



## Case study reports: Serbia CS1



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# 1. Background

## Funding and Governance

This farm was interested in building relationship with BioSense Institute so established collaboration. After initial joint work both actors decided that sharing the knowledge on the farm will facilitate uptake of new technologies by local farmers so a set of events covering all important aspect of the productions of the farm were designed. The demonstrations are organised jointly by researchers of BioSense Institute and employees of the farm. The topics are chosen by research institute and then adapted to fit common practice at the farm. Both researchers and farmers take part in demonstrating. The demonstrations are self-funded.

## Actors and networks

The demonstrations at this farm are intended bring together end-users interested in utilising IT solutions in agriculture. Apart from researchers and employees' other local farmers and researchers are welcomed but also students and agriculture advisers.

## Event Farm and location

It is a private medium sized farm focused on arable crop production (i.e. corn, wheat, soybean, and oilseed rape, and barley, sunflower) and livestock (i.e. Pig husbandry). The farm owns 2325ha arable land (540ha irrigated) and big husbandry with more than 5000 pigs. The farm invested about 2.5Mil Euro in advanced farming technologies striving to adopt precision agriculture approach in its common practice. Acquiring and sharing knowledge related to technology use in agriculture is the main driving force while engaging with researchers on their premises. Notable effort is made in sharing experience and knowledge with local farmers therefore joint demonstrations are organised together with researchers.

## How it works

- Physical part in the fields of the company where many smart machines, tools and devices for precision agriculture are installed and fully operational in the real production environment – there are also thematic stands for face-to-face interaction with demonstrator and other participants
- Virtual part in the classrooms of BioSense Institute where instructions for using AgroSense digital platform is given
- The demonstrations were advertised as open farm visit on last Friday in the month (April-October) and the virtual part following on Saturday
- There is no limit in the number and profile of participants and the demonstration is free of charge
- A notable advertising effort is made to inform people about events

## Event Dates:

- **April 27, 2018:** LoRa system for communication with sensors and meteorological stations – continuous monitoring of the field conditions  
The basic idea behind the event was to introduce local farming community to new technologies in agriculture, both from the machine and IT/data points of view. There were 3 stalls in total. On the first one AgroSense, digital platform for farmers, was presented by researchers from BioSense institute, which is focused on the application of IT in agriculture. The platform itself is a useful and a highly practical tool for monitoring the production and gathering all the necessary information in one place. The second stall, also organised by BioSense was focused on sensory technologies and their integration into AgroSense web platform through modern LORA systems. There, BioSense's experts shared their experiences about using these technologies and along with agronomists presented the benefits these systems give. On the third stall, agronomists and farm workers presented new machinery they are using in their daily activities, such as tractors, combine harvesters and other equipment based on variable-rate technologies, which allows them to apply precision-agriculture principles and reduce costs, thus maximising the profit.
- **May 25, 2018:** Variable fertiliser – reducing fertiliser consumption and increasing crop yield

The demonstration included two themes: variable rate fertilisation and overview on AgroSense application. Variable rate fertilisation was described, and machine presented by end user. Also, real demonstration on pilot site was provided, which was highly appreciated by attendees of the demonstration event. Important aspects of profitability and environmental sustainability were discussed. BioSense researchers were responsible for demonstration of AgroSense applications. All segments: creating account, field annotation, entering data related to all aspects of crop production, available data on weather forecasts, satellite images and indices, as well as advanced concepts of rich spatial information in the form of soil conductivity maps, elevation maps and yield maps were explained.

About 30 participants attended the event.

Additional events planned in 2018:

- **June 29, 2018:** Satellite images in agriculture – detailed insight into the crops' wellbeing
- **July 27, 2018:** Soil moisture sensors and irrigation systems – choosing the right moment for irrigation
- **August 31, 2018:** Drones in agriculture – maps for variable fertilisation and yield assessment
- **September 28, 2018:** Yield monitors and grain moisture sensor – yield mapping, performance evaluation and recommendations for the next season
- **October 26, 2018:** Probe for measuring electromagnetic conductivity of the soil – management zone

## 2. Method

In line with the Methodological Guidelines, three main data sources are used: a background document and interviews at Programme and Farm level to analyse structural and functional characteristics, and event tools and surveys to analyse event level participation and learning, as follows:

1. A background document for every case study was completed by the AgriDemo-F2F partner who carried out the case study.
2. Interviews with representatives of programme/networks (level 1) and farm level interviews with demonstrators/hosts (Level 1) to reveal how the functional and structural characteristics enable learning. Analysis of these interviews is reported in Sections 3 and 4. Data is sourced from 1 interview at the farm level. The analysis followed 4 themes: (1) Coordinating effective recruitment of host farmers and participants, (2) Developing and coordinating appropriate interaction approaches, (3) Planning, designing and conducting appropriate demonstration processes, (4) Enabling learning appropriate to purpose, audience, context, (5) Follow-up activities.
3. Event tools and surveys (level 3) to reveal peer to peer learning processes. Event details and analysis is reported in Section 5. As there were two events held, the analysis is based on the following data. For the first event, data is sourced from 11 pre and post-demonstration participant surveys, post event surveys with 4 demonstrators, post-demonstration interviews with 2 host farmers and an event observation tool completed by an observing researcher. For the second event, data is sourced from 8 pre and post surveys for participants, 1 pre and post survey for demonstrators, post-demonstration interviews with 1 host farmer and an event observation tool completed by an observing researcher. This data is mainly used for the analysis of learning processes and learning outcomes related to the specific event and overall comments on the effectiveness of the event. The analysis followed 5 themes: (1) Coordinating effective recruitment of host farmers and participants, (2) Developing and coordinating appropriate interaction approaches, (3) Planning, designing and conducting appropriate demonstration processes, (4) Enabling learning appropriate to purpose, audience, context, (5) Follow-up activities.

Finally, partners reviewed the case study reports to prepare their workshops with different stakeholders related to the case studies. These workshops aimed at validating the data presented in the case study reports and to discuss on key characteristics related to effectiveness of demonstrations. A workshop with Serbian case study partners will be held around January 2019.

### 3. Structural Characteristics

#### T1: Programme/network level

##### 1. The main organisations involved in the demonstration activities and their roles:

###### *BioSense Institute researchers role*

BioSense Institute's researchers are responsible for the design, coordination and organisation/development of the demonstration, the topic selection and the timing proposition. They act also as demonstrators, as well as facilitators during demonstration events. For some of the above-mentioned functions (see below section on farm employees roles), BioSense Institute's researchers are collaborating with farm employees (demonstration, planning and organisation, timing etc.). However, the BioSense Institute seems to have the main responsibility for the demonstration events.

R: How is the demonstration organised? Who coordinates and who decides when the demo will take place? R: This is mainly done by BioSense Institute. The researchers proposed topics and we agreed...The demonstration at our farm is designed by BioSense Institute researchers. We added the part regarding use of equipment that support precision agriculture concept. ..Researchers from BioSense and farmers designed demonstration and advisers were guests... (Farmer).

###### *Farm employees' roles (experts, workers, agronomists etc.)*

Employees and the host farmer (farm's director) after consultation with the BioSense Institute, are responsible for the timing of the event, to be in line with field activities. In that way, the proposed timing of the event can be changed by farm members. The farm does not have any responsibility as far as the topic selection is concerned (the BioSense Institute selects the topic), but they act complementary on the topic presented, showing how these practices work in their field. The farm does not organise any formal demo on its own, but it is often visited informally by farmer colleagues.

R: Researchers from BioSense Institute proposed topics and we were consulted on timing of the events.... The time for some topics was changed following suggestion so the topics are presented in line with field activities. Yes, institute proposed and then we adapted to be in accordance with field activities. Q: Did you ask for having some topics that are of your direct interest? R: No but we realised that there are some useful information for our own practice. (Farmer).

R: The main topic on the last event was LoRa and meteo measurement but in addition to this we set a stand to show how this technology works in the field.

Q: So this is your practice in the field? R: Yes exactly we were thinking how be complementary to what the institute presents. (Farmer).

R2: Did you informally organised something for farmer colleagues? R: No, we did not organise, but some colleagues visited us to see our machinery. (Farmer).

On the other hand, people from BioSense institute are inspired of and/or include tools and approaches from the farm when designing a demo.

After first meetings with farm employees, we realised that they use different ICT tools for which BioSense has knowledge and different approaches. Then we listed a number of segments that are connected so that full picture of application of ICT in agriculture could be covered. (Someone named Oskar from the Farm Level Interview-he told only that-must be from BioSense-Need for clarifications).

The farm is divided into separate departments (arable crop production, machinery department etc.). Depending on the topic the institute suggests, more suitable/ experienced employees, i.e. those with more knowledge on the topic, communicate with the institute regarding all aspects of organising and developing the demonstration event (Farmer). Then, agronomists of the farm, farm workers as well as all farms'

departments work together for the organisation of a demonstration event. (Observation tool +Farm Level Interviewee).

Q: Ok, and who in the farm is responsible for demonstrations? What position is in charge for this? R: I am responsible for agrotechnics so I communicate with the research institute regarding all aspects of organising demonstration event. I am responsible for data collection and planning. Q: It looks like the person with most knowledge on the topic liaises with the research institute? R: That's right! Q: Who else is included? R: Chief of arable crop production and Chief of machinery department....Q: It looks like all structures are involved? R: This is team work and basically how the responsibility in common work is divided in demonstration as well. (Farmer).

The farm level interviewee works at the farm, as expert in precision agriculture. Technically he was the direct organiser of both events (25-04 and 27-04), always in collaboration with BioSense (Personal communication with national research). For the two events, he was responsible for data collection and demonstration planning. Although he had some organisational responsibilities for the events, he stated that he is not involved in the overall development of demos at the overall programme level (Farmer).

Finally, both BioSense researchers and farm employees take part in demonstrating topics during events. Five demonstrators in total took part at the two demonstration events. Three of them were BioSense researchers and two employees (Pre survey demonstrator 27-04 and 27-05).

#### *Advisers*

The farm makes use of advisers' support, especially those who are experienced in a specific issue. It seems that the farm is mainly supported by researchers than advisers. At the demo events, advisers are present, but as available data indicate, it seems that they don't have an active role, as they are mainly involved in disseminating leaflets and/or preparing posters used during the events.

The farm for example collaborates with several advisers each with expertise in different agrotechnics... Researchers from BioSense and farmers designed demonstration and advisers were guests. ...Advisers provided printed material with info on how to apply variable treatments .Q: Did you ask them to prepare this material for this demonstration? R: No, this is prepared earlier... (Farmer).

Posters from advisers and leaflets introducing digital farm concept and AgroSense web based platform for collecting data and assessing satellite products for given field (Observation tool 27-04).

#### *The director of the company/ host farmer*

The director of the company is the owner of the farm. He collaborates with the chiefs of each department and holds a consulting role on their proposals concerning the organisation of each event. During the two demonstration events (27-04 and 25-05), the host farmer, apart from technical assistance to organise and set the location, he has also demonstrated how the presented technology is used in the farm (Observation tool 27-04 and 25-05).

R: Chief of arable crop production and Chief of machinery department. We always consult the director but he usually agrees with what we propose. (Farmer).

#### *Target Audience/type of participants (not an actor).*

The demonstrations on the farm intend to bring together end-users interested in utilizing IT solutions in agriculture. It seems that the demo audience of this farm does not have any active role at any demonstration function and/or organisation. This was the case in both demonstration events occurred of 25-05 and 27-04, in which participants (farmers, advisers, researchers etc.) did not involve in the overall development of this demonstration (Post survey demonstrator1).

The attendees of demonstration events are generally local farmers, high school students, farmers that use the new tractors with GPS, researchers (apart from BioSense ones) and advisers. There is no typical profile of the demonstration attendees. Big regional producers (who are owners of a farm at least of the size of the demonstration farm) do not come to demonstration events, even though this is desirable. A notable advertising effort is made to inform people about events.

In our region there are only small farms. We have tried to contact them and call them and some did come for the first opening event but mainly small farmers and some high school students from the region come... Nowadays almost all new tractors have GPS so when colleagues buy it they want to know what can be done with it and how.... The bigger farms are the more difficult is to attract farmer because they have their own approach to lead business. Q: And how efficient were you in attracting big producers? R: None from big regional producers came. (Farmer).

Apart from researchers and employees, researchers are welcomed but also students and agriculture advisers. (Background info)

Sometimes demonstration participants are targeted. R: Sometimes they are. BioSense Institute advertised events and we are in contact with local input provider who shared his database of contacts. (Farmer)

At the event took place at 25/05/2018 the group size was 30 persons. The announcement of the event through diverse channels brought a mixture of attendees encompassing farmers, students and professors of agriculture (Observation tool 25-05). All participants interviewed (n=4) worked in the local area (3 farmers, 1 student) (Pre participant survey).

Participants of the 25-05 demonstration were targeted, as invitations have been sent to potential end-users of the AgroSense app (i.e. farmers, students and professors of Faculty of Agriculture). Despite this, advertisement for the event was spread publically, so everybody who wanted could attend. According to the same person, the targeted invitations, for potential users of the application, added on the effectiveness of this demo-event. (Post survey demonstrator 1)

At the event took which took place on 27-04 the group had 50 participants (Observation tool 27-04). Again, different communication channels were used and brought diverse attendees encompassing agriculture technicians, economist, engineers of agriculture, farmers etc. Two out of eleven participants work in the region close to the farm and 9 out of 11 reported that they were coming from far away (Pre participant survey demo 27-04).

The participants of the 27-04-2018 demonstration were not targeted according to 3 out of 4 demonstrators (1 answer is missing). In that way, it was possible for everyone who wanted to participate to take part in the demonstration according to these 3 demonstrators (Pre survey demonstrator). Finally, according to one demonstrator there were problems with transport of participants to the event, thus, some participants were not able to attend (Pre survey demonstrator 27-04).

## 1. Networks

The demo farm is neither part of a bigger agricultural network, nor is connected with other farms in the frame of a demo program. The farm cooperates regularly with BioSense. Occasionally, the farm collaborates with other institutions, as for instance in the case of a one off event which has been organised by FAO representatives in Serbia in the farm. Moreover, input providers of the farm, organise field days at other farms, in which employees sometimes are also invited.

R: Our suppliers invite us regularly to such events. From time to time we attend.

Q: Did you host other demos apart from these with BioSense Institute? R: Yes, for example last November there was event organised by FAO representatives in Serbia. (Farmer).

The owner/director of the farm and the Farm level Interviewee, responsible for the organisation of the events in collaboration with BioSense, did not indicate if they are participating at farming networks and/or

programmes (Post host farmer interview 27-04). In addition, no one from the demonstrators, were part of a network (Pre demonstrator survey 25-5 and 27-04).

## 2. Funding arrangements

There is no data concerning any kind of funding and/or compensation for the demo activities. The demonstrations seem to be self-funded. However, it seems that demo expenses are not a big issue and pose no risk for the sustainability of the planned events.

Q: There are expenses for all demonstrations. Who takes care of this for this farm? How do you cover expenses?" ... R: The expenses are minor, we bought some tents and we provide drinking water....Finances pose minimal risk for sustainability. (Farmer)

## 3. Human Resources

The employees of the farm seem to have an empirical approach concerning the role of demonstrator. They have not received any formal training in order to be demonstrators. From the five demonstrators in both events, 3 of them did not answer if they have received any training for being demonstrator; the rest reported they have not received any training in order to be demonstrators. (Pre survey demonstrator 25-05 and 27-04).

Q: This is not asked but I am interested to know what do you think to what extent your demonstrator are in line with numbered here? R: We can certainly do better. We are not educated demonstrators so we learn by try and error. (Farmer)

Four out of five demonstrators agreed/or strongly agreed that they could benefit from some extra training as a demonstrator. (Post survey demonstrator 25-05 and 27-04).

## 4. The decision-making process in organising demonstrations

According to the roles already described for each actor the entire approach followed seems to be mainly top down, with the BioSense Institute being the main actor concerning most of demo functions. However, there is a good cooperation and understanding between BioSense and employees. Employees act complementary but also actively in the frame defined by BioSense Institute. Additionally a top-down approach is followed towards demo-participants.

Q: Why like this? Is the approach directed by research institute? R: Participant do not have experience in precision agriculture so just displaying is already enough. (Farmer)

## 5. Goals and objectives

Acquiring and sharing knowledge related to the use of technology in agriculture is the main driving force that guides researchers' engagement (Background info), while the goals of the farm are to continue their good collaboration with BioSense Institute. An important goal is also to find partners that also apply precision agriculture in their practices, for knowledge sharing and evaluation of relevant practices etc. Notable effort is made in sharing experience and knowledge with local farmers, therefore joint demonstrations are organised together with researchers.

R: We are honoured to organise this kind of events. We want good and long term collaboration with BioSense Institute. And finally we hope to get known new partners interested in precision agriculture so we could together develop this topic (Farmer).



## T2: Farm (event) level

The farm is a private medium sized commercial farm, focused on arable crop production (i.e. corn, wheat, soybean, and oilseed rape, and barley, sunflower) and livestock (i.e. pig husbandry). The farm owns 2325ha arable land (of which 540ha irrigated) and pig husbandry with more than 5000 pigs. The farm invested about 2.5Mil Euro in advanced farming technologies striving to adopt precision agriculture approach in its farming practices (Background info + Post host farmer interview).

The farm organises several events per year in order to achieve an efficient knowledge transfer, to as many as possible farmers. Seven demonstration events in total have been organised as open farm visit on last Friday of the month (April-October 2018) this year and the virtual part following on Saturday. Additionally farmers can visit the farm upon request. Finally, farmer visitors can have an idea of the major agrotechnical operations of the farm, through the Digital farm.

The idea with Digital Farm here at the farm is that anyone interested could come at any time and see what does it mean and learn something of interest. But we were aware that it is not feasible to have someone from the institute available every day so we think this is good alternative to cover major agro technical operations. (Farmer)

Multiple events seem to facilitate farmers' uptake of new technology.

"..One participant from the first demonstration approached to us recently asking for meeting to discuss on what he was able to see during demonstration. (Farmer)

Two events took place on the farm, one on 27th of April 2018 and a second on 25<sup>th</sup> of May 2018.

### Event of 27th of April 2018

The demonstration event took place on 27th of April 2018. The basic idea behind the event was to introduce local farming community to new technologies in agriculture, both from the machine and IT/data points of view (Observation tool 27-04).

#### 1. Practice/technology demonstrated

**Topics:** Precision Agriculture

- 1) AgroSense, digital platform / application of IT in agriculture.
- 2) Sensory technologies and their integration into AgroSense web platform through modern LoRa systems. (LoRa system for communication with sensors and meteorological stations – continuous monitoring of the field conditions)
- 3) Demonstration of new machinery used in farms' daily activities: tractors, combine harvesters and other equipment based on variable-rate technologies (Observation tool).

#### 2. Organisation, actors and roles (event-level)

The event has been organised with joint efforts from farmers and researchers. There were 3 stalls in total. A farmer employee or a researcher from BioSense hosted participants in each stand and facilitated knowledge exchange and interaction. The researchers from BioSense guided questions and discussion both as demonstrators and as assistants to farmer in his presentation. The participants gathered around the station that displays technology or machinery of their interest, where demonstrators presented what was displayed (technology and benefits) and encouraged participants to ask questions and discuss options for using given technology (Observation tool).

The host farmers displayed the on farm use of presented technology. Finally, posters and leaflets introducing digital farm concept and AgroSense web based platform were distributed by advisers (Observation tool).

On the first stall, AgroSense, researchers from BioSense institute, presented a digital platform for farmers, which is focused on the application of IT in agriculture. The platform is a highly practical tool for monitoring the production and gathering all the necessary information in one place. (Observation tool).

The second stall, also organised by BioSense focused on sensor technologies and their integration into AgroSense web platform through modern LoRa systems. There, BioSense experts shared their experiences about using these technologies and along with agronomists presented the benefits these systems offer. (Observation tool).

On the third stall, agronomists and farm workers presented new machinery they are using in their daily activities, such as tractors, combine harvesters and other equipment based on variable-rate technologies, which allows them to apply precision-agriculture principles. Agricultural machinery displayed in field by the host farmer (Observation tool).

### 3. Event Farm location and layout (size and design of test area)

According to the farm level interviewee, demonstrations on this farm are exemplary, although he thinks that, a mixture of exemplary and experimental approaches is more preferable. Additionally the demonstrations provided by the farm are mainly single focus (Farmer).

There is no consensus between demonstrators if the demonstrations follow a whole farm approach or rather a single focus approach.

The event of April 27 was exemplary according to 2 out of 4 demonstrators (more specifically the two researchers), while the two demonstrators from the farm, classified the demonstration as mixture of exemplary and experimental approach (Post survey demonstrator 27/04). No comparative layouts (strips or plots) were showcased in the farm. The performance of the sensors and their wireless connection were displayed in the test plot sized 30mx30m. (Observation tool 27-04).

### 4. Timing

The demonstration event took place on 27th of April 2018.

Participants communicated the need for a better timing in order to be free from their occupations (Pre participants survey 27-04). In the same vein, according to the observation tool, another time should be chosen for the next demonstrations (perhaps on weekends) to facilitate farmers' attendance.

### 5. Frequency

The demonstration organises a series of demonstrations events (as the two events at 27-04 and 25-05) in order to better cover a range of topics of precision making. (Observation tool 25-5 and 27-04).

Both post host farmers interviewees did not answer how often they organise demonstration events during a year period.

### 6. Farm infrastructures and/or arrangements

This farm offers some arrangements when holding an event, like tents for shading and drinking water. In order to be more efficient in demo delivery, the farm is planning some improvements in the near future, by offering for instance food and transportation for potentially interested farmers. (Observation tools 27-04 and 25-05).

Both post host farmers interviewees did not answer if they made any arrangements to host the event at 27-04 (accommodation, catering, etc.)

## 7. Farms accessibility

Travel time of farmers to reach the demo farm, ranged from 10 to 220 minutes. Except for two participants whose trip lasted 120 and 220 minutes, the rest of participants travelled an average time of 35 minutes. Four out of 11 participants interviewed have rated their travel effort to participate as rather easy, 3 out of 11 as of medium effort and 4 out of 11 as difficult or rather difficult. Participant comments concerning the travel effort referred either to the long travel or problems with the timing of the event (which coincided to a busy periods in their farms). (Pre participants survey 27-04).

## 8. Fees for participation

There are no fees for participation at this demonstration event. Moreover the participants were not financially compensated somehow to attend the demo (Post participant's survey 27-04).

### Event of 25<sup>th</sup> of May 2018

#### 1. Practice/technology demonstrated

**Topic:** Precision Agriculture

- i) Variable fertilisation- saving fertiliser and increasing yield) (Observation tool)
- ii) Overview of AgroSense application (creating account, field annotation, entering data related to all aspects of crop production, available data on weather forecasts, satellite images and indices, as well as advanced concepts of rich spatial information in the form of soil conductivity maps, elevation maps and yield maps were explained) (Background info + Observation tool)

#### 2. Organisation, actors and roles (event-level)

The demonstration has been organised jointly by experts of the farm and BioSense researchers. The variable rate fertilisation was described by a BioSense researcher and machinery was presented by the host farmer. Two stations were organised displaying agricultural machinery of variable ratio fertiliser machine that can be used for precision agriculture. Real demonstration of the machinery, on pilot site was provided to demo attendees from host farmer (machinery user. (Observation tool + background info).

Moreover, BioSense researchers were responsible for the demonstration of AgroSense applications. AgroSense application was showed to the attendees of digital farm event. (Observation tool + background info).

The participants gathered around the stand/station that displayed the technology or machinery of their interest. Employees and researchers from BioSense hosted participants in each stand and facilitated knowledge exchange and interaction. BioSense researchers guided questions and discussion both as demonstrators and as assistants to the farmer's presentation. The demonstrator presented what was displayed (technology and benefits) and encouraged participants to ask questions and discuss options for using given technology (Observation tool + background info).

#### 3. Event Farm location and layout (size and design of test area)

According to the farm level interviewee, demonstrations held at this farm are exemplary. Nevertheless, he has pointed out that, a mixture of exemplary and experimental approaches would be more preferable. Finally, the demonstrations provided by the farm are mainly single focused (Farmer).

"This is my opinion but it is based on my experience from attending field days where I have noticed that farmers are interested to see experiments and to compare the results." (Farmer).

The event occurred in 25/5/2018 was also exemplary. The performance of variable ratio fertiliser machine was displayed in the field, with a possibility to run the machine on a test plot sized 100m x100m. No comparative layouts (strips or plots) are used in the farm (Observation too + Post survey demonstrator<sub>1</sub>).

The demonstrator of the 25-05 event stated that he aimed to apply a 'whole farm approach' during the demonstration, rather than showing an isolated topic/technique (Post demonstrator<sub>1</sub>). Thus, in cases, even if at the farm level a single focus is indicated, individual events may also share notions of a whole farm approach.

#### 4. Timing

The demonstration event took place on 25th of May 2018. The timing of a demonstration event is an issue of great importance, as non-appropriate timing is a major obstacle for attending. The appropriate timing is pointed out, as the most effective way of attracting participants.

The first event in this season was during sowing campaign so this was major obstacle. Seasonal tasks on own farm are priority... after these events we discussed how to approach and we think of scheduling event in less busy period. (Farmer)

#### 5. Frequency

The demonstration organises a series of demonstrations events, in order to better cover the field of precision agriculture. The 25-05 demonstration is one of a series of events covering a range of topics (Observation tool 25-05).

Q: it is obvious that there are series events for different topics which should cover overall field of precision agriculture at this farm. (Farmer)

R: Would not be easier to have it once a year instead seven times in a year?

R: It would be easier but would not be efficient for knowledge transfer and to enable more farmers attend. (Farmer)

#### 6. Farm infrastructures and/or arrangements

The farm offers some arrangements when holding an event, like tents for shading and drinking water. In order to be more efficient, the farm is planning for some improvements in the near future, i.e. to offer food/catering and to organise transportation to the farm.

R: The expenses are minor, we bought some tents and we provide drinking water. (Farmer)

R: "...what is the most effective way of attracting participants and advertising events? R: we discussed how to approach and we think that besides scheduling event in less busy period we should provide some food during event and maybe organise transport. (Farmer)

#### 7. Farm's accessibility

Travel time of farmers to reach the demo farm, ranged from 30 to 45 minutes, with an average time close to 36 minutes. All participants interviewed (n=4) have rated their travel effort to participate as rather easy (Pre participants survey 25-05).

#### 8. Fees for participating

There are no fees for participation at this demonstration event. Moreover, the participants were not financially compensated somehow to attend the demo (Post participant's survey 25-05).

## 4. Functional characteristics

### T1: Coordinating effective recruitment of host farmers and participants

#### 1. Incentives

The farmer did not mention any particular incentives associated with hosting demonstrations.

#### 2. Motivations for host farmers

According to the Farmer, the key motivation for running demonstrations was to develop links and a working relationship with the BioSense Institute. In addition, they wanted to use the demonstration as a platform to find partners also interested in precision agriculture.

We hope to be able to draw conclusions on what we do well and what not (Farmer)

The Farmer felt 'honoured' to be involved in offering these kinds of demonstrations events; this reflects how running demonstrations is a prestigious activity to be involved in.

We are honoured to organise this kind of events. We want good and long term collaboration with BioSense Institute (Farmer)

#### 3. Motivations for participants

The Farmer claimed to be motivated by a desire to demonstrate innovations in farming – particularly in relation to precision farming. He also valued the opportunity to share his story to help other farmers overcome problems he had experienced.

This what we show is new farming approach. Most farmers heard about precision agriculture and only some had attempts into. Nowadays almost all new tractors have GPS so when colleagues buy it they want to know what can be done with it and how. Also there was an example of colleague that asked how to overcome some problems that he faced. And I noticed that the problems are similar to those that we had when started.

Participants attending the first event stated that their main reasons to attend were: Improvement in agriculture production; Self-improvement; Improvement of knowledge; Introduction to new technologies.

Participants attending the second event stated that their main reasons to attend were: To learn something new and to improve business of my farm; education; to hear more about variable fertilising; I am interested in digital technologies in agriculture; New knowledge Improvement of knowledge and practice.

#### 4. Advertising and recruitment

The demonstrations are advertised in a conventional way, via BioSense and through a database of contacts.

BioSense Institute advertised events and we were in contact with local input provider who shared his database of contacts.

### T2: Appropriate demonstration and interaction approaches

#### 1. The nature of interaction

The Farmer described the events as 'Entirely top down'; he suggested that this was because the demonstrated activity was basic and largely entry level, so there was little to diversify away from topic-wise.

## 2. Involving farmers in the learning process and the demonstration programme

The Farmer claimed the farm demonstration is designed by BioSense researches in conjunction with themselves at the farm. The design of demonstrations did not extend to participants.

## 3. Focus and Design

The Farmer described the demonstrations he provides as 'Single focus', and 'Experimental' in nature. He expressed a preference for an approach that would fall between 'Exemplary' and 'Experimental'. He claimed this stance was from his own experience of attending more experiment-oriented approaches – which allowed him 'to see experiments and to compare the results'.

## 4. Group size

According to the Farmer, approximately 100 people was desirable for demonstrations on precision farming techniques. This number, he felt, it struck a good balance between allowing maximum people to attend, and also engage with questions and answers.

About 100 people for this kind of demonstration. This would allow more people participate while we will still have possibility to answer all questions.

## T3: Enabling learning appropriate to purpose, audience, context

### 1. Facilitating interaction and learning: structure, content and techniques

The farmer emphasised the importance of being outside and in the fields for the discussions/presentations. He added that there was some benefit in allowing participants to visit 'stands' or 'stations' in their own time.

Presentation directly in crop fields would be good but stands were also effective as people can decide for which topic to spend the most time.

In terms of the content, the farmer recalled how the use of drone imagery in combination with machinery exhibitions are particularly effective. He also noted how discussion and interaction were intensified when participants were split into smaller groups.

Presentation of drone imagery and display of machines were the most attractive and raised the most intensive discussion.

Also it was obvious that there was more discussion and more interaction with farmers when they split into groups.

Interestingly, the Farmer claimed the demonstrations did not aim to make recommendations to participants on how to do things – out of fear of being 'pushy' – but instead showed participants, impartially, how to do things. There are important implications here for participant learning; by leaving it up to participants to decide what might work for them and how they might apply techniques or approaches, it is allowing them to take ownership of their learning.

Interviewee: Do you give recommendations?

Farmer: We have discussed this earlier and there is agreement that we do not want to be pushy so we show what we do and if someone thinks it is OK, they can implement.

In addition to the use of drone imagery, the Farmer noted how they prepared take-home leaflets for participants. This is quite a traditional and standard approach to the use of materials.

We prepared and disseminated two types of leaflets, one for AgroSense app and one that describes digital farm and what it means.

The Farmer ranked the ability for 'Participants to ask questions and talk openly' as the most important characteristic of a demonstration event. Rather than justifying this as an opportunity for learning or knowledge exchange, he cited that time built in for questions and discussions meant it prevented participants interrupting the proceedings.

We noticed that it is not interesting enough when demonstrator just gives presentation. Participant always tend to interrupt and ask questions.

## 2. Taking into account variation in learning

The Farmer claimed he did not take into account variation in learning types, attributing this to not knowing participants until they arrive on the day.

We did not prepare to variation in learning capacities as we did not know until the last moment who will attend.

### T4: Effective follow-up activities

#### 1. Follow-up activities and materials

The Farmer claimed that he did continue to engage with participants after the event. However, this seemed to be on an ad hoc informal basis, as opposed to anything more structured.

One participant from the first demonstration approached us recently asking for a meeting to discuss what he was able to see during demonstration

He noted that all materials used during the demonstration continued to be available for participants, after the demonstration.

#### 2. Assessing impact

The Farmer did not attempt to assess the impact of his demonstration events amongst participants, nor in the wider farming community.



## 5. Event analysis: effective peer learning characteristics - Event of April 27<sup>th</sup>, 2018

### Event details

The group consisted of 50 participants. 11 filled in the pre and post surveys. 4 pre and post surveys were filled in by demonstrators.

	n° surveys	Agricultural technician	farmer	Engineer	MSc economy	unknown
<i>occupations</i>	11	4	2	2	1	2
<i>working area</i>	10					
<b>local area</b>	2			2		
<b>not local area</b>	8	4	2		1	1
<i>gender</i>	10					
<b>male</b>	8	2	2	1	1	2
<b>female</b>	2	2				
<i>age</i>	5					
<b>18-30</b>	3	2	1			
<b>31-40</b>	1			1		
<b>41-50</b>						
<b>51-60</b>	1		1			

### T1: Learning processes

#### 1. Communication initiation by participants

When in the whole group between 10% and 50% of the participants (10 people) had no problem sharing their knowledge and/or experiences related to the topic. The group consisted of both experienced and novice farmers. Mainly those experienced were willing to share their ideas. The size of the groups did not change notably as participants gathered around stands in smaller groups. There was a lot of time for questions, about 30% of the total time. A lot of questions were asked, but there were people that asked more than 10 questions while some did not ask a single. There were a few participants trying to formulate their own points of view regarding the topic.

	participant answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
I had the feeling that I could share my own knowledge as relevant information.	0	0	7/11	4/11	0
I asked at least one question during the demonstration .	9/11 yes				
I shared my own point of view at least once during the demonstration.	9/11 yes				
I felt encouraged to ask questions during the demonstration.	0	1/11	6/11	4/11	0
When there were any discussions, I felt comfortable sharing my opinion.	1/11	0	4/11	6/11	0

	demonstrator answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
I asked participants to share some of their own background knowledge during the demo.	0	0	2/4	2/4	0
I encouraged the participants to formulate their own point of view during the demonstration.	0	0	2/4	2/4	0
I encouraged the participants to formulate questions during the demonstration.	0	0	1/4	3/4	0

## 2. Interactive knowledge creation

### *Hands-on opportunities and other multi-sensorial experiences*

A hands-on activity was demonstrated taking enough time, so it was clear to every participant. The demonstrator showed how measurements of the NDVI could be performed with hand health spectrometer and how the data stored into mobile device can be stored and retrieved for later analysis. Participants could take part in a hands-on activity, and got some sort of feedback on their doing. Participants could engage with different sensors and see exactly how they work. For example the soil moisture sensors were installed and participants were asked to water the soil and observe change in the measurement values.

Participants were able to hold components of LoRa system in their hands and see how attaching sensors to plants work. Also they were able to sit in machinery.

### *Discussion opportunities and negotiating conflicting points of view*

The researchers from BioSense guided questions and discussion both as demonstrators and as assistants to the farmer in his presentation.

Open discussions between a few participants were stimulated and took up about 20% of the time. There were for example discussions about replacing old wireless technology with LoRa. Shared critical points of view were clarified/rephrased so more people could understand. Pros and cons of various technologies were shared. Users' perspectives on this were shared.

	participant answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
In my opinion, <b>there were interesting discussions</b> during the demonstration.	0	2/11	4/11	5/11	0
If participants <b>didn't agree</b> with each other during discussions, somebody (demonstrator/other participant) <b>tried to reach a consensus</b> between them.	1/11	4/11	6/11	0	0

	demonstrator answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
In my opinion, <b>there were interesting discussions</b> during the demonstration.	0	0	1/4	3/4	0
If participants <b>didn't agree with each other during discussions</b> , somebody (me or somebody else) <b>tried to reach consensus</b> between them.	0	0	2/4	1/4	1/4

### 3. Engagement during the event

Participants all seem to know each other well, but are not close friends. The participants showed interest in problems and motivation of others to attend this demonstration. All were opened to share their experience linked to topics presented during the demonstration.

	participant answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
I felt actively involved during the whole demonstration process.	0	1/11	6/11	4/11	0
I felt like the demonstration increased my ability to rely on myself as a farmer.	0	1/11	8/11	2/11	0
I could relate well to other participants (because they have an agricultural background similar to mine).	0	3/11	4/11	4/11	0
A lot of the other participants are part of the same farmer network as me.	1/11	1/11	5/11	4/11	0
I felt like I could trust the knowledge of (most of) the other participants.	1/11	1/11	4/11	5/11	0
The demonstration felt like an informal activity to me.	1/11	2/11	7/11	1/11	0
I thought the host farm was comparable enough to my own farm.	0	4/11	5/11	2/11	0
I had the feeling the demonstrator was like one of us.	1/11	3/11	3/11	4/11	0
I had the feeling I could trust the demonstrators knowledge.	0	2/11	7/11	2/11	0
I got along very well with the demonstrator.	0	3/11	4/11	4/11	0

	demonstrator answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
Were participants (farmers, advisers, researchers etc.) involved in the overall development of this demonstration?	2/4 yes, 2/4 no				
Most of the participants were well known to me.	1/4	1/4	2/4	0	0
A lot of the participants are part of the same network as me.	0	2/4	2/4	0	0
The demonstration felt like an informal activity to me.	0	0	3/4	1/4	0
I think the host farm was well suited for this demo.	0	0	1/4	3/4	0
I got along well with the participants.	0	0	1/4	3/4	0

## T2: Learning outcomes

Explained knowledge was sufficiently understandable. Sensor networks were explained by referring to all components but also by referring to farmer, market and environment perspective. Practical skills were not sufficiently addressed to foster maximum uptake by participants. Presented technology was not intended for active use but rather for monitoring purposes. The host was not willing to allow test drive of machinery but displayed under supervision most of the options the systems provide. Common methods or ways of thinking on farming were questioned and alternatives were shortly elaborated on in group. The observation versus sensor based measurements were questioned, the importance of data evaluation was questioned and using math rather than common sense. Common methods or ways of thinking on learning were not questioned.

	participant answers				
What would you <b>ideally like to learn</b> today?	How to be able to get farmland besides big farming companies; GPS systems; New technologies; To drive a tractor and new mechanization.				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
The <b>demonstration met my expectations</b> regarding what I wanted to learn.	0	3/11	5/11	3/11	0
The <b>demonstration exceeded my expectations.</b>	2/11	3/11	4/11	2/11	0
I <b>felt surprised</b> at some point(s) during the demonstration.	1/11	2/11	5/11	3/11	0
I <b>obtained a clearer understanding</b> of the topic(s) demonstrated.	0	1/11	6/11	4/11	0
I have the feeling I <b>learned something new</b> (knowledge, skill, practice, etc.).	0	0	6/11	5/11	0
I <b>thought about how I could implement</b> some of the ideas and practices on my own farm.	2/11	2/11	4/11	3/11	0
I <b>reflected on my own point of view</b> at some point during the demonstration.	0	4/11	5/11	2/11	0
I learnt about <b>the principles underlying a practice.</b>	1/11	2/11	8/11	0	0
I thought about <b>how we learn something new</b> on demonstrations (e.g.: teaching methods).	1/11	2/11	5/11	3/11	0
I thought about <b>why</b> I want to learn about <b>the topic(s) of this demonstration.</b>	0	1/11	7/11	3/11	0

	demonstrator answers				
what do you <b>intend for the participants to learn</b> today?	To use the AgroSense platform and understand available satellite images; What benefits could be expected from the introduction ITC I am experienced with into agricultural practice.				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
I think <b>participants have learnt</b> what I intended them to learn.	0	0	2/4	2/4	0
I tried to <b>surprise</b> participants with uncommon/new knowledge/new skill.	0	0	2/4	2/4	0
I <b>felt surprised</b> at some point(s) <b>myself</b> during the demonstration (e.g. by a question or discussion).	0	0	2/4	2/4	0
I <b>obtained a clearer understanding</b> of the topic(s) myself.	0	0	2/4	2/4	1
I have the feeling I <b>learned something new</b> during this demo (from participants, discussion...).	0	0	3/4	1/4	0
I <b>reflected on my own point of view</b> myself at some point during the demo.	0	0	1/4	3/4	0
I encouraged participants <b>to reflect on their own point of view</b> during this demo.	0	0	2/4	2/4	0
I encouraged participants <b>to reflect on their own situation</b> sometime during this demo.	0	0	0	4/4	0
I encouraged participants to <b>reflect on how we learn something new</b> on demonstrations.	0	1/4	2/4	1/4	0
I encouraged participants <b>to reflect on why we are trying to learn</b> about the topic of this demonstration	0	0	2/4	2/4	0

### T3: Overall comments on the effectiveness of the event

#### *Participants:*

With an average of 3,9 on 5, participants rated the event overall as effective. Everyone would recommend the demonstration. They stated as most effective characteristics of the event: Introduction of something new; the demonstrators and their willingness to respond to questions; it widened my knowledge.

Suggestions for improvement included: Help young farmers which are eager to work; invite more researchers to give presentation; more focus on practical skills; more modern mechanisation should be available.

#### *Demonstrators:*

The demonstrator reported 'direct interaction with equipment' and 'contact between experienced farmers and engineers that all look into the common problems from different angles' as the most effective characteristics of the demonstration. They also added that 'participant had direct insight into how proposed solutions can be applied in common practice.'

As points of improvement, they reported: testing the equipment in the field; define step-by-step guideline that farmer should follow in order to implement new technologies into common practice and the outcome of ICT implementation should be clearly emphasised.

#### *Observed main strong points of the event:*

The main strong-point of the demonstration event was that the participants could receive limited hands-on experience about new technologies and discuss various issues with experts. The discussion was very productive. The way that it was organised allowed participants to ask as many questions as they needed and get in-depth knowledge about the themes covered by the event. Also, the event was organised with joint efforts from farmers and researchers. As a result, the topic was presented both from the researchers' side (optimistic) and from end users side (realistic).

Some participants travelled as much as 4 hours to reach the demonstration farm and they found that the visit was definitely worth it.

In my view, the demonstration activity was very successful. It enabled introduction to novel and cost saving technology. Also the demonstration event enabled discussion between farmers and researchers and between farmers.

#### *Observed main improvements:*

Perhaps some form of transport should be organised for potentially interested farmers, or another time should be chosen for the next demonstration (weekend perhaps). Also, more practical work where participant can have direct experience on using presented technology in their production could have been made part of the demonstration.

## 6. Event analysis: effective peer learning characteristics - Event of May 25<sup>th</sup>, 2018

### Event details

The group consisted of 30 participants. 8 filled in the pre and post surveys. 1 pre and post survey was filled in by the demonstrator.

	n° survey participants	Agronomist	farmer	social sciences	student
<i>occupations</i>	8	1	4	1	2
<i>working area</i>	7				
local area	5		3		2
not local area	2	1		1	
<i>gender</i>	8				
male	7	1	4	1	1
female	1				1
<i>age</i>	7				
18-30	6		3	1	2
31-40					
41-50	1		1		

### T1: Learning processes

#### 1. Communication initiation by participants

When in the whole group between 10% and 50% of the participants (3 people) had no problem sharing their knowledge and/or experiences related to the topic. The demonstrator created a friendly and supportive atmosphere but kept authority to lead discussion with participants. The size of the groups did not change notably as participants gathered around stands in smaller groups. Nevertheless, more than 50% of the participants had no problem sharing their knowledge and/or experiences related to the topic when in smaller groups. There was a lot of time for questions, about 30% of the total time. A lot of questions were asked. Participants that took part in the demonstration on working with variable ratio fertiliser machine asked numerous questions related to the preparation and operation of such technology on their fields. Regarding the AgroSense application, participants were highly interested in the new services that will be developed for AgroSense. There were a few participants trying to formulate their own points of view regarding the topic. Only those experienced in variable ratio fertilisation were able to formulate their opinion on the applicability of presented technology.

	participant answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
I had the feeling that I could share my own knowledge as relevant information.	0	1/8	5/8	1/8	1/8
I asked at least one question during the demonstration .	5/8 yes				
I shared my own point of view at least once during the demonstration.	5/8 yes				
I felt encouraged to ask questions during the demonstration.	1/8	1/8	4/8	1/8	1/8
When there were any discussions, I felt comfortable sharing my opinion.	0	0	4/8	2/8	2/8

	demonstrator answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
I asked participants to share some of their own background knowledge during the demo.	0	0	0	1	0
I encouraged the participants to formulate their own point of view during the demonstration.	0	0	0	1	0
I encouraged the participants to formulate questions during the demonstration.	0	0	1	0	0

## 2. Interactive knowledge creation

### *Hands-on opportunities and other multi-sensorial experiences*

More than one hands-on activity was demonstrated very clearly/ instructively. The demonstrator showed how to use variable ratio fertiliser machine. The demonstrator of the Agrosens application showed how to find and create a field in the Agrosense application based on the cadastral number. Participants could take part in a hands-on activity, and got some sort of feedback on their doing. Participants could engage with variable ratio fertiliser machine on a test plot to see how to prepare and run the machine. There were no other multi-sensorial experiences.

### *Discussion opportunities and negotiating conflicting points of view*

Open discussions between a few participants were stimulated and took up about 20% of the time. This were discussions on usage and experiences with AgroSense application between users that already created users' accounts and entered data. Particularly interesting discussion was on the interpretation of satellite indexes – NDVI, EVI.... Critical points of view were further clarified.

The researchers from BioSense guided questions and discussion both as demonstrators and as assistants to the farmer in his presentation.



	participant answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
In my opinion, <b>there were interesting discussions</b> during the demonstration.	0	0	4/8	2/8	2/8
If participants <b>didn't agree</b> with each other during discussions, somebody (demonstrator/other participant) <b>tried to reach a consensus</b> between them.	2/7	0	4/7	0	1/7

	demonstrator answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
In my opinion, <b>there were interesting discussions</b> during the demonstration.	0	0	1	0	0
If participants <b>didn't agree with each other during discussions</b> , somebody (me or somebody else) <b>tried to reach consensus</b> between them.	0	0	0	0	1

### 3. Engagement during the event

Participants all seem to know each other well, but are not close friends. The participants showed interest in problems of others and their motivation to attend this demonstration. Participants that already created AgroSense accounts and had just started to use the application were open to share their experience linked to topics presented during the demonstration. All were opened to share their experience linked to topics presented during the demonstration.

The demonstrator acts open and friendly, but not as close friends with the participants. He created a friendly and supportive atmosphere but kept authority to lead discussion with participants.

	participant answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
I felt actively involved during the whole demonstration process.	0	1/8	4/8	2/8	1/8
I felt like the demonstration increased my ability to rely on myself as a farmer.	1/8	0	4/8	2/8	1/8
I could relate well to other participants (because they have an agricultural background similar to mine).	0	1/8	4/8	3/8	0
A lot of the other participants are part of the same farmer network as me.	2/6	1/6	0	3/6	0
I felt like I could trust the knowledge of (most of) the other participants.	0	0	5/8	3/8	0
The demonstration felt like an informal activity to me.	1/6	0	3/6	1/6	1/6
I thought the host farm was comparable enough to my own farm.	1/7	2/7	2/7	2/7	0
I had the feeling the demonstrator was like one of us.	0	2/8	4/8	1/8	1/8
I had the feeling I could trust the demonstrators knowledge.	0	0	6/8	1/8	1/8
I got along very well with the demonstrator.	0	0	4/8	3/8	1/8

	demonstrator answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
Were <b>participants</b> (farmers, advisers, researchers etc.) involved in the overall development of this demonstration?	no				
Most of the <b>participants</b> were well known to me.	0	1	0	0	0
A lot of the participants <b>are</b> part of the same network as me.	0	0	1	0	0
The demonstration felt like <b>an informal activity</b> to me.	0	0	1	0	0
I think the <b>host farm</b> was well suited for this demo.	0	0	1	0	0
I <b>got along well</b> with the participants.	0	0	0	1	0

## T2: Learning outcomes

Explained knowledge was sufficiently understandable. Possibilities of AgroSense were explained by referring to all components but also by referring to farmers, market and environment perspectives. Practical skills were not sufficiently addressed to foster maximum uptake by participants. The host was willing to allow test drives of the variable ratio fertiliser machine but displayed under supervision most of the options the systems provide. . Common methods or ways of thinking on farming were questioned and alternatives were shortly elaborated on in group. Variable ratios of the fertiliser machine were questioned from the investment procedure and required inputs. Employees elaborated on their use. Common methods or ways of thinking on learning were not questioned.

	participant answers				
What would you <b>ideally like to learn</b> today?	How to get the most from modern mechanization for optimization of fertilizer use; More about organic production and new technologies Application of maps in variable fertilizing; How to monitor status of crops in the field How to apply technology on already existing mechanization or with minimal adaptations.				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
The <b>demonstration met my expectations</b> regarding what I wanted to learn.	0	0	4/8	3/8	1/8
The <b>demonstration exceeded my expectations.</b>	0	2/7	2/7	2/7	1/7
I <b>felt surprised</b> at some point(s) during the demonstration.	1/7	1/7	3/7	1/7	1/7
I <b>obtained a clearer understanding</b> of the topic(s) demonstrated.	0	1/8	3/8	3/8	1/8
I have the feeling I <b>learned something new</b> (knowledge, skill, practice, etc.).	0	0	4/8	3/8	1/8
I <b>thought about how I could implement</b> some of the ideas and practices on my own farm.	0	0	3/8	5/8	0
I <b>reflected on my own point of view</b> at some point during the demonstration.	0	1/6	3/6	1/6	1/6
I learnt about <b>the principles underlying a practice.</b>	0	0	4/7	2/7	1/7
I thought about <b>how we learn something new</b> on demonstrations (e.g.: teaching methods).	0	2/8	3/8	3/8	0
I thought about <b>why</b> I want to learn about <b>the topic(s) of this demonstration.</b>	0	0	5/8	3/8	0

	demonstrator answers				
what do you <b>intend for the participants to learn</b> today?	Basics for using AgroSense app				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
I think <b>participants have learnt what I intended them to learn.</b>	0	0	1	0	0
I tried to <b>surprise</b> participants with uncommon/new knowledge/new skill.	0	0	1	0	0
I <b>felt surprised</b> at some point(s) <b>myself</b> during the demonstration (e.g. by a question or discussion).	0	0	1	0	0
I <b>obtained a clearer understanding</b> of the topic(s) myself.	0	0	1	0	1
I have the feeling I <b>learned something new</b> during this demo (from participants, discussion...).	0	0	1	0	0
I <b>reflected on my own point of view</b> myself at some point during the demo.	0	0	1	0	0
I encouraged participants to <b>reflect on their own point of view</b> during this demo.	0	0	1	0	0
I encouraged participants to <b>reflect on their own situation</b> sometime during this demo.	0	0	0	1	0
I encouraged participants to <b>reflect on how we learn something new</b> on demonstrations.	0	0	1	0	0
I encouraged participants to <b>reflect on why we are trying to learn</b> about the topic of this demonstration	0	0	0	1	0

### T3: Overall comments on the effectiveness of the event

#### *Participants:*

With an average of 4,3 on 5, participants rated the event overall as very effective. Everyone would recommend the demonstration. They stated as most effective characteristics of the event: Practical possibilities; the effort of demonstrators to increase the quality of production to higher level and make it efficient; direct contact with demonstrators.

Suggestions for improvement included: Demonstrators should be more interesting and able to include better participants into discussion; technologies should be presented in small farms; organised in winter after production season; involve more young people and ensure they attend.

#### *Demonstrators:*

The demonstrator reported the targeted invitation for potential users and on-farm presentation of the app performance as the most effective characteristics of the demonstration.

As points of improvement, she reported: On site try out of all tools available in AgroSense.

#### *Observed main strong points of the event:*

The strongest aspect of the event were the practical demonstrations. Also, announcement of the event through diverse channels brought a mixture of attenders encompassing farmers and students, and professors of agriculture. This created a good starting point for discussion among participants.

In my view, the demonstration activity was very well organised. It enabled introduction to variable rate fertilisation technologies and an IT platform that can assist farmers in planning crop production and decision-making. Several discussions during demonstrations enabled exchange of knowledge and opinions among participants.

#### *Observed main improvements:*

When demonstration events include high-valued machines in agriculture, additional consulting regarding investment models would be beneficial for farmers. The demonstration of the AgroSense application could benefit from the invitation of advanced end users of AgroSense application to share their experiences with those that are considering its usage.