AGRIDEMO

Case study reports:

The Netherlands CS1

AgriDemo-F2F has received funding from the European Union's Horizon 2020 Research and innovation program under grant agreement No 728061

1. Background

Programme “Practice centre for precision farming”

The umbrella Programme of the specific demonstration is called “Practice centre for precision farming" (‘Praktijkcentrum voor Precisielandbouw). The programme “Practice centre for precision farming” is working in some regions on precision agriculture.

The programme Practice centre for precision farming covers Practice Centre for Precision Agriculture (PCvPL) in Reusel and AgroFood Innovation Centre in Colijnsplaat. (Programme interviewee)

There are different actors who take part in the programme. The consortium consists of five partners and ZLTO is the leading partner. Besides this, there are universities and other supporting entities, as well as groups of arable farmers who constitute an innovative group to work on those new techniques.

Partners in Proeftuin are the farming cooperation & ZLTO: universities: HAS, TU/e, WPlR; advisory: Rusthoeve, Delphi. (Programme interviewee)

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 interviews with 1 Programme interviewee and 1 farm level interviewee, who were interviewed in May 2018. 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. This data is sourced from 13 pre and 10 post demonstration surveys for participants, 1 pre survey and post survey for the demonstrator, a post host farmer interview 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.

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. For the Belgian and Dutch cases, a workshop was held on the 9th of November.

3. Structural characteristics

T1: Programme/network level

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

ZLTO

The Southern Agriculture and Horticulture Organisation (ZLTO) represents the interests of entrepreneurs working in green areas. Around 15,000 farmers and growers in the South-Netherlands are members of the association. ZLTO works with farmers, in order to produce healthy food innovatively and sustainably (ZLTO website) ZLTO undertakes projects to accelerate the adoption and the application of precision farming in the Netherlands (Background info) ZLTO is linked with many different parties and actors related to agriculture.

> ZLTO takes the responsibility to channel developments on precision agriculture on EU, national and (inter) regional level. This is done in lobby, projects and advice. (Programme interviewee)

It is mainly ZLTO who manages the project «Proeftuin for Precision Agriculture», as the project manager supported by a programme leader are both ZLTO employees. (Programme interviewee +personal contact ZLTO) The manager of ZLTO supports the cooperation between ZLTO and the farmers, while he also has coaching responsibilities toward the collaborating farmers. (Programme interviewee) Finally, there is an employee of the farm who is in charge with the planning of events, daily administration and organisation in PCvPL. (ZLTO personal contact)

> Most important is the extraordinary host farmer. The ZLTO project manager built up a relation with the host farmer in many projects and converted the relation in a structural cooperation. The host farmer warns him when it seems to become too innovative and makes the stories economically sound. The ZLTO manager supports this complex cooperation and coaches the host farmer when needed. (Programme interviewee)
>
> ZLTO target farmers to host demonstrations through its extensive network in the Netherland's farming community and the long term relations that ZLTO keeps with farmers. Another criterion is related to the willingness and ability of the host farmer to get actively involved in the development of the demonstration. Additionally, through its networking, ZLTO identifies relevant topics that will interest farmers, as farmers' needs are an absolute priority for ZLTO. (Programme interviewee)
>
> ZLTO always involves the host farmer as well as participants at the topic selection (Programme + Farmer) Furthermore, the topics selected for demos are strongly related to the topics funded through the projects that ZLTO applies. The demos organised fit with each project's aims. (Programme interviewee)
>
> The project's results and/or progress are also an inspiration for the selection of the demo topics. (Farmer)
>
> Finally, each demo topic has to be adapted to available crops and farming cycles. (Programme interviewee)
>
> They (host farmers) are always involved in general, in the subjects or demonstration. Hosting the demonstration is part of a longer relation. Involving them only to host a demonstration will not work: so many projects are rejected and we have to disappoint them in that case. (Programme interviewee)
>
> Q: How are demonstration topics selected? R: Preferred selection: we answer requests from visitors. In other cases, we show progress in projects. (Farmer)
>
> Q: How do you target farmers to host demonstrations? R: Via board members (ZLTO, Delphy universities etc.) and employees direct contacts. We give everyone a chance by our media (weekly, E letters, soc media, etc. (Programme interviewee)

Q: How do you identify/select relevant topics that will interest farmers? R: Our ZLTO members tell us what is interesting for them. {Host farmer name} relations do the same. (Programme interviewee)

Q: How are demonstration topics selected? R: Main direction: need of farmers. Precondition: being financed: this is mostly covered by applying for projects. In PCvPL we make a place where it is attractive and affordable to get demo's for farmers groups without subsidy. (Programme interviewee)

Overarching: we provide possibilities that fit in the Programme (in EFRO project: uptake of PCvPL) Individual demo is determined by season/plant growth stage and wishes of groups. (Programme interviewee)

ZLTO employees undertake several tasks when they organise demo activities, such as the adaption of the content to attendees, the feedback activities (about the demo itself and on probable adoption of practice), evaluation procedures and the continuous engagement of demo participants after the event. Again, ZLTO's extensive connections, collaborations and networking with the farming community help the organisation to accomplish these difficult tasks.

Q: Do you plan and design demonstration activities differently for different audiences? R: Yes the story should fit to the audience. (Programme interviewee)

Q: Do you request feedback from demo participants? R: Yes. Just ask. Sometimes simple inventory (max 5 questions). (Programme interviewee)

Q: Do you evaluate the demonstration activities overall? R: Yes. For next meetings, we - optimise the PowerPoints, - change the approach of the subject, - and include others to take part of the message from their own experience, - send forward better information - manage expectations. (Programme interviewee)

Q: Do you - at the Programme level - continue to engage participants after the demonstrations? R: Yes. From project to project. Stay involved with the core people expectations. (Programme interviewee)

Q: Do you assess if participants have engaged with/acted on the lessons of the demonstrations? R: Yes. Time consuming and not always possibility, but we do it by asking people I know during other meetings. We plan to do more, that's one of the aims of innovation groups around. (Programme interviewee)

Do you try to assess the extent of influence (diffusion) from your demonstration programme(s) to non-participants? R: Yes. We ask in our farmers groups. (Programme interviewee)

The specific demonstration was managed and planned by the programme director of ZLTO and the host farmer. The host farmers, were in charge of the financial arrangements of the organised activities (Farmer). The topic selection of the specific demo has been determined by the participants and the farmer/demonstrator (Poster)

Together with {programme manager), the planner or I {one of the host farmers' name} make appointments. We have a shared agenda, a tariff list and a standard presentation, that we improve permanently. The {ZLTO manager and the ZLTO employee} are coaching the entrepreneurs. The host farmer checks if the developments are financially ok. Apart from the management, the 2 employees of the farm take care that everything is clean when demonstrations start. (Farmer)

2. The main actors involved in the demonstration activities and their roles

Host farmer and demonstrator

The owners of the farm and host farmers are two brothers. They cooperate with ZLTO in the frame of the project "Proeftuin for Precision Agriculture". One of them does the administrative and Precision Agriculture part and the other one is the straightforward farmer (ZLTO personal contact). The host farmer is a very well informed person in precision agriculture (Programme interviewee). He is actively involved in topic selection,

the organisation and the management of the demo. He is a well-connected person, who uses his contacts with other farmers to select inspiring demo topics (Programme + Farmer). At the specific event one of the host farmers was the demonstrator (Poster + Observation tool). The other one organised the event in close cooperation with ZLTO and he was preparing the exposed farm data for the demo.

> Q: How do you identify/select relevant topics that will interest farmers? R: Our members tell us what is interesting for them. {Host farmer's name} relations do the same. (Programme interviewee)

The Programme interviewee stated that host farmers are always involved in the development of the individual demonstration activities as well as in the overall demonstration programme. The collaboration of ZLTO with a host farmer for a demo event, presupposes an agreement with the host farmer as well as his active involvement on the subject selection of the demonstration.

> They will only open their farms if they agree on what is demonstrated. (Programme interviewee)

> They are always involved in general, in the subjects or demonstration. Hosting the demonstration is part of a longer relation. Involving them only to host a demonstration will not work: so many projects are rejected and we have to disappoint them in that case. (Programme interviewee)

At the specific demonstration the host farmer have had an active involvement at the management of the demo activities on farm. He was involved in preparing the demo agenda, the fees definition and the preparation of the presentation.

> Together with (Programmes manager name) the planner {planner name} or I (one of hosts' farmers' name) make appointments. We have a shared agenda, a tariff list and a standard presentation, that we improve permanently. {ZLTO Manager of the project manager name and of another ZLTO employee name} is coaching the entrepreneurs. (One of the two host farmers, real farmer) checks if the developments are financially ok. (Farmer)

Moreover, the host farmer is always involved in the overall development of demos at the Programme / network level. Because of his deep knowledge and wide connections, he strengthens partnerships and knowledge exchange (both technical, economical etc.) in the farming community. (Farmer)

> I'm often the person bringing inspiration, connecting partners with specific knowledge of their developments. I give a critical advice on technical aspects and the feasibility: financially and in the market. (Farmer)

The host farmer undertakes several tasks when he organises demo activities, like the adaption of the content to attendees, some informal feedback and evaluation activities and the continuous engagement of demo participants. (Farmer) Again, the host farmer's extensive connections, collaborations and networking through farming community allow him to accomplish these difficult tasks. (Programme and Farm level Interviewee + Observation tool) The host farmer has several demo events, open days and meetings with farmers groups through a year. In total he hosts over 50 events per year. (Pre survey demonstrator)

> Q: Do you plan and design demonstration activities differently for different audiences? R: Yes the story fits to the audience. But they can react unexpectedly: elderly beekeepers (some former farmers) were better informed than policy makers in innovation. (Farmer)

> Q: Do you request feedback on the event day from participants? Yes. Just ask: was it worth the effort? R: Only few times critical reactions: very good to learn. (Farmer)

> Q: Do you evaluate the demonstration activities overall? R: Yes. Looking back on the results of the project. Ask feedback from people who hear my story once in a while (yearly). (Farmer)

> Q: Do you assess if participants have engaged with/acted on the lessons of the demonstrations? R: Sometimes. Time consuming and not always possibility, but I do it by asking people I know. Plan to do more, that's one of the aims of innovation groups around PCvPL. (Farmer)

For this specific demonstration and its visitors there were no follow-up activities. But for the farm and the farmer there are a several demonstrations and visiting groups through the year (Observation tool)

Audience / type of participants

According to the Programme interviewee, the intended audiences of the demonstration events are everyone who is interested in precision farming (students, farmers, technicians, processors, university professors, policy makers, citizens, etc.) According to the farm level interviewee the demo participants on his farm are usually innovative, early majority farmers, manufactures of precision farming machines and policy makers. As the host farmer is very well known in the farming community, many demo participants are through his personal connections or are part of the same networks he is in too. These connections, as well as ZLTO's extensive networking, result to the great variety of participants in farm demos.

> Through the year, a lot of different visitors (national and international) visit the farm. (Background info)
>
> Q: How effective are you in recruiting in 'the hard to reach' or those who have never attended a demonstration event before? R: Very :{ host farmer's name} attracts all kinds of people. ZLTO attracts active farmers and people with interest in farming. (Programme interviewee)
>
> Q: Who typically attends your demonstrations activities? R: Innovative and early majority farmers, policy makers. Machine manufacturers sometimes come to me, but more often I visit them (easy to talk in their development departments). (Farmer)
>
> Q: How effective are you in recruiting in 'the hard to reach' or those who have never attended a demonstration event before? R: I organised an open day after a visit of the queen. There 2000 relations of the family, people renting their land to us, people from the near environment came to visit me. (Farmer)

Both the Programme and Farm level interviewees pointed out the involvement of participants in the demos' topic selection. The Farmer stated that participants are also involved in the overall development of the demonstrations. However, it seems that this was not the case, in the specific demonstration event, as according to the Post survey demonstrator, participants (farmers, advisers, researchers etc.) were not involved in the overall development of this demonstration. Before a demonstration the participant/applicant could make appointments with the demonstration about the topic. In this specific demonstration event they make appointments in front.

> Q: How are demonstration topics selected? R: Preferred selection: we answer requests from visitors. In other cases we show progress in projects. (Farmer)
>
> Q: Are participants (farmers, advisers, researchers etc.) involved in the overall development of the demonstrations? R: Yes. Well yes, I ask what they want to hear, they often know what I told on other events. And I discuss about demonstrations with colleague demo farms. (Farmer)
>
> Q: Were participants (farmers, advisers, researchers etc.) involved in the overall development of this demonstration? R: No. (Post survey demonstrator)

3. Networks

As already mentioned partners in this Programme are farming associations, advisory entities, universities etc., with. ZLTO leading the network's consortium.

> The Programme Proeftuin Precisielandbouw covers "Practice Centre for Precision Agriculture" (PCvPL) network, in Reusel and AgroFood Innovation Centre in Colijnsplaat. Partners in Proeftuin are farming: the farm & ZLTO: universities: HAS, TU/e, WPlR; advisory: Rusthoeve, Delphi. (Programme interviewee)

The specific demonstration farm is part of four programmes and wider networks. The host farmer also holds elected or appointed roles on three farming networks/boards. The farm is also widely connected to other

demo farms as well as other knowledge exchange organisations. Individual farmer colleagues, farmer networks or groups, universities and companies are some of them.

> Q: Is your demonstration farm part of a Programme or wider network (e.g. LEAF)? R: Yes. We join in the many industry networks (f.i. DIH in Smart Industry), by projects like IoF2020, Optimove, and in private initiatives, like Making sense (with a farm near Rotterdam) (Farmer)
>
> Q: Do you hold elected or appointed roles on farming networks/boards? R: Yew. Glasfiber (Vice chair), Reuselglas (chair) and Ver high agro campus (chair) (Pre survey demonstrator)

We are connected to colleague farms: experimental farm Colijnsplaat (in project Proeftuin), Forward Farm Abbenes, a Bayer Forward farm (together in IoF2020), we share experiments with University farm Vredepeel (Wageningen University) For many years our test management measures with sensors in the group 'making sense', now with Rotterdam. We cooperate with de Enk (to demonstrate soil scan and auto drive machines in golf courses) and Fleuren (fruit trees). (Programme and Farmer)

However, in the specific event it seems that the participants were not part of the same network with the host farmer. (Post survey demonstrator) Additionally 70% of participants were not connected in any way through common networks. (Post participant's survey)

4. Resources, finances and incentives

The demonstration activities organised in the frame of the Programme are partly funded by regional development fund and also by partners funds to which all partners contribute. (Programme interviewee) The Practice Centre for Precision Agriculture network is supported by EU, national and provincial funds (EU Rural Development, the Dutch government, the province Noord-Brabant) and also by participants fees. (Background info) The network intends to be self-funded through demonstrations activities. (Programme interviewee)

> During project Proeftuin there is funding from regional development fund (EFRO) and partners. After the project PCvPL will generate its own funding from demonstrative experiments and introductions and trying to attract other projects. (Programme interviewee)
>
> The university pays a fee, so the students can visit the farm. The farm is part of the 'Practice centre for precision farming'. This practice centre is supported by the EU Rural Development, the Dutch government and province Noord-Brabant. (Background info)

ZLTO offers incentives to farmers to host demonstration activities. The exact type of these incentives was not clarified. It is mentioned also, that funded projects is a feasible way to cover demo expenses and to benefit the involved farmers.

> Q: Do you offer any incentives to farmers to host demonstration activities? R: Yes. We pay our organisation effort. In the case of PCvPL we invested much time in a new development (cooperation between individual and association is rare). (Programme interviewee)
>
> Precondition: being financed: this is mostly covered by applying for projects. In PCvPL we make a place where it is attractive and affordable to get demo's for farmers groups without subsidy. (Programme interviewee)

Part of the starting costs is always covered by project funding. (Farmer) The demonstrations as a business case, is not for big profit, but just for covering costs for the host farmer. (Poster) Furthermore, there are different price-lists for participants depending on the size of the visiting group, the institution behind each visiting group i.e. school, university etc. Additionally there is an internal pricelist for research activities and preparation of demo events.

However, it is still not quite clear if participants are paid or pay for attending a demonstration event or what criteria differentiate this decision. More precisely, it is mentioned that a small payment is offered to participants. (Farmer)

> Q: What are the funding arrangements for your demo activities? How do these impact on the lifespan of the farm demo? R: During project Proeftuin we are financed partly by EFRO funding. We already ask small amounts of money to be sure that visitors are motivated for introductions. Schools pay €150 per group visit of 3 hours, groups of 15p pay €300, groups bigger than 15 pay €400. For research and preparation of demos there is an internal pricelist. Part of the starting costs is covered by project funding. (Farmer)
>
> Q: Are participants targeted in demo recruitment? R: Always. It's well known what I offer, groups select themselves by asking for a meeting and accepting a small payment. (Farmer)

ZLTO makes efforts to reinforce the skills of collaborating farmers, as for instance in the case of the manager of ZLTO who is responsible for coaching the entrepreneurs.

> {Manager of ZLTO, supports this complex cooperation and coaches {host farmer name} when needed. (Programme interviewee)

The demonstrator of the case study has never received any training in order to become demonstrator. He commended that it is a learning by doing process. (Pre survey demonstrator) However, he agreed that he could benefit from some extra training as a demonstrator. (Post survey demonstrator)

5. The decision-making process in organising demonstrations

Both Programme and Farm level Interviewees agreed that their general approach (as organisation or as a coordinator/demonstrator respectively) is mostly bottom-up.

> Mostly bottom-up. Trigger people to think actively is first requirement of demos. (Programme interviewee)

It is already mentioned that ZLTO seeks the collaboration of host farmers who are willing to get involved actively in the demo development. Furthermore ZLTO always involve host farmers as well as participants at the topic selection and actively pursue to keep in touch with farmers and participants needs. (Programme interviewee) In the same vein, ZLTO makes some effort to follow multi-participatory approaches like feedback, evaluation and follow-up activities. (A resume from Programme interviewee)

1. Goals and objectives

The primary goals of this Practice Centre is to accelerate the adoption and application of precision farming in the Netherlands. (Background info) To achieve this, they provide demonstrations and test precision techniques in practice, alongside a commercial arable farm. (Farmer)

> Q: What are the overall goals/objectives of the demo farm? How are these decided? R: Demonstrate and test precision techniques in practice. Decided after long cooperation period between farmer and union: very relevant for farmers to know what direction to take in Precision Agri. (Programme interviewee)

T2: Farm (event) level

The demonstration event took place on the farm, an average sized (500ha) and very innovative commercial arable farm in the southern part of the Netherlands. The main crop is potatoes. There are also a few hectares with maize and sugar beets. Since 2016 the farm has participated in precision farming and since 2017 the farm is part of the practice centre for precision farming (PCvPL). The farm is considered as innovative and as a pioneer in precision farming. The two farmer owners are supported by three fulltime employees. (Poster + Post host farmer interview + Background info)

The demonstration event took place on 1 March 2018. The overall objective of the event was to demonstrate and test precision farming techniques in practice. At the specific event, the precision farming focused on arable farming (Observation tool). The event included a presentation and a farm visit. There was also enough space for discussion during the event (Poster).

1. Topic and focus

Precision farming in arable farming (potatoes) (Observation tool).

Both Programme and Farm Level Interviewees stated that the demos organised by their organisation/or on the specific farm respectively, fall within a whole farm approach. During the specific event, the demonstrator stated that he actively aimed to apply a 'whole farm approach' rather than showing an isolated topic/technique (Post survey demonstrator). However, in the observation tool it is mentioned that only a few notions/remarks of whole farm approaches were demonstrated, as most of the time the demonstration was about the cultivation process of potatoes (Observation tool).

Both Programme and farm level interviewees stated that the demonstrations organised by their organisation/or on the specific farm respectively are a mixture of exemplary and experimental approaches. Their views concerning the most preferable demo approach are also identical. They also believe that a mixture of experimental and exemplary approaches are better, as in their view the two approaches are the two sides of the same coin. The specific event was also classified as a mixture of experimental and exemplary approaches. (Post survey demonstrator)

> Experimental: I discuss, investigate and start trials yearly (with scientists ZLTO, others, partly own interest) some new developments and varieties. Exemplary: given my machinery and experience on the farm I can show state of the play in innovative agriculture. These are 2 sides of the same coin. (Farmer)

2. Group size

According to the observation tool, 50 participants attended the event. Attendees were a group who followed the same courses at university (Observation tool), who intend to be future-farmers. (Background info) Their teacher selected/decided which pupils, would take part at the demonstration and the host farmer didn't know his audience (Pre survey demonstrator + Post survey demonstrator). Almost 70% of participants worked in the local area (Pre demonstration survey participant). The event's participants were farmers (66%) with some different occupations were also mentioned (high school professor, traders, students etc.)? (Pre demonstration survey participant)

3. Actor's role during the event

The host-farmer was the demonstrator and the leading person of the event. He started with a presentation, and answered questions of the visitors. At the first part of the demonstration (presentation), the visitors could mainly listen to the host farmer. During the presentation, the host-farmer told a lot about the different techniques he used in the farm. After the presentation, the host farmer guided a tour in his farm. During the tour, the visitors could listen to the tour guide/demonstrator, touch the machinery and touch and smell the potatoes (Observation tool). There was not a dedicated facilitator to guide the questions at this event. However, the host farmer could be seen as a facilitator, as he was available to answer questions (Observation tool). No other actor is mentioned during the specific event.

4. Practice/technology demonstrated

The host farmer started from the beginning of the cultivation process and explained the precision farming tools he used. In almost every step in the cultivation process, precision farming is used. He showed, soil scan to know exactly the capacity of the soil and sensors during storage of the potatoes who measure the temperature of the potatoes in order to analyse its effect during the storing period (Observation tool).

5. Event Farm design and layout

The test area consisted of a few big storehouses with potatoes and space for machines. There wasn't a specific test field area where the visitors could have a look. From a practical point of view, of course all the fields are test fields because the farmer tests precision farming on his own fields (Observation tool).

There were no real fields or storehouses to compare. However the host-farmer started the demonstration with a presentation. In this presentation he showed a lot of pictures which showed the difference between 'normal farming' and precision farming. During this presentation, the farmer gave more information about the profitability of precision farming (Observation tool).

6. Duration

According to the farmer, a typical time span for a demonstration event is 3 hours in total. Generally he devotes 1,5 hour for storytelling i.e. presentation and 1,5 hour for showing machines and practices. Discussion is always included during machines/practice demonstration. (Farmer)

7. Frequency

Presentations and demonstration events are organised approximately 2-5 times a week at the specific farm (Post host farmer interview). Additionally, the frequency of the events is related to the type of the demonstration topic. Depending on that, an event could be one off or more complex.

> Of course, every content needs adapted process and format. Format for sustainable is not different from new technology? Measure for sustainability can be one off and intro of new technology is a complex process. (Programme interviewee)

8. Other farm's infrastructure or arrangements

During the demonstration events organised on farm, some arrangements are made for the participant's i.e. coffee-breaks. (Programme interviewee)

Generally, the host farmer takes care of participants' requirements. These requirements are not clarified or detailed.

> I listen to the requirements of the participants and try to do something with their requirements. Sometime it is possible, sometimes not. (Post host farmer interview)

Finally, the demonstrator mentioned that some better reception room(s) would be necessary in order to improve the effectiveness of demonstration events. (Post survey demonstrator)

9. Farm's accessibility

The travel time of participants to reach the demo farm, ranged from 150 to 270 minutes, with an average time of 180 minutes (Pre demonstration survey participant). Six out of thirteen participants rated their travel effort to participate as very little effort or little effort. An equal number rated their travel effort to participate as quite

some effort and one as great effort (Pre demonstration survey participant). We cannot draw any clear conclusion in relation to the organisation of the specific event and the farm location. Some participants, who travelled for 270 or 180 minutes, rated their travel effort to participate as very little effort or little effort and some participants who travelled for 150 or 180 minutes rated their travel effort to participate as quite some effort or great effort.

10. Fees for participation

At the specific demonstration event, all participants had to pay fees for participation. (Post participant's survey) Moreover, seven out of ten participants did not receive any financial compensation as they were students, with the remaining three reporting to have received a financial compensation for their attendance. These were no further details on this differentiation. (Post participant's survey)

4. Functional characteristics

T1: Coordinating effective recruitment of host farmers and participants

1. Incentives

The project Proeftuin receives funding from EFRO, a regional development fund. Some of this funding goes to carrying out on-farm research and setting up demos. Farms then charge a small amount for group visits and demonstrations; the price varies depending on the group size and the length of visit. By charging for demonstrations the project aims to be self-funded after initial start-up costs are covered. Host farmers are paid for the effort of organising demos and research.

> During project Proeftuin we are financed partly by EFRO funding. We already ask small amounts of money to be sure that visitors are motivated for introductions. Schools pay €150 per group visit of 3 hours, groups of 15 persons pay €300, groups bigger than 15 persons pay €400. For research and preparation of demos there is an internal pricelist. Part of the starting costs are covered by project funding. (Farmer)

> During project Proeftuin there is funding from regional development fund (EFRO) and partners. After the project PCvPL will generate its own funding from demonstrative experiments and introductions. (Programme Interviewee)

> We pay our organisation effort. (Programme Interviewee)

2. Motivations for host farmers

Farmers are motivated by a desire to share their knowledge with other farmers. The Farmer observes that this desire comes from a firm belief in the effectiveness of the precision techniques being shared. The farmer also comments that by allowing them to test new techniques, the Programme offers new business opportunities.

> Demonstrate and test precision techniques in practice, alongside a commercial arable farm. (Farmer)

> As I need Precision Agriculture to do the complex planning of a farm with many parcels, I'm convinced or the usefulness of it. I'm sure new techniques will give me new business opportunities. I see demonstrations as a business case (not for big profit, but covering costs), therefore I'm in cooperation PCvPL. (Farmer)

3. Motivations for participants

Participants are interested in learning new techniques; they are particularly motivated by the opportunity to observe these techniques in practice on a working farm.

> The real practice situation and newest techniques interests them. In some networks I/m well known. (Farmer)

Participants themselves stated as main motivators to attend the demonstration: To discover new issues; Interest in potatoes; to learn something new; precision farming is important for the future; it is part of the farm visit and big interest in the sector; I'm interested in precision farming; at my own farm we cultivate potatoes and I'm interested how we can improve.

4. Target audience

There is a broad mixture of people who attend demonstrations.

> They could be students, Farmers, Technicians, Processors, University professors, Policy makers, citizens, etc. (Farmer)

5. Advertising and recruitment

The farmer believed that a good quality demo event advertises itself as word spreads naturally. While the Programme interviewee agreed, they added that in order for demos to attract participants they need to address the most pressing issues to farmers, and cover the topics that farmers are actually interested in. These subjects are established using the organisation's network.

> Give good demos, the word spreads itself. (Farmer)

> Combination: offer good quality on the long term; and use organisation's network to find the actual highlights that need to be demonstrated. (Programme Interviewee)

T2: Appropriate demonstration and interaction approaches

1. Involving farmers in the learning process and the demonstration programme

Both the Farmer and the Programme Interviewee described the nature of interaction as mostly bottom-up. The Programme Interviewee explained that this approach was taken in order to 'trigger people to think actively,' which is the 'first requirement of the demos.'

There is no formal process in place for involving participating farmers in the network programme. However participants are able to request demonstration subjects. Within individual demonstrations, the farmer will offer participants the chance to ask for specific areas or topics to be covered during the day.

> We answer requests from visitors…I ask what they want to hear. (Farmer)

Host farmers are involved in deciding the subject to be covered by a demonstration, as well as the planning of the event. The Programme Interviewee emphasised the ongoing relationship between the host farmers and the network programme. They indicated that the host farmers have a leading role in establishing the subject of a demonstration: members inform the Programme of what they are interested in, and a demonstration is developed around this.

> They are always involved in general, in the subjects or demonstration. Hosting the demonstration is part of a longer relation. Involving them only to host a demonstration will not work: so many projects are rejected and we have to disappoint them in that case…They will only open their farms if they agree on what is demonstrated…Our members tell us what is interesting for them. (Programme Interviewee)

2. Focus

Both the farmer and the Programme interviewee described the demos in the network as having a 'Whole farm' focus.

3. Design

Both the farmer and the Programme leader described the network demonstrations as 'a mixture' between experimental and exemplary practices. Both prefer this approach as appose to favouring either one or the other, as they consider experimental and exemplary practices to be one in the same.

> Experimental and exemplary are two sides of the same coin. (Farmer)

4. Ideal group size

The optimal group size varied depending on the goal of the meeting or event. For planning and deep discussion smaller groups were preferable, as these are the sessions where participants want to contribute more and ask more questions. Events focused on raising interest and knowledge, usually in the form of a presentation, could handle a greater number of attendees. Generally, the less audience participation was expected or required, the greater the group size could be.

> Now average 15. Depends on the goal of the meeting: up to 10 for planning; they ask most questions, 10-25 for discussion and involvement; I ask questions and wait till I get answers. Bigger groups: raising interest and knowledge: I ask questions and answer myself. (Farmer)

> For planning and deep discussion: up to 10. For discussion and involvement: up to 25. For interest and knowledge: bigger – presentation. (Programme Interviewee)

T3: Enabling learning appropriate to purpose, audience, context

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

The general structure for a demonstration day consisted of a mixture of presenting information and a tour of the farm, within which there is a discussion. The tour could include the machines, crops or experiments in question. This format allows for the host farmer to encourage participants to ask and answer questions, so as to be actively engaged throughout the day.

> Start with coffee, - then introduction, - if needed of the visitors, - Introduction on the subject, - coffee break - farm visit /looking at machines/ crops/ experiments and discuss on the way - wrap up; Challenge them to ask and answer questions. Expose a fresh and passionate approach. (Farmer)

The Farmer mentioned various materials used to aid the demonstration. Presentations provide a large amount of practical experience condensed in simple terms. Demonstrating real sensors and machines, or looking at the difference between plants, offers a visual understanding of technique or technology being discussed. Various other resources may be used to boost interest, such as PowerPoints or physical farm artefacts.

> Management cycle (a presentation developed during 5 years) Very practical experience in simple words; PowerPoint, real sensors and machines, real (difference between) plants. The notebook of my grandfather! (Farmer)

Both the Farmer and the Programme Interviewee cited 'participants ask questions and talk openly' as the most important factor in providing an effective demonstration. This was because it encourages participants to think for themselves, which was considered the most effective learning tool.

> People should learn by thinking themselves. (Farmer)

> You can bring a horse to the water, but you cannot make it drink. You can bring a visitor to the solution, but you cannot make him think. (Programme Interviewee)

2. Taking into account variation in learning

Both the Farmer and the Programme Interviewee said that they do take into account variations in learning. The Programme considers the different goals in different groups of farmers, mainly in reference to their age and what this means for their priorities in farm management (e.g. 20-30yrs need to earn money, while 50-60yrs need to prepare for farm succession). However there was no mention of accommodating for different learning styles amongst participants.

> We connect to the level on which the target group is in the position to make decisions. Young farmers 20-30yrs need to earn a lot of money in few years, 30-40 build a family and network, 40-50 want to make a difference (innovation), and 50-60 prepare the farm for succession. (Programme Interviewee)

T4: Effective follow-up activities

1. Follow-up activities and materials

Both the farmer and those at the Programme level try to engage with participants after the event, either by staying connected to the relevant networks or by keeping in touch with the 'core participants.'

The Programme is very active on its own websites as well as on social media, providing videos, stories, interviews, Tweets etc. for participants after the event. These resources tend to be put out the day after the demonstration, while engagement is high and people are likely to be checking for more information on the subject.

> Video, pictures, small stories, tweets, interviews, etc. Very active on sites such as Facebook, twitter, LinkedIn, YouTube (many images with drones) Many introductions. (Farmer)

2. Assessing impact

The Farmer stated that they sometimes assess the impact of the events on the participants by taking an informal approach and following their progress on social media. The Programme Interviewee stated that they do assess the impact, but did not comment on how they do this.

Assessment of the impact of an event on the wider farming community was carried out by asking the farmers themselves. The farmer also commented that it is possible to deduce the impact on the farming community by considering the spread of the products they provide to farmers at demo events. The impact of increasing the use of drone data or Crop-r management, for example, can be figured out through their understanding of the scope and impact of the technology.

> We know the use of products that we provide to farmers: Scans, drone data, use of Crop-r management Programme (no difference between participants and non-participants). (Farmer)
>
> We ask in our farmers groups. (Programme Interviewee)

5. Event analysis: effective peer learning characteristics

Event details

The group consisted of about 50 participants, of which 13 filled in the pre survey and 10 the post survey.

	n° survey participants	beef farmer	farmer	High school professor	farmer's son	vegetable farmer	pig farmer	student	trading in potatoes	unknown
occupations	**13**	**1**	**5**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
working area	**12**									
local area	4	1		1			1		1	
not local area	8		5		1			1		1
gender	**13**									
Male	8		3	1	1	1			1	1

Female	5	1	2				1	1		
Age	**13**									
18-30	12	1	5		1	1	1	1	1	1
31-40										
41-50	1			1						
51-60										
60+										

T1: Learning processes

1. Communication initiation by participants

When in the whole group, not more than 10% of the participants hesitated but shared their knowledge and/or experiences related to the topic. In our view, the visitors had no problem sharing their knowledge. However it still didn't happen. In addition, the size of the group was too big so there was not much interaction during the presentation. In smaller groups the visitors talk more to each other and share their knowledge. But they don't necessarily share their knowledge with the demonstrator.

There was sufficient time for questions but the visitors didn't ask a lot of questions. There was room for questions during and after the presentation and during the tour. During the presentation there were some questions, during the tour was it limited.

The demonstrator had a sufficient amount of information, it was nice listening to him. Some good discussions took place when the demonstrator asked the visitors a question. During the discussions the visitors gave their point of view. The demonstrator made enough time for discussions however the visitors did not have questions or felt the need to engage in discussions, so the demonstrator continued the presentation.

	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	8/10	1/10	1/10	0
I asked at least one question during the demonstration .	7/10 yes				
I shared my own point of view at least once during the demonstration.	2/10 yes				
I **felt encouraged to ask questions** during the demonstration.	0	3/10	6/10	1/10	0
When there were any discussions, **I felt comfortable sharing my opinion**.	0	2/10	2/10	0	6/10

	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	0	1	0

2. Interactive knowledge creation

Hands-on opportunities and other multisensorial experiences

There were no hands-on activity demonstrated or possible to carry out by the visitors. Visitors could only listening, look and touch. During the first part of the demonstration (presentation), the visitors could mainly listen to the host farmer. During the tour, the visitors could listen to the tour guide/demonstrator, touch the machinery and touch and smell the potatoes.

Discussion opportunities and negotiating conflicting points of view

There was no specific facilitator to guide the questions. The host farmer could be seen as a facilitator, as he was available to answer questions.

There was time for an open discussion, but nobody really engaged. Approximately 15% of the time was spent on discussions. There was more time but not all the time was used by the visitors. During the tour in smaller groups there were more discussions. There was no elaboration/further explanation on shared critical points of view. The visitors didn't have enough questions to have a good discussion and conflict.

	participant answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
In my opinion, **there were interesting discussions** during the demonstration.	0	6/10	2/10	0	2/10
If participants didn't agree with each other during discussions, somebody (demonstrator/other participant) **tried to reach a consensus** between them.	0	1/10	0	0	9/10

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

3. Engagement during the event

Participants all seem to know each other well, but are not close friends. The visitors were a group who followed the same courses at university, so they know each other well. They share their point of view but not their own farm situation. The demonstrators talked openly about his company and the possibilities of different techniques he used. Also the demonstrator acted quite informal to the visitors, this created an open and informal ambiance.

	participant answers				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
I **felt actively involved** during the whole demonstration process.	0	2/10	6/10	2/10	0
I felt like **the demonstration increased my ability to rely on myself** as a farmer.	2/10	4/10	3/10	0	1/10
I could **relate well to other participants** (because they have an agricultural background similar to mine).	1/10	4/10	5/10	0	0
A lot of the **other participants** are **part of the same farmer network** as me.	7/10	0	3/10	0	0
I felt like I could **trust the knowledge of (most of) the other participants**.	0	1/10	9/10	0	0
The demonstration **felt like an informal activity** to me.	1/10	1/10	5/10	3/10	0
I thought **the host farm was comparable enough to my own farm**.	1/10	5/10	3/10	0	1/10
I had the feeling the **demonstrator was like one of us.**	0	3/10	4/10	3/10	0
I had the feeling **I could trust the demonstrators knowledge**.	0	0	2/10	8/10	0
I **got along very well with the demonstrator.**	0	1/10	9/10	0	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**?	No				
Most of the **participants were well known to me**.	1	0	0	0	0
A lot of the participants **are part of the same network as me**.	1	0	0	0	0
The demonstration felt like **an informal activity** to me.	0	0	0	1	0
I think the **host farm** was **well suited** for this demo.	0	0	1	0	0
I **got along well** with the participants.	0	0	0	1	0

T2: Learning outcomes

Most of the visitors were familiar with the explained knowledge, so the knowledge was sufficiently understandable. In addition, the demonstrator explained the knowledge very well so it was understandable. There was sufficient depth on the subject, and the demonstrator made sure that the visitors were alert during the presentation. Common methods or ways of thinking on farming were questioned and alternatives were shortly elaborated on in group. During the demonstration precision farming was demonstrated as an alternative on 'normal' farming. The precision farming was focused on arable farming. The demonstration was focused on the way of precision farming. How to use it and the advantages/disadvantages. Common methods or ways of thinking on learning were not questioned.

	participant answers				
What would you **ideally like to learn** today?	Content on precision farming and arable farming; More silage from own fields; A lot about increasing of yields; How to collect data; Innovation in potato cultivation				
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
The **demonstration met my expectations** regarding what I wanted to learn.	0	0	8/10	2/10	0
The **demonstration exceeded my expectations.**	0	4/10	3/10	3/10	0
I felt surprised at some point(s) during the demonstration.	0	2/10	5/10	3/10	0
I obtained a clearer understanding of the topic(s) demonstrated.	0	0	4/10	6/10	0
I have the feeling **I learned something new** (knowledge, skill, practice, etc.).	0	0	3/10	7/10	0
I **thought about how I could implement** some of the ideas and practices on my own farm.	1/10	1/10	4/10	4/10	0
I **reflected on my own point of view** at some point during the demonstration.	0	6/10	4/10	0	0
I learnt about **the principles underlying a practice**.	2/10	4/10	4/10	0	0
I thought about **how** we **learn something new** on demonstrations (e.g.: teaching methods).	5/10	3/10	2/10	0	0
I thought about **why** I want to learn about **the topic(s) of this demonstration.**	6/10	2/10	1/10	0	1/10

	demonstrator answers				
what do you **intend for the particpants to learn** today?					
	strongly disagreed	disagreed	agreed	strongly agreed	not applicable
I think **participants have learnt what I intended them to learn**.	0	0	0	1	0
I tried to **surprise** participants with uncommon/new knowledge/new skill.	0	0	0	1	0
I felt surprised at some point(s) **myself** during the demonstration (e.g. by a question or discussion).	0	0	1	0	0
I obtained a clearer understanding of the topic(s) myself.	0	1	0	0	0
I have the feeling **I learned something new** during this demo (from participants, discussion...).	0	1	0	0	0
I **reflected on my own point of view** myself at some point during the demo.	0	1	0	0	0
I encouraged participants **to reflect on their own point of view** during this demo.	0	0	0	1	0
I encouraged participants **to reflect on their own situation** sometime during this demo.	0	0	0	1	0
I encouraged participants to reflect **on how we learn something new** on demonstrations.	0	0	0	1	0
I encouraged participants **to reflect on why we are trying to learn** 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 3,7 on 5, participants rated the event overall as effective. 10 on 10 participants who answered the questions would recommend the demonstration.

As main effective characteristics of the demo participants mentioned: Presentation in order from cultivation process; to learn how to optimise the use of a field; demonstrator told his own story about the development of

precision farming; good presentation; the demonstrator was one of us; demonstrator used a lot of examples from his own experience and farm; Presentation with new information for me

Participant mentioned following suggestions for improvement: tour was not effective. Sometimes you can't follow the demonstrator; group was too big (60 people); try to have more discussions; more test fields to see better the advantages of precision farming.

Demonstrators:

As main effective characteristics of the demo, the demonstrator mentioned: they want to come and they got to be active.

As suggestion for improvement the demonstrator mentioned: better reception room(s)

Observed main strong points of the event:

The demonstrator has a strong sense of empathy with the different visitors, which he uses to adapt the presentation on their level. The results in an optimal knowledge uptake.

Observed main possible improvements of the event:

The demonstration was on the potatoes farm, because of this the knowledge information was ideal. First there was a presentation, after that during the tour we can see a part of the practice. One missing point was a view on a real test field. In a test field, the theory will be shown in practice.

Although time was foreseen, there was a lack of questions and discussion input from the participants. Maybe some questions to foster discussion could be prepared in the future, when participants don't have much inspiration themselves.