CAPSELLA

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

Deliverable D 2.2

1st workshop evaluation report

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Executive Summary

Being the first event organised by the CAPSELLA consortium, this awareness raising workshop acted as a forum where farmers, both from the organic and conventional world, networks, clusters, ICT and data experts, including SMEs, food retailers, chefs, and pertinent stakeholders were given the opportunity to share thoughts about how to better address challenges and needs that still lie ahead. The workshop focused primarily on the domains of organic and conventional agriculture across Europe. It also became the stage for a number of high-profiled speakers, EU funded project delegates, and SME representatives, who presented significant results in the data domain and ICT developments.

In this context, the CAPSELLA partners took the opportunity to present the project main activities and expected outcomes, focusing specifically on the three scenarios and pilots -on field, seed and food- that will be carried out by CAPSELLA in work packages WP3 and WP4.

Last but not least, the event paved the way to the collections of farmers' needs and requirements that will play a key role throughout the projects lifespan's activities in terms of tailor-made ICT solutions development.

This deliverable summarises the organisation and delivery of the workshop, and presents the most important findings, as they were derived from the discussion among the event participants gathered in focused Round Tables moderated and chaired by experts from the seeds, field and food environment.

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1. Scope of the event

This networking, two-day meeting aimed at spreading the word about the project and its goals in terms of fostering adoption of ICT tools for the benefit of the agrobiodiversity domain *from seed to fork.* The event addressed hot topics related to the existing and already adopted ICT tools in agriculture, the benefits of sharing open data and the challenges that still have to be addressed. It examined how tailor-made ICT solutions can serve –or are already serving– the agricultural and overall societal needs across Europe, through their uptake by a key European sector like agriculture. Focus was paid on horizontal issues such as open data security, trust and privacy and on addressing also the food chain and the relevant data for this domain. In the same context, the workshop served as a vehicle for communicating success stories and promoting collaboration opportunities at the European level between farmers by facing the undeniable differences and needs between northern and southern EU countries.

Moreover, given also the CAPSELLA innovation driven aspects, which will be pursued in the last phase of the project through incubation activities, the workshop briefly addressed issues related to the role and reinforcement of start-ups and SMEs within the European Commission (EC) Research and Development projects (R&D projects). Both startups and SMEs are of crucial relevance for the European economy: they offer flexibility and adaptability that larger companies cannot offer, they are generally more innovative and less risk-averse, and they have a high innovation potential, competing even on a global market.

2. Workshop set up and preparation

Given the scope of the event with a strong participatory focus and its fundamental goal of understanding and voicing the farmers and communities needs, requirements and expectations, it was decided to give more relevance to the face-to-face discussions, through the organisation of focused Round Table discussions, and less to the frontal presentations, to which farmers are not necessarily used to. Nevertheless, the organisers valued the importance of ensuring few keynote presentations to set up the scene, provide a glance of already developed ICT solutions and moreover to foster collaborations with related data EU funded projects such as FOODIE (Farm-Oriented Open Data in Europe), LinDA (Linked data) and SDI4Apps.

Thanks to the efficient preparatory work organised through several on-line meetings and phone calls between the moderators specifically **Dr. Diego Guidotti** from Aedit, a spin-off of Scuola Superiore Sant'Anna who jointly with **Mrs. Teresa Lazzaro** from the Scuola Superiore Sant'Anna (SSSUP) chaired and moderated the Field round table, **Dr. Gea Galluzzi** from Rete Semi Rurali (RSR) who moderated and chaired the Seeds round table, **Mrs. Adanella Rossi** from University of Pisa and **Mr. Pavlos Georgiadis** from We Deliver Taste (WDT) who both moderated and chaired the

Food round table, that all agreed on the structure of the round tables and the procedure, these meetings achieved the expected and planned results.

For getting comparable results of the three round tables, to the degree this is possible, it was decided to make in advance a list of technologies already available. For compiling this list CAPSELLA got in contact with businesses specializing in the area, such as was *Aedit*, a spin-off of Scuola Superiore Sant'Anna[1] . The idea was to have a common set of material for the facilitators of the three tables about the available information and communication technologies available on the market for the agricultural sector. This material was not meant to be used in formal presentations but as ready-to-show-examples to illustrate the feasibility of making concrete the ideas that the participants will propose if and when needed during the discussion.

A tentative list of available technologies divided in four macro areas was created and included those presented in Table 1.

Table 1: List of available technologies

Sector	Tool	Description
Software	**Web-based information system**	*web site to exchange data among users*
	Geographical Information System	*software for creating maps*
	Decision Support System	*software to support farmers to take decision*
Hardware	**Sensors**	*"tools for in-field observations"*
	Robots and drones	
	Mobile technologies	*monitoring and access data from the field*
	Precision farming	*apply different inputs in different parts of the fields*
Data source	**Remote Sensing**	*get field data using satellites*
	Crowd sourcing	*bottom-up network of users sharing information*
	Open data	*using data freely available from government, agency and private*
Data Analysis	**Spatial data analysis**	*forecast a value using data from closest points*
	Data mining/Big data	*extract knowledge from large database*

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[1] http://www.santannapisa.it/en/research/spin-off/aedit-srl

Modeling	*simulate crop and pest using weather and other data*
Bioinformatic	*analysing genetic data*

3. Overview and facts

The first CAPSELLA workshop was held in Volterra at the International School for Higher Education (SIAF) premises, about 80 km from Pisa, on the 30th and 31st May 2016. Already existing contacts and key partners based in the area (namely Scuola Superiore Sant'Anna, Rete Semi Rurali and Zephyr) acted as catalysts and ensured a broad representation of farmers, networks and agricultural players. In addition, the SIAF - International School for Higher Education premises were a suitable location for the logistics, being a campus where all participants could be accommodated, thus minimizing time lost in travelling from and to the event's venue and maximizing interactions among participants.

The opening of the workshop took place in an organic farm near Volterra belonging to the Floriddia family, where these Italian farmers run interesting experiments with ancient cereal crops. It engaged 59 participants from the farm sector and farmers' networks, ICT and data experts, including start-ups such as Aedit s.r.l. and Primo Principio, research and academic institutions, stakeholders and clusters such as Arc2020 and Ars Natura from Greece. The heterogeneous audience ensured the concrete exchange of ideas between ICT providers and other stakeholders, the collection of needs and expectations from farmers, and some fruitful outcomes from the round table discussions which will be detailed in the next paragraphs.

The geographical distribution of the workshop participants is illustrated in Figure 1:
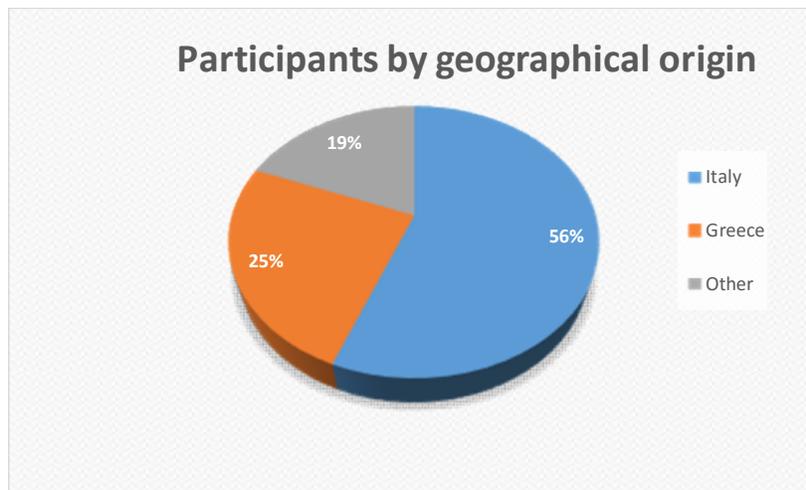
Figure 3-1: Participants by geographical provenance

As it is shown in the picture above, the majority of participants came from Italy and Greece. This was due to the presence and active collaboration of Greek farmers networks (Aegilops) and a

cluster Ars Natura. Nevertheless, in the category "Other" we included those attendees coming from Austria, Czech Republic, Ireland, Netherlands, Spain and the U.K. The participation of Northern EU farmers provided some stimulating inputs during the round table discussions based on the geographical differences and related needs.

Taken into account the above and in order to ensure that the workshop ran smoothly, translation services were provided. Four quotes from respective Italian companies were collected and finally it was decided to sign the contract with Musound SRL, a company located in Rome. Musound provided an official translator (by native-speaking trained professionals), both simultaneous and consecutive from English into Italian. The translation from English into Greek and into Spanish -if and when necessary- was carried out by the CAPSELLA partners.

The distribution of the workshop participants as per their category such as clusters (i.e. Ars Natura) and stakeholders such as ARC2020 is illustrated in Figure 2:
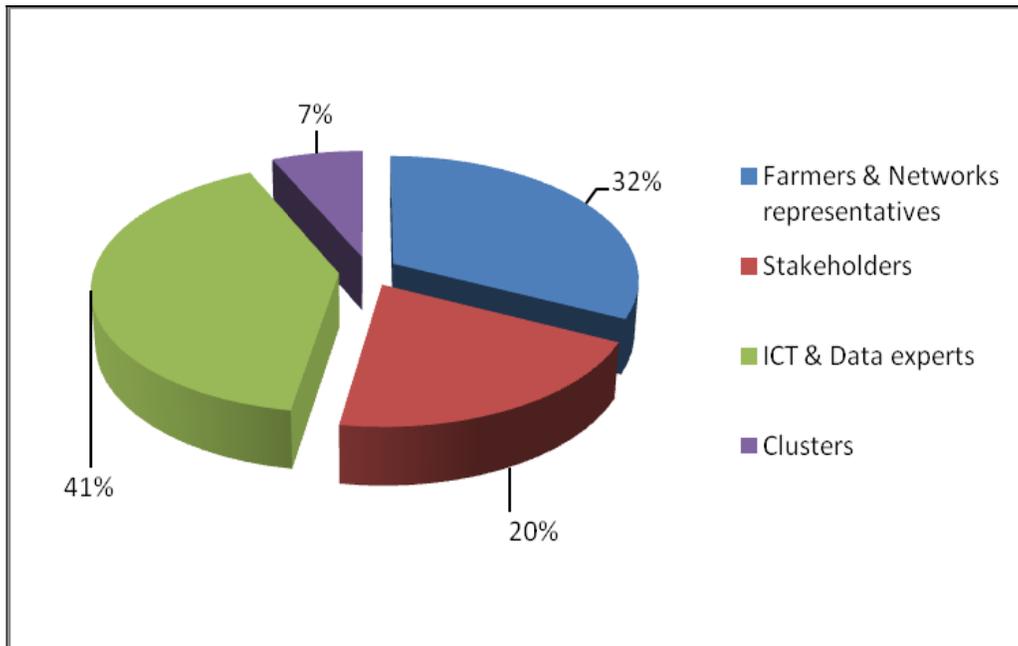
Figure 3-2: Participants profiles

4. Keynote Session

1.1.   Overview of the session and summary of presentations

This section provides a brief overview of the presentations delivered by the invited keynote speakers, while the presentation slides have been published in PDF format and are available on the CAPSELLA website (http://www.capsella.eu/first-workshop/).

The opening of the workshop took place at the Floriddia organic farm near Volterra. In his welcome speech, the farmer presented the interesting experiments with ancient cereal crops they run in the farm. Paolo Bàrberi from the Scuola Superiore Sant'Anna and Riccardo Bocci from Rete Semi Rurali set up the scene by introducing the scope of the event and the CAPSELLA project ambitious workplan and expected results. This short speech was followed by an overview of the growing agro-biodiversity as a new paradigm, and two practical field sessions focusing on (i) the **seeds**, specifically the practice and experimentation on cereal genetic diversity in DIVERSIFOOD project, and on (ii) the **field**, specifically the importance of enhancing soil fertility in sustainable agriculture and how to visually evaluate it were given. Session (i) was organized by Rete Semi Rurali and session (ii) by Luca Conte, representative of ESAPODA, one of the communities formally engaged in CAPSELLA.

The keynote presentations started after lunch and focused on how to foster links between actors in the agro-biodiversity domain, which is a core element of the CAPSELLA project together with the open data collection. Networks such as Red de Semillas, Aegilops, Esapoda, Ars Natura, involved in CAPSELLA since its start, provided a concrete presentation on conserving and using agro-biodiversity in organic farming introducing experiences from European agro-biodiversity-based farmers' networks. The networks' presentation was then followed by the data related talks, given from representatives of AgroKnow and Primo Principio, and of three EU funded projects: the FOODIE (Farm - Oriented Open Data in Europe), the LinDA (Linked data) and SDI4Apps (Uptake of open geographic information through innovative services based on linked data) projects that presented respectively their pilots and outcomes. Last but not least, Arc2020 provided an overview of the food chain and the social society/citizens expectation in terms of food quality based on the conservation of biodiversity.

Overall the keynote speeches aimed at informing the audience about key projects, findings, challenges, and opportunities on the use of open data and ICT tools, and focused on the farmers' needs and requirements. The keynote presentations also served as stimulators of the round table discussion that followed.

1.2. Speakers short bio

Paolo Bàrberi is Professor in Agronomy and Field Crops at the Institute of Life Sciences, Sant'Anna School of Advances Studies (SSSA) in Pisa (Italy), where he leads the agroecology group. His research focuses on functional agrobiodiversity. In addition to coordinating the SSSA's International PhD Programme in Agrobiodiversity, he is an external expert for the FAO (agroecology and ecological weed management), the European Commission (RTD programmes),

the European Food Safety Authority (environmental risk assessment of GMOs) and the Italian Ministry of Agricultural, Food and Forestry Policies (leader of the organic cropping systems expert group).
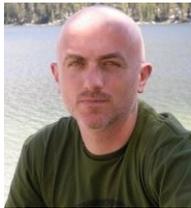
Riccardo Bocci has an MSc in Agriculture from the University of Florence. He is the managing director of the Italian farmers' seed network **Rete Semi Rurali.** He has been the AIAB's co-ordinator for the VIIFP project "Strategies for Organic and Low-Input Breeding and Management ([SOLIBAM](#) 2010-2014) and for the [VIFP project "Farm Seed Opportunities"](#) (FSO 2007-2009). He has also been advisor at the Overseas Agronomic Institute (IAO - Italy) for issues related to the implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and for the promotion of on-farm conservation in Southern countries, including a bilateral cooperation project between Italy and Brazil. In the period 2010-2012 he participated to the expert group coordinated by the Ministry of Agriculture that released the National Guidelines for the Conservation of Plant Genetic Resources for Food and Agriculture in Italy.

Eng. Norma Zanetti, MSc. in Electronic Engineering at Politecnico of Milan. She has been involved in EC Projects since 1995 as project manager. She is currently head of the R&D Department of Hyperborea Srl (SME based in the Scientific and Technological Pole of Navacchio, Pisa) member of Management and Steering Committees of several international and national projects in ICT and computer science domains, namely: environment, geo-spatial semantic web, Ambient Assisted Living, Linked Open Data, Big Data. In particular: FP7 LINDA, ICT PSP SDI4APPS and H2020 ENTROPY. She also acts as ICT projects expert evaluator and reviewer at EU, national and regional level. She is co-author of scientific papers in different research areas.

Dr. Panagiotis Zervas is a Senior Project Manager at Agroknow, since April 2016. Panagiotis holds a Diploma in Electronics and Computer Engineering from the Technical University of Crete, Greece in 2002, a Master's Degree in Computational Science from the Department of Informatics and Telecommunications of the National and Kapodistrian University of Athens, Greece in 2004 and a PhD from the Department of Digital Systems, University of Piraeus, Greece in 2014. He has 13-year professional experience in the conception, coordination and implementation of 21 R&D Projects in Technology-enhanced Learning and Learning Technologies. Panagiotis has also been involved in the design and implementation of large-scale EU-funded initiatives such as CIP Inspiring Science Education and FP7 Go-Lab. Panagiotis is the co-author of more than 90 scientific publications with more than 400 citations, as listed in Scholar Google and he has received 5 times Best Research Paper Awards in International Conferences on Learning Technologies (July 2014, July 2011, November 2010, July 2009, July 2007). He has been a Researcher in the Information Technologies Institute (ITI), Centre for Research and Technology –

Hellas (2003-2016) and a Researcher at the Department of Digital Systems, University of Piraeus (2012-2016).

Ms. Simona Mincione Junior Project Manager at ENCO srl, she holds a Master degree in International Relations and European Studies. Responsible for developing project proposals and carrying out project activities, she has experience in the planning and execution of communication and dissemination strategies and exploitation activities for several EU-funded projects (H2020, CIP-ICT-PSP, FP7) as SMART GROUND, Waste2Fuels, FOODIE, Zewipro, Algatec 2. In particular, she has taken responsibility for designing and implementing D&C actions and Intellectual Property Management. In addition, she is working on marketing activities for some FIWARE projects.

Mr. Walter Mayer (CEO, PROGIS GmbH) has a university degree at the University for Applied Life Science and Natural Resources Vienna (1975) for forestry, avalanches and torrents and a college degree of agriculture (Matura) (1968). His job history led him from his activities with the Forstverwaltung Schwarzenberg and the foundation of the company ZEMA GmbH, Austria-Sales of Apple u. Acer Computer (1978 – 1985) to the foundation of his civil-engineer office (1984). Since 1988, Mr. Mayer has been dealing with the development of software for the management of forest and agricultural enterprises and founded PROGIS (1995).

Dr. Oliver Moore is Communications Manager with NGO ARC2020.eu. In this capacity, he provides and manages the content, while also curating the social media engagement of the organisation - ARC2020 is a policy discussion and debate platform for rural and agri-food actors around the EU. He has a PhD in the sociology of farming and food, specialising in organics, direct selling and consumer-producer relations. He is published in consumer studies, agri-food and more general sociological journals and books. He lectures with the Centre for Cooperative Studies in UCC, part of the Department of Food Business and Development. Since February 2005, Oliver has written a weekly column on organic food and farming for the Irish Examiner, a newspaper to which he also contributes regularly on a range of agri-food issues. A member of the Irish Food Writers Guild, he has also done radio and TV work in his speciality areas in Ireland and the UK.

Dr. Andrea Galante is employed at the Marketing and Communications area at Primo Principio. He has a Master degree in Sociology at the University of Bologna. In 2010, Andrea got an European Master in Labour Studies at the Universitat Autonoma de Barcelona. In 2011, achieved a Master by Research in Science and Technology Studies at the Institute for the Study of Science, Technology and Innovation of the University of Edinburgh, hence he specialises in issues relating to the social aspects of scientific and technological research, management and the promotion of

innovation and the relationship between science, technology and socio-economic development. In 2012, back in Sardinia, he worked as an intern at CRS4 (Research Center, Development and Advanced Studies in Sardinia) at Valorisation and Transfer of Knowledge Unit where he dealt with technology transfer and marketing of scientific research.

Dr. Paolo de Vita Graduated in forestry and environmental sciences at the University of Florence. In 2005, he moved to Cordoba (Spain) through an Erasmus fellowship, where started to work at his degree thesis in the Department of Agronomy, Plant Pathology Section, at the University of Cordoba. Since 2006 he started working as a research fellow in the same department. In 2008, he became a researcher at the University of Cordoba, dealing with different phytopathology projects in agriculture, forest and protected areas; in 2013 he graduated in agricultural science and technology, plant medicine curricula. Paolo participated in several international research projects and academic excellence, is now member of COST (European Cooperation in Science and Technology), is acknowledged for 4 consecutive years Collaborator Honorary of University of Cordoba; in 2010, he received a scholarship for an international graduate internship in molecular biology at the University of Neuchatel (CH); in 2012 identifies and describes the propagation mechanism of the root rot's pathogen Pythium spiculum. From 2014 he is part of the team of Primo Principio as Agronomist expert in Phytopathology.

1.3.   Communities and Networks involved

Given that one of the workshop's scope was to collect needs and requirements from the agricultural players, an active role in terms of presentations and intervention in the round tables discussion were played by those communities and networks involved in the project since its proposal phase. The presence of Ars Natura and Aegilops was fundamental also in terms of facilitating the involvement of the Greek farmers thanks to the translation from English (the workshop official language) into Greek done by their representatives. This translation ensured a full comprehension and participation of the Greek farmers in each phase of the event.

ESAPODA is an Italian non-profit network that brings together farmers and professional agro-ecologists under the main mission of promoting knowledge and diffusion of integrated and biological pest control. Beyond crop protection, ESAPODA is involved in several fields of organic and agroecology-based cropping system. One of its most successful projects is a farmer-to-farmer training school on organic cropping systems ('Scuola esperienziale itinerante per l'agricoltura biologica', http://www.scuolaesperienziale.it/) active from 2006.

AEGILOPS a Network for Biodiversity and Ecology in Agriculture, is a Greek non-profit community of researchers and producers in the sector of Sustainable and Ecological Management of

Agrobiodiversity. AEGILOPS is coordinating every year training courses for farmers, processors, consumers and seed savers in many regions of the country. Its main mission is the preservation – re-cultivation of local varieties/heritage crops and the development of varieties and seeds adapted to local conditions and organic farming, as well as supporting agrobiodiversity use in the perspective of sustainable multifunctional agriculture.

ARC2020 Agricultural and Rural Convention is a multi-stakeholder platform that has involved numerous civil society networks and organisations from the majority of EU Member States all working on issues affected by the EU's Common Agricultural Policy (CAP). ARC2020 is mobilising individuals and organisations beyond traditional stakeholder interests, working in parallel also on the policy level for a paradigm shift in agriculture.

ARS NATURA is a cluster of experts in environment, agriculture and informatics empowered by the Hellenic Forests LTD Company. ARS NATURA has among its scopes the development of ICT solutions for agricultural sustainability assessments. It is also concretely involved in the policy making environmental consultation and dialogue and in the assessment and design of sustainable food production systems.

RED DE SEMILLAS "Resembrando e Intercambiando". The loss of genetic resources in our agri-food system and the recovery of local varieties were the reasons for creating the Red de Semillas "Resembrando e Intercambiando" (Re-Sowing and Exchanging network). This national organisation aims to bring together the various local projects in Spain and provide instruments for carrying out activities in the field of the preservation and utilisation of agricultural biodiversity, helping to coordinate activities amongst the different members and promoting their participation in national and international projects. At a national level, Red de Semillas carries out political activities and provides information; legal amendments aiming to unravel the complex legislation on seeds and ascertain its effects on farmers. They train small farmers in how to set up micro-enterprises of organic seeds of local varieties. At an international level, this network has been present at several international events and it is participating, alongside other EU groups.

THE SEED NETWORK OF ANDALUCIA (Red Andaluza de Semillas "Cultivando Biodiversidad") is an organization working for the last 13 years that aims to cope with the loss of agricultural biodiversity in Andalusia and also to the loss of peasant knowledge. The organisation makes the promotion of organic

farming and sustainable rural development, the awareness of local varieties in the consumers of Andalusia and wants to help in the creation of employment in rural areas through the production and marketing of seeds locally produced. Members of the RAS are farmers, consumers, engineers, environmentalists and rural collectives, etc. RAS articulates itself with other organizations at the regional, national and European level. This network was represented by **María Carrascosa**, coordinator of Red Andaluza de Semillas (RAS) and chairwoman of Red de Semillas "Resembrando e Intercambiando". María is agronomist with a Masters Degree in organic agriculture. Her professional activities are focused in developing projects in the framework of food sovereignty, agroecology, agricultural biodiversity, family farming and short supply channels.

5. Round Table Discussion

Following the keynote presentations, a round table session, running in parallel and organised in three different rooms, engaged both the invited speakers and the participants in an active discussion revolving around the current status of ICT adoption on field, seeds and the food chain. Participants were stimulated to work interactively in small groups, through the aforementioned flexible brainstorming sessions, organised in thematic Round Tables dedicated respectively to the three future project's pilots: Field, Seeds and Food. These discussions turned into practical objectives thanks to the experiential and participatory bottom up work throughout the duration of the workshop. The main findings as well as the recommendations for reinforcing their role in these context are presented in the following paragraphs.

1.4.   Main Findings and outcomes

The round tables gathered experts with different backgrounds, i.e. in the field round table experts from the ICT and data domain not only presented in an exhaustive manner solutions already available to improve the farmers work, but managed to collect requirements from them, and to provide advices and answers to their concerns regarding the use of ICT.

During the discussions, the following key points summarised in the paragraphs below emerged to be of key relevance to explain the state of the art.

1.5. Round Table #1 - Field

The **Field Scenario** round table gathered 23 attendees and involved farmers in an engaging discussion about the main problems that they face in their daily farm management. The focus was on those issues that can be tackled by means of data management tools.

The first session was dedicated to the construction of a rich picture around the question: "***What are the main agronomic problems that you face?".*** In this part, the participants shared their main concerns without the need to follow a strict discussion path. This part of the round table aimed at defining the "what" of the Field Scenario, i.e. the main topics of interest for the farmers involved in the project (Figure 1).

Rich pictures are used in soft systems methodology for gathering information about a complex situation (Checkland, 1981)[2]. Given the complex and diversified issues that could be included in the Field Scenario, this method was selected as the more efficient for farmers to take part in the round table discussion and express their needs, and for the CAPSELLA partners to collect the requirements coming from the participants.

The rich picture was used for the pre-analysis stage, before we could clearly state which parts of the topics discussed should be regarded as processes and which as structures. The selection of topics from the rich picture allowed to focus of structures on which CAPSELLA can operate. The distinctions between specific (e.g. SOM and water management) and general themes (e.g. knowledge access and field book use) allowed the participants to structure a work plan proposal for the Field Scenario.

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[2] http://systems.open.ac.uk/materials/T552/pages/rich/richAppendix.html

Figure 5-1. Rich picture produced by the discussion during the first session of the round table

From the rich picture, a set of six topics stood out as representative for the whole discussion. The participants used these topics as base for discussing "how" CAPSELLA can address problems in the domain of agronomic practices.

The six outstanding topics are hereafter listed together with a summary of the discussion around each issue.

Knowledge access and sharing

The main interest of the participants was about: (i) having access to information on organic farming practices, (ii) enhancing exchange of knowledge among farmers, (iii) supporting a learning network for future farmers' generations.

Organic matter management

The correct management of soil organic matter (SOM) was at the core of the discussion on this topic. The main interests underlined were about data-supported services to increase soil fertility, to use compost, to manage SOM with precision agriculture techniques and to deal with soil organisms in order to balance soil quality requirements and functional biodiversity.

Water quantity and quality management

Irrigation systems improvement and water sources management were indicated as fundamental for reducing the quantity of water used in agriculture. The low quality of water, due to pollutants or high salinity level, was pointed out as an issue highly affecting crop production, especially in greenhouse conditions. The prevention of soil salinization in field and greenhouse conditions was identified as a topic on which the support of intensive data use could be fundamental. Managing water from different sources (e.g. rainfall, surface, wells, etc.) was pointed out as a possible way for reducing the risk of soil salinization in vegetable cropping systems.

Cover crops

The management of cover crops was discussed mainly in connection with SOM management.

Field book

The participants highlighted the need of using IT tools to manage the information about agricultural practices and field monitoring data ('field book'), and to integrate public information and internal farm data.

Pest management

Field identification of pests, diseases and weeds appeared as a basic need for any type of farm. The access to information about pest management practices in organic agriculture is the main difficulty arisen from this discussion.

These six topics can be organized in two broad categories: (i) agronomic themes dealing with specific issues that can be improved by using technological tools, e.g. organic fertilization, water management, use of cover crops, pest management; (ii) ICT tools that can be used across different themes, e.g. knowledge management, field books.

In the second session the discussion, animated by the ICT experts, dealt with several ICT tools (data, software, models, sensors) related to the six topics. Several examples of existing ICT tools (e.g. online decision support systems, online databases, online maps and spatial data, available models, software) were used as basis for identifying concrete requirements to the project. The need of accessing/producing data, develop models to use these data and build software for end-users was highlighted during this part of the discussion.

This discussion focused on the two main agronomic themes of SOM and water management, integrating them with the knowledge sharing and field book topics. In the discussion about SOM and water management, all participants agreed on the need to integrate external data sources with internal data in order to develop useful services for the farmers. Below, for each topic we list: (i) the external and internal data sources that CAPSELLA can use in the Field Scenario development, (ii) the connected services that can be developed around the knowledge

management issue, (iii) the connected services that can be developed around the field book topic. A list of software of interest for each of the two topics is also provided.

Organic matter management

External data sources that could be exploited in CAPSELLA:

- Satellite data (Landsat, Copernicus) to detect the vegetation mass, soil cover etc.

- Historical vegetation data (from satellite or land use data).

- Weather data (from regional/national weather stations).

- Local data to be exploited in CAPSELLA (focal farm in the Netherlands):

- Local weather sensors (temperature, humidity, soil humidity).

- Soil analyses and soil maps.

- Data collected by drones.

- Knowledge management: collect knowledge and practices about organic matter management; collect experience from participatory sampling activities.

Field Book: collect data about crop rotation, crop yield, fertilization, soil tillage.

Software of interest:

- Models to estimate SOM humification and mineralization.

- Estimation of SOM and soil nutrient balance (compost, cover crops, nutrient use by the crop).

- Decision support system to support farmers in crop management (choice of crop rotation, cover crops, define the optimum amount of fertilizer).

- Precision farming tools to define the variable rate to distribute compost.

Water Management

External data sources that can be exploited in CAPSELLA:

- Data about surface and ground water quality (e.g. http://sira.arpat.toscana.it/sira/bandat.php).

- Weather data (temperature, evapotranspiration, rain).

- Satellite vegetation map/soil stress indicator.

Local data that can be exploited in CAPSELLA (focal farm in Italy):

- Local weather sensors (air and soil).

- Local sensors on water quality (pH, salinity, nutrient content).

- Local soil/analysis and soil maps.

Knowledge management: collect knowledge and practices about water management (reduce water consumption, deal with low quality water sources).

Field book: collect data about irrigation distribution, crops (phenology and yield) and their agronomic practices.

Software of interest

- Tools to estimate evapotranspiration and water balance (crop requirements, crop coefficients, estimation of actual and potential evapotranspiration).

- How to deal with potentially polluted/saline waters.

- Define how to integrate rainfall water with other water sources.
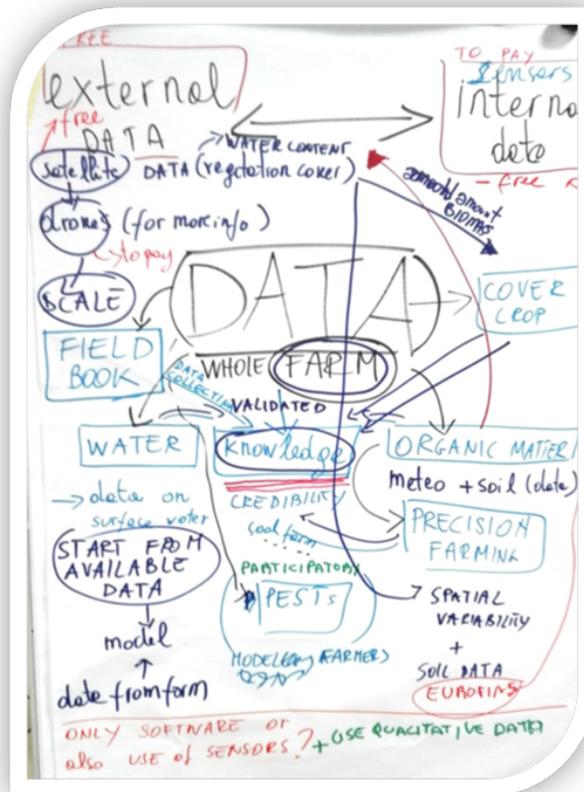
Figure 5-2. How to use data in CAPSELLA to address the six topics highlighted during the round table

Towards the end of the round table, participants were asked to rank the emerged topics in decreasing order of importance. This resulted in the following list of topics, ranked from the most to the least important:

1. Knowledge sharing and access

2. Organic matter management

3. Water quality and quantity management

4. Cover crops

5. High-tech field book

6. Pest management

Taking into account the overall discussion and the ranking of the topics, we propose a strong focus of the Field Scenario and the connected piloting work on SOM and water quality and quantity management (Figure 5-3).
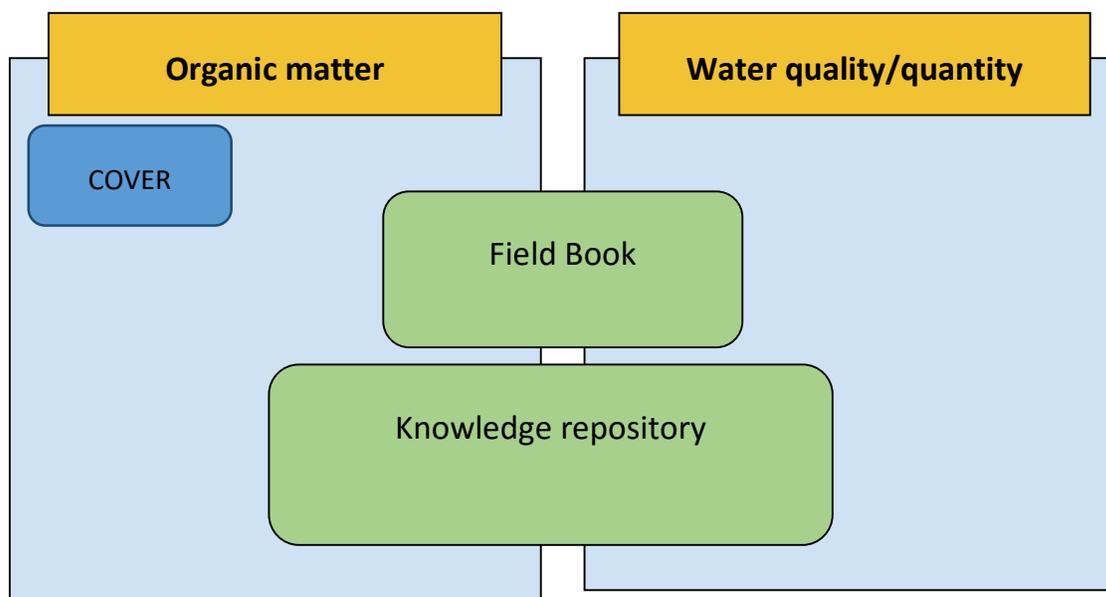
Figure 5-3. Possible piloting plan for Field Scenario using the outputs of the round table discussion

The work on the use of IT field books and knowledge sharing and access can be developed in the framework of this two agronomic themes. The cover crop topic can be treated as a sub-case of the SOM management one.

Round table evaluation

Participants were invited to evaluate the round table discussion, by answering the following questions.

Q1. Did the activities fulfill your expectations? (Answers from 1=not at all to 5=completely).

Q2. How much did you learn during this round table discussion? (Answers from 1=nothing to 5=very much).

Table 2: Round table evaluation results

Participants	Average Q1	Average Q2
Overall	3.5	3.5
Farmers + technicians	2.9	3.3
Researchers	4.0	3.3

The evaluation (Table 2) about participants' expectations was positive (overall average 3.5), although there was room for improvement regarding farmers' expectations (average 2.9). The participants were also asked to give suggestions regarding the methodology used. Farmers highlighted (i) the preference to have less researchers and more farmers as participants (in our case the situation was quite balanced) in order to share practices with each other and (ii) the need to have participants from more countries in order to exchange knowledge with farmers from other contexts.

For CAPSELLA, the result of the evaluation is an indication that different stakeholders (in our case farmers) have to be involved in the planning phase, if their expectations at the highest level are to be met.

1.6.   Round Table #2 - Seeds

This round table was moderated and chaired by **Dr. Gea Galluzzi from Rete Semi Rurali.** About fifteen participants in the Seed Scenario round table engaged in stimulating discussions around what kind of ICT solutions could better address the needs of farmers and technicians involved in participatory research around agrobiodiversity and informal seed systems.

The first session was devoted to briefly explaining the type of activities, hence the type of data and stakeholders, involved in European seed networks. This session was animated by the representatives of the seed networks directly participating in the CAPSELLA project (Rete Semi Rurali from Italy and Aegilops from Greece), as well as by representatives of the Spanish network Red de Semillas.

The main requirements emerging from the seed networks were those of having tools and solutions to better manage the increasing body of data on the varieties circulating in the informal seed systems they work with, as well as to record, link and elaborate the data coming from the on-farm experimental fields these networks manage. The tool would be used by each seed network at national level, making their activities cleaner, more efficient and streamlined and allowing end results to be more comparable. The Horizon 2020 DIVERSIFOOD project, which involves networks from Italy, Spain, France, Switzerland and Austria, is already working on a common template for these organisations' databases in order to harmonize their work and make national efforts more coherent at European level.

In discussing possible solutions to these requirements by the ICT community, issues of data sharing, open access and privacy emerged and were elaborated at length. Seed network representatives explained the context in which their work takes place, the reasons why privacy and restricted access to data on genetic resources, landraces and traditional knowledge are perceived as extremely important by farmers, and how the relatively localised level of their work makes access to variety data from other countries a not too high priority. It deserved to be mentioned also that the ICT stakeholders participating in the round table acknowledged the importance of authentication and authorisation in relation to the seed communities' data, and all agreed that this is not a technical issue, as there are available tools and methodologies to ensure the desired level of openness.

Rete Semi Rurali, Red de Semillas and Aegilops clearly stated that the data they collect are not for commercial use. All this led to the agreed recognition among round table participants that the level of public access to the data collected through the use of ICT tools would have to be carefully decided upon and not automatically made available across networks and countries or external users. It was stressed that, anyhow, the use of standard templates, methodologies and approaches to data collection and management could greatly empower the European networks impact, allowing them to share comparable results and present these to policy makers and broader audiences at EU level.

With greater clarity among practitioners and ICT actors around the table, the second day was more focused on outlining the general features of an ICT tool which each seed network in their own country could use. It was agreed that such a tool should link the databases of varieties, users, farmers and farms, which each network holds, with the information coming from experimental fields. Externally available data such as weather or soil data for each experimental location, gathered on the CAPSELLA platform, could be further used to link with the variety data. The tool should then be able to feed all the above data into a statistical analysis platform (based on the R language) for its elaboration and delivery in a graphical form, which could then be used for dissemination, training or awareness purposes. The database will have different level of users and accordingly different data entry and sorting.

The map below describes the tentative workflow the tool should facilitate.
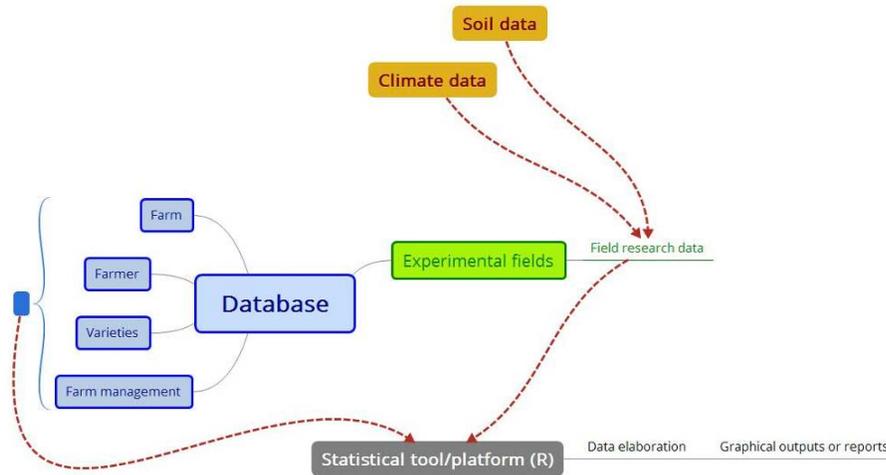
The following steps in the direction of building the tool are:

- Follow up closely with the DIVERSIFOOD project to have the agreed common template for European seed networks' databases, as a starting point for the tool building

- Define the user categories and their specific objectives in using the tool/accessing/contributing data more clearly to facilitate the ICT specialists' work

- Provide access to the ICT specialists to the databases and the information within them for the purpose of exploring their information content and structure

- Continue working on privacy and data accessibility issues

1.7.   Round Table #3 - Food

This round table was chaired and moderated by **Pavlos Georgiadis from We Deliver Taste and Adanella Rossi from University of Pisa**. It gathered around twelve participants engaged in participatory design methodologies for eliciting community requirements related to the CAPSELLA Food Scenario. The participants represented a diverse set of actors in the food supply chain: farmers and seed savers, food processors (social restaurants), consumers and ICT researchers.

The process aimed and achieved the identification of what type of ICT / open data tools are currently used by the community, what type of further such tools are required, and how CAPSELLA can deliver them.

Further to an active discussion among participants, the team came up with the below table, summarising some of the ICT/Open data tools currently used by the community.

Table 3: ICT / Open Data tools currently used by the community

Farmers	Google Analytics used to understand demographics of website visits (*ie.* number, origin, age, background).
Restaurants	Dedicated e-Commerce websites/Apps for direct wholesale purchases from farmers (showing product availability).
	Facebook pages to show the kind of cuisine offers and restaurant setting.
Consumers	TripAdvisor used as a source of information about restaurants and the kind of cuisine they offer, and evaluation by other users.
	Supermarket applications connecting consumers with producers (*ie.* origin, ingredients, QR coding).

All stakeholders	Social Media (Facebook, WhatsApp, Twitter) for PR; Online Search Engines; Membership Mail-lists/Newsletters; MS Office (Excel, Word); Cloud Storage (Google Drive); Seed Catalogues

Then the participants exchanged opinions about what tools could be useful based on their personal experience. Afterwards, the discussion revolved around what are the most relevant and useful open data required. The table below summaries some results:

Table 4: Types of Open Data required by the communities

Areas	Required data (examples)	Possible Outputs
Product Quality	ingredients; shelf-life; story; origin; ethics	Increase awareness for better informed choices. Allow personalised choices to avoid certain ingredients (for health or taste reasons). Information about ethical codes adopted by farms/restaurants.
Health & Nutrition	Presence of allergens; presence of chemicals/contaminants; statistics on junk food consumption; external costs of unhealthy diets	Relate with obesity/diabetes in certain locations. Allergen alerts. Increase knowledge for better informed choices.
Financial Data	spending capacity by country; willingness to pay; maximum spending (related to location/age/gender…); data enabling access to markets; data related to price paid for quality food (e.g. environmental friendly)	Understand spatial and temporal aspect of food purchases (patterns of spending in different contexts; trends over time).
Consumer Satisfaction	preferences; expectations; impressions	Allow understanding of consumer needs/preferences by producers/restaurants. Related with demographic data (*i.e.* children preferences) or trends and context-dependent consumption patterns.
Environmental Footprint	Water; Soil/Land; carbon; food miles	Information about quality of water (as a natural resource, used during production/processing phase, and as an ingredient at restaurants). Information about production techniques (if polluting or not). Information about food transportation (who, how, etc.).

Food Education & Culture	eating habits; trends in/needs for food knowledge; modes for knowledge sharing	Educational information: nutrients, farming practices, ways of cooking food, how to transform/process food.
Demographic Data	Stakeholder demographics; food trends; mapping farms/restaurants; tourist statistics (related to location)	Understanding consumption potentials and patterns in certain locations.
Legislation Data	PGO/PGI; Health & Safety regulations; Patents	Easy-to-access information about legal regulations.
Supply Chain Data *	seasonality; availability of products by local farms; places of availability of special ingredients and related prices; mapping of farms and other chain agents	Increase of transparency and efficiency in Supply Chain Management.
Menu Data *	menu type; type of restaurants	Understand availability/avoidance of certain ingredients; adaptation of menu according to consumer feedback. Investigate recipes and ingredients. Map restaurants that offer certain types of food (*ie.* local, vegetarian, etc).

Participants shared their thoughts and considerations also with regards to some data such as those of the *supply chain and Menus* that are considered to be very dynamic, influenced by case-specific and location-specific contexts. Therefore, it is difficult to provide Open Data infrastructure that can be horizontally relevant and useful to every use case or actor. However, the CAPSELLA Food Scenario will aim to create methodologies for data elicitation and a minimum viable product, offering the necessary infrastructure for the development of localised and case-specific applications. These can be potential developed through startups and services that will be incubated in WP6.

Overall, this round table come up with the below table related to some open data sources.

Table 5: Possible Open Data Sources

Data source	Tools	Examples
Bibliographic Data	online databases; encyclopaedias; publications (Food Agencies, Research Institutes, Public Bodies)	voedingswaardetabel. nl
Statistics	reports; publications	

Sentiment Analysis	social media	Facebook; Twitter; Instagram; TripAdvisor; FourSquare;
Surveys	questionnaires	

Finally given the presence of a chef who showed his interest and availability to possibly run a pilot in the food domain, this might be developed at **Alba restaurant** which was defined as a *"social restaurant"* and it is also vegan, hence gathers consumers with clear needs and requirements.

6. Workshop Dissemination

The CAPSELLA consortium started the workshop preparations at a very early stage of the project. This provided partners with time to promote and disseminate the event through several key channels including the project website, where a devoted page was created[3], and various social media.

Specifically, the dissemination activities were supported by on-line tools and communities:

– Entry on the CAPSELLA workshop in Facebook (with currently 156 Likes)

– More than 30 live tweets during the event (#Capsella) with currently 99 followers

– Entries on the CAPSELLA LinkedIn group (currently 42 group members)

– News AgroKnow Blog entry that is automatically sent to its social media with over a thousand followers.

Moreover, the event was promoted by the related projects such as FOODIE, SDI4Apps and LinDa on their social and by the following, no exhaustive, networks and stakeholders.

e-agriculture- http://www.e-agriculture.org/events/capsella-project-1st-workshop

ISOFAR - http://www.isofar.org/isofar/

ICROFS - http://icrofs.dk/en/aktuelt/nyheder/viewnews/artikel/capsella-collective-awareness-platform-for-environmentally-sound-land-management-based-on-data-tech/

ICT-AGRI - http://www.ict-agri.eu/node/36143

EIP-AGRI - https://ec.europa.eu/eip/agriculture/en/content/capsella-project-collective-awareness-platform-environmentally-sound-land-management-based

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[3] http://www.capsella.eu/first-workshop/

Finally, a CAPSELLA project's article/interview in the Science Node newsletter series run by the dissemination manager was published on the 6th of April 2016[4], so well in advance to provide very good visibility and promotion. This newsletter is published in Europe by CERN and in the United States by the NSF. The audience reached by the aforementioned publication is about 20,000 readers in both Europe and U.S.

After the event, the main findings were summarised and published in the [first CAPSELLA's newsletter](#) released in early July 2016 channeled through all the project's social media and dissemination channels and published also in the Arc2020 newsletter[5] and website for further visibility.

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[4] https://sciencenode.org/email/2016/april-20/index.html

[5] (http://www.arc2020.eu/2016/06/capsella-participatory-science-and-open-data-for-field-seed-food/).

7. Conclusions and some considerations

This deliverable summarised the details of organisation and delivery of the first awareness raising CAPSELLA workshop, which took place Volterra, Tuscany on May 2016. Building on the established list of contacts of CAPSELLA project and of other EU-funded projects and on the basis of previous successful collaboration, the event was enriched by the presence of key international networks and related data projects. The goal of this collaboration was to foster knowledge sharing among the actors present at the event, to collect need and requirements from farmers, and also to gain visibility, thereby ensuring an adequate and properly informed audience.

One of the primary concerns before the event took place seemed to be the lacking awareness and understanding of farmers and networks about the existing ICT tools and the benefits of their adoption. The stimulating discussions during the round tables showed not only that they are more aware of existing technologies than it is commonly believed but they find them also useful and look forward to adopt new ones.

Another valuable point is related to the concrete suggestions that came up in relation to the CAPSELLA scenarios and as part of the round table discussions.

Featuring a series of keynote presentations, the workshop addressed topics related to the adoption and use of open data and ICT tools by the agricultural domain across Europe. In this light it is important to mention one of the challenges that emerged during the event, which is the different perception and willingness towards open data by the ICT players and the seeds' networks. It is not a matter of taking the one or the other position, and this is also out of scope of this deliverable; it is, however, an important finding for the CAPSELLA partners and will allow us to develop customised communication strategies for the networks and communities, and thus better understand their requirements and address their needs.

Finally, showcasing project results contributed towards identifying challenges and opportunities for the biodiversity and agrifood sectors. The event also served as a vehicle for discussion on the reinforcement of start-ups and SMEs participation in EC-funded research and development projects. The main findings and recommendations that resulted from this discussion were presented in the deliverable. Based on the considerations above expressed, it can be affirmed that the event achieved all its expected and planned results also in terms of collection of requirements.

ANNEX 1 WORKSHOP AGENDA

Sunday, 29th May	Transport from Pisa to SIAF premises in Volterra
20.30	Meeting point at main entrance SCUOLA SANT'ANNA – Piazza Martiri della Libertà, 33 (bus reserved for the workshop)
Monday 30th May	**Floriddia Organic Farm** **...to each seed its soil, to each soil its seed....**
9:00-9:45	**Welcome** *Rosario and Giovanni Floriddia (host farmers)* **CAPSELLA's 1st workshop: major objectives and expected outcomes** *Paolo Bàrberi (SSSA) and Riccardo Bocci (Rete Semi Rurali)*
9:45-12:00	**Growing agro-biodiversity: a new paradigm** Practical field session The seeds: practice and experimentation on cereal genetic diversity in DIVERSIFOOD project The soil: practices for soil fertility assessment and preservation *Facilitators: Rete Semi Rurali & Esapoda* The legal framework on agro-biodiversity conservation and sustainable use *Riccardo Bocci (Rete Semi Rurali)*
13.00–14.30	**Lunch at SIAF**
	Fostering links between actors in agro-biodiversity_ Presentations and Q&A
14:30-15:05	**Conserving and using agro-biodiversity in organic farming: experiences from European agro-biodiversity-based farmers' networks** *Rete Semi Rurali, Red de Semillas, Aegilops, Esapoda, Ars Natura*
15:05-15:30	**Using data to support agro-biodiversity** *Panagiotis Zervas (Agroknow) and Andrea Galante (Primo Principio)*
15:30-15:50	**Arc2020: how consumers' networks can support agrobiodiversity and sustainable food systems** *Oliver Moore (Arc2020)*
15:50-16:10	**EU-wide data sharing and handling experiences** *Simona Mincione & Walter Meyer FOODIE (Farm-Oriented Open Data in Europe), Norma Zanetti (LinDaLinked Data & SDI4Apps) Projects*
16:15-16:30	**Coffee Break**
Time	***ICT solutions to support agro-biodiversity*** ***Joint discussion on requirements and needs***

16:30-18:00	Parallel round tables on: - Agronomic practices and farm management - The seed system: accessing, conserving, using and sharing seeds - Linkages to the supply chain (from farm to fork) *Facilitators: Sant'Anna School, Rete Semi Rurali, Red de Semillas, We Deliver Taste, Aegilops, Ars Natura*
18:00	**End of Day 1**
19:00	**Transport from SIAF to Volterra**
20.00	Dinner and sightseeing in Volterra
Tuesday, 31st May	***ICT solutions to support agro-biodiversity*** ***Joint discussion on requirements and needs...continued***
08:30-11:00	Parallel round tables on: - Agronomic practices and farm management - The seed system: accessing, conserving, using and sharing seeds - Linkages to the supply chain (from farm to fork) *Facilitators: Sant'Anna School, Rete Semi Rurali, Red de Semillas, We Deliver Taste, Aegilops, Ars Natura*
11:00-11:20	**Coffee Break**
Time	**Plenary session**
11:20-11:40	Synthesis of round tables discussions
11:40-12:00	Wrap up & Conclusions
12:00	**End of the Workshop**

ANNEX 2 WORKSHOP PRESS RELEASE

1st Workshop PRESS RELEASE

The CAPSELLA Project, launched on January 1st 2016 under Horizon 2020, will establish a Collective Awareness Platform for Environmentally-sound Land Management based on Data Technologies & Agrobiodiversity

22 February 2016: With over 77% of the European territory classified as rural (47% farmland and 30% forest) and around 12 million full-time farmers, agriculture is a vibrant and important sector of the EU economy and welfare. Agriculture and agri-food account for 6% of the EU's GDP, comprising 15 million businesses and 46 million jobs.

The European Commission has hugely invested in a Common Agricultural Policy designed to support farming, ensure food quality and safety and promote sustainable and balanced development across all EU rural areas. EU farmers have to face multiple challenges to meet increasing demands from consumers and the civil society. Besides their traditional role of food, feed and fiber producers, farmers are nowadays requested to provide other ecosystem services, such as the production of renewable energy, the conservation of the environment, landscape and rural cultural heritage, and the mitigation of climate change. There is increasing awareness that all these demands can be met by the conservation and wise use of agricultural biodiversity, or 'agrobiodiversity'.

To meet the present goals of EU agricultural and agri-food systems and to foster knowledge on the importance of agrobiodiversity among EU stakeholders and actors, the use of novel ICT solutions is key. Targeted ICT-based solutions can promote innovative, knowledge-intensive farming systems and methods based on the optimization of local natural resources and on reduced use of external inputs. On top of this, ICT can greatly contribute to closing the digital divide between urban and rural areas, thus creating a more inclusive society.

In this light, CAPSELLA is organizing its first workshop, on 30-31 May 2016 in Volterra (Pisa), Italy, aiming at bringing together Northern and Southern EU farmers to collect and understand their ICT needs and requirements. The event will try to answer and provide solutions to them, exchange best practices and use cases and pave the way to exchange knowledge and future collaborations around the theme of agrobiodiversity.

The event's vibrant environment will be a stage where farming communities with different background (such as conventional and organic) but sharing the interest in agrobiodiversity, will openly discuss and compare their points of view, where existing ICT tools will be presented to expose their benefits to farmers communities, and where the goals and activities of CAPSELLA will be presented. The workshop includes outdoor (in field) and indoor sessions, aimed to break the ice among participants and build a collaborative spirit.

Focus groups moderated by a facilitator will ensure a concrete exchange of opinions, knowledge and experiences, the effective collection of requirements by the networks and communities involved, and awareness raising on the importance of collecting and sharing open data and knowledge on agrobiodiversity, the benefits of co-designing ICT tools and of new products such as a cloud platform delivered by the CAPSELLA consortium at the end of the project.

The agenda is available on the CAPSELLA website (www.capsella.eu)