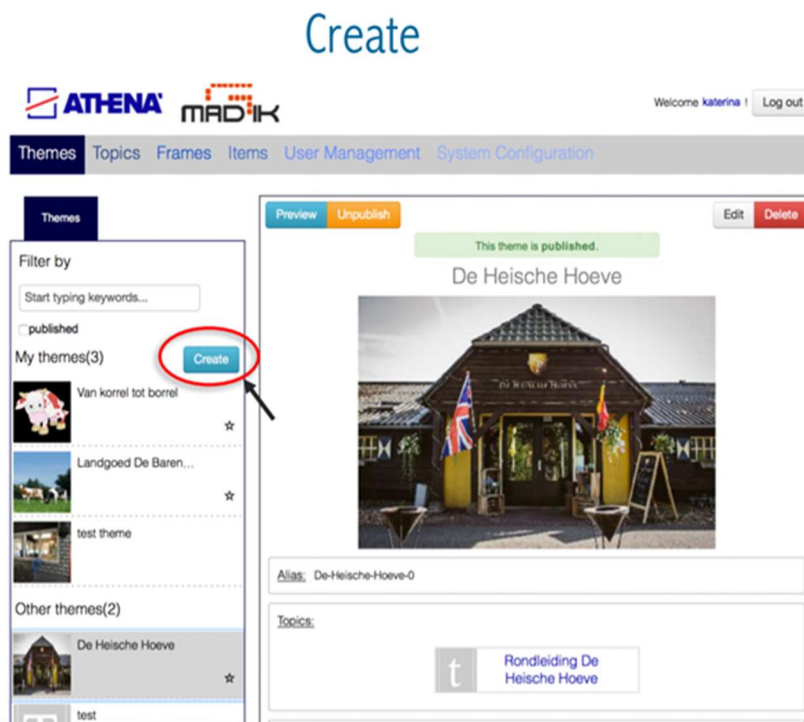


Figure 11 Storytelling pilot authoring tool main screen

After choosing the publication option, the story becomes visible in the online portal. With a hyperlink the story can be presented on request on online communication channels, for example on a website or through a Facebook post.

Handwijzer Hereford

... HOME ... FAM GROENEN HEREFORDS BOERDERIJ FOKKERIJ
NIEUWSBRIEF CONTACT BLOG

Over ons,



Met veel plezier zijn wij dagelijks op d'n Handwijzer in de weer om plant, dier en omgeving in optimale conditie te houden.

onze Herefords



Hereford is een ras dat onder sobere omstandigheden zijn kroost kan groot brengen.

en de boerderij



Al ruim 40 jaar boerend aan de Bredasedijk en Keersop met zicht op de toren van 't Loo.



Figure 12 Storytelling pilot story examples

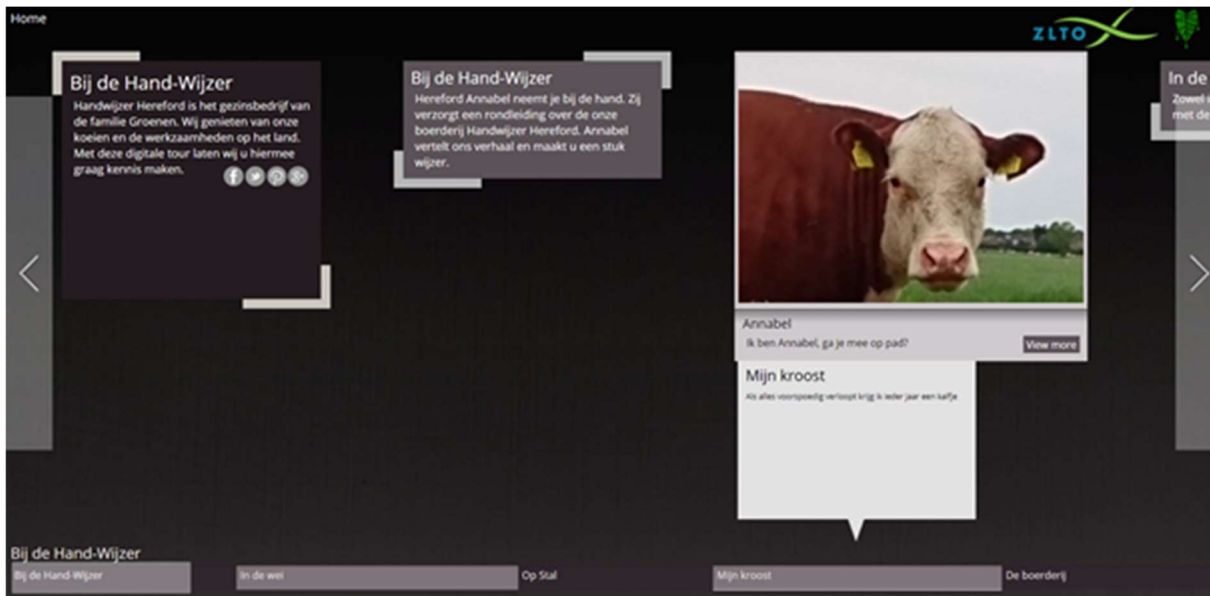


Figure 13 Storytelling pilot story part

For working out the contents of a story, farmers can use a short manual with templates for three types of storylines and various writing and photo tips.



Aan de slag met storytelling

Deze handleiding bevat drie verhalen. Hieronder staat de tekst op een rij. Aan de slag met storytelling? Leuk om uit te proberen! Het is een leuke manier om te vertellen. Het is een leuke manier om te vertellen. Het is een leuke manier om te vertellen.

1. **Waarom is bijzonder product in de schijnwerpers?**
Wat is het verhaal van het product? Wat is de achtergrond? Wat is de geschiedenis? Wat is de toekomst? Wat is de toekomst? Wat is de toekomst?
2. **Waarom is het verhaal van het product?**
Wat is het verhaal van het product? Wat is de achtergrond? Wat is de geschiedenis? Wat is de toekomst? Wat is de toekomst? Wat is de toekomst?
3. **Personen: verhaal over jezelf en het product**
Wat is het verhaal van het product? Wat is de achtergrond? Wat is de geschiedenis? Wat is de toekomst? Wat is de toekomst? Wat is de toekomst?

Verhaal ontwikkelen

- Begin met beschrijven. Wat is het verhaal? Waar is de achtergrond? Wat is de geschiedenis? Wat is de toekomst? Wat is de toekomst? Wat is de toekomst?
- Het begint met een klein detail. Het is de achtergrond. Het is de geschiedenis. Het is de toekomst. Het is de toekomst. Het is de toekomst.
- Het verhaal dat wordt verteld moet het verhaal. Het is de achtergrond. Het is de geschiedenis. Het is de toekomst. Het is de toekomst. Het is de toekomst.
- Het verhaal moet een klein detail. Het is de achtergrond. Het is de geschiedenis. Het is de toekomst. Het is de toekomst. Het is de toekomst.
- Het verhaal moet een klein detail. Het is de achtergrond. Het is de geschiedenis. Het is de toekomst. Het is de toekomst. Het is de toekomst.
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- Het verhaal moet een klein detail. Het is de achtergrond. Het is de geschiedenis. Het is de toekomst. Het is de toekomst. Het is de toekomst.

CAPSELLA is een internationaal project waarin gezocht wordt naar manieren waarop ICT, big data, agri en meer aan deze moderne landbouwers agrarische ondernemers helpen om te laten zien dat zij de bodem en biodiversiteit goed behandelen. ZLTO is één van de partners.



Drie verhalen van een paar boeren

- Het is brengen je verhaal te weten. Het is de achtergrond. Het is de geschiedenis. Het is de toekomst. Het is de toekomst. Het is de toekomst.
- Het is brengen je verhaal te weten. Het is de achtergrond. Het is de geschiedenis. Het is de toekomst. Het is de toekomst. Het is de toekomst.
- Het is brengen je verhaal te weten. Het is de achtergrond. Het is de geschiedenis. Het is de toekomst. Het is de toekomst. Het is de toekomst.

Template 1: Nieuw of bijzonder product in de schijnwerpers

- Drie verhalen:**
- **Wie ben je (naam, woonplaats, leeftijd) en wat voor boer ben je?**
Wat is het verhaal van het product? Wat is de achtergrond? Wat is de geschiedenis? Wat is de toekomst? Wat is de toekomst? Wat is de toekomst?
 - **Wat wordt er op jouw bedrijf gemaakt?**
Wat is het verhaal van het product? Wat is de achtergrond? Wat is de geschiedenis? Wat is de toekomst? Wat is de toekomst? Wat is de toekomst?
 - **Product 'X' is de reden voor het product**
Wat is het verhaal van het product? Wat is de achtergrond? Wat is de geschiedenis? Wat is de toekomst? Wat is de toekomst? Wat is de toekomst?
- Wat is de reden voor het product?**
- **Wie ben je (naam, woonplaats, leeftijd) en wat voor boer ben je?**
Wat is het verhaal van het product? Wat is de achtergrond? Wat is de geschiedenis? Wat is de toekomst? Wat is de toekomst? Wat is de toekomst?
 - **Wat wordt er op jouw bedrijf gemaakt?**
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Template 1: Nieuw of bijzonder product in de schijnwerpers

- Drie verhalen:**
- **Wie ben je (naam, woonplaats, leeftijd) en wat voor boer ben je?**
Wat is het verhaal van het product? Wat is de achtergrond? Wat is de geschiedenis? Wat is de toekomst? Wat is de toekomst? Wat is de toekomst?
 - **Wat wordt er op jouw bedrijf gemaakt?**
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Figure 14 Storytelling pilot Story authoring guidelines

6.2 Pilot Trials

At the start we were connected to farm shops, with the need to optimize their produce by getting feedback from their clients. It showed to be difficult in the CAPSELLA setting to do this. Farmers have chosen for food design principles which were outside the scope of CAPSELLA. Because of this the pilot focus changed.

In the ZLTO farmers community another group showed needs in the line of storytelling: farmers who want to share the story of their food production with consumers for their marketing and potential development, farmers with regular visitors from schools ('Klasseboeren' = (top)class farmers) and in relation to other activities, such as farm shops and recreational facilities – on – the – farm. These communities had the need to communicate their story in an interactive way, asking a lower time investment than guided tours. 'Virtual Exhibition', developed at ATHENA Research Center, was foreseen as an appropriate tool.

In the Virtual Exhibition tool we started with development of two stories for the Barendonk and Heische Hoeve farms. For the second farm Students of Geo Media & Design from HAS University investigated new storylines by using geo data and design, whereas students of KW1C took care of film and animated for the story.

With the experience of 2 stories the process of involving more farmers started. Finally five stories are available. It appeared that most farmers don't have the skills and/or time to make the stories themselves. The possibilities for support have been expanded for this.

The tool is now widely made available to farmers to use. It has a place in a complete set of communication tools for farmers such as:

- Training on ‘how to use’ social media’ (for beginners and advanced)
- Individual support on digital communication plans
- Digital platform ‘[Dichterbij de boerderij](#)’

In the latest action, the Telephone circle, there were unexpected positive result on the possibilities of the stories exposed. Entrepreneurs were happy with the result, saw new possibilities and planned to optimize pictures and add new stories.

ZLTO advisors have the experience now that these plans are hard to realize. But with the help of a journalist the number of stories can expand and the tool can grow in importance. In the next months ZLTO will make a plan on continuation and discuss this with the farmers.

Table 6 The Storytelling on (food) production – Evaluation events

Event	Date(s)	Brief description	Participants	Personas represented
Events Festival	9-11 and 8-12 2016	Presentation pilot in workshops storytelling	60 farmers	Nelleke, Thijs, Caroline
Geo Conference	20-6-2017	Presentation tool as part of the programm	80 students, teachers, experts and farmers	Thijs
Workshop	12-9-2017	Instruction and training session about storytelling and the tool	12	Nelleke, Thijs, Caroline
Event Festival	10-11-2017	Presentation tool in session about making the connection with consumers	30	Nelleke, Thijs, Caroline
Telephone circle	12-3-2018	Interviews on the satisfaction of the farmers about the app and related work	10	Nelleke, Thijs, Caroline, others
Concluding meeting	may 2013	decision how the tool will be provided to farmers on the lon term	10	Nerlleke, Thijs, others, ZLTO advisors & journalists

7. The Precision Agriculture Pilot

7.1 Pilot Demonstrator

Originally the ZLTO pilot was linked to Precision Agriculture. Within the broad spectrum of possible precision applications we have chosen a (in Netherlands) a non-existing solution that would be in line with the CAPSELLA objectives supporting the upgrade of soil life and soil organic matter with compost.

Compost is a voluminous product, and therefore it is worthwhile to apply more where needed most, and vice versa. To facilitate the farmer in this, we developed the idea of a **Compost Calculator**. This web application calculates the amount of compost per level of organic matter content in the soil. On the poorest zones it helps to apply a considerable volume, not suffocating soil life. On the richest zone zero should be applied.

The Experts suggested a maximum of 50 tons/ha (poorest zone). Then an average application of 20 tons/ha is realized by setting the levels on 30-20-10-0 tons/ha in the next zones. The farmer can start the automatic calculation with standard values, then optimize the settings and recalculate, until he realizes the desired level of compost in all zones.

After calculation and presenting in a map, the web app produces a task map for the controller/board computer of the high tech compost spreader.

Basis for the calculation is a map (in a shape file) with within-field zones as result from an Electro Magnetic soil scan, which measures the water content of the soil, which is a good estimator of organic matter. The tool calculates the size of the field zones, and produces a map from the shape file. This is the first screen a farmer sees.

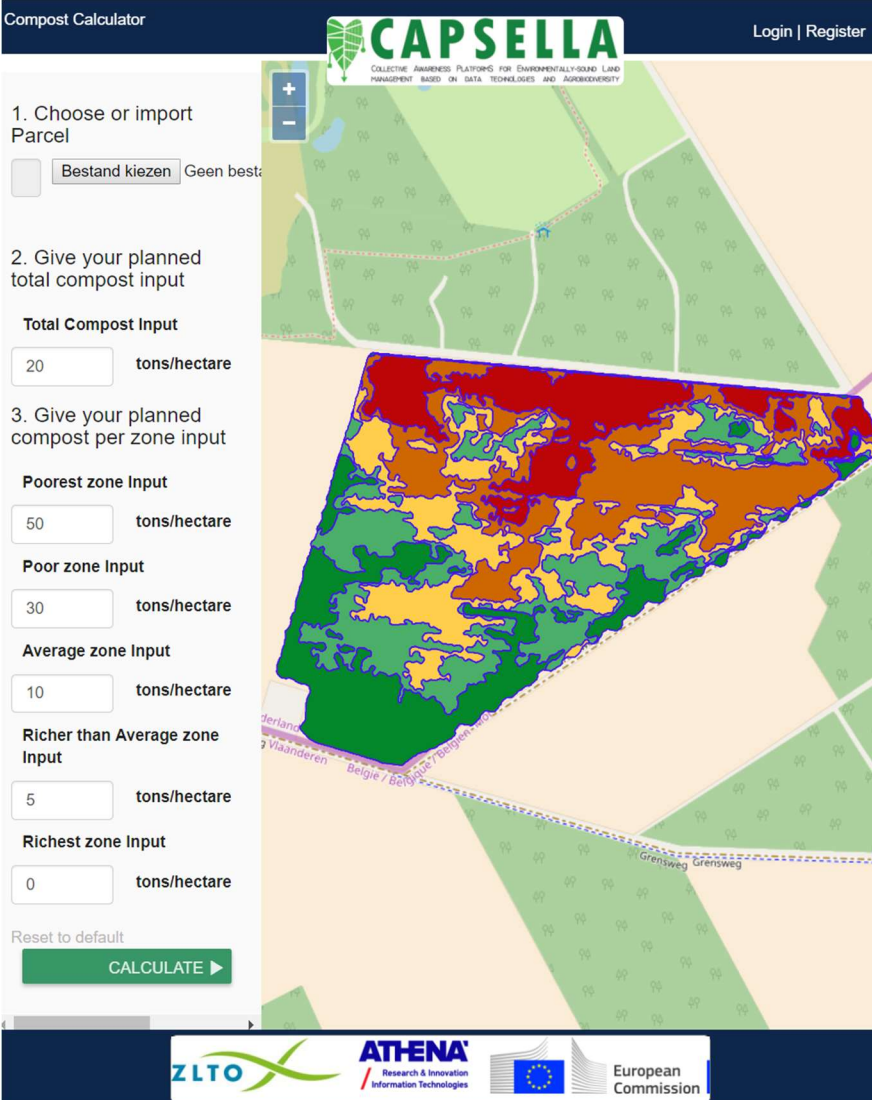


Figure 15 Precision Agriculture – Compost Calculator Map

This screen will be optimized with extra functions. In essence, after uploading a file, a farmer needs to push one button to get a common practice task map. And he/she has the possibility to let it fit in detail to its wishes (with only a few changes of values).

Personas involved

As mentioned in Deliverable D3.5 High-level analysis of bottom up requirements, farmers like Nelleke, Thijs and Caroline link very well to what society asks from them. And they (early adopters) want extremely simple-to-use tools to take the measures and prepare the communication in order to realise and show what they deliver. We started the interaction with a group of 2 advisors and 6 early adopters in November 2017

- Huub van der Velden is a practical advisor in arable farming, with a broad focus on sustainability, from pesticide use to soil fertility and machinery. He oversees the complete farming practice.
- WicoDieleman is advisor and project leader with a focus on natural reserve and biodiversity. He knows to choose elements in farming where biodiversity can be fostered.

- Piet Hermus, Jacob Molenaar, Rob Dirkx and Jolanda Raaijmakers are (like Nelleke, Thijs and Caroline) farmers that make effort to improve soil quality. They focus on better farming, not on better ICT. So ICT solutions should be very simple and adequate.

It is *complex* to make *simple* tools, good advisors and pioneer farmers are needed to describe the decisive functions and simplify it to the essence. In this line, a pioneer farmer, project leader, and 2 advisors cooperated in the early phases of the development:

- Jacob van den Borne is a very progressive farmer, he is expert in linking relevant data in a way that farming practice can work with it. He knows all developments and persons behind.
- Michael van der Schoot and Dirk Beekmans are GIS specialists, pioneering in ZLTO on services for farmers, advisors and policy based on open and proprietary data.
- Peter Pree is project leader who can connect these people to a practical plan.

The pioneer group was able to provide the ICT team of Athena Institute with a realizable description of what the tool should do, what it should look like and which data can be used:

- Nikos Larios is a flexible programmer, able to understand a general description and oversees the agricultural context in which they should work
- Eleni Toli is bridging gaps between the communities and knows what is needed to develop and introduce innovative tools.

7.2 Pilot Trials

After applying variable rate application in 2016, the desired app-functions were described by Jacob van den Borne, an innovative farmer, Michael van der Schoot, Dirk Beekmans, Huub van der Velden and Peter Pree, advisors at ZLTO. On July 4, 2017 Athena Institute finished the first test version of the app (Figure 15).

On 4-8-17 a 2nd version was finished, including correct calculations of field zone sizes and optimized layout.

On 4-10-17 a 3rd version was ready and discussion was made, using field boundaries etc from existing field repositories.

On 30-11-17 a group of farmers, advisors and experts from soil health trial evaluated the tool and discussed the integration with the soil health app.

Table 7The Precision Agriculture Pilot – Evaluation events

Event	Date(s)	Brief description	Participants	Personas represented
test by advisors	5+6/7/17	Test of 1st test version suggestion table layout	advisors	Michael, Dirk
test by advisor	6/8/17	Test of 2nd version	1	Huub
skype + meet-	18+19/9/17	Precise description of ad-	2 advisors, 1	Huub, Michael,

ing		ditional functionality	farmer	Jacob
telco	4/10/17	Tests with additional field repository (boerenbunder, akkerweb)	2 advisors	Michael, Dirk
telco	28/11/17	ok till now, start upload function	1 farmer	Jacob
group session	30/11/17	test complete version and integrations with soil health	3 advisors, 8 farmers, 3 external	Jacob, Huub, Michael, Dirk, Piet cc
meeting	26/2/18	need for additional information from soilmaps and photos	3 advisors	Wico, Michael, Dirk
focus group	beginning April	test of version 4		Wico, Michael, Dirk, Huub, Jacob
meeting	7/5/18	farmers, advisors, soil health	4 farmers, 3 advisors, 3 external	Piet cc, Huub, Wico
meeting	may 18	other farmers group	>6	Piet cc
meeting	june 18	final decision about product and continuity	initial farmer and advisors	Jacob, Huub, Wico, Michael, Dirk

8. The Soil Health Pilot

8.1 Pilot Demonstrator

The major outcome of Soil Health pilot is a web and android application for self-assessment of soil quality. The application is open access. The **web-app** is available at <https://soilhealth.capsella.eu/> under SPADE TEST function

CAPSELLA soil health platform

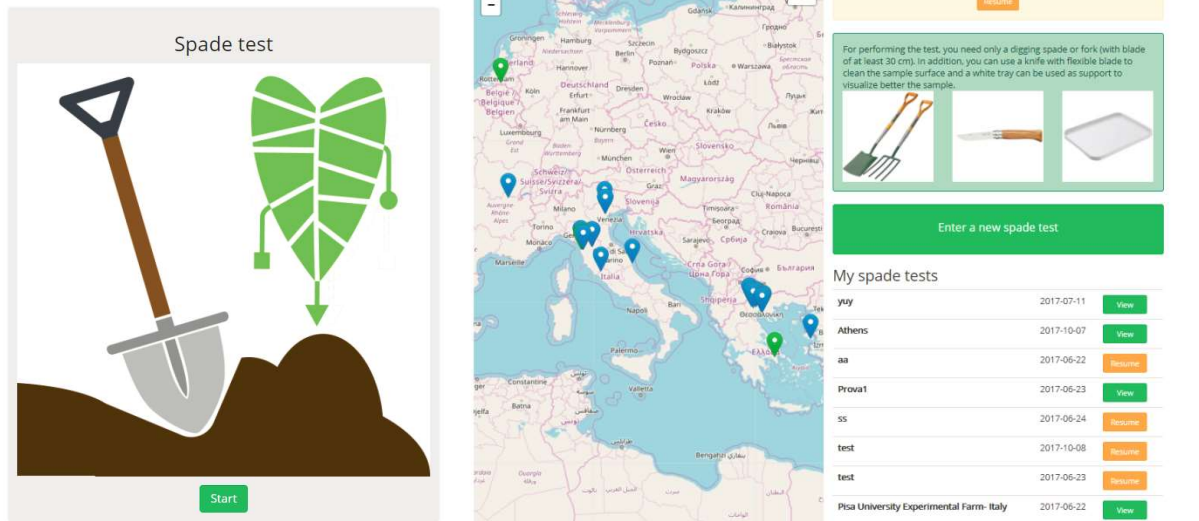


Figure 16 Soil Health pilot web-app

The android app (SOILapp) is available free of charge on Google Play Store at https://play.google.com/store/apps/details?id=eu.capsella.soilhealth.spade_test&hl=en

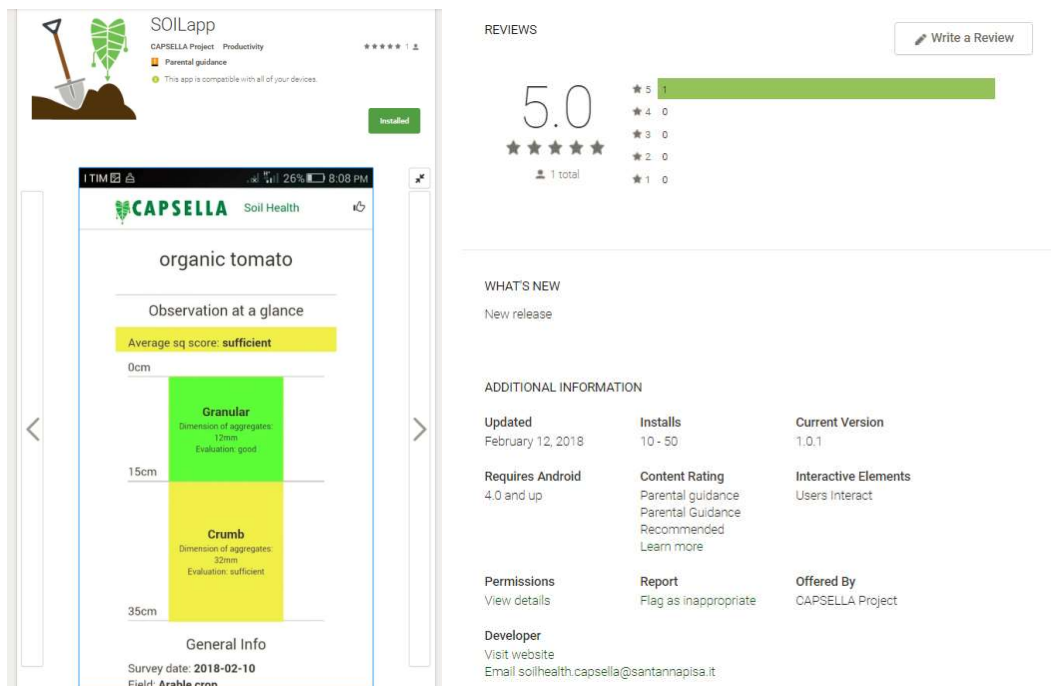


Figure 17 Soil Health pilot mobile-app

The application is open source. The source code is available on Git Hub at:

<https://github.com/CAPSELLA/Soil-Health-Web-Application>

The application supports farmers across Europe in maintaining healthy agricultural soils, facilitating the self-assessment of soil health using a widely used, qualitative method for performing the observation of soil conditions (spade test). It gives to farmers information on soil fertility and on

mechanical operations effects on its structure. Farmers, by using the application for recording their observations, are able to share their findings, learn from each other and seek further advice.

The spade test application guides the user through an easy touch-enabled interface to define the soil features for different layers in a sample. At the end, summary results highlighting the most important features are given and shared, eventually adding comments and a short description of farm practices.

The application is intended for: single farmers and farmers communities (unions, associations, informal networks); extension services from local authorities; organic and biodynamic certification organizations.

The demonstrator is the outcome of the co-creation, participatory process, conducted with [Scuola ESAPODA- Esperienzialeltinerante di AgricolturaBiologica](#) and [AEGILOPS - The Greek Network for Biodiversity and Ecology in Agriculture](#) farmers associations.

This demonstrator was developed for addressing their need of forecasting by themselves, in periods between two formal quantitative soil analysis, the effect of fertilization practices and other agronomic practices on soil physical, chemical and biological conditions.

1.1 Pilot Trials

The Soil Health Pilot demonstrator has been tested with end users:

- in groups, doing a spade test on field or with a demo, while each user was saving the observation on his/her own device and collecting the evaluation with an open discussion or with a written questionnaire;
- visiting single farms and using the app to collect the observation of 1-2 spade tests with the farmer;
- inviting researchers and consultants of the sector to test the app on their own and provide feedback.

Pilot trials in groups have been performed in Italy, Greece, France and Netherlands. Trials with single farmers were done in Italy and Greece. We involved researchers and consultants from several Countries, including Germany, Switzerland, Serbia and Ethiopia, beside the countries member of the consortium Italy, Netherlands and Greece.

Table 8 summarises the evaluation events and provides details on the type of evaluation and the end users involved.

Table 8 The Soil health pilot – Evaluation events

Event	Date(s)	Brief description	Participants	Personas represented
Group trial with oral feedback	9 June 2017	<p>The CAPSELLA Soil Health pilot was presented during the “Let’s cultivate biodiversity 2017” event organised by Rete Semi Rurali at Floriddia Organic farm in Peccioli (Pisa, Italy).The alpha version of the demonstrator was presented to six groups of around 20 participants. Participants, thanks to an example, were guided, question by question, at using CAPSELLA app for spade-test observation recording. An open discussion within each groups was used for collecting ideas for improving the tool and general evaluation of the early version of the demonstrator.</p>	100 (farmers, consultants, policy makers, researchers, interested citizens)	Farmer, Consultant, Manager, Consumer
Group trial with oral feedback and written evaluation questionnaire	27 June 2017	<p>Trial hosted by ESAPODA farmers’ association. Participants did at an organo farm part of the association a spade test. The trial was organized in groups and the field activity was preceded by a detailed presentation of the spade test method. Participants used CAPSELLA application to register the observations and were involved in evalu-</p>	48 (farmers, consultants, citizens interested to the topic, researchers, agri-food enterprise managers)	Farmer, Consultant, Manager, Consumer

		ating the application with a dedicated discussion session and by filling in a satisfaction questionnaire.		
Group trial with oral feedback and written evaluation questionnaire	8 October 2017	Trail hosted by Aegilops-Network for Biodiversity and Ecology in Greece farmers' association in collaboration with the Union of Organic Farmers of Northern Greece. At the Farm of Ecological Agriculture, a biodynamic farm part of the Aegilops network in Thermi, Thessaloniki, participants did a spade test in group and registered the information using CAPSELLA application. Participants were involved in evaluating the application in a dedicated discussion session and by filling in a satisfaction questionnaire.	40 participants (farmers, consultants, researchers)	Farmer, Consultant,
Group trial with oral feedback	27 October 2017	Both the "Soil health" and "Data Management for EU Seeds Networks" pilots were presented at the workshop on "Digital and technological revolution in the agricultural sector: Fitting in the Agroecological approach?" organized within the first Agroecology Europe Forum in Lyon (France). The forum included visits of farms in the area of Lyon. On the visit of an integrated	25 (researchers, NGOs members and farmers)	Farmers, Consumers

		<p>crop-livestock farm, we tested on field the SOILapp for visual observation of soil conditions. The participants performed the visual evaluation of the soil and used CAPSELLA app on their own devices for recording the observations. Open discussion with the participants was used for getting feedback on the demonstrator.</p>		
Group trial with oral feedback	23 November 2017	The demonstrator was presented at workshop by FERTILCROP project (on soil management in organic vineyard) with a demo followed by a discussion with the participants	>100 Organic viticulture farmers	Farmer, Consultant,
Group trial with oral feedback	1 December 2017	The demonstrator was presented at workshop by ZLTO Precision farming pilot with a demo followed by a discussion with the participants	15	Farmer, Consultant, Consumer
Single farmers feedback	October 2017 - ongoing	Visits to farms, spade test observation conducted with the farmer and oral feedback collected from the discussion during the observation	20 farms visited	Farmer
Single researchers/consultants	October 2017 - ongoing	Contact via mail to researchers/consultants experts in soil fertility management. Each of them tested the app and provided feedback via email	>10 experts involved	

9. Summary and Conclusions

This report presented the development status and working functionality of the deployed pilots and highlights the main activities for their evaluation, introducing thus deliverable D4.4 where the evaluation results will be analyzed.

Tens to hundreds of users have been employed to test the pilot demonstrators in a number of different activities, ranging from demonstration and focus group discussion in the context of greater events like conferences as well as testing in the field for particular demonstrators.