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GATES
SMART FARMING SIMULATION PLATFORM

Applying GAming TEchnologies
for training professionals in Smart Farming

Document Summary

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Abstract

*This deliverable defines and describes the **major user requirements and competencies**, as well as the strengths and weaknesses of the customer segments and end-users together with their requirements and expectations when it comes to future GATES serious gaming platform. The requirements that emerged from the comprehensive interview-based survey conducted by the three GATES project partners are presented and they will be explained in depth for each of the target groups, i.e. future beneficiaries of the GATES game (as described in GATES Communication & Dissemination Strategy & Plan). The initial goal of partners involved in this activity was to have a questionnaire filled in by 240 interviewees from 3 European countries (namely, Spain, Greece and Serbia) and at the end there were 253 answers collected from interviewees coming from seven European countries. Therefore, this deliverable presents the conducted survey results and focuses on the most important aspects stakeholders find useful regarding the learning strategies.*

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1. Introduction

GATES, the acronym of "***Applying GAming TEchnologies for training professionals in Smart Farming***", is a European Project, supported by the European Union's Horizon 2020 Research and Innovation Programme, whose **overall objective** is to develop a **serious game-based training platform** in order to train professionals across the agricultural value chain on the use of **Smart Farming Technology**, thus allowing deploying its full economic and environmental potential in European agriculture.

The **GATES gaming platform** will be marketed as a **white-label app** within 1-2 years of project's end (June 2019), with the possibility of being customized according to the needs of paying customer (SFT companies, universities and extension services /agricultural consultants). It will function either as a stand-alone or as a complementary tool to traditional training methods, covering a wide range of agricultural settings in order to cater for the needs of different professionals in the SFT value chain. An in-depth **market analysis** and a **Business Plan** will be conducted during the project for facilitating the entry of the GATES gaming platform in the market.

The **GATES User Requirements Analysis** has been designed by InoSens, in close interaction among all project partners participating in this task (AUA and ANSEMAT), for efficiently presenting and understanding the real needs from the side of future GATES game testers and users.

In this context, the current report presents the methodology as well as the results of the survey launched within the framework of the GATES project with a view to capturing and analysing the needs of GATES target groups in terms of understanding the concept of serious gaming as educational platforms. In particular, it presents the information overview of a comprehensive interview-based questionnaire conducted over a 2 months' period (April-May 2017) with more than 250 interviewees and its main results. The major outcomes achieved serve as fuel for the design, testing and validation of the new generation of serious gaming experience to be provided by GATES partners for the benefit of whole agrifood value chain.

The document is structured in 5 chapters as follows:

- The overall introduction is given in Chapter 1.
- Chapter 2 presents the scope and objectives of the conducted interviews.
- Chapter 3 defines methodology of the survey, major target groups as well as survey questionnaire with accompanying interview process and specific guidelines for interviewers.
- Chapter 4 gives an overview on the findings of the performed survey.
- Chapter 5 elaborates on concluding remarks and results of the survey.

In addition, the two major annexes of the report present the questionnaires that were utilised in the frame of the survey (as part of this document) as well as the answers received from the interviewees (as a separate document, available upon request from the EC).

2. Scope and objectives of the survey

The main objective of the survey is to capture the needs of the diverse GATES target groups representatives which participate in and operate within the broad agri-food ecosystem in Europe, paving the way towards concluding on homogeneous target groups' profiles in terms of readiness for accepting serious gaming as an educational tool and business opportunity. The rationale behind the survey and initial hypothesis GATES had is that serious gaming utilization across complex and diverse agri-food value chain in Europe has not been systematically structured yet due to a fact that the uptake of innovative technologies (including gaming and/or online tools and platforms) has not reached massive scale and stakeholders need more guidance in this respect.

Based on presented above, GATES team initiated the survey action, since its team wants to gain insights on the needs of agri-food stakeholders with respect to serious gaming. It wanted to see if target groups (farmers, agri consultants, smart farming industry representatives, students) representatives have any common characteristics in terms of readiness for accepting the concept of serious faming for the benefit of agri-food value chain, and what are the barriers and if there are any success factors in this process. The idea is to profile them and utilise the findings of the survey to create well-tailored serious gaming platform and supporting services.

In this context, **the purpose of the interviews conducted is to capture current experience and interests target groups might have with respect to serious gaming.** To this end, they target various **participants across the agri-food value chain** (as explained in the paragraph above) as well as **company representatives** (with emphasis on partners' countries) across Europe.

More precisely, specific objectives include:

- Understanding the degree to which representatives within the agri-food ecosystem are currently engaged in (serious) gaming experiences,
- Identifying the main barriers that are preventing agri-food value chain participants from integrating (serious) gaming into their routine activities,
- Assessing the willingness of agri-food participants to establish/enhance (serious) gaming understanding,
- Gaining insights into the perceived knowledge, skills, tools and/or support that participants need in order to successfully capitalise on serious gaming utilization.

3. Methodology

3.1 Survey design

The survey followed a well-tailored design that ensured that its implementation would be efficient and feasible within the given time frame of the activity in the context of the project, while producing reliable results. In particular, at least 240 interviews within a 2-3 months' period were to be conducted with stakeholders from the defined target groups. In fact, the survey targeted to reach interviewees with various level of experience in serious gaming as well as interviewees who have never experienced such concepts. This fact helped project partners to understand better why exactly European target groups' representatives are not engaging in this learning modality and what are their exact needs in terms of large-scale inclusion in serious gaming for the benefits of the entire value chain. Moreover, interviewers opted for approximately 40% of the conducted interviews to be directed towards the farmers that can, in general, be considered as non-adopters of serious gaming platforms. This is important since an insight from farmers as backbone of the agri-food value cain that are not experiencing serious gaming in its full potential guides the development of future game and services in a proper direction, i.e. it can include the most important aspects that they need from the very beginning of the operational setup.

The reason why we chose only questionnaire survey in user requirements analysis instead of other methods is because the questionnaire was developed by all the partners involved in the task and in several iterations, by following the logic of preparing the face-2-face questionnaire based interview. Since we did not rely on any other already implemented survey in this field, we have jointly decided that this will be the most appropriate and the fastest way to understand the needs from the interviewees that we reached. The interviews were semi-structured and conducted either via personal meetings (in vast majority of the cases) or digital means (e.g. telephone, Skype, etc.), according to the most efficient logistic arrangement that could be achieved for each individual case.

3.2 Target groups

In respect to the specific target groups, the project team interviewers have thought to cover almost the complete agri-food value chain areas, different geographic scope and even adopters/non-adopters of serious gaming concept. As described by the Standing Committee on Agricultural Research (SCAR)[1] of the European Commission, the agri-food ecosystem is actually a cross-sectoral ecosystem that encompasses farming, food industry, trade, retail, logistics networks, and it becomes more and more backed by technology and innovation providers. In order to capture such a complex system, GATES has divided survey target groups in 4 segments: farmers (focus in Serbia), agricultural students (focus in Greece), smart farming technologies (SFT) specialists and companies' representatives (focus in Spain), as defined in the Description of Action and in compliance with GATES Communication & Dissemination Strategy & Plan.

It is important to mention that companies were mainly the agricultural machinery producers and very often their employees who participated in the survey are also smart farming technologies specialists, but they have selected to participate as companies' representatives. All these target groups with more explanations are given in Table 1 below.

[1] EU SCAR (2012), Agricultural knowledge and innovation systems in transition – a reflection paper, Brussels

Table 1 GATES target groups

Target Groups	Explanation
Farmers 	Responsible for on-field growing of various agricultural products. This group comprises primary producers, including various fields of agri-food domain, such as: arable crops growers, tree crops growers, open field vegetables (horticulture) growers, vineyards farmers, etc. Including farmer's Unions, farmers' associations (including Cooperatives for the Utilisation of Agricultural Machinery) and federations, producers' organisations and Unions, Agricultural cooperatives & associations, Chambers of Agriculture. This Target Group is considered as End-users/trainees of the gaming platform, a key group for the exploitation of the gaming platform. The final aim is to increase the adoption level of smart farming technologies by this group.
Agricultural Students 	As the new professionals in the SFT value chain, they need to be educated in the applicability and potential for utilisation of SFT from a systemic approach, in order to acquire knowledge and skills on the collection, integration and interpretation of information in complex and interconnected agricultural systems.
Smart Farming Technologies (SFT) specialists 	Agronomists, Chambers of agronomists, public advisory and extension services and authorities, and their associations (EFAC – The European Federation of Agricultural Consultants; EUFRAS – European Forum for Agricultural and rural advisory services); agricultural engineers and their associations (i.e. EurAgEng). As agricultural consultants, SFT specialists will benefit from applying the GATES serious game for training their customers (farmers), allowing them to expand their advisory service portfolio while gaining new insights in the applicability of SFT, thus also improving their advisory skills and increasing job performance.
Companies' representatives 	The Smart Farming industry comprises a wide array of multinational companies, SMEs and start-ups in different fields: developers of precision equipment and agriculture machinery, sensors, ICT tools and services (farm management software, satellite images, etc), robots, drones, etc; National and EU wide associations of SFT manufacturers (i.e. ANSEMAT in Spain, Federunacoma in Italy, AXEMA in France, CEMA EU wide). The SFT industry, despite having traditionally played an active role in training farmers and advisors, faces an increasing pressure in terms of training, due to the fast pace of development of SFT technologies and the costly equipment needed for an efficient training in real life. This target group is considered as paying customers of the gaming platform (see Table 3). GATES will be designed to adapt to the needs of different SMEs in the SFT market, allowing them to benefit from the application of gamification for training their staff and potential customers in a particular technology or service of their portfolio, allowing also for different combinations of SFT adapted to the pedo-climatic and agricultural settings of their choice.

Mainly European countries where project partners are coming from were in focus, but project team members strived to capture different interviewees' standpoints that are coming from European countries outside of the partnership. Both adopters and non-adopters of serious gaming concept were included in the sample. The objective of this guided although qualitative grouping was to grasp and account for the different needs and priorities of stakeholders in relation to their different socio-economic characteristics and position in the agri-food value chain.

3.3 Survey questionnaire

A scheme was elaborated for the different types of stakeholders to be addressed as presented in Figure 1.

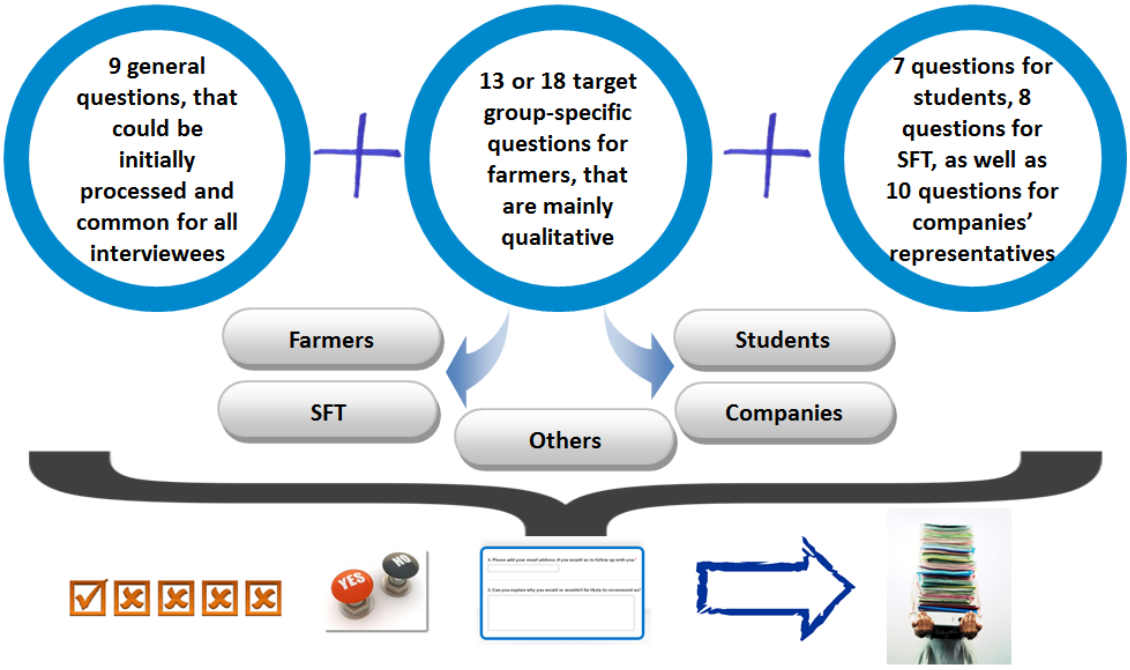


Figure 1 Set of questions and target groups

Because every single out of four main target groups has its own characteristics and reason for getting involved in the future in GATES ecosystem that is why we have decided to have two groups of questions: the common ones and target group specific ones. The benefit of having such an approach is actually the fact that we have to take into consideration several different views from different beneficiaries. In case we focus only on one group, we risk that the future game will not be interesting for other(s), so we had to develop a comprehensive questionnaire and divide among the partners involved. On top of that, it is stated in the Description of Action that we will somehow divide beneficiaries between our partner countries, so we actually had to have different parts of this questionnaire.

Nine general questions are common for all target groups and they aim to capture the current state regarding interviewees' understanding of the serious gaming concept and general interests. The following questions are target-group specific ones and go more in depth in topics related to specific characteristics of each target group.

Since the GATES partners aimed to capture as much of the agri-food value chain as possible (from farmers to students and specialists), survey questions are divided into several categories, in order to allow for both quantitative and qualitative analysis afterwards. Project team focused on interviewing various individuals that have not yet benefited from the serious gaming concept. The questions vary from YES/NO questions, multiple-choice questions to questions where interviewees' specification was needed. The questionnaires employed in the framework of the interviews are annexed to the current report.

3.4 Interview process

The overall approach used with respect to the implementation of the interviews focused on the following three aspects:

- Introduction - where interviewers introduced themselves and explained the purpose of the interview,
- Discussion guided by the questionnaire - where interviewers asked the set of questions and enabled the interviewees to openly comment on them while discussing the issues they find important regarding serious gaming concept, and
- Closing of the interview - where interviewers posed the final invitation to each and every interviewee to join the GATES community, in order to create a critical mass for the upcoming validation cycles during the project. Approximately one third of the participants left their contact details and supported the creation of the GATES community.

All partners involved in the survey were properly briefed and trained on how to efficiently and effectively implement the methodology of the survey by the InoSens as task responsible and overall work package leader, the core responsible partner for the activity. This included the **elaboration and utilisation of specific methodological guidelines** as well as online templates for capturing and digitising the responses collected during the interviews (provided via a LimeSurvey based template, hosted at the InoSens webserver - http://inosens.rs/survey/) that were used by each involved GATES partner (preview of online survey is shown on Figure 2, Figure 3, Figure 4, Figure 5, Figure 6 and Figure 7)

Figure 2 On-line survey - Intro

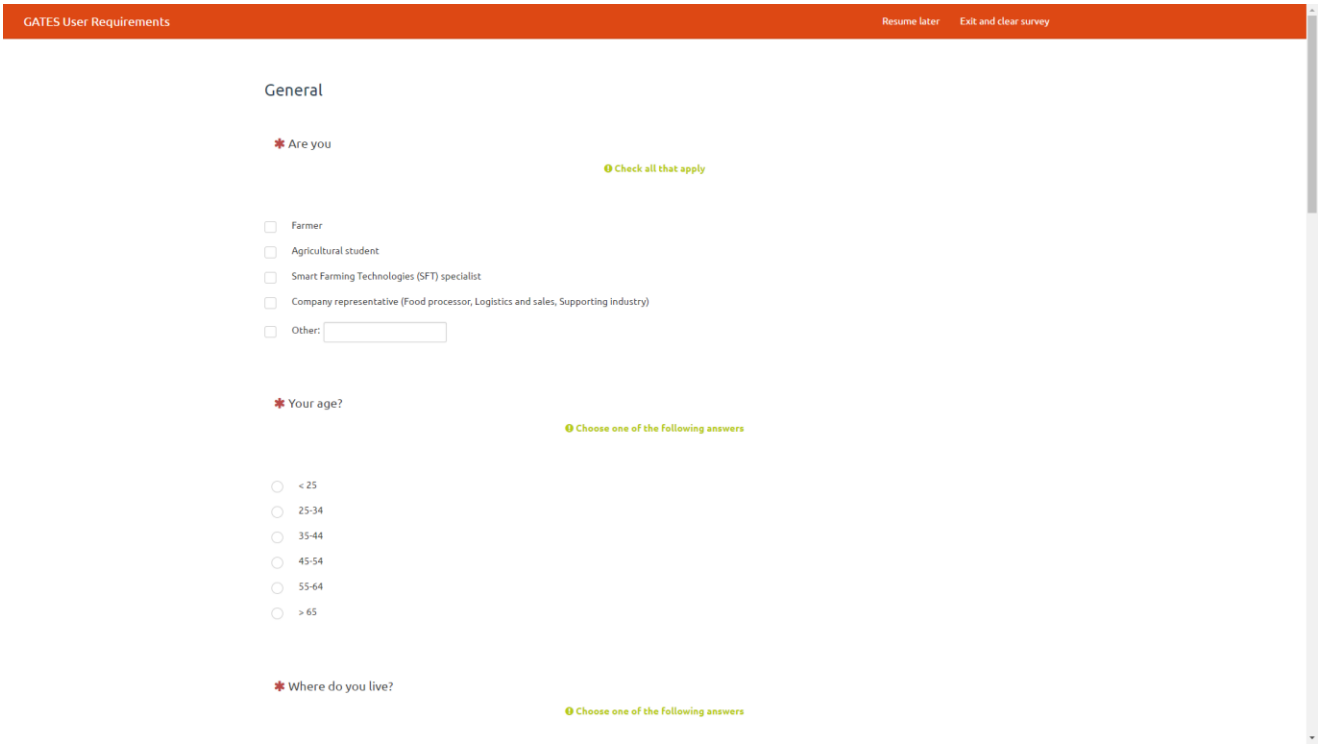


Figure 3 On-line survey - General questions

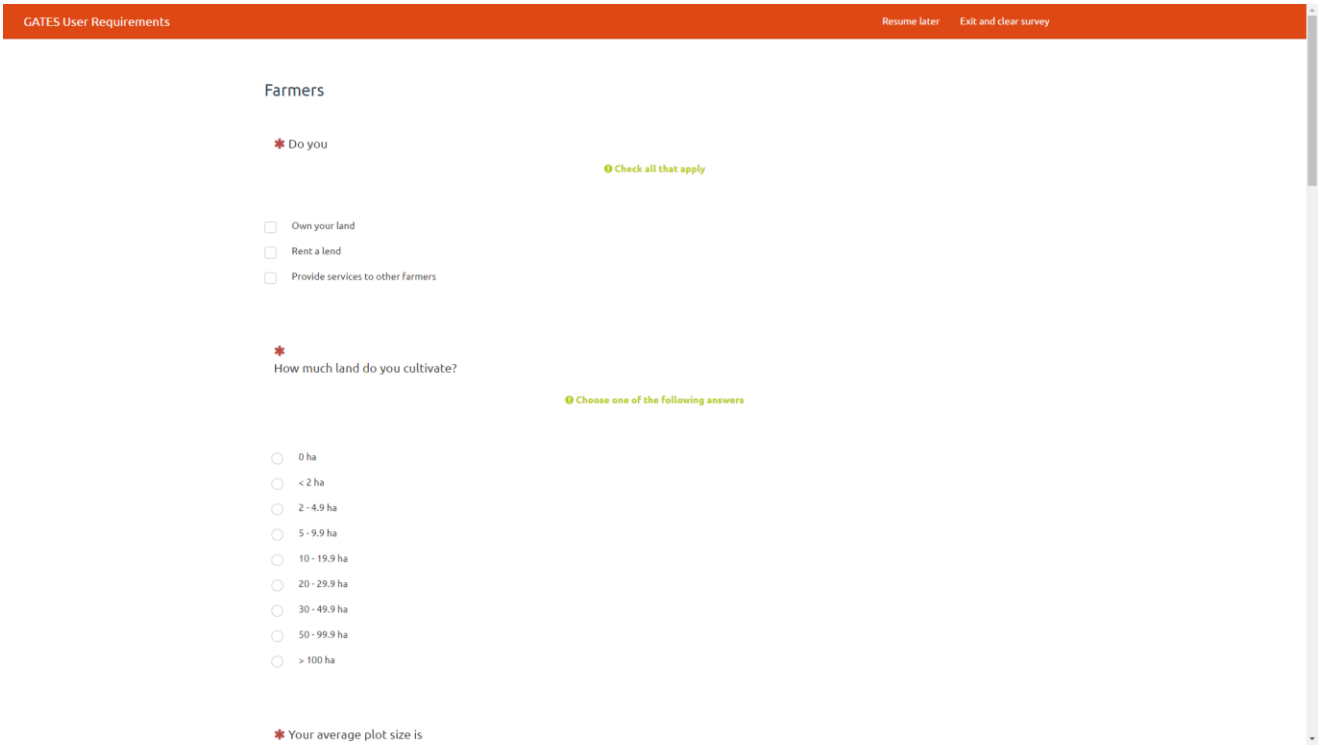


Figure 4 On-line survey - Farmers

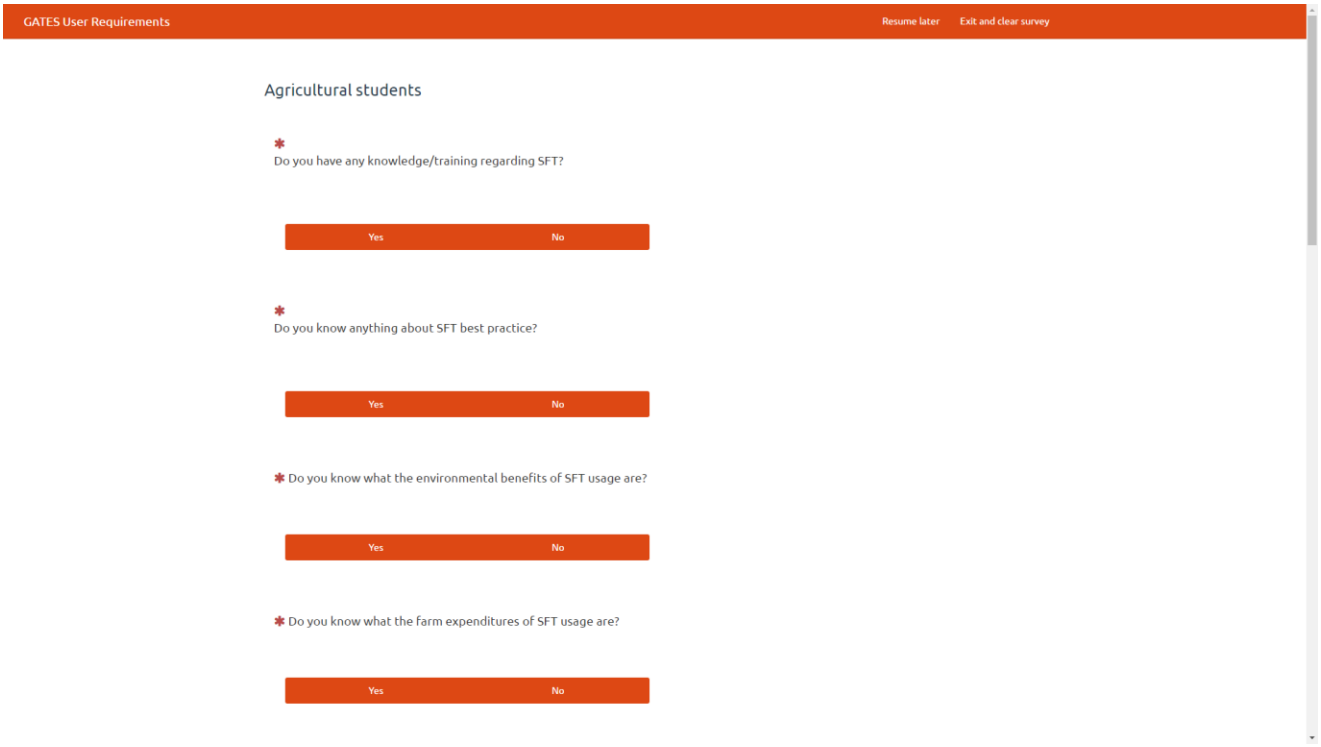


Figure 5 On-line survey - Agricultural students

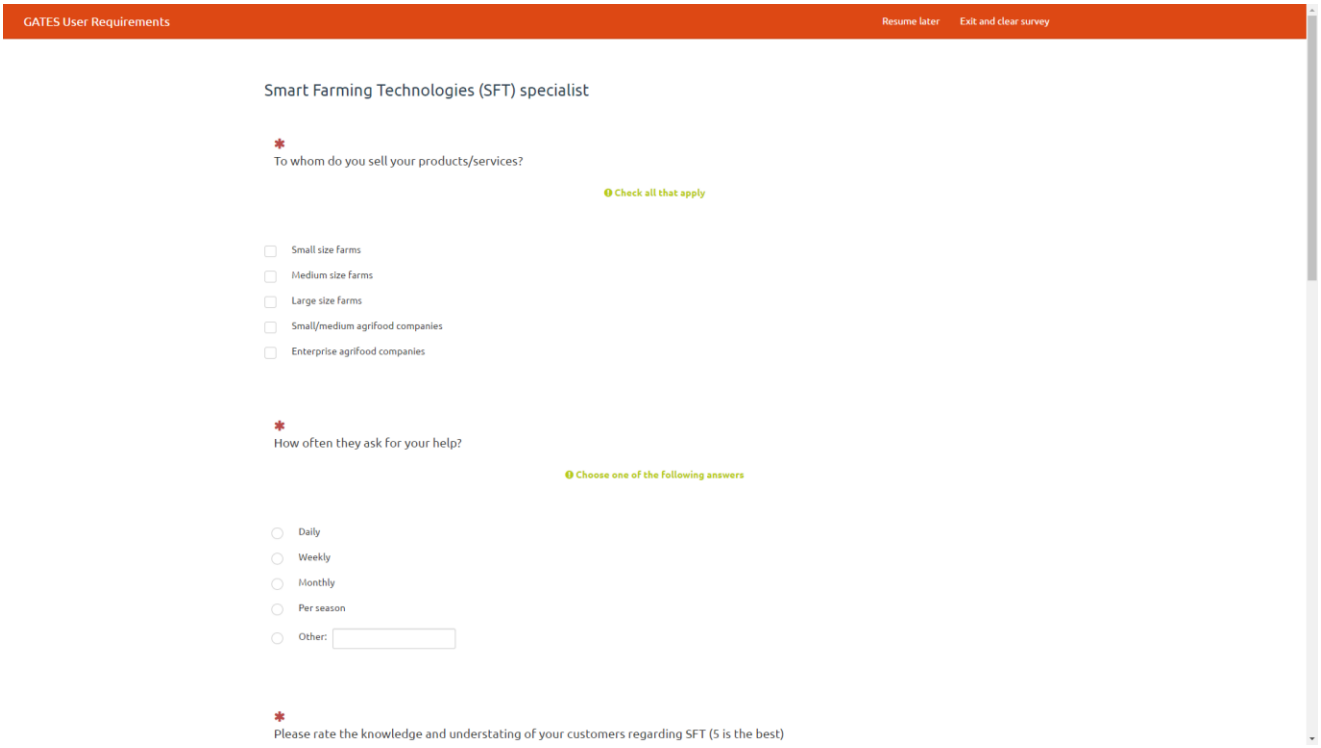


Figure 6 On-line survey - SFT specialists

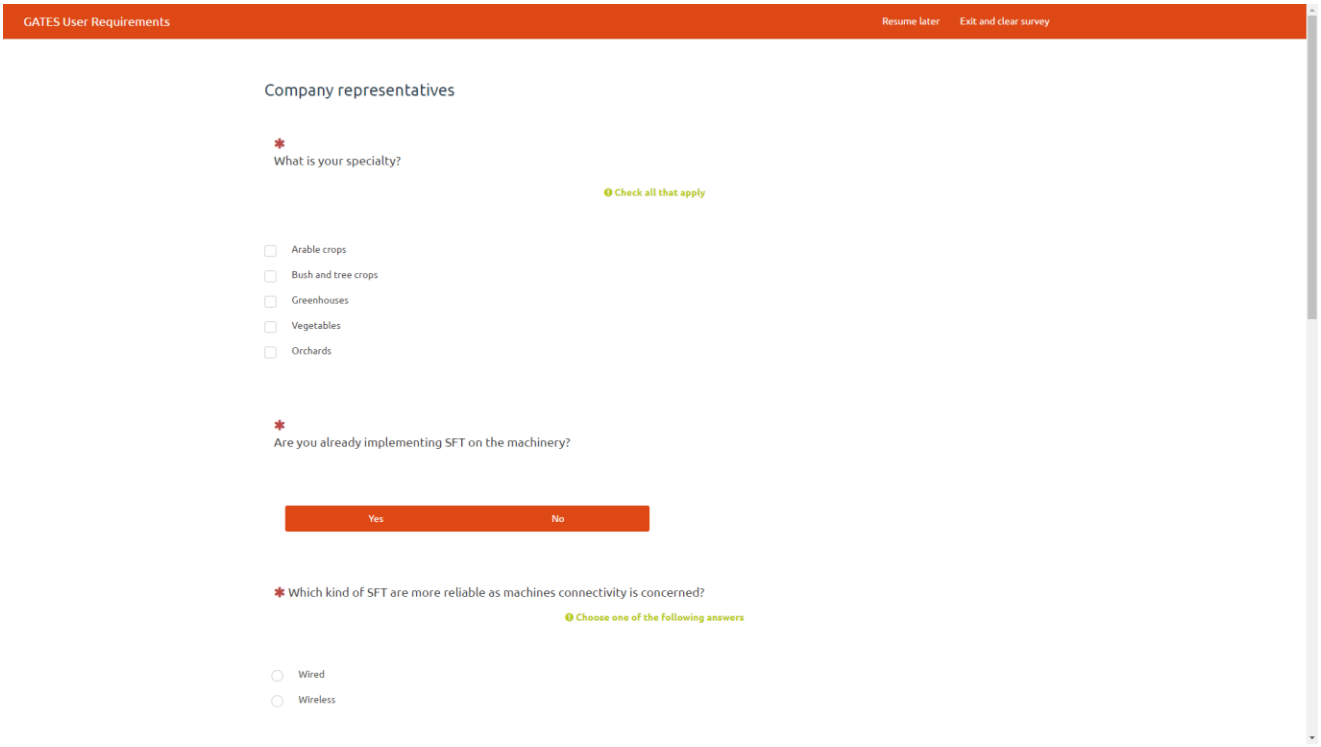
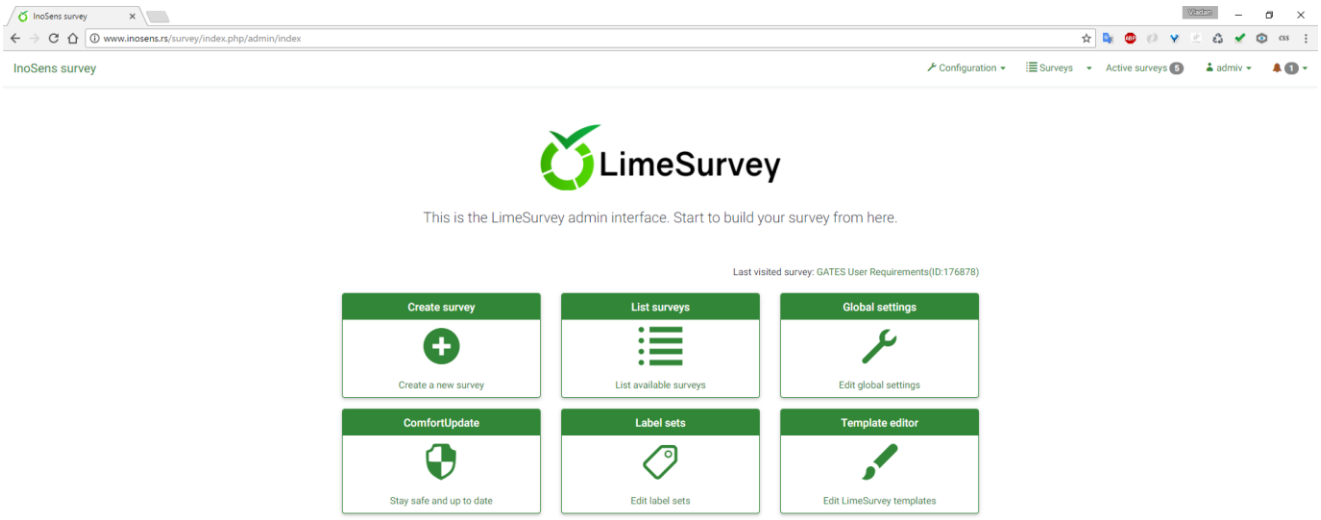


Figure 7 On-line survey - Company representatives

Administrative panel of LimeSurvey is depicted on Figure 8.



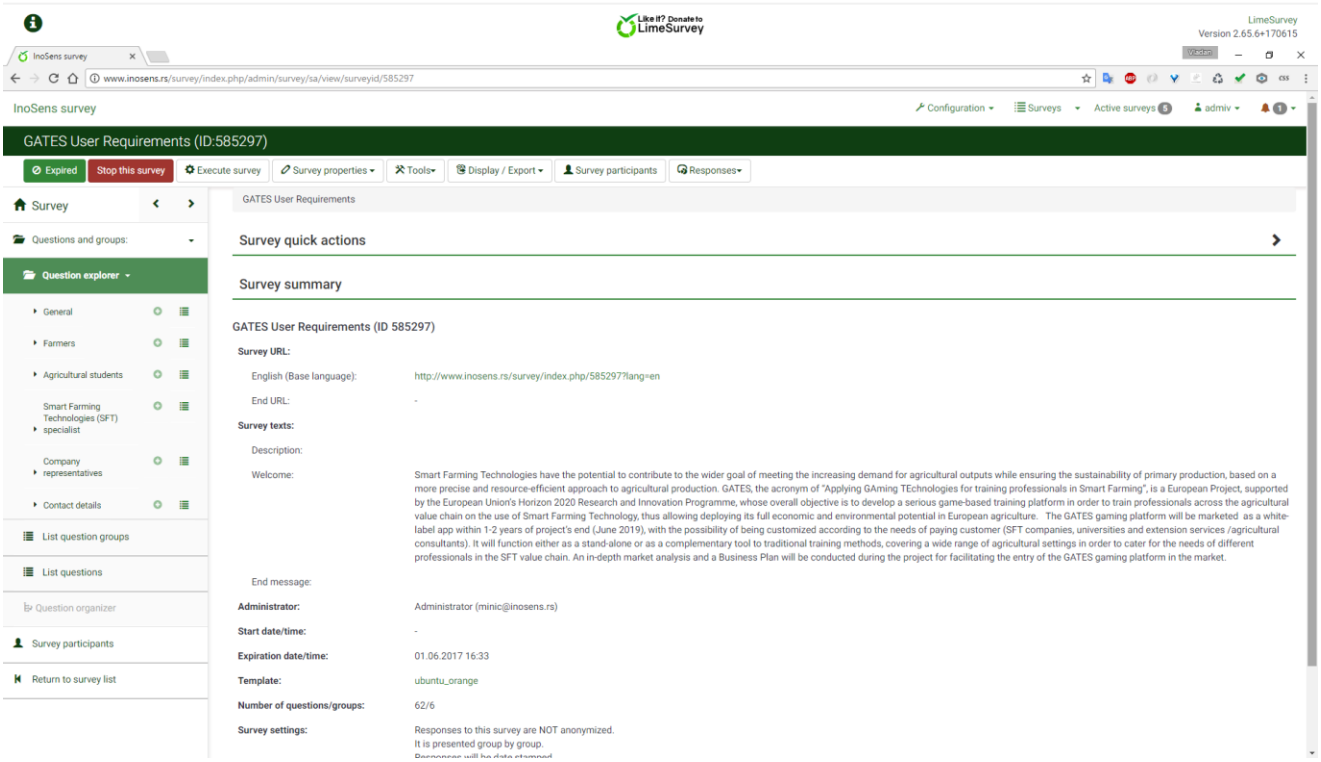


Figure 8 a and b - LimeSurvey administrator panel

4. Findings of the survey

This section provides detailed explanations of the survey findings. It is divided into five sections. The first part of findings is overview of responses given on general questions common for all target groups. It is followed with the other four parts covering groups' specific questions, namely: farmers, agricultural students, SFT specialist and the last group of stakeholders are company representatives.

Given the survey structure and collected answers, the authors of this deliverable provided within this section the descriptive statistical analysis. The structure of this survey is created in a way that it does not include the probability theory, thus there are no hypotheses testing and deriving estimates. Therefore, descriptive statistics concerns with properties of the observed data. A statistic on percentage in answers is presented, as well as the descriptive analysis of questions. For questions where it fits, measures that are commonly used to describe a data set are given: measures of central tendency and measures of variability or dispersion (calculated by using the Minitab statistics package).

4.1 Results by all categories (common questions)

This chapter will cover questions common for all four stakeholders groups. There are nine common questions in this group and will be described on the following pages. The idea of these questions was to capture the basic distribution between the target groups and fundamental demographic observations of the captured data set. Additionally, the authors wanted to understand better whether and for what purposes all target groups play video games (both fun and serious games) and also whether they had some experience related to the SFT learning experiences at specific educational platforms.

Lastly, within this common questions section we wanted to understand what interviewees perceive as the most important features future GATES platform should have (availability across devices, business problems focus, the usage of the machinery within simulation, etc.).

Are you		
Answer	**Count**	**Percentage**
Farmer (SQ001)	96	37.94%
Agricultural student (SQ002)	96	37.94%
Smart Farming Technologies (SFT) specialist (SQ003)	11	4.35%
Company representative (Food processor, Logistics and sales, Supporting industry) (SQ004)	51	20.16%
Other Browse Agr. machinery employee	1	0.40%

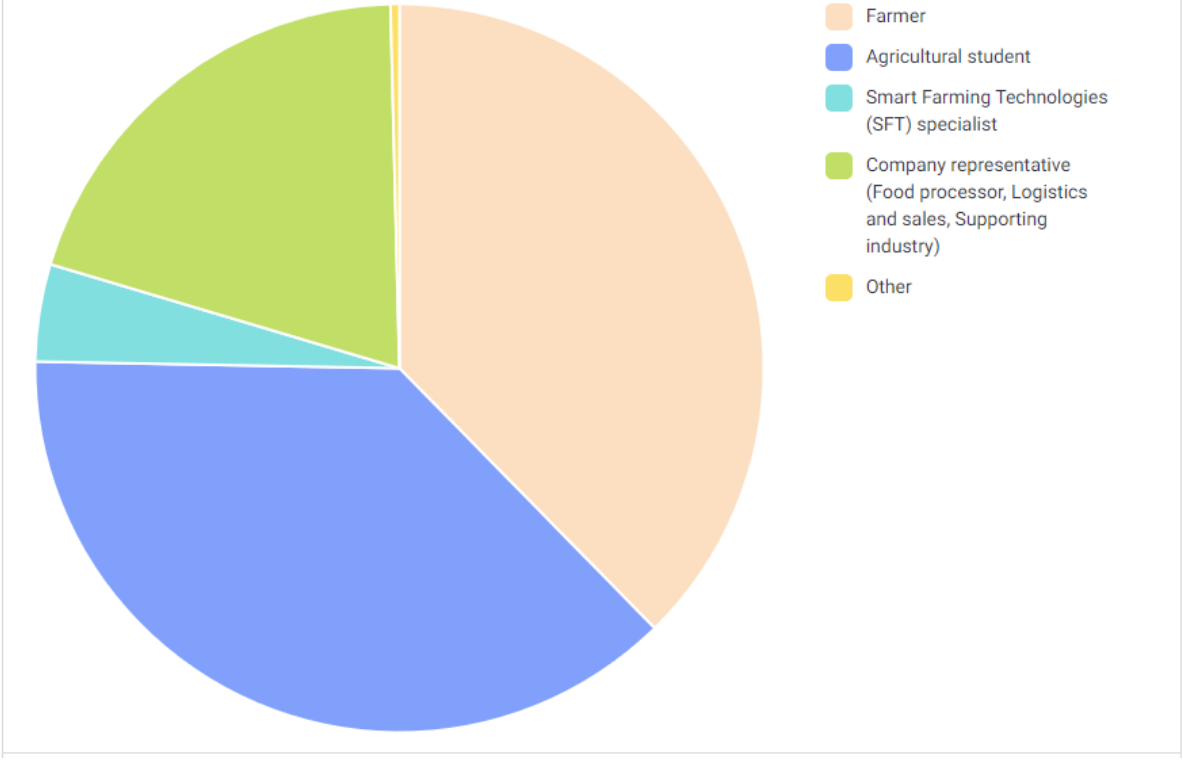


Figure 9 Target groups

Figure 9 shows that 96 of 253 responses (slightly over one third) are coming from the agricultural students, and the same number comes from farmers. Last third belongs to Company representatives (20.16%) and Smart Farming Technology specialist (4.35%), where two stakeholders answered on both group questions and one answer from Agricultural machinery employee (0.4%).

Your age?		
Answer	**Count**	**Percentage**
< 25 (A1)	105	41.50%
25-34 (A2)	35	13.83%
35-44 (A3)	38	15.02%
45-54 (A4)	47	18.58%
55-64 (A5)	25	9.88%
> 65 (A6)	3	1.19%
No answer	0	0.00%

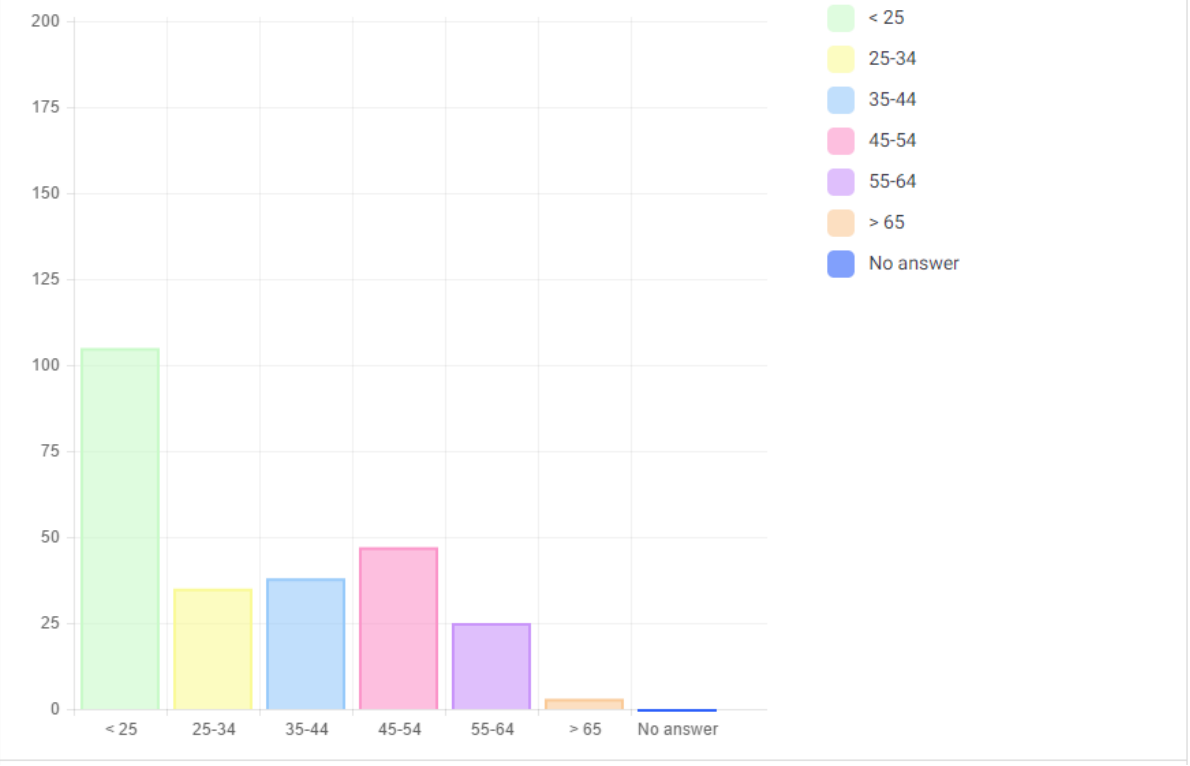


Figure 10 Stakeholders age

The largest number of examinees (105) are younger than 25 years, as depicted in Figure 10, as a result of having 96 agricultural students. Next largest group are people between 45 and 54 years (47), following with the groups of 35-44 (38), 25-34 (38) and smallest group is the one with stakeholders older than 65 years.

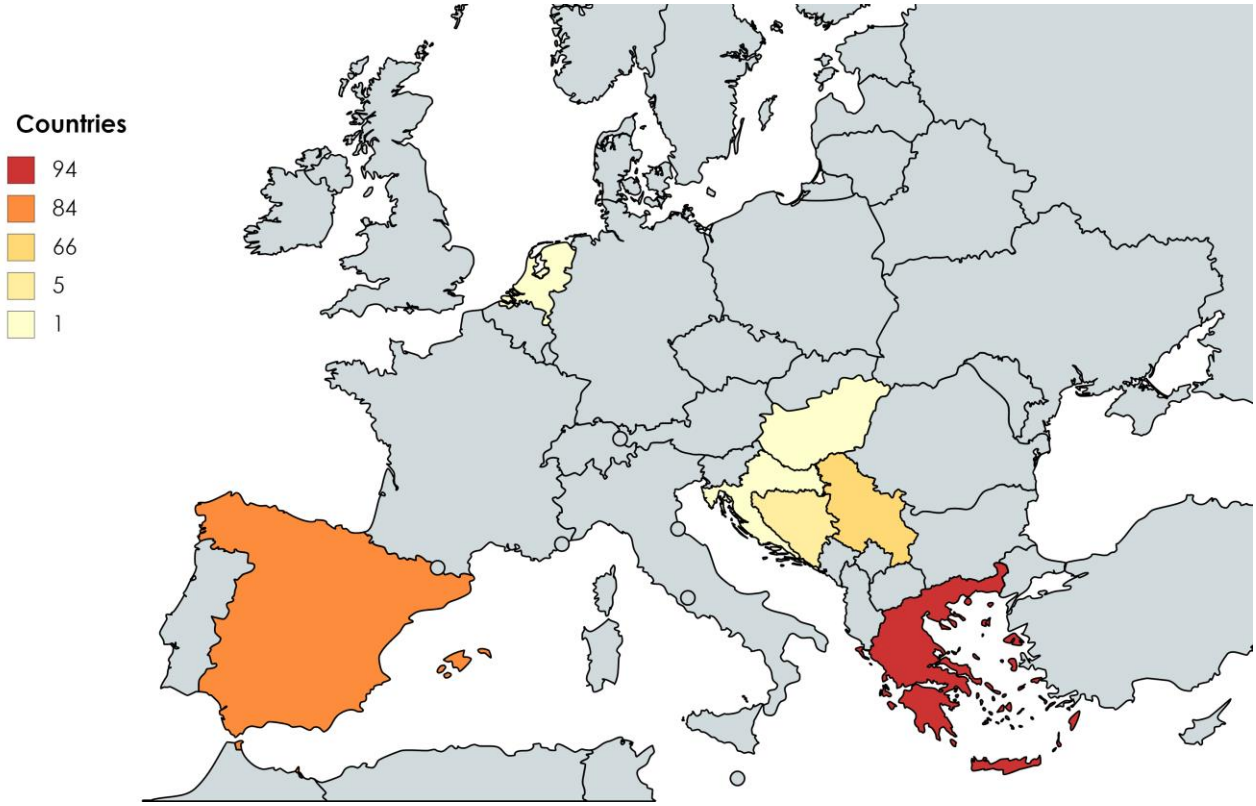


Figure 11 Responses map

In total **253 interviews** with stakeholders from the pre-classified groups was conducted - Figure 11. Responses are coming from **7** different European countries: consortium countries (Greece 94, Spain 84, Serbia 66) plus from 4 European countries outside the GATES consortium (Bosnia and Herzegovina 5, Croatia 1, Hungary 1, The Netherlands 1).

Figure 12 shows very interesting facts. Almost one third (30.83%) doesn't play games at all (36 farmers, 14 students, 2 SFT specialist and 26 company representatives). Second third (32.81%) play games from time to time (32 farmers, 30 students, 5 SFT specialist and 17 company representatives). Last third play games on regular basis (28 farmers, 52 students, 4 SFT specialist and 8 company representatives and 1 "other").

From 175 stakeholders who play games (69.17%), majority of them (93.18%) play fun games and almost half (55.68%) play serious (educational) games (21 farmers, 56 students, 7 SFT specialist and 16 company representatives), as depicted in Figure 13.

Do you play video games?		
Answer	**Count**	**Percentage**
Every day (A1)	41	16.21%
Once a week (A2)	30	11.86%
Once a month (A3)	21	8.30%
From time to time (A4)	83	32.81%
I don't play the games at all (A5)	78	30.83%
No answer	0	0.00%

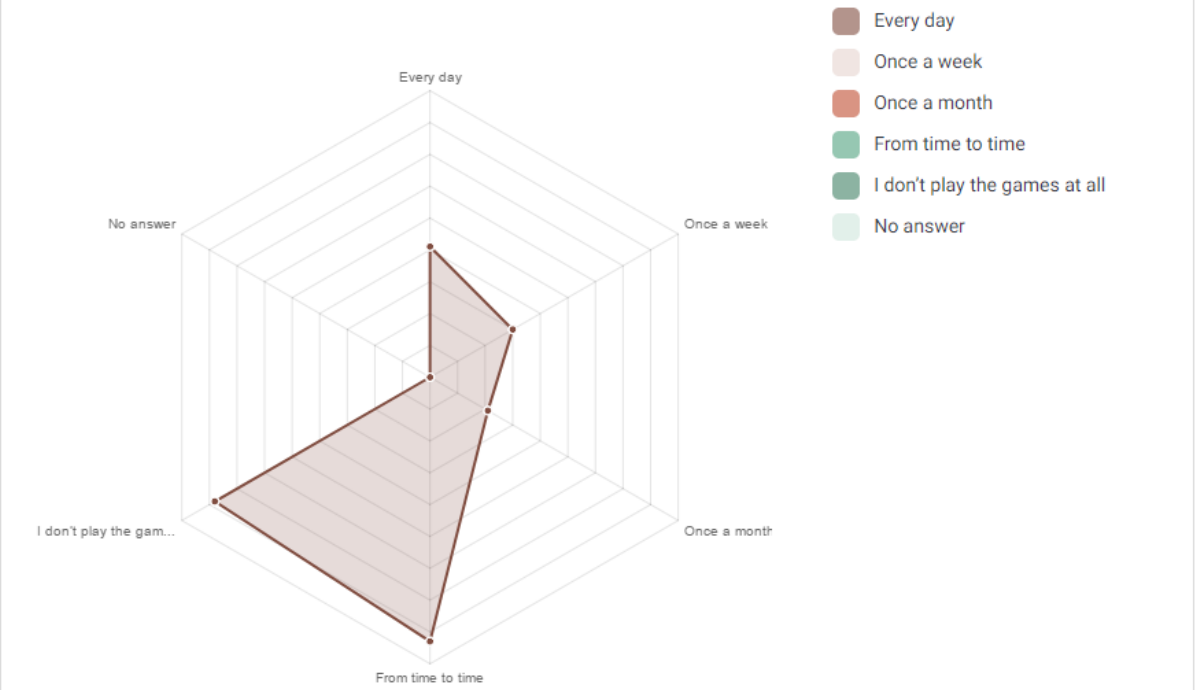


Figure 12 Playing videogames

What kind of games do you play?

Answer	Count	Percentage
Fun (SQ001)	164	93.18%
Serious (Educational) (SQ002)	98	55.68%

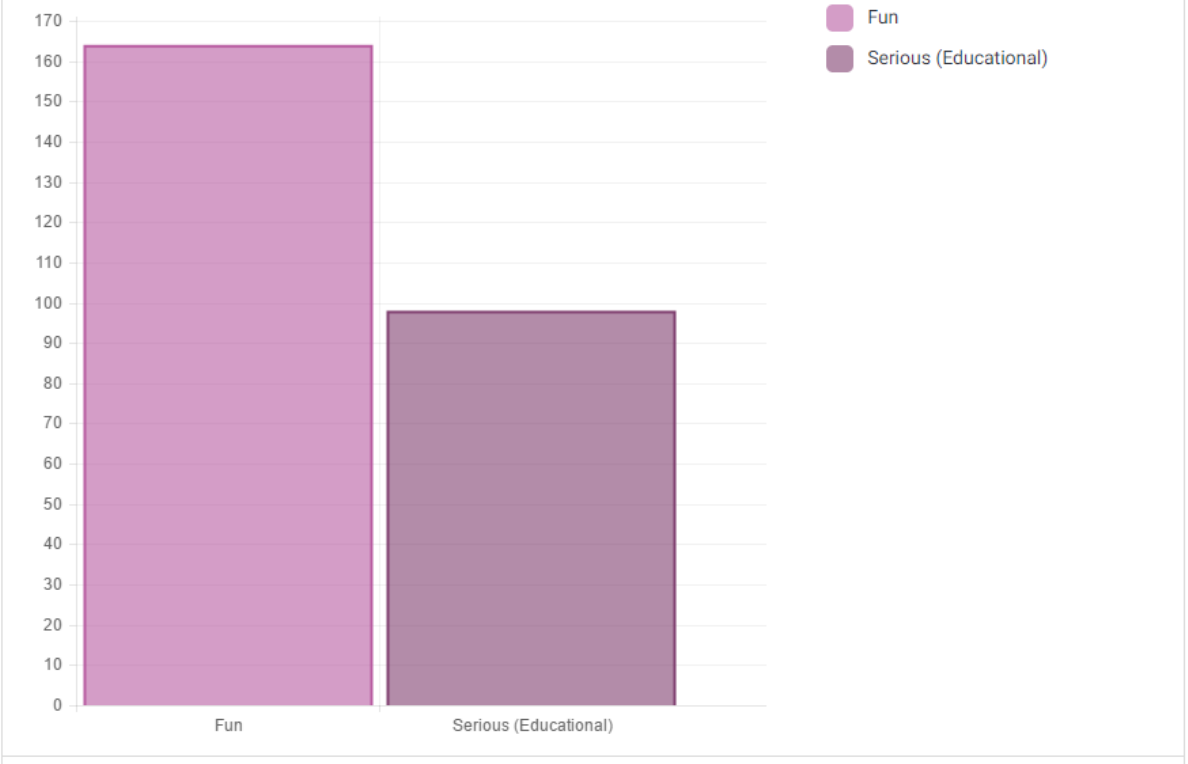


Figure 13 Game types

On question ***Did you ever use any training platform for agricultural machineries/services?*** *83 stakeholders (32.81%) answered with Yes and 170 (61.19%) with No.*

56.92% (109) responded with yes on ***Have you ever considered to play video games where your level of progress and expertise would help you out in your daily real work?*** *and 109 (43.08%) with No.*

When evaluating question ***Which do you think are the most important features this platform should have?***, stakeholders responded on almost every question with high marks and their answers are depicted in Figure 14, which is probably result of high expectations of GATES simulation platform. Here are the results of users ratings:

Availability of a game on any platform (device)?: 75.89% answered that it is very important for them that GATES is playable on any device (marks 4 and 5). Mark 3 takes 15.02% of answers and marks 1 and 2 just 9/09%. Arithmetic mean is 4.15 and standard deviation is 1.12.

Availability of a game on any browser?: Arithmetic mean of this feature is 3.76 with standard deviation of 1.25. Two thirds (60.01%) said that it is important that game is playable in any browser – marks 4 and 5, 19.37 gave mark 3 and 14.62% marks 1 and 2.

Availability of a game on standalone mode?: Slightly more than a half of stakeholders (53.36%) replied with marks 4 and 5 (very important) regarding feature that GATES should be standalone application. Almost a third said that it is middle important feature (mark 3) and 16.60% that it is not important feature (marks 1 and 2). Arithmetic mean is 3.53 and standard deviation is 1.18.

Figure 14 The most important features

Simulation of any business model concept?: Arithmetic mean for this feature is 3.83 with standard deviation of 1.03. 64.43% stated it is very important to have this kind of simulations. 26.09% gave mark 3 and 9.49% gave marks 1 and 2.

Simulation of a specific model concept?: Almost the same percentage of answers are for this feature as well. 63.24% gave high rates, 25.69% middle and 1.07% low rates. Arithmetic mean is 3.8 and standard deviation 1.03.

Elements of the ecological aspect the game will include?: Majority of stakeholders stated that ecological aspect is very important for them. Two thirds (66.80%) gave a marks 4 and 5, 22.13% of them said that it is medium important and 11.07% that it is not important at all. Arithmetic mean is Arithmetic mean is 3.88 and standard deviation is 1.09.

Simulation of any business problem?: This is another feature important for two thirds majority (66.43%). For 27.27% of them is medium important and for 8.30% is not important. 3.89 is arithmetic mean and std. deviation is 1.01.

Simulation of a specific business problem?: Similar answers we have and for this feature. 66.40% of stakeholders think that this is important feature. It is of medium importance for 24.11% of them and 9.49% that it is not important. Arithmetic mean is 3.87 and std. deviation is 1.02.

The usage of machinery in a simulation? The four fifths of stakeholders (81.42%) stated that feature is very important. 15.02% voted that it is of medium importance and just 3.56% answered that it is not important. Arithmetic mean is 4.27 and std. deviation is 0.87.

A possibility to purchase machinery in a simulation?: Two thirds of stakeholders (66.40%) gave marks 4 and 5 to this feature. 24.11% said that it is average important feature – mark 3, and 9.49% gave marks 1 and 2. Arithmetic mean is 3.87 bad standard deviation is 1.09.

Simulation on a specific machinery brand?: Slightly less than one third (29.25%) replied that it is not important at all (marks 1 and 2), 30,83% that this feature is of average importance (mark 3), and 39.92% that it is very important (marks 4 and 5). Average mean of answers is 3.17 (average importance) as a mark with standard deviation of 1.29.

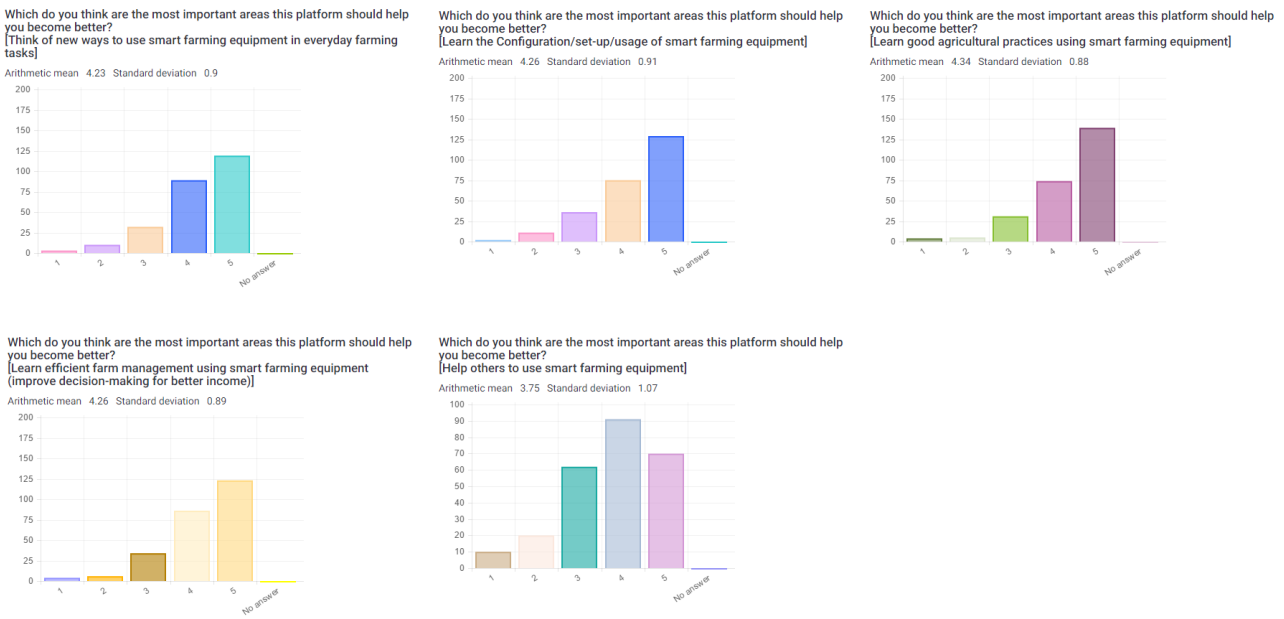


Figure 15 The most important areas

Figure 15 shows the answers on question: ***Which do you think are the most important areas this platform should help you become better?*** Even more than on previous question, stakeholders rated almost all areas as very important:

> **Learn the Configuration/set-up/usage of smart farming equipment**: Four fifths (80.63%) gave a marks 4 and 5, 14.23% mark 3 and 5.14% marks 1 and 2. Arithmetic mean is 4.23 and std. deviation is 0.9.
>
> 84.19% would like to **Learn good agricultural practices using smart farming equipment**. 12.25% gave an answer that it is of medium importance for them and only 3.56% that they don't need that kind of knowledge. Arithmetic mean is 4.26 and std. deviation 0.91
>
> To **Learn efficient farm management using smart farming equipment (improve decision-making for better income** is more than welcome for 82.61% of stakeholders. For 13.44% this knowledge is of medium importance and 3.95% thinks that they don't need it at all. Arithmetic mean is 4.34 and std. deviation is 0.88.
>
> Of 253 interviewees, to **Help others to use smart farming equipment** 63.64% stated that it is very important. 24.51% said that it is of medium importance and 11.86% that helping others is not important at all. Arithmetic mean is 4.26 and std. deviation 0.89.
>
> 82.21% of stakeholders would like to know how to **Think of new ways to use smart farming equipment in everyday farming tasks**. 12.65% thinks that it is medium importance and 5.14% thinks that this kind of information is not useful for them. Arithmetic mean is 3.75 and std. deviation is 1.07.

- From 253 stakeholders, the majority is younger than 25 years and they primarily live in Southern Europe. Almost two thirds either doesn't play games or play from time to time and from those who play slightly more than half play fun games. This means that there is a room for increasing a stake of serious gaming concept as a learning tool within the stakeholder groups.
- Majority didn't use any training platform and more than a half has consider to play such video games which will increase their expertise, so GATES represents very good starting point for all of them. They prefer it to be playable on any device and to be standalone application and, if it is going to be a web based game, to be playable on any internet browser. They would also like to get insights from any business models and problems from the field, as well as about a specific one from their branches.
- Almost 40% said that they would like to try simulation on a specific machinery brand, which is very good for GATES platform since it provides an opportunity to further develop a white label business model.
- Slightly more than 80% of stakeholders would like to learn good agricultural practice and how to set-up and use SFT equipment, efficient farm management and new ways of using them.

4.3 Farmers (specific questions)

This chapter will cover responses from 96 farmers who took part in this survey. This target group that took part in the survey is coming from Serbia (and in few cases from some regional countries as well) and Spain. In most of the cases, they are rather small-scale farmers who are focused on arable crops production. Conducted interviews usually took place under the auspices of regional/international trade fairs and similar events (e.g. http://www.sajam.net/en/fairs-2017/84th-international-agricultural-fair) and project team members had the opportunity to understand better the farmers' needs in direct talks in the business-related atmosphere.

As shown in Figure 16, 93.75% of farmers (90 of them) are land owners, 40.62% (39) also rent a land from others and 14.58% (14) provides services to other farmers.

Do you		
Answer	**Count**	**Percentage**
Own your land (SQ001)	90	93.75%
Rent a lend (SQ002)	39	40.62%
Provide services to other farmers (SQ003)	14	14.58%

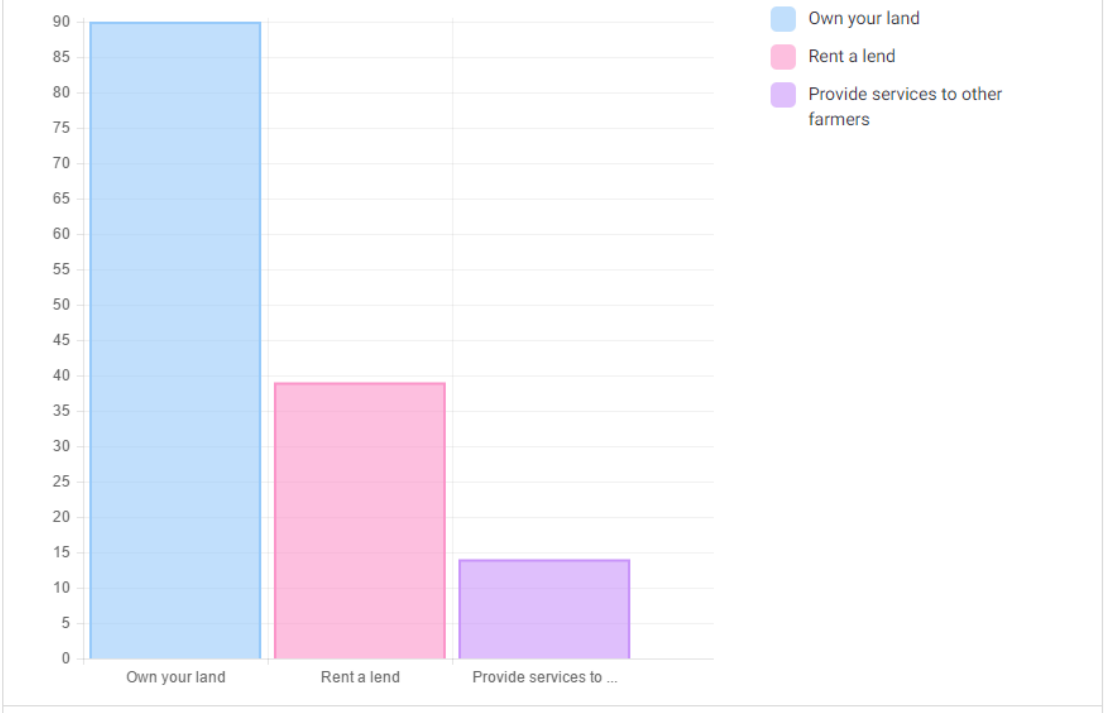


Figure 16 Land owners

Figure 17 depict very interesting information regarding amount of land cultivated by farmers. On one side, 2.08% do not cultivate the land. On the other hand, the biggest number of farmers, 23.96% cultivate land between 2 ha and 4.99 ha. 15.62%, at the same time, cultivate less than 2ha as well as land between 50 ha and 99.9 ha. 12.50% of farmers cultivate from 10 ha to 19.90 ha. Land larger than 100 ha is cultivated by 9.38% of farmers. Similar percentage of 8.33% goes to farmers with land 5 ha and 9.99 ha, and 7.29% to 20 - 29.9 ha land sizes. Land from 30 – 49.9 ha is cultivated by 5.21% of famers. Looking globally, exactly 50% cultivate a land below 10ha and other half land with size over 10 ha.

How much land do you cultivate?		
Answer	**Count**	**Percentage**
0 ha (A1)	2	2.08%
< 2 ha (A2)	15	15.62%
2 - 4.9 ha (A3)	23	23.96%
5 - 9.9 ha (A4)	8	8.33%
10 - 19.9 ha (A5)	12	12.50%
20 - 29.9 ha (A6)	7	7.29%
30 - 49.9 ha (A7)	5	5.21%
50 - 99.9 ha (A8)	15	15.62%
> 100 ha (A9)	9	9.38%
No answer	0	0.00%

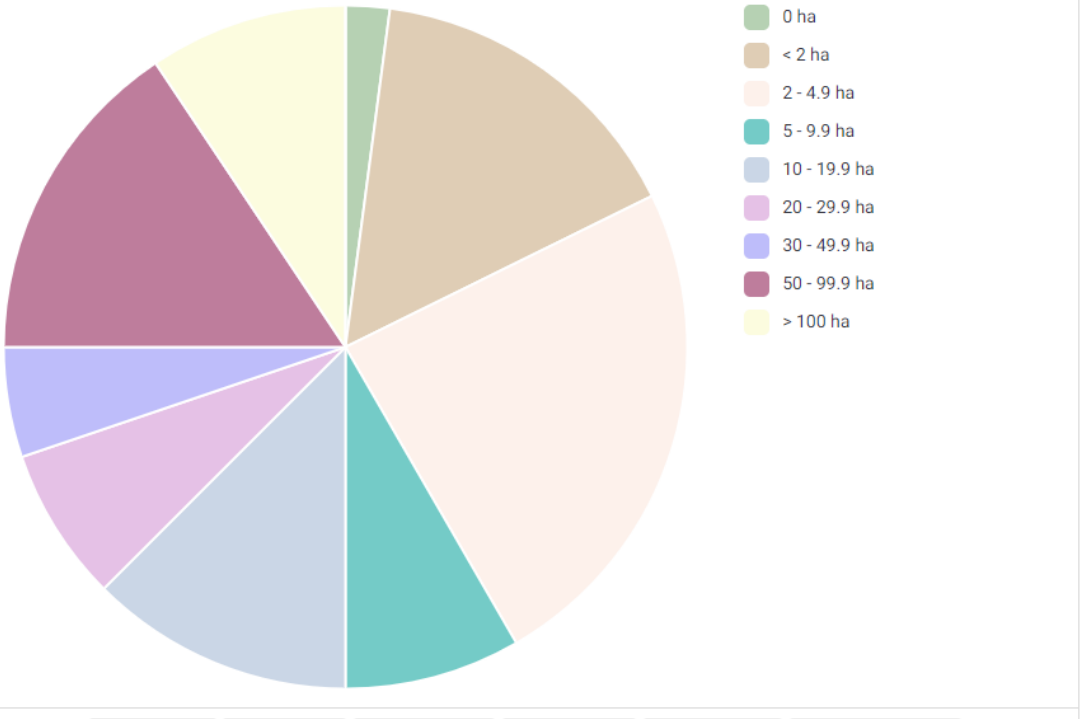
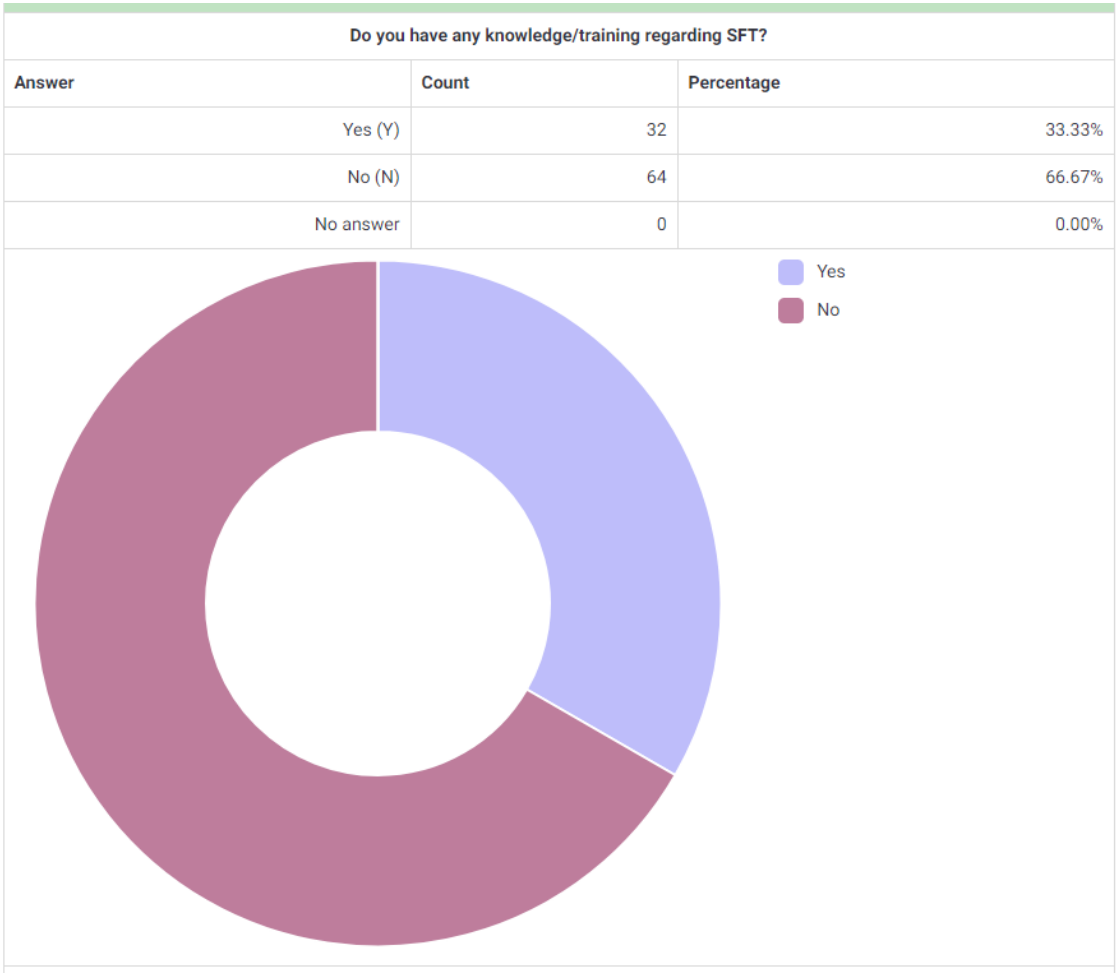


Figure 17 Land cultivation

30.21% of farmers have an average plot size between 1 and 2 ha, followed by plots smaller than 1ha (26.04%) and those between 2 and 5 ha (25%). Next biggest plots are those between 5 and 10 ha (12.5%) and 6.25% of plots between 10 and 50 ha. There are no plots with average size greater than 50 ha.

75% of farmers have a help of family members in land cultivation. 30.21% said that they get help of their friends or other farmers – 31.25%. Agronomists provide help to 21.88% of farmers and consultants to 17.71%. 7.29% claimed that no one is helping them which also means that none of them hire smart farming experts.

On question ***"Do you have any knowledge/training regarding SFT?"*** exactly two thirds answered that they don't have any knowledge or training regarding SFT - Figure 18.



Do you have any knowledge/training regarding SFT?

Answer	Count	Percentage
Yes (Y)	32	33.33%
No (N)	64	66.67%
No answer	0	0.00%

Figure 18 SFT knowledge

98.96% of farmers answered on question If using of some special equipment in farming jobs can help you improve your income are you open to find out more about it? with Yes and 1.04% No

On following two questions we may see the similar percentage of Yes as an answer like in previous one, and identical responses for both of them: **If you have the chance to control various farming tasks like irrigation, fertilization etc. through a mobile phone or a tablet or a laptop to save you time and money from spending in fuels to get to the farm or use more material than needed, would you like to know more**? 94.79% Yes and 5.21% No

If you have the chance to increase your profits by using machinery that allows you, for instance, to plant seeds with more precision, or sow with more precision, or harvest trees with less strain on the tree or the fruit, would you like to know more? question was answered with Yes in 94.79% and 5.21% with No.
If farmers have a chance to use SFT equipment on their fields, 64.58% of farmers would use them for arable crops, 21.88% for bush and tree crops, 11.46% for greenhouses, 20.83% for vegetables and 18.75% for orchards. (Question was **If you have the chance to use smart farming equipment like the ones described in the previous questions, for which crops would you use them?**).

How much money do you spend in a 5-year period to buy specialized equipment, like the ones described in questionnaire intro?

Answer	Count	Percentage
0 Eur (A1)	42	43.75%
1 - 1999 Eur (A2)	22	22.92%
2000 - 4999 Eur (A3)	11	11.46%
5000 - 9999 Eur (A4)	8	8.33%
10 000 - 19 999 Eur (A5)	8	8.33%
20 000 - 49 999 Eur (A6)	4	4.17%
50 000 - 100 000 Eur (A7)	1	1.04%
> 100 000 Eur (A8)	0	0.00%
No answer	0	0.00%

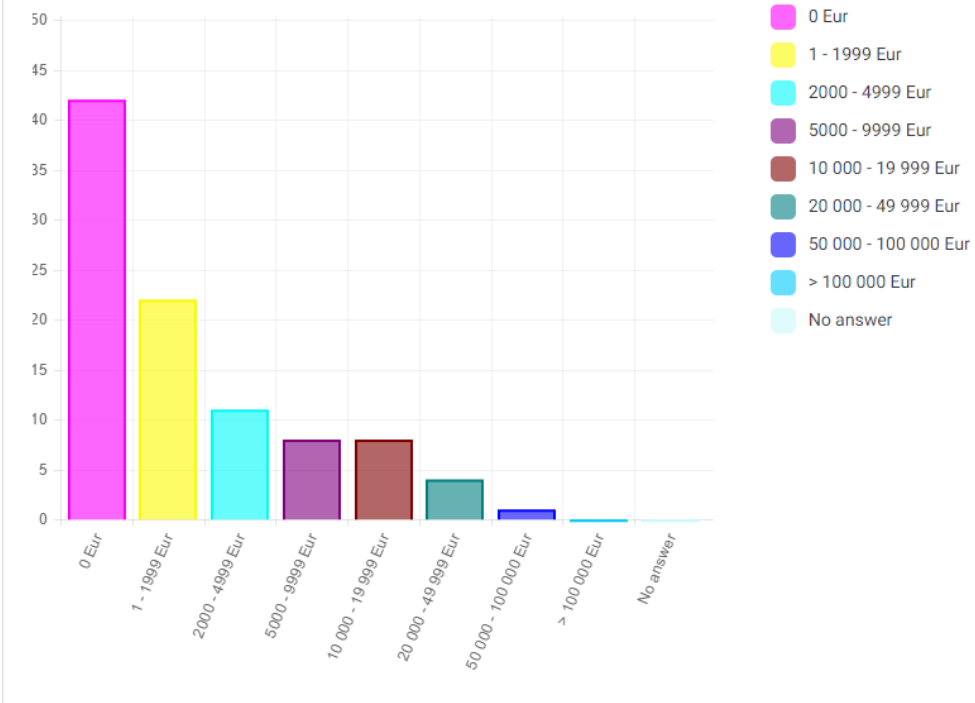


Figure 19 Spent money

As shown in Figure 19, 43.75% of famers didn't spent single euro in last 5 years. 22.92% invested between 1 and 1999 euros. 11.46% of farmers spent from 2000 to 4900 euros. 8.33% between 5000 and 9999 and 10 000 and 19999 euros. Larger amount of money, from 20000 to 49999 euros was invested by 4.17% of farmers, and only 1.04% of them spent between 50000 and 100000 euros. There were no farmers who invested more than 100000 of euros in past five years.

How much money are you willing to spend in a 5-year period to buy specialized equipment, like the ones described in questionnaire intro?		
Answer	**Count**	**Percentage**
0 Eur (A1)	7	7.29%
1 - 1999 Eur (A9)	27	28.12%
2000 - 4999 Eur (A3)	25	26.04%
5000 - 9999 Eur (A4)	13	13.54%
10 000 - 19 999 Eur (A5)	13	13.54%
20 000 - 49 999 Eur (A6)	6	6.25%
50 000 - 100 000 Eur (A7)	5	5.21%
> 100 000 Eur (A8)	0	0.00%
No answer	0	0.00%

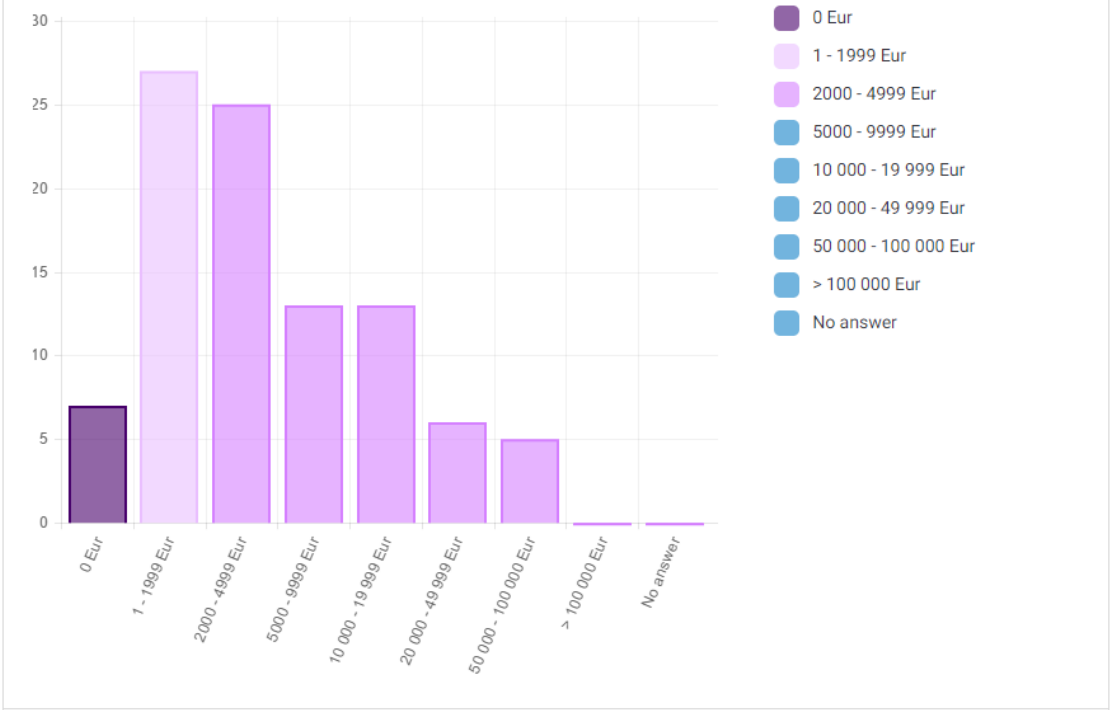


Figure 20 Investing money

According to farmers' answers, situation is much better when we asked them to estimate amount of money that they are willing to investing in next five years. 7.29% will not invest any money, 28.12% of farmers will invest from 1 up to 1999 euros, slightly less or 26.04% will invest between 2000 and 4999 euros. The same percentage of farmers - 13.54% planning to spent from 5000 to 9999 and from 10000 to 19999. Range of 20000 to 49999 was covered by 6.25% and from 50000 to 100000 euros by 5.21%. As expected, no one will invest more than 100000 euros.

Are you using SFT equipment?		
Answer	**Count**	**Percentage**
Yes (Y)	28	29.17%
No (N)	68	70.83%
No answer	0	0.00%

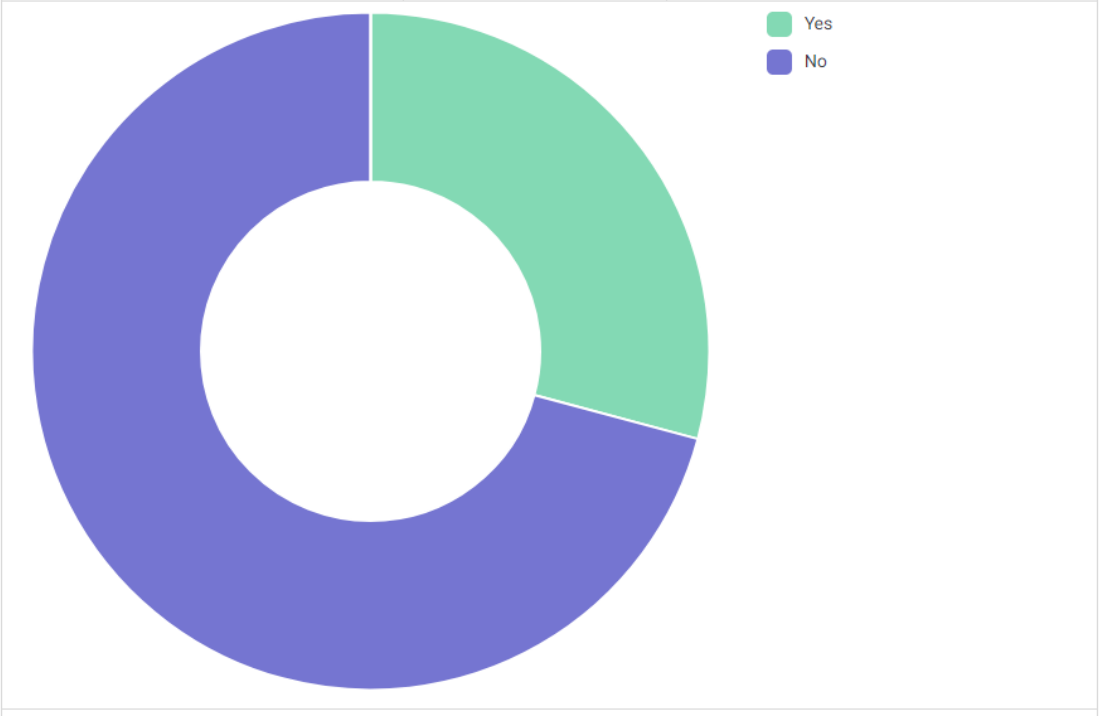


Figure 21 Usage of SFT

On question ***Are you using SFT equipment?*** 70.83% stated that they don't use SFT equipment - Figure 21. As depicted on Figure 22, the biggest problem for them and main reason why are they not using SFT, as two thirds (69.12%) of them stated is *Lack of knowledge regarding SFT.* Second reason with 47.06% of answers is *Farm income pressure limits use of precision services.* They also think that *Cost of precision services to customers greater than benefits*, for 25% of them. Fourth place, with 19.3% goes to *Topography / Farm structure limits use by farmers.* 10.29% claims that one of the problems is also *Soil types in area limits profitability of precision.* That *Customers lack confidence in site-specific recommendations* is also problem was picked up by 7.35% of farmers and just 2.94% thinks that *Interpreting / decisions too time consuming for customers* makes them problems.

Why are you not using SFT?		
Answer	**Count**	**Percentage**
Topography / Farm structure limits use by farmers (SQ001)	13	19.12%
Farm income pressure limits use of precision services (SQ002)	32	47.06%
Customers lack confidence in site-specific recommendations (SQ003)	5	7.35%
Soil types in area limits profitability of precision (SQ004)	7	10.29%
Cost of precision services to customers greater than benefits (SQ005)	17	25.00%
Interpreting / decisions too time consuming for customers (SQ006)	2	2.94%
Lack of knowledge related with SFT (SQ007)	47	69.12%

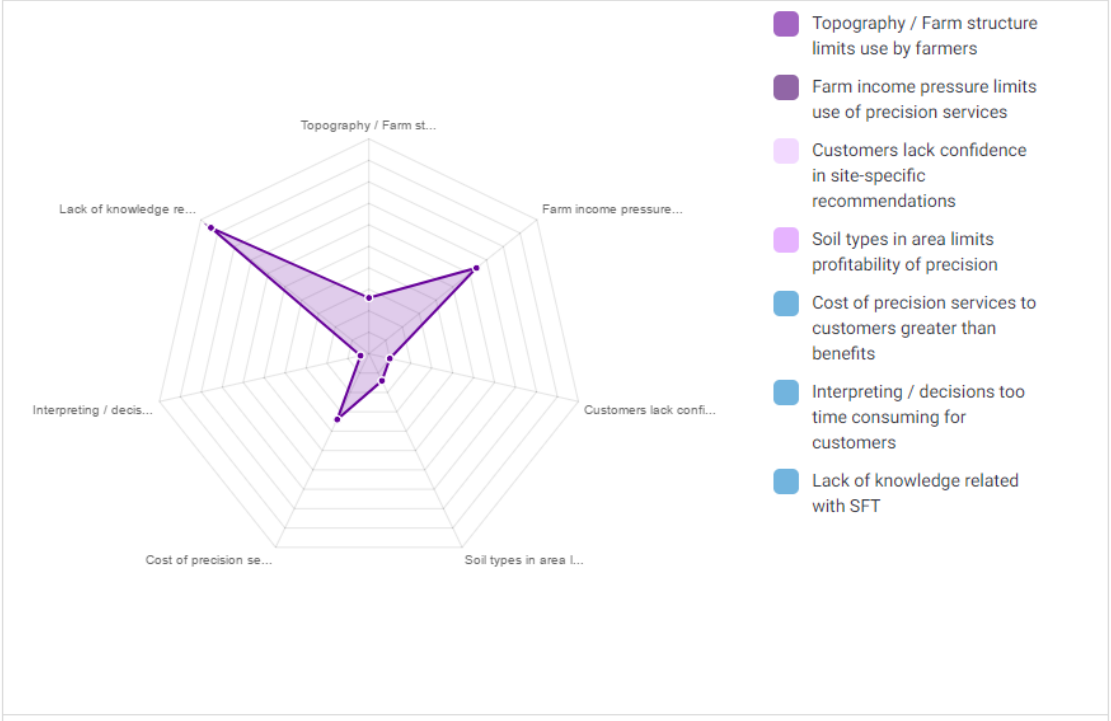


Figure 22 Reasons for SFT

From all farmers who use SFT (29.17% of farmers), 72.41% of usage goes to arable crops, followed by orchards – 20.69%. The same percentage of 17.24% belongs to vegetables and bush and tree crops. Greenhouses are on the last position taking 6.90%, as shown on Figure 23

If you already use smart farming equipment like the ones described in the previous questions: For which crops do you use them?

Answer	Count	Percentage
Arable crops (SQ001)	21	72.41%
Bush and tree crops (SQ002)	5	17.24%
Greenhouses (SQ003)	2	6.90%
Vegetables (SQ004)	5	17.24%
Orchards (SQ005)	6	20.69%

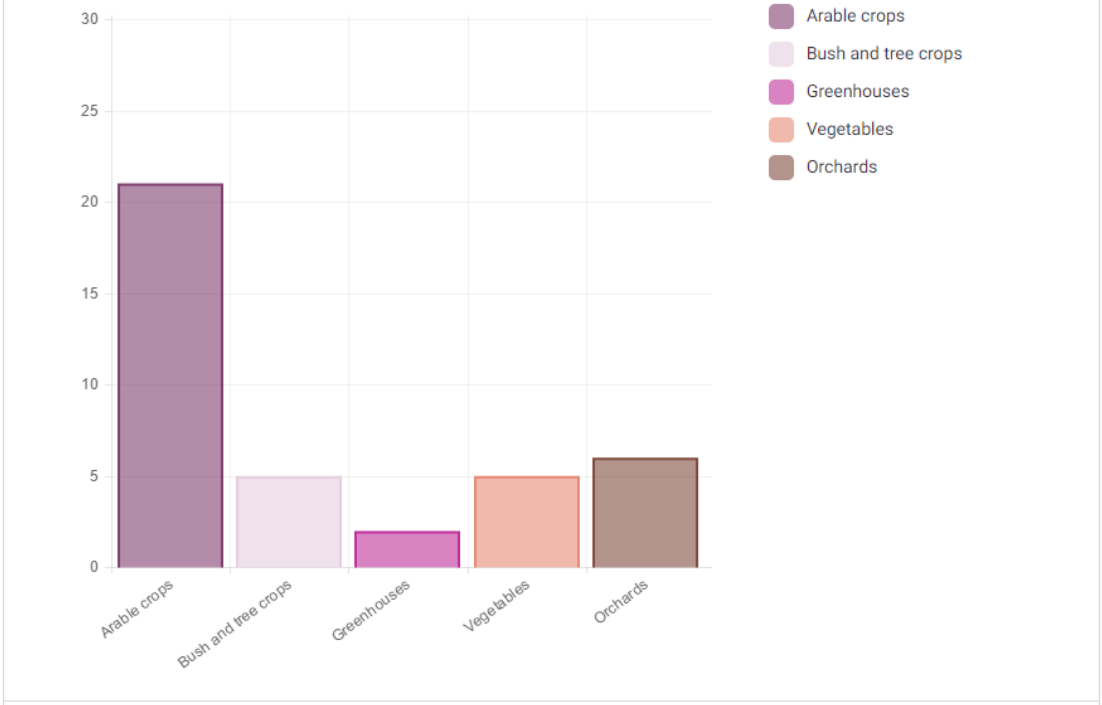


Figure 23 SFT crop usage

Question **What is the degree of your satisfaction in using it?** was answered on following way: 44.83% are satisfied, 20.69% are very satisfied, the same percentage of 20.69% are neither satisfied nor unsatisfied, 6.90% are not satisfied and 3.45% are very unsatisfied.

Figure 24 shows that the biggest percentage of SFT equipment already in possess of farmers is GPS guidance, 41.38% for auto-control and same percentage for manual control. Field mapping use 27.59% of farmers. 24.14% use GPS enabled sprayer control and satellite/aerial imagery for internal use. 20.69% of farmers have GPS for logistic and also 20.69% of them use precision services offered. Soil electrical conductivity is in use for only 6.9% of farmers. The worst results have telemetry with 3.45% as well as other vehicle mounted soil sensors.

What SFT are you already using?		
Answer	**Count**	**Percentage**
GPS Guidance (Auto control / Auto steer) (SQ001)	12	41.38%
GPS Guidance (Manual control) (SQ002)	12	41.38%
Precision services offered (SQ003)	6	20.69%
GPS-enabled sprayer control (SQ004)	7	24.14%
Satellite / Aerial imagery for internal use (SQ005)	7	24.14%
Field mapping (GIS) (SQ006)	8	27.59%
GPS for logistics (SQ007)	6	20.69%
Telemetry (SQ008)	1	3.45%
UAVs/ Drones (SQ009)	5	17.24%
Soil electrical conductivity mapping (SQ010)	2	6.90%
Other vehicle mounted soils sensors (SQ011)	1	3.45%
Chlorophyll / Greenness sensors (SQ012)	4	13.79%

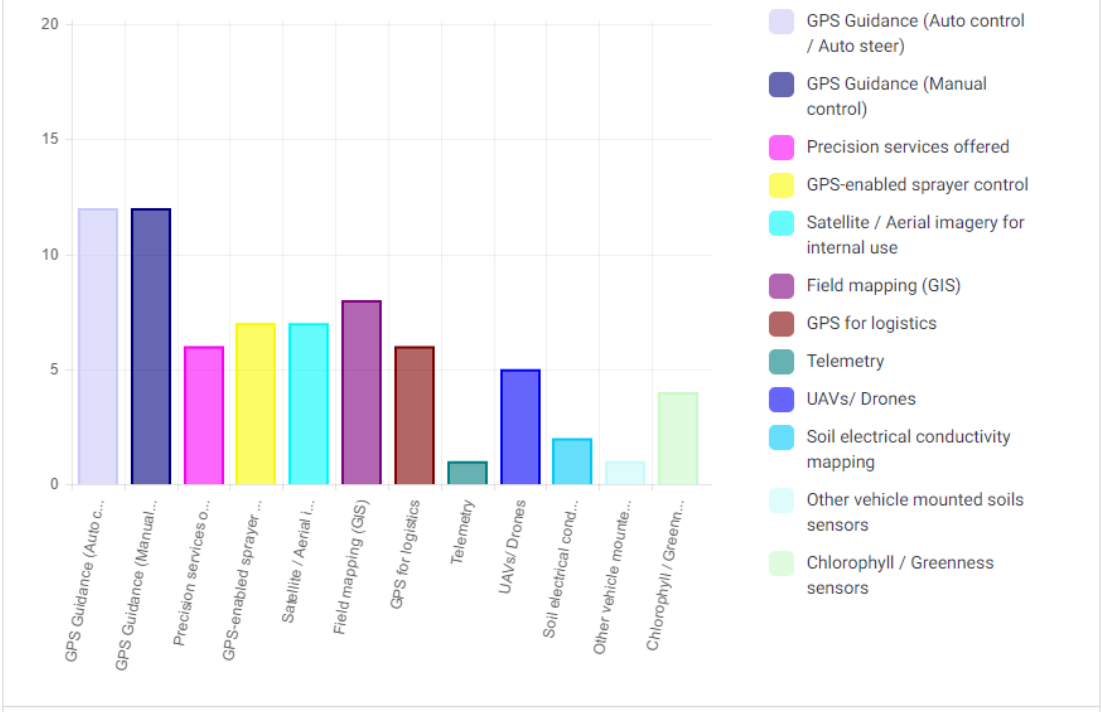


Figure 24 Currently used SFT

When we asked farmers **What is the degree of your satisfaction in using it? majority of them were with positive experiences.** 46.43% of them stated that they are satisfied. 21.43% said that they are very satisfied and the same percentage that they are neither satisfied nor unsatisfied. 7.14% were unsatisfied and 3.57% were very unsatisfied.

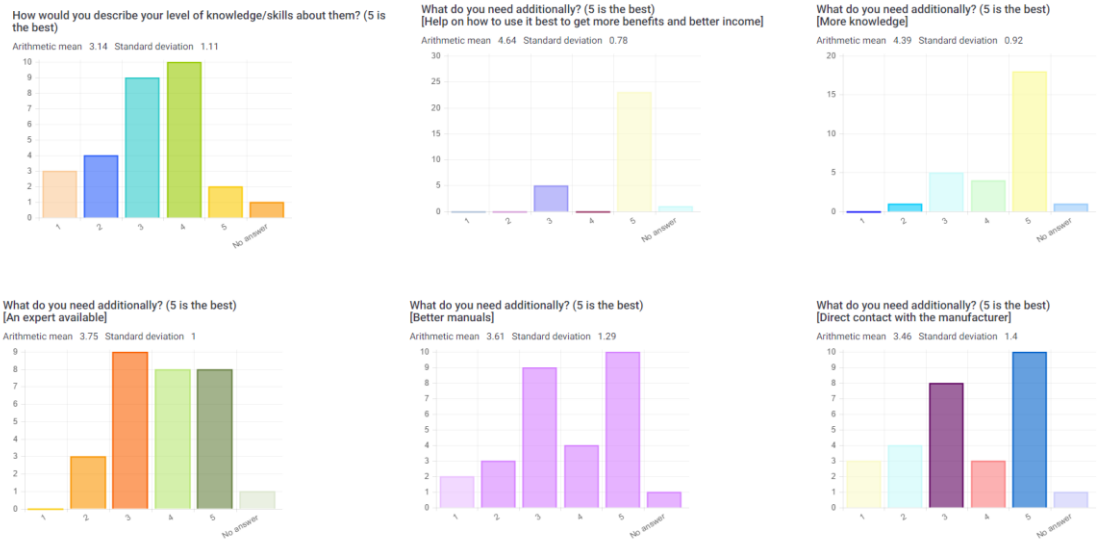


Figure 25 SFT level of satisfaction and additional needs

Figure 25 shows farmers additional needs in SFT technologies:

82.14% of farmers who use SFT gave mark 5 (highest mark) to option **Help on how to use it best to get more benefits and better income** and 17.86% gave mark 3.
64.29% gave mark 5 on do they need **More knowledge**. 17.86% of them gave mark 3, 14.29% mark 4 and 3.57% mark 2.

28.57% of farmers think that It is important and very important to have **An expert available**. 10.71% think that they don't need an expert and 32.14% that it neither important nor unimportant.

Better manuals are very important for 35.71% of farmers and important for 14.29% of them. Neutral opinion have 32.14%. 10.71% thinks that better manuals are not important and 7.14% that they are not important at all.

Direct contact with the manufacturer is very important (mark 5) for 35.71% of farmers and important (mark 4) for 10.71%. 28.57% are neutral in opinion (mark 3). 14.29% think that direct contact is not important (mark 2) and 10.71% that it is useless (mark 1).

On question **How often do you need help in managing them or making decisions concerning them?** 71.43% claimed that they manage them only once per season. 17.86% stated that they are maintaining them once a week and 3.57% choose once a month as an answer 7.14% of users said something else (other) namely: "It depends on technologies." and "It depends on changing in GIS application".

- More than 90% of farmers are land owners. Half of them cultivate land smaller that 10ha, usually between 2-5 ha with average plot size less than a 2 ha. That is also reason why 75% of farmers stated that they have a help of their family members.
- Two thirds claimed that they don't have any knowledge regarding SFT which means that GATES platform should have very emphasized educational content.

- Almost all of them are open to hear and learn more about using some special equipment in farming jobs, to control various farming tasks like irrigation, fertilization etc. through a mobile phone or a tablet, to increase their profits by using SFT machinery, and two thirds would like to use them on arable crops.
- Two thirds of farmers didn't spend any money or has spent less than 2000 euros in a past five years for buying some SFT equipment. Good news for SFT industry is that they are planning to spend more in the next five years. Almost half of them will invest between 2000 and 20000 euros and there are also those who will invest between 50000 and 100000 euros.
- 70% of farmers currently do not use SFT. Usual reason is lack of knowledge and also frequent answer was lack of funding which corresponds with answers for money investments in previous five years.

- Those farmers who are using SFT mainly have arable crops production and they are generally satisfied with using SFT. Majority stated that they need more knowledge, better manuals and help on how to use it best to get more benefits and better income and GATES is an ideal platform to educate them in SFT.

4.3 Agricultural students (specific questions)

This section will cover questions and responses from 96 agricultural students. Students are coming from the Agricultural University of Athens, the third oldest university in Greece and the prominent institution providing education in the field of agricultural science. Those students follow the latest trends in the field and are usually familiar with state-of-the-art technologies surrounding the agrifood value chain. Nevertheless, since SFT are recently emerging as new concept in the value chain, it is understandable that not all of the students have more information about them.

Do you have any knowledge/training regarding SFT?		
Answer	**Count**	**Percentage**
Yes (Y)	35	36.46%
No (N)	61	63.54%
No answer	0	0.00%

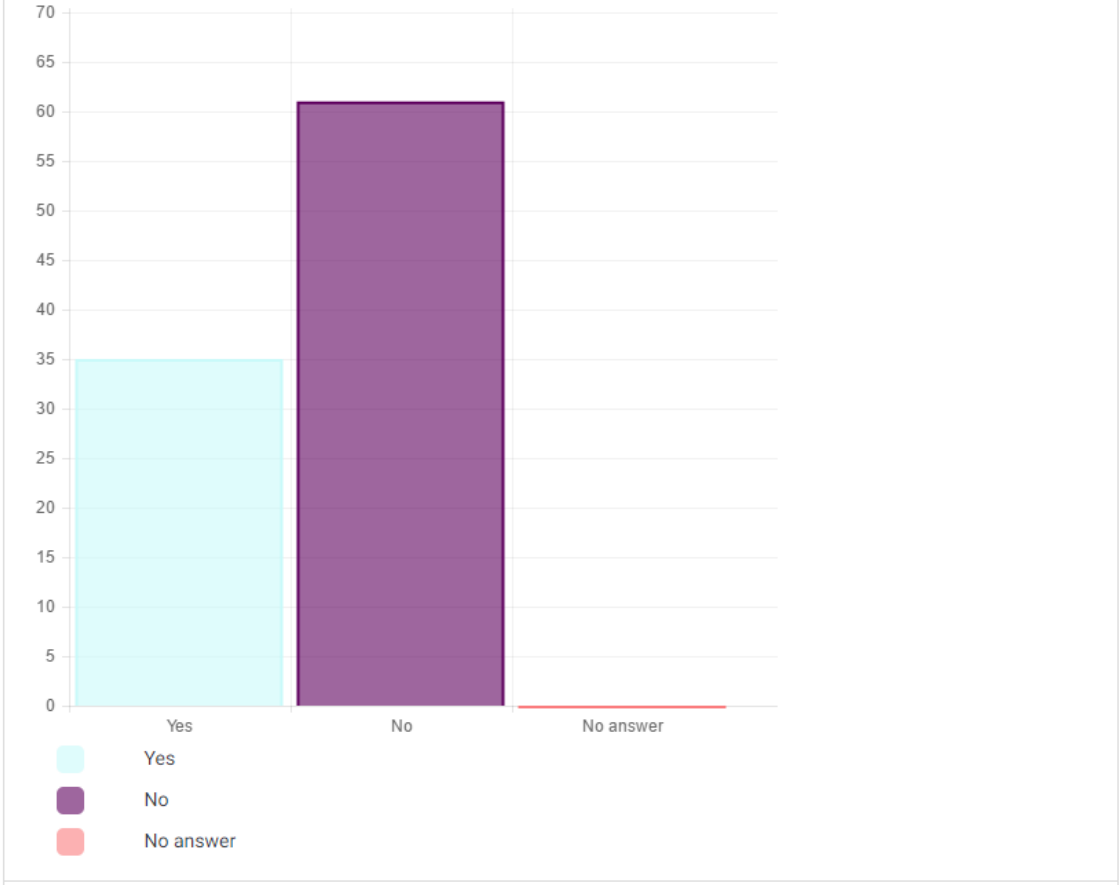


Figure 26 Students knowledge

63.54% of agricultural students said that they don't have knowledge/training regarding SFT and 36.46% that they have it - Figure 26

Similar percentage is also for question **Do you know anything about SFT best practice?**. 34.38% answered with yes and 65.62% with no. - Figure 27

Do you know anything about SFT best practice?		
Answer	**Count**	**Percentage**
Yes (Y)	33	34.38%
No (N)	63	65.62%
No answer	0	0.00%

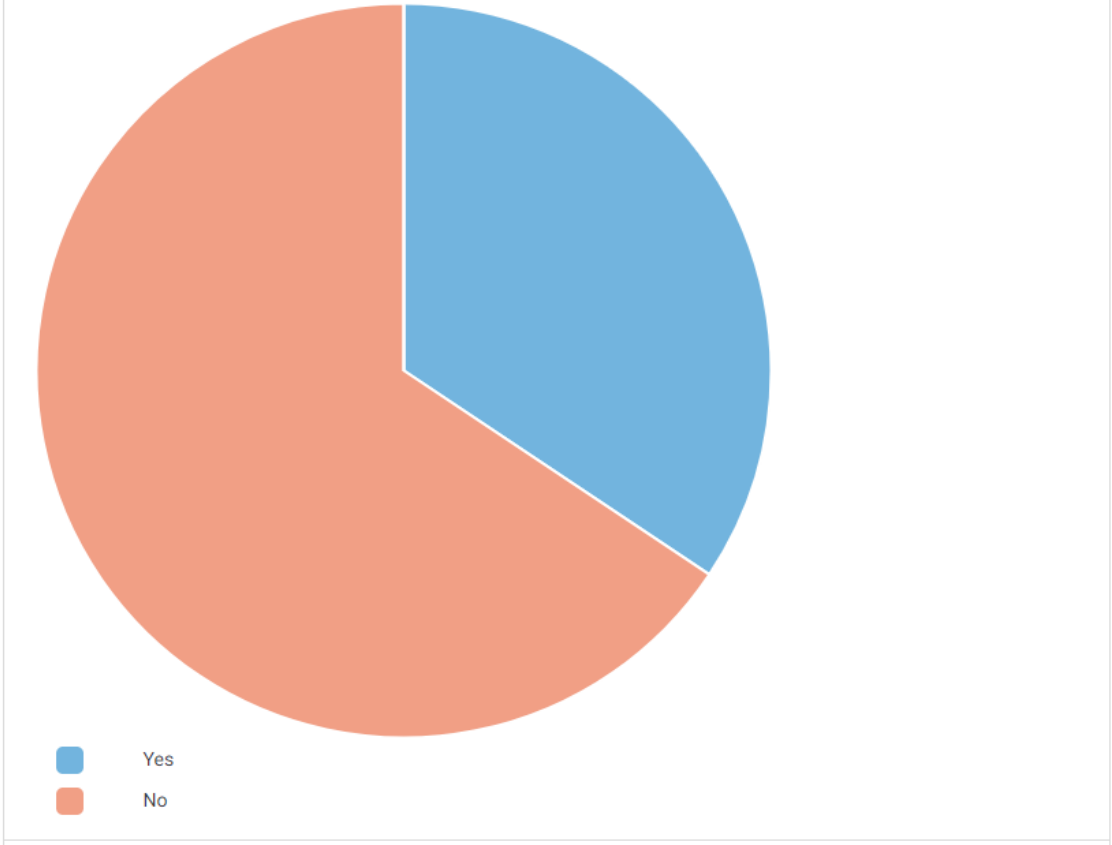


Figure 27 SFT best practice

Figure 28 depict question **Do you know what the environmental benefits of SFT usage are?** 55.21% of students claim that they know about environmental benefits and 44.79% that they don't.

Do you know what the environmental benefits of SFT usage are?		
Answer	**Count**	**Percentage**
Yes (Y)	53	55.21%
No (N)	43	44.79%
No answer	0	0.00%

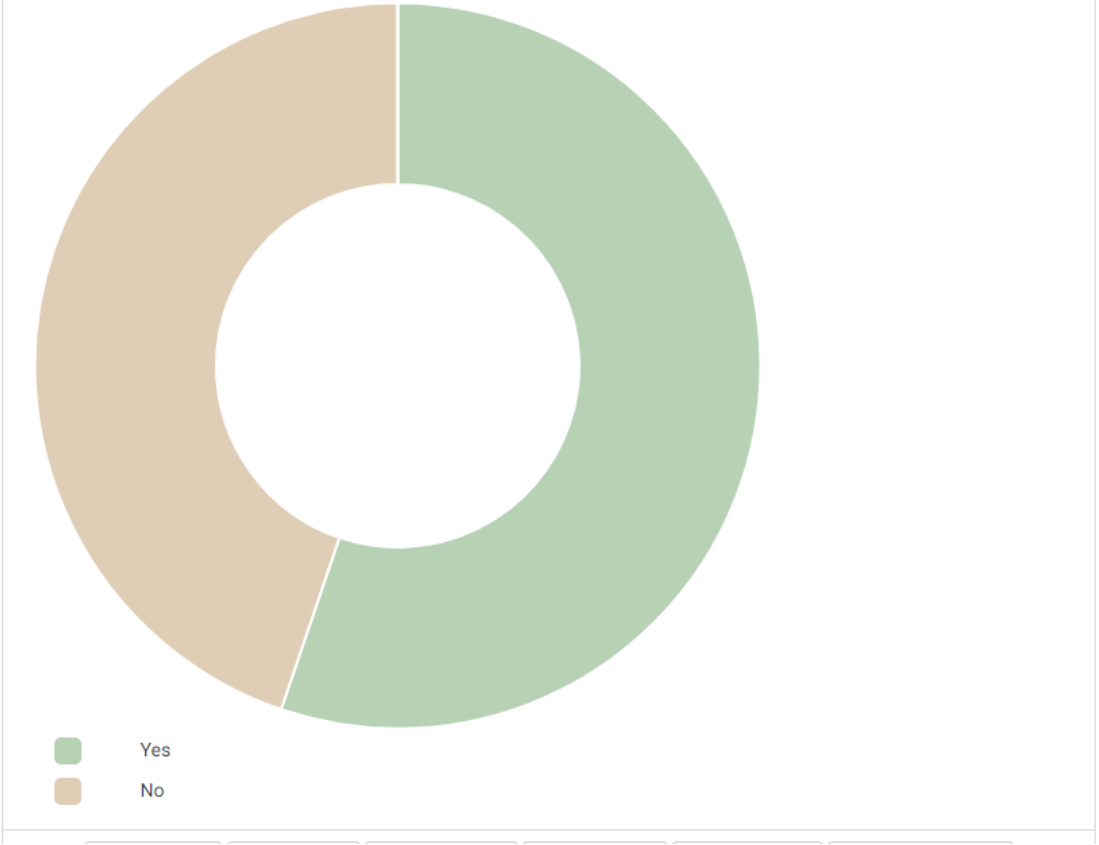


Figure 28 Environmental benefits

Figure 29 represents bar plot with answer on question **Do you know what the farm expenditure of SFT usage are?** 48.96% answered with yes and 51.04% with no.

Do you know what the farm expenditures of SFT usage are?		
Answer	**Count**	**Percentage**
Yes (Y)	49	51.04%
No (N)	47	48.96%
No answer	0	0.00%

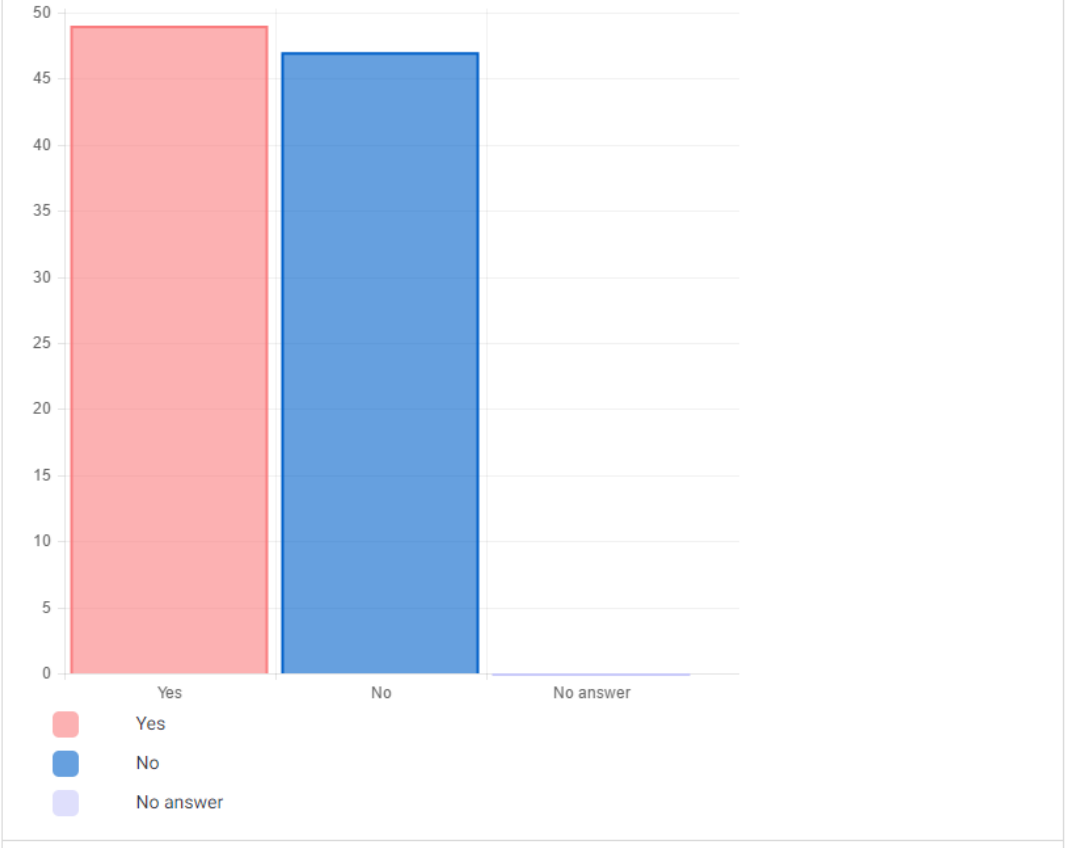


Figure 29 Farm expenditures

Do you think that SFT have a future in agriculture practice? Was answered with yes in 96.88% of students and just 3.12% think that SFT is non promising. - Figure 30

Do you think that SFT have a future in agriculture practice?		
Answer	**Count**	**Percentage**
Yes (Y)	93	96.88%
No (N)	3	3.12%
No answer	0	0.00%

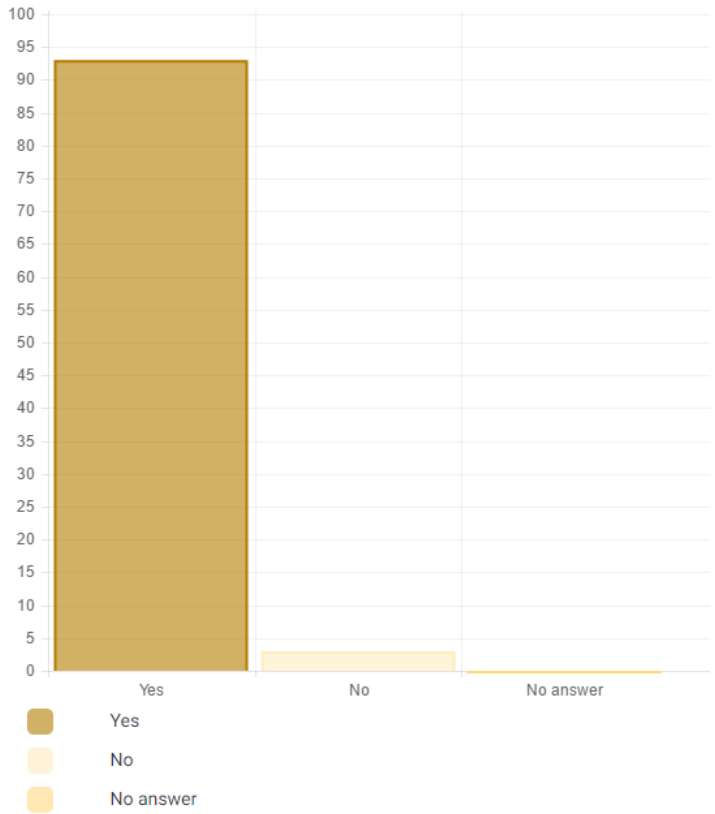


Figure 30 Future of SFT

95.83% of students believe that they should be ambassadors of SFT in agricultural practice and 4.17% don't share same opinion. - Figure 31.

Do you think that agricultural students should be the ambassadors of SFTs in agricultural practice?		
Answer	**Count**	**Percentage**
Yes (Y)	92	95.83%
No (N)	4	4.17%
No answer	0	0.00%

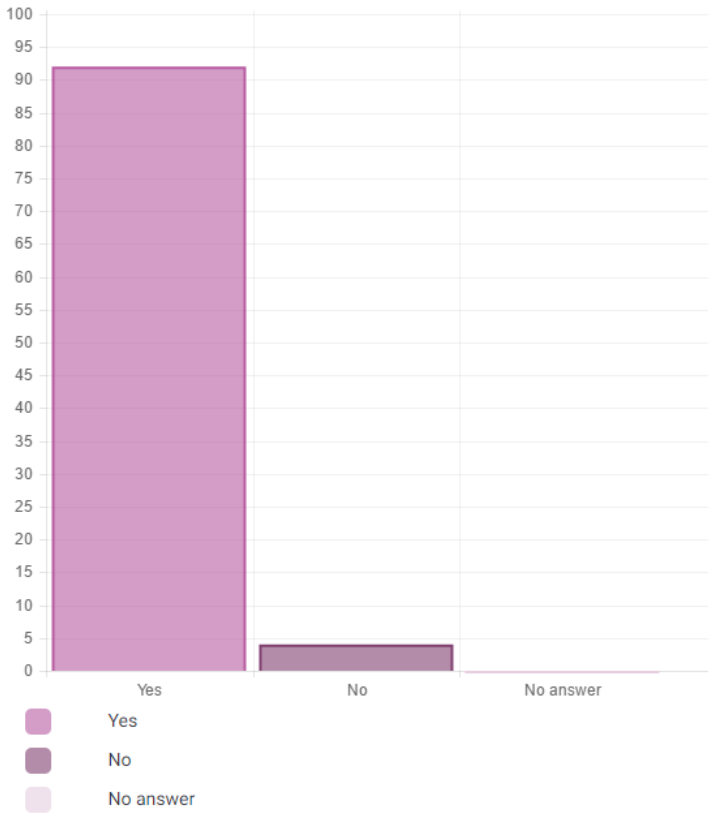


Figure 31 SFT ambassadors

93.75% of students would like to have more courses related to SFT and 6.25% ae not so interested - Figure 32

Would you prefer to have more courses related to SFT in your curriculum?		
Answer	**Count**	**Percentage**
Yes (Y)	90	93.75%
No (N)	6	6.25%
No answer	0	0.00%

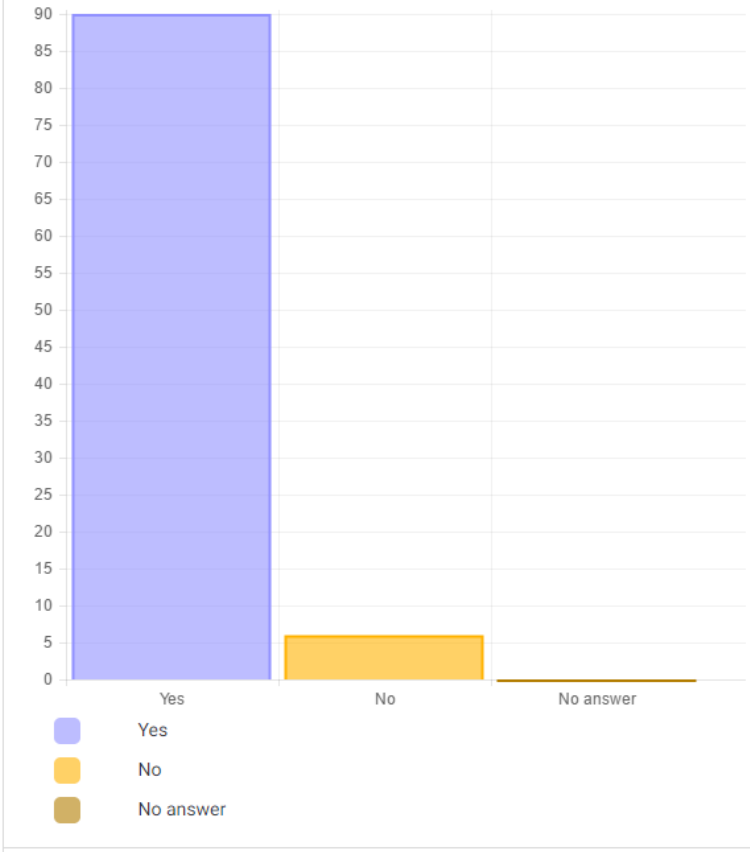


Figure 32 SFT courses

100% of them are also interested to have more interactive tools for their education related to SFT and other trends in agriculture - Figure 33

Would you be interested in having more interactive tools for your education related to SFT and other new trends in agriculture?

Answer	Count	Percentage
Yes (Y)	96	100.00%
No (N)	0	0.00%
No answer	0	0.00%

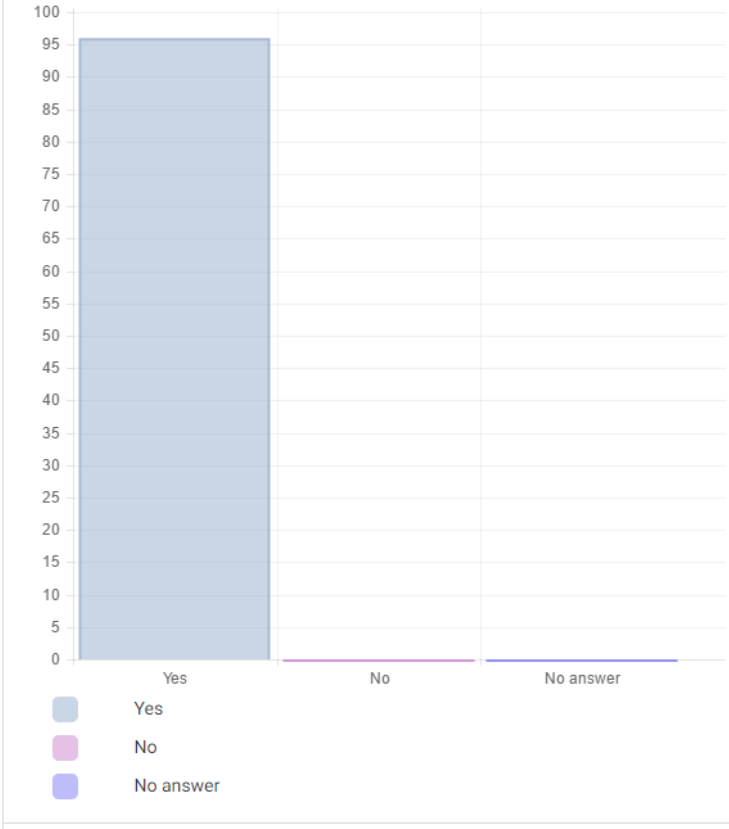


Figure 33 Interactive tools

97.92% of students are convinced that simulation platforms based on actual technical information would help them to improve and 2.08% think opposite. - Figure 34

Do you think that simulation platforms based on actual technical information would help you to improve		
Answer	**Count**	**Percentage**
Yes (Y)	94	97.92%
No (N)	2	2.08%
No answer	0	0.00%

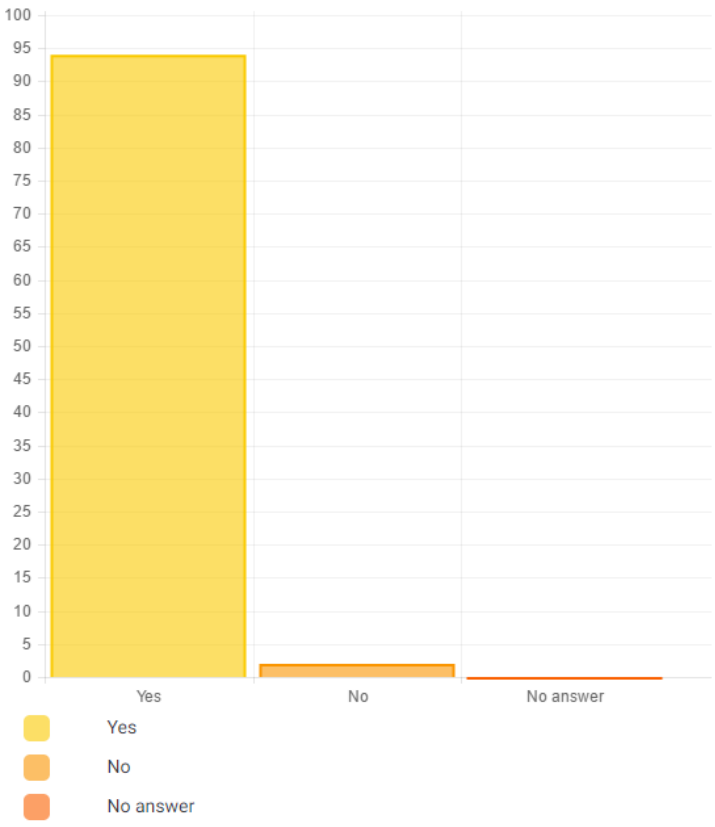


Figure 34 Simulation platforms for skills improvement

56.25% of students would like to see simulation platform as a mobile application, 44.79% would like to have it installed on their computer and 31.25% prefer to be web based. - Figure 35

Do you think that simulations platforms should be		
Answer	**Count**	**Percentage**
Webpage allocation (SQ001)	30	31.25%
Mobile applications (SQ002)	54	56.25%
Installed on the computer (SQ003)	43	44.79%

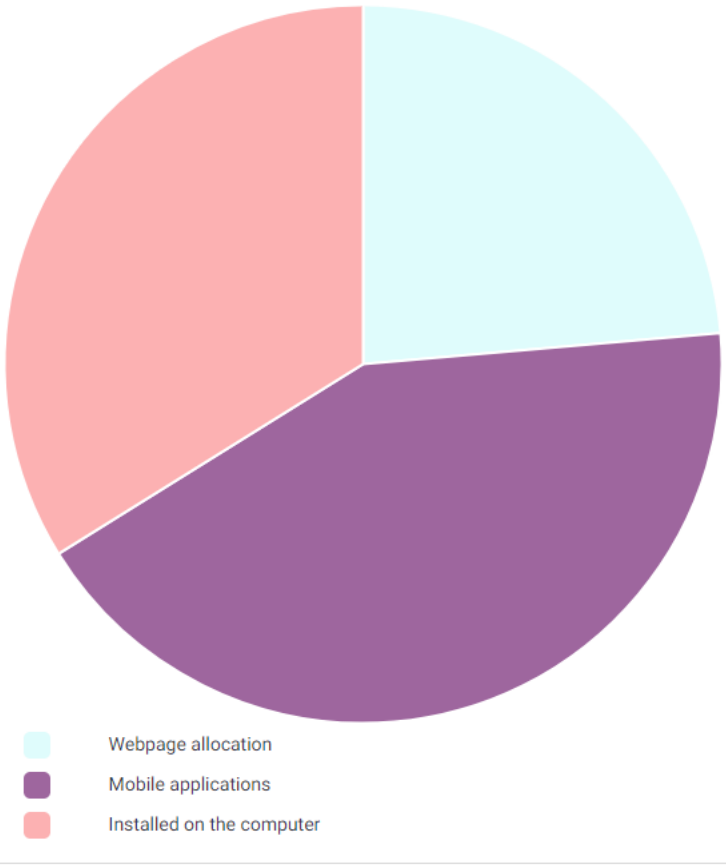


Figure 35 Type of application

Figure 36 shows that 91.67% of students think that simulation multiplayer mode would be beneficial because user scoring would foster the use of the serious game since increases competiveness among users. 7.29% thinks that serous game platform should not be in intended as an entertainment and 1.04% would like to see it in dual mode competitive and non-competitive.

Do you consider that a multiplayer environment would be beneficial for the learning experience?

Answer	Count	Percentage
Yes (user scoring would foster the use of the serious game since increases competitiveness among users) (A1)	88	91.67%
No (a serious game platform should not be intended as entertainment) (A2)	7	7.29%
Other Browse 2 modes: competitive/ non-competitive	1	1.04%
No answer	0	0.00%

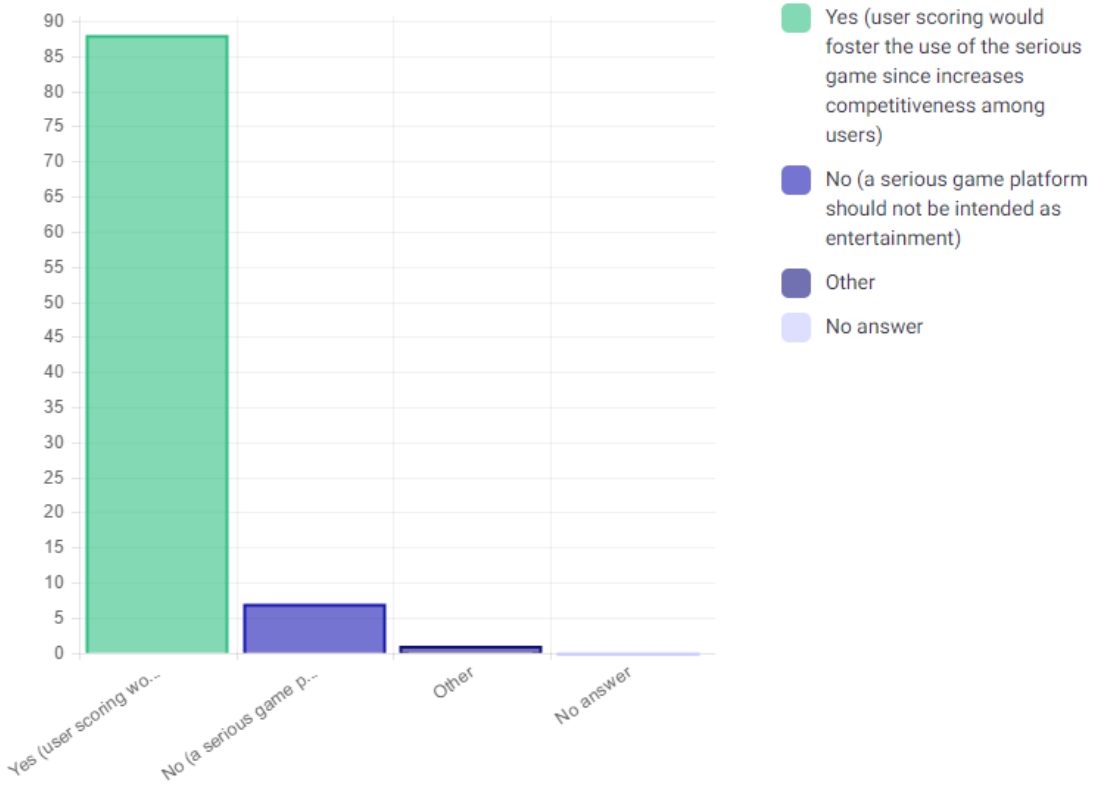


Figure 36 Multiplayer environment

When it comes to decision should the platform be played by a single user or competitively, 43.75% of students think that it should be played with more people in a group. Exactly one third would like to play it with a student colleague and 22.92% prefer to play it alone.

Would you prefer a serious game for SFT should be played by a single user or competitively with a student colleague?

Answer	Count	Percentage
Alone (A1)	22	22.92%
With a student colleague (A2)	32	33.33%
With more people on a group (A3)	42	43.75%
No answer	0	0.00%

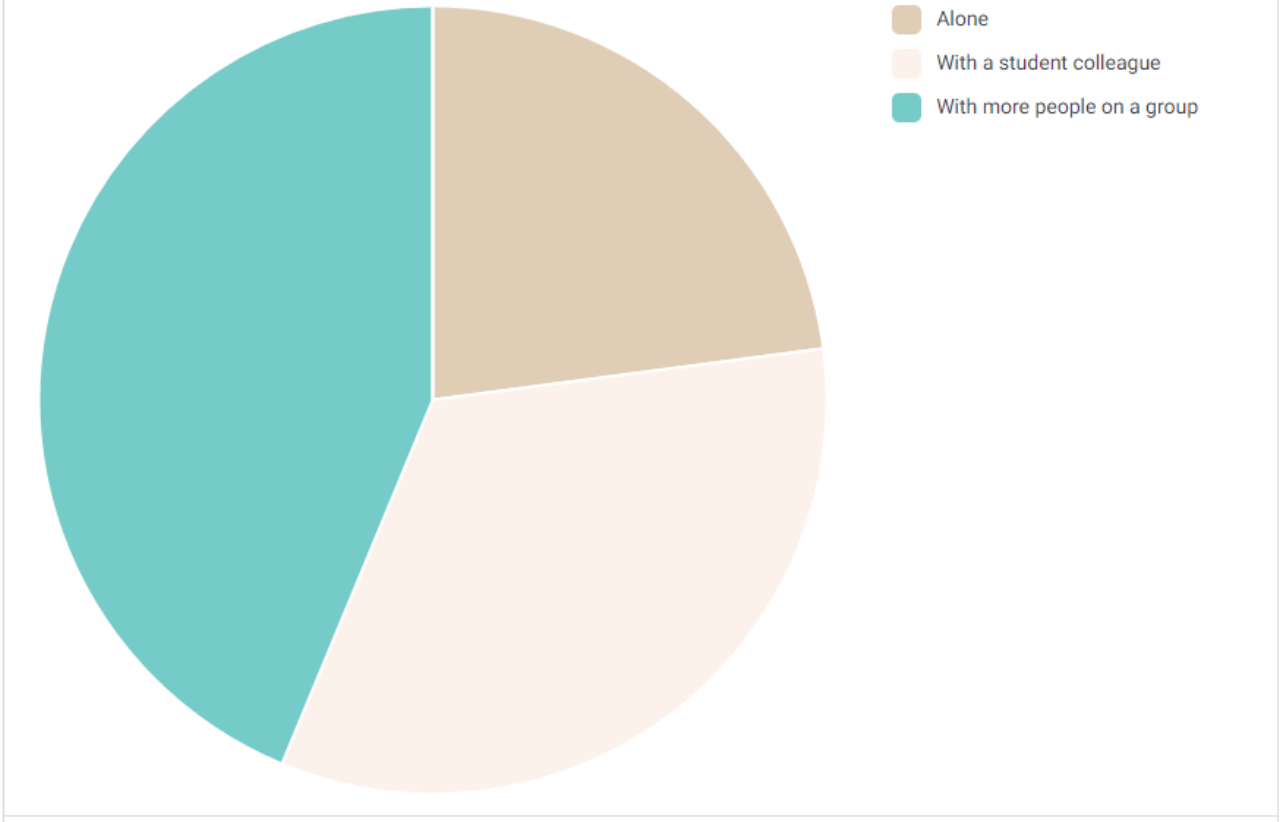


Figure 37 Single or multiplayer

- Two thirds of agricultural students said that they don't have any knowledge regarding SFT and that they don't know anything about SFT best practice, which is normal having in mind that they are just entering into the world of agriculture. That means that even in academic circles where students learn a lot about agriculture, educational platforms like GATES will be more than welcome to help them in quicker and better adoption of SFT.
- Students would like to have more courses and interactive tools related to SFT, helping them to improve their skills.
- They expect from GATES to be available on both the mobile phone and the computer, but they are also fine if GATES becomes a web based platform, which was expected having in mind that they are young

and used to those technologies. They would also like to see GATES in a multiplayer environment with more people in a group which is something that they are used to using social networks.

4.5 SFT specialists (specific questions)

This chapter is devoted to questions and answers of 11 SFT specialists. They are coming from Spain and they are usually collaborating with medium and large-scale farmers. Still, this is expected since not so many small-scale farmers have adopted SFTs yet (as presented in the section 4.2). Despite that, it is very useful for GATES partners to understand what type of services SFT specialists provide to farmers and other clients in order to properly target future communication.

To whom do you sell your products/services?

Answer	Count	Percentage
Small size farms (SQ001)	2	18.18%
Medium size farms (SQ002)	8	72.73%
Large size farms (SQ003)	8	72.73%
Small/medium agrifood companies (SQ004)	5	45.45%
Enterprise agrifood companies (SQ005)	4	36.36%

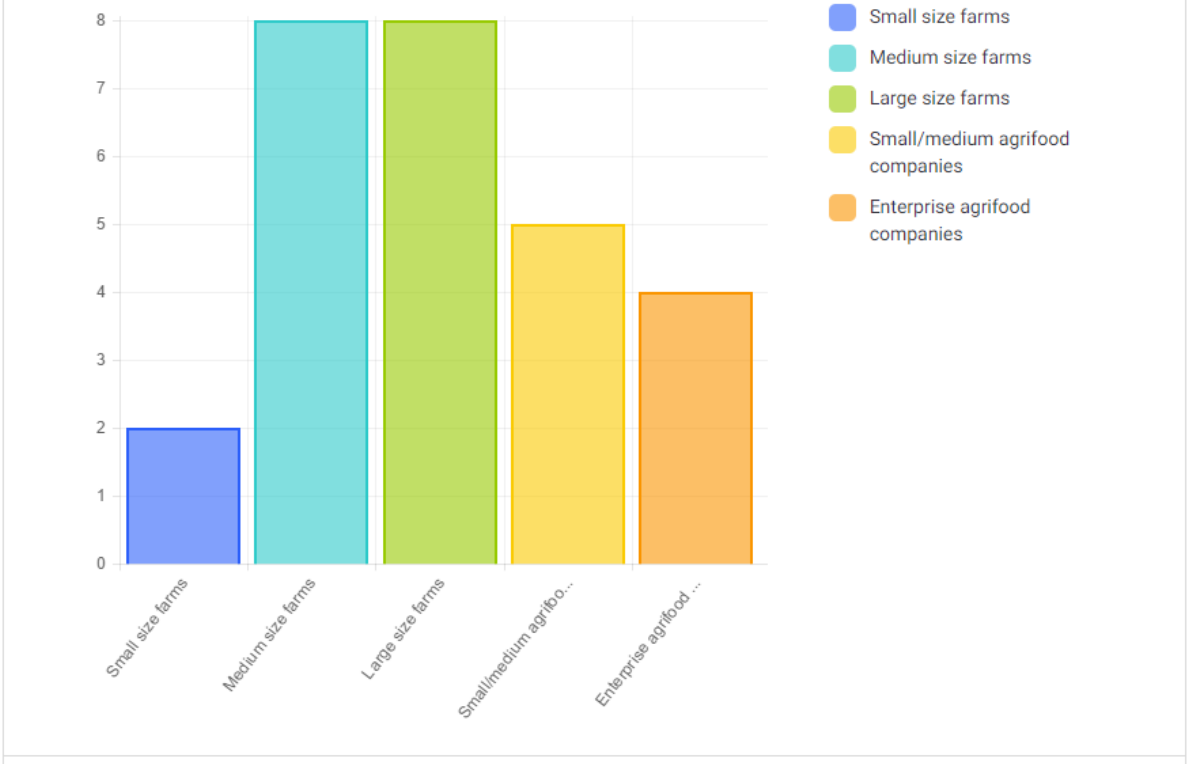


Figure 38 Buyers of products/services

As depicted in Figure 38 SFT specialist mostly selling their services and/or products to medium and large size farms. That was stated by 72.73% of them for both farm size. They are followed by small/medium (45.45%) and

enterprise (36.36%) agrifood companies. The minimum of their services/products they are selling to small size farm (18.18%).

Their buyers usually asking them for help on daily basis (45.45%), followed by users who needs help once per season (27.27%). Weekly help is needed by 18.18% of users and monthly by 9.09% of them - Figure 39.

How often they ask for your help?

Answer	Count	Percentage
Daily (A1)	5	45.45%
Weekly (A2)	2	18.18%
Monthly (A3)	1	9.09%
Per season (A4)	3	27.27%
Other Browse	0	0.00%
No answer	0	0.00%

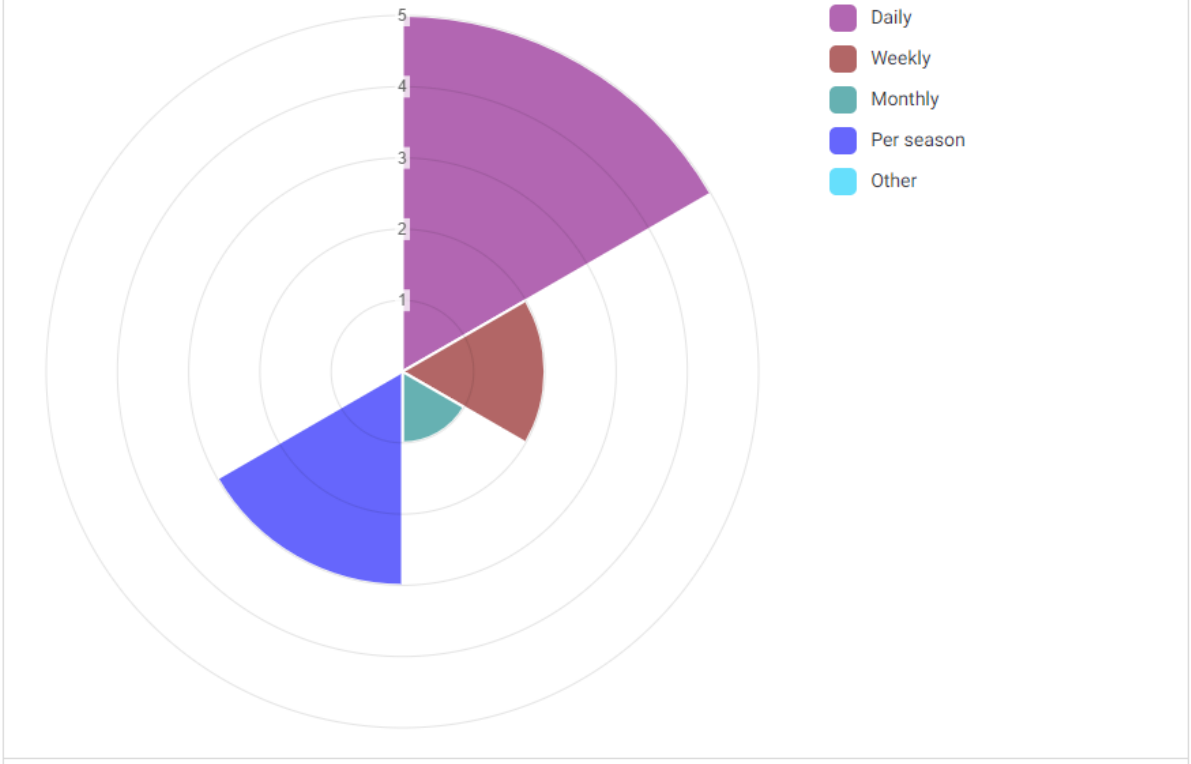


Figure 39 Asking for help

More than four fifths of SFT specialists claimed that their customers have poor knowledge and understating regarding SFT. 45.45% of them gave mark 2 (bad) and 36.36% that they are average (mark 3). Only 18.18% thinks that their users are good. No one voted for mark 1 (very bad) or mark 5 (very good) - Figure 40.

Majority of SFT specialist are also convinced that companies provide minimum technical information about their SFT products – 81.82%. On the other hand, 18.18% think that companies do not provide neither minimum of SFT information. - Figure 41.

Please rate the knowledge and understating of your customers regarding SFT (5 is the best)			
Answer	**Count**	**Percentage**	**Sum**
1 (1)	0	0.00%	45.45%
2 (2)	5	45.45%	
3 (3)	4	36.36%	36.36%
4 (4)	2	18.18%	
5 (5)	0	0.00%	18.18%
Sum(Answers)	**11**	**100.00%**	**100.00%**
No answer	0	0.00%	
Arithmetic mean		0	
Standard deviation		0	

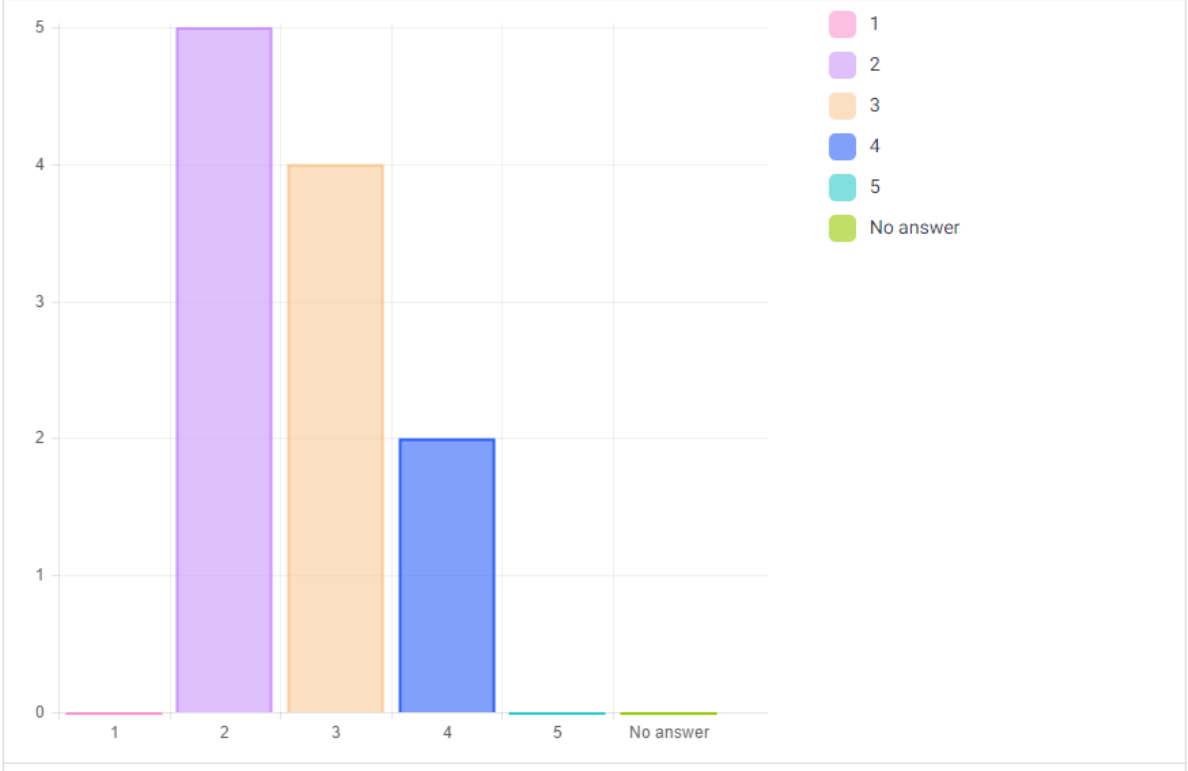


Figure 40 Customers knowledge and understanding

As you are concerned, do you think that companies provide the minimum technical information about their SFT products

Answer	Count	Percentage
Yes (Y)	9	81.82%
No (N)	2	18.18%
No answer	0	0.00%

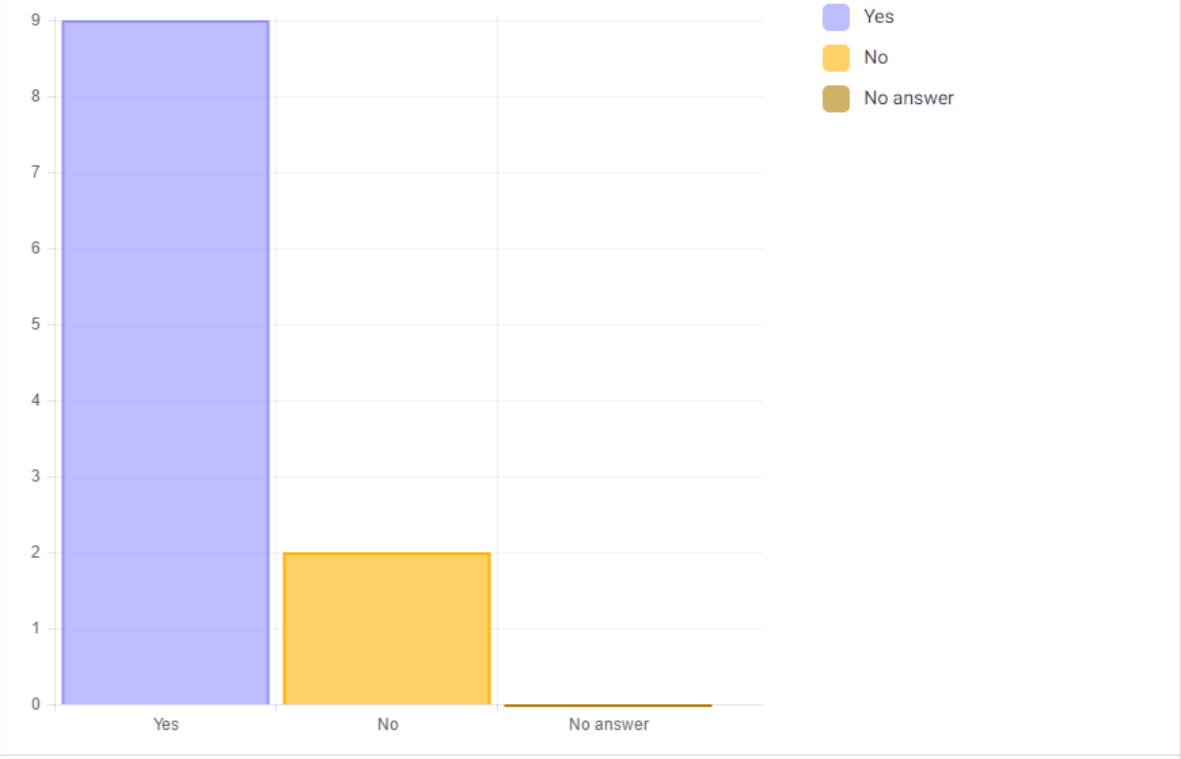


Figure 41 Minimum technical information

As shown in Figure 42, 90.91% of SFT specialists voted that main obstacles for SFT implementation is **lack of IT training of farmers.** 54.55% of votes went to **inadequate user information from manufacturers** as well as **low investment level**. 45.45% thinks that obstacles are **average of machineries in use** and **farm structure not suitable for available SFT. Data coverage in rural areas** was picked up by 27.27% of SFT specialists. 9.09% also chose **increasing second-hand machinery market** and **lack of promotion and useful information to the customer.**

81.82% of SFT specialists thinks that the most efficient driver to enhance the use of SFT is to **foster its cost efficiency benefits**. **Highlight its environmental aspects** was choose by 54.55%. 45.45% voted for **ergonomic** issues and labour safety. One specialist said that “Personal assistance to the customer; to train the customer on these technologies. Spending at least two days with each customer.” - Figure 43.

In your opinion, currently which are the main obstacles for the SFT implementation?		
Answer	**Count**	**Percentage**
Lack of IT training of farmers (A1)	10	90.91%
Inadequate user information from manufacturers (A2)	6	54.55%
Low investment level (A3)	6	54.55%
Average age of machinery in use (A4)	5	45.45%
Increasing second-hand machinery market (A5)	1	9.09%
Farm structure not suitable for available SFT (A6)	5	45.45%
Data coverage in rural areas (A7)	3	27.27%
Other Browse Lack of promotion and useful information to the customer	1	9.09%

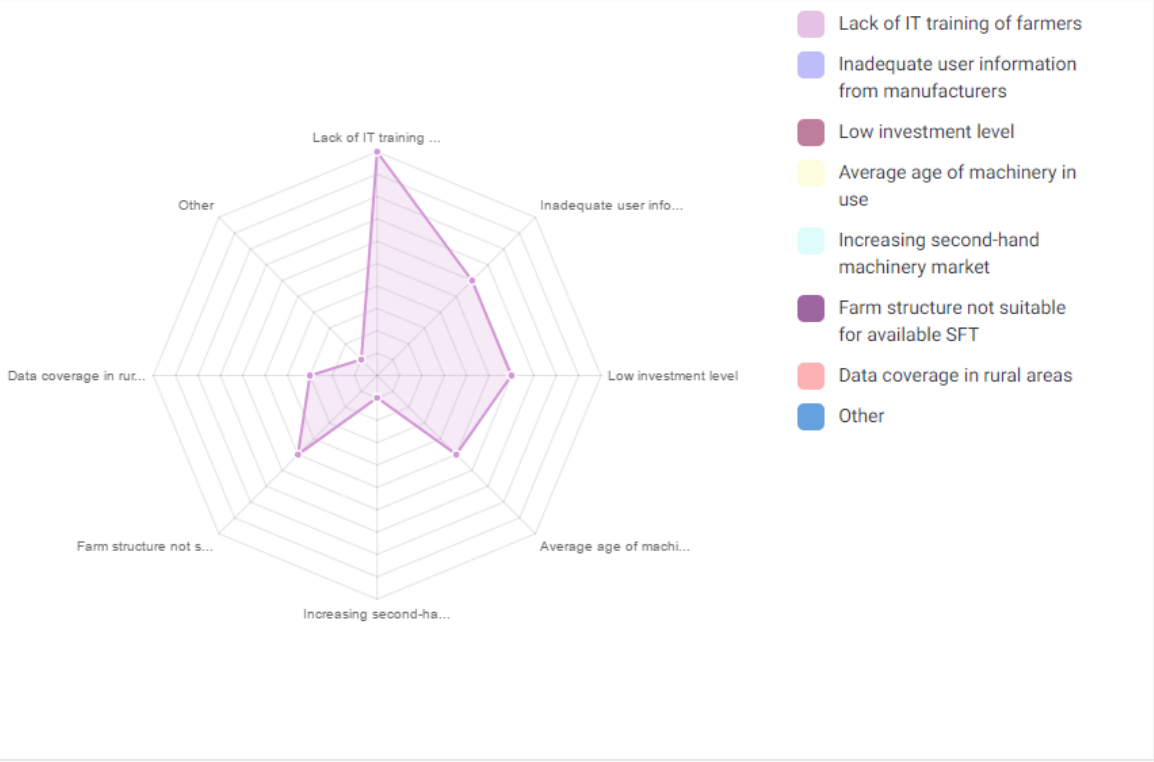


Figure 42 Main obstacles

Which would be the more efficient drivers to enhance the use of SFT?		
Answer	**Count**	**Percentage**
Foster its cost-efficiency benefits (A1)	9	81.82%
Highlight its environmental aspects (CAP greening) (A2)	6	54.55%
Ergonomic issues and labor safety (A3)	5	45.45%
Other Browse Personal assistance to the customer to train the customer on these technologies. Spending at least 2 days with each customer.	1	9.09%

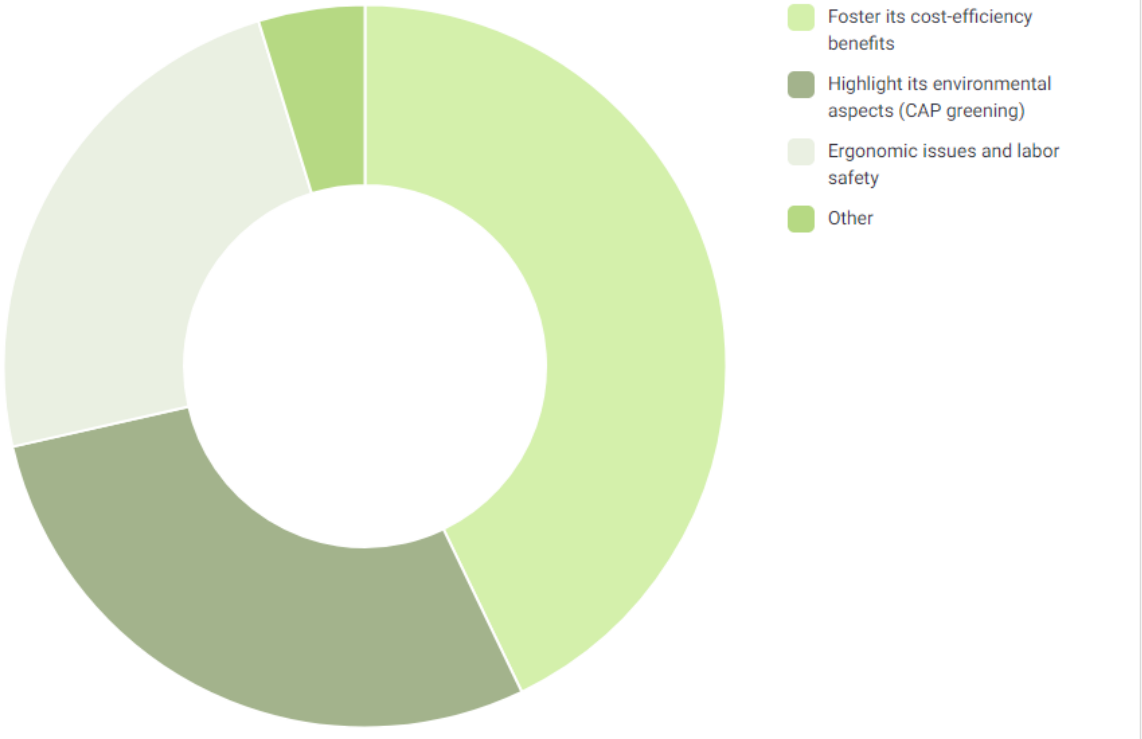


Figure 43 Drivers

On a question **Which kind of tools shall be necessary to move current farming to digital?**, 72.73% voted for *better communication and practical learning among end users* and *creation of information network among all SFT players.* 54.55% thinks that it is *improve the quality and volume of technical information from manufactures* - Figure 44.

Which kind of tools shall be necessary to move current farming to digital?		
Answer	**Count**	**Percentage**
Improve the quality and volumen of technical information from manufacturers (A1)	6	54.55%
Better communication and practical learning among end-users (A2)	8	72.73%
Creation of a information network among all SFT players (farmers, specialists, contractors, dealers, manufacturers) (A3)	8	72.73%

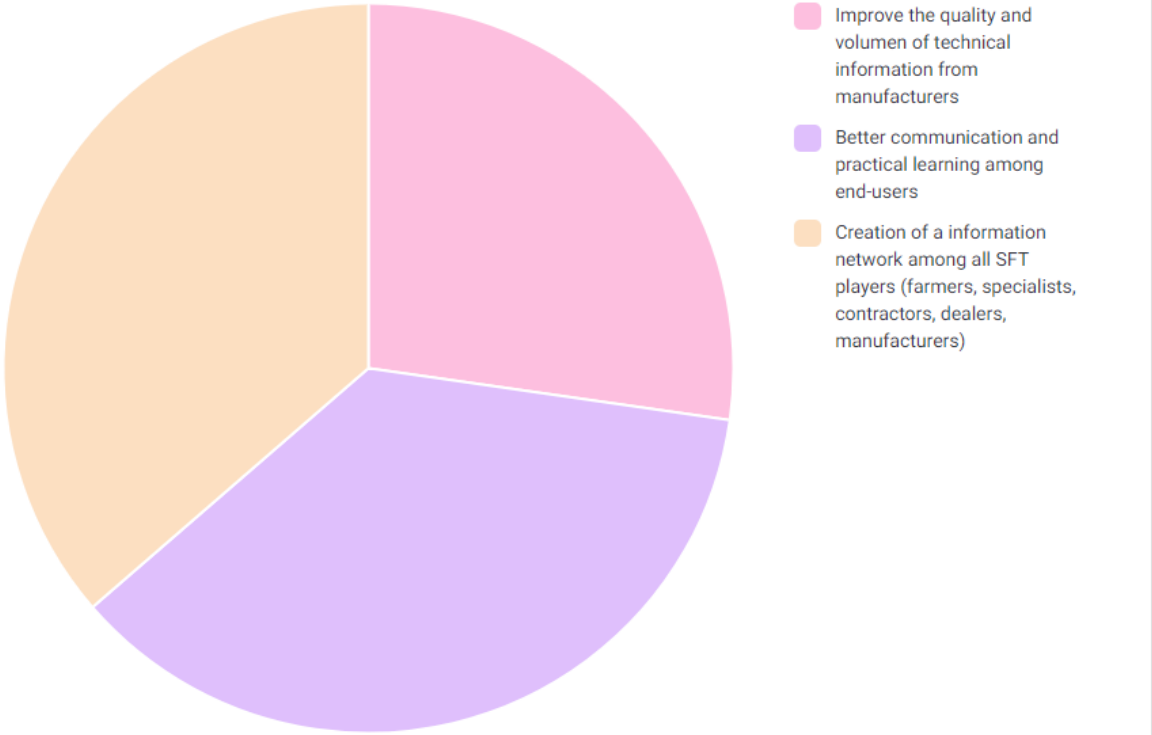


Figure 44 Tools

Figure 45 depict the question **Would a simulation platform on SFT satisfy these topics?** 81.182% think that it would, and 18.18% said that it wouldn't satisfy.

Would a simulation platform on SFT satisfy these topics?		
Answer	**Count**	**Percentage**
Yes (Y)	9	81.82%
No (N)	2	18.18%
No answer	0	0.00%

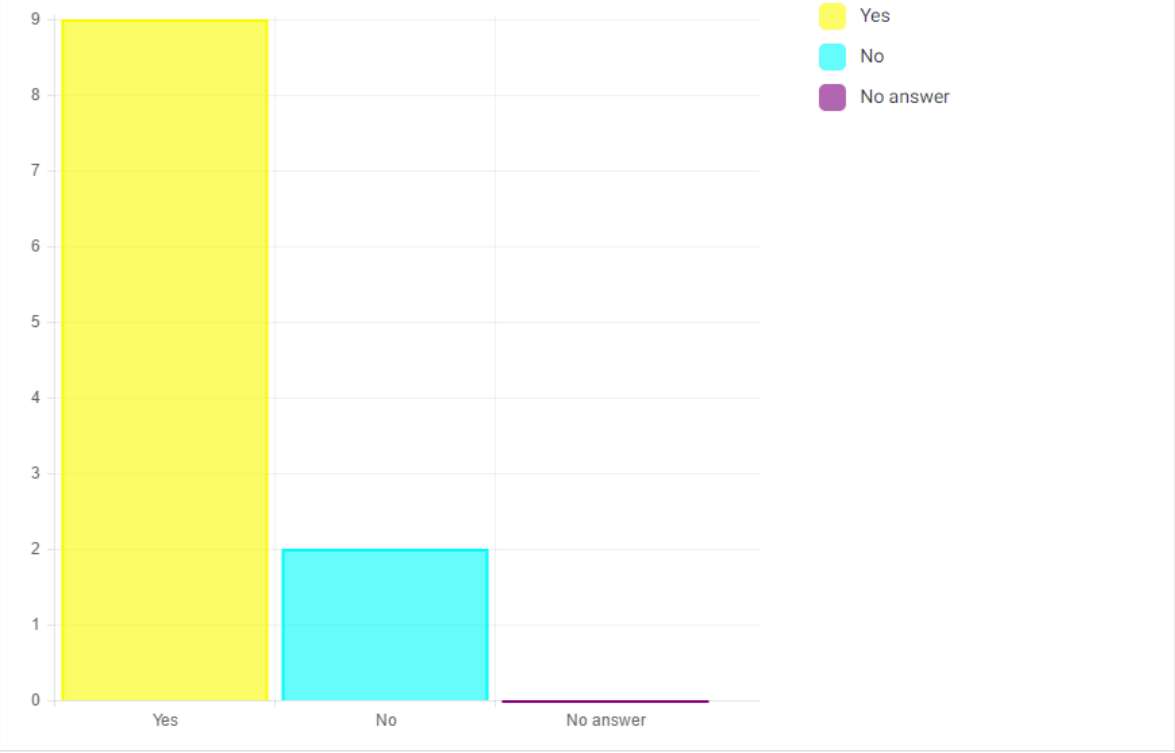


Figure 45 Simulation platform

- Smart farming technology experts stated that they are selling their services mostly to farmers with medium and large size farms. Having in mind that majority of interviewed farmers have a plots less than 2 ha in size, GATES will help in filling the gap.
- Their users have not so good knowledge regarding SFT, according to experts, which also corresponds with farmers' answers about their SFT knowledge.
- Lack of IT training of farmers was selected as the main obstacle for SFT implementation, followed by inadequate user information from manufacturers and low level of investments, which is also in compliance with farmers' answers.

4.4 Company representatives (specific questions)

This is the last chapter which covers questions and answers of 51 company representatives. The vast majority of these companies are members of Spanish partner ANSEMAT - the association of agricultural machinery manufacturers and their legal representatives in Spain. Since its 118 member associates have a market share of a 68% in volume and a 78% in value of the investment on agricultural machinery in 2015, this provides relevance for the GATES purpose and proves a sample that is selected efficiently.

What is your specialty?

Answer	Count	Percentage
Arable crops (SQ001)	43	84.31%
Bush and tree crops (SQ002)	12	23.53%
Greenhouses (SQ003)	5	9.80%
Vegetables (SQ004)	22	43.14%
Orchards (SQ005)	21	41.18%

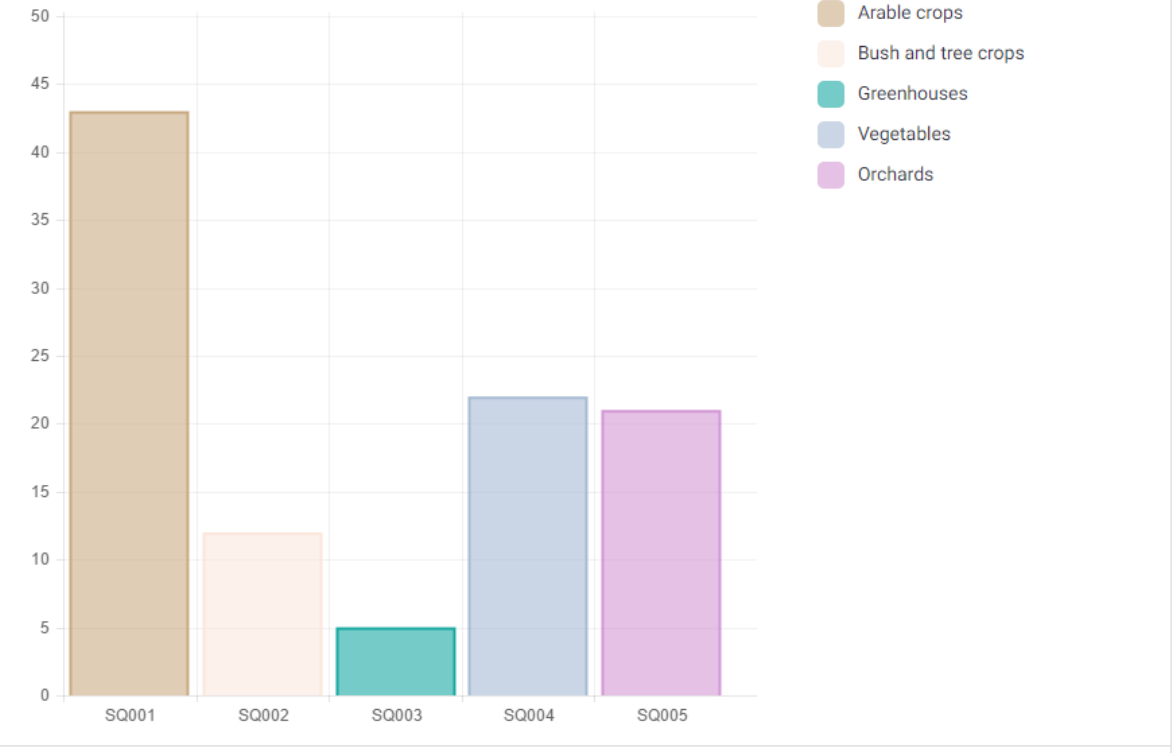


Figure 46 Speciality

The majority of interviewed company representatives are specialist in arable crops – 84.31%. 43.14% also said that they are specialists in vegetables as well and in orchards - 41.18%. Bush and tree crops specialist are 23.53% of them and 9.8% are specialists in greenhouses - Figure 46.

68.63% are already implementing SFT on the machinery and 31.3% still not - Figure 47

Are you already implementing SFT on the machinery?

Answer	Count	Percentage
Yes (Y)	35	68.63%
No (N)	16	31.37%
No answer	0	0.00%

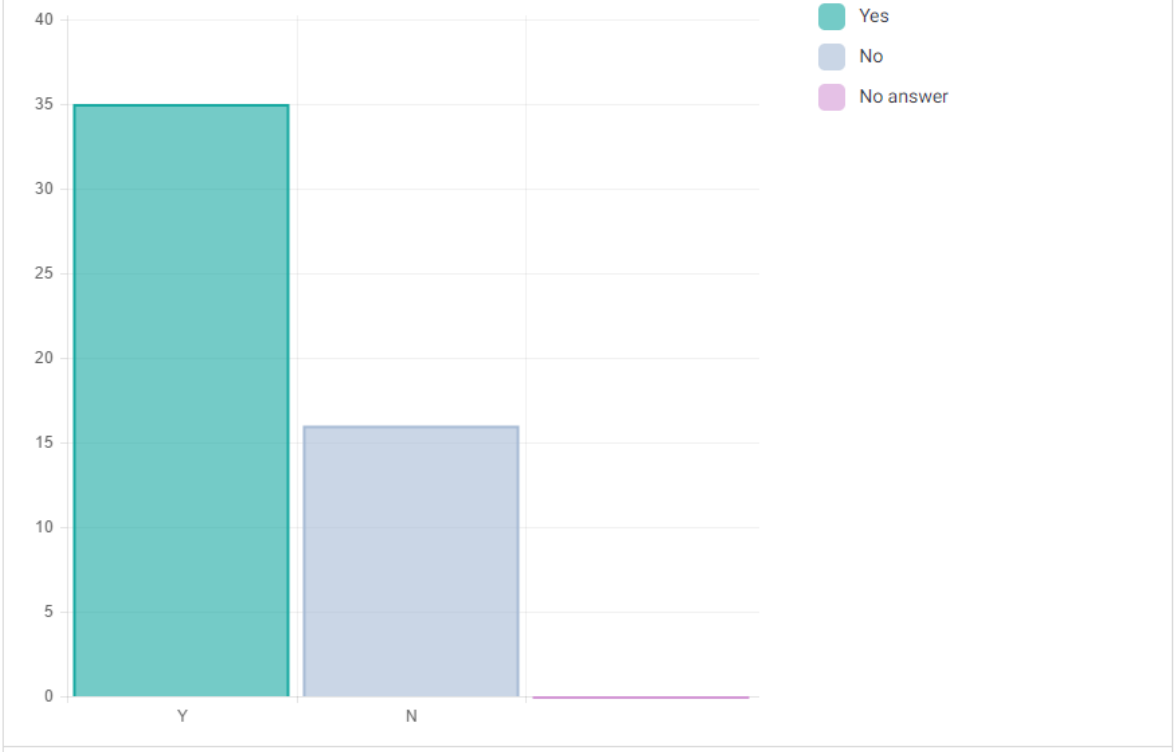


Figure 47 SFT on machinery

From those who are still not implanting SFT, 44.4% stated that **they will implement it in the future**. 38.89% said that **there is no demand** for such things. 16.67% claim that reason is **needed connectivity with self-propelled vehicle** and 11.11% choose **no availability of internal resources or training** as well as **lack of data coverage in rural areas -** Figure 48**.**

81.25% of them also think that **SFT is needed to increase their potential market** and 18.75% are not convinced in that.

Which is the main reason that led you to choose not implementing SFT?		
Answer	**Count**	**Percentage**
No demand (SQ001)	7	38.89%
No availability of internal resources (revenue) or training (SQ002)	2	11.11%
Needed connectivity with self-propelled vehicle (SQ003)	3	16.67%
I will implement SFT in the future (SQ004)	8	44.44%
Lack of data coverage in rural areas (SQ005)	2	11.11%

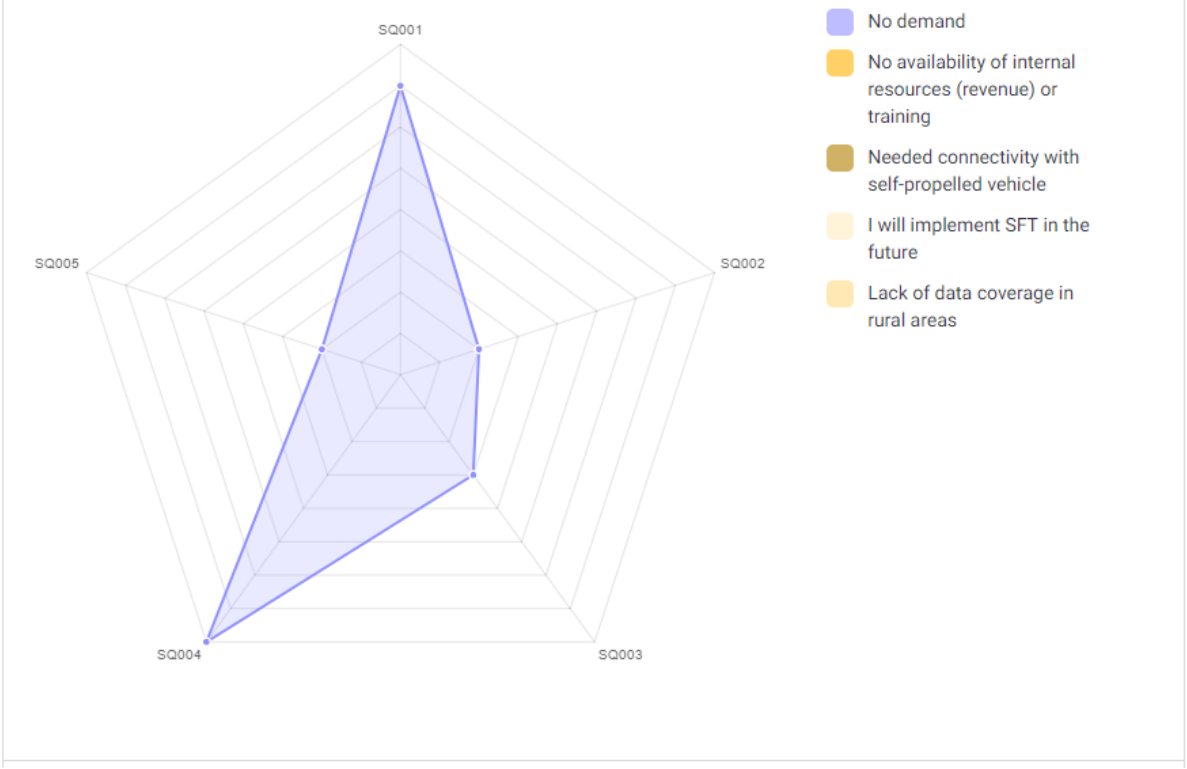


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Figure 48 Reasons

Does your SFT catalogue include options for new and used agricultural vehicles?		
Answer	**Count**	**Percentage**
Yes (Y)	23	65.71%
No (N)	12	34.29%
No answer	0	0.00%

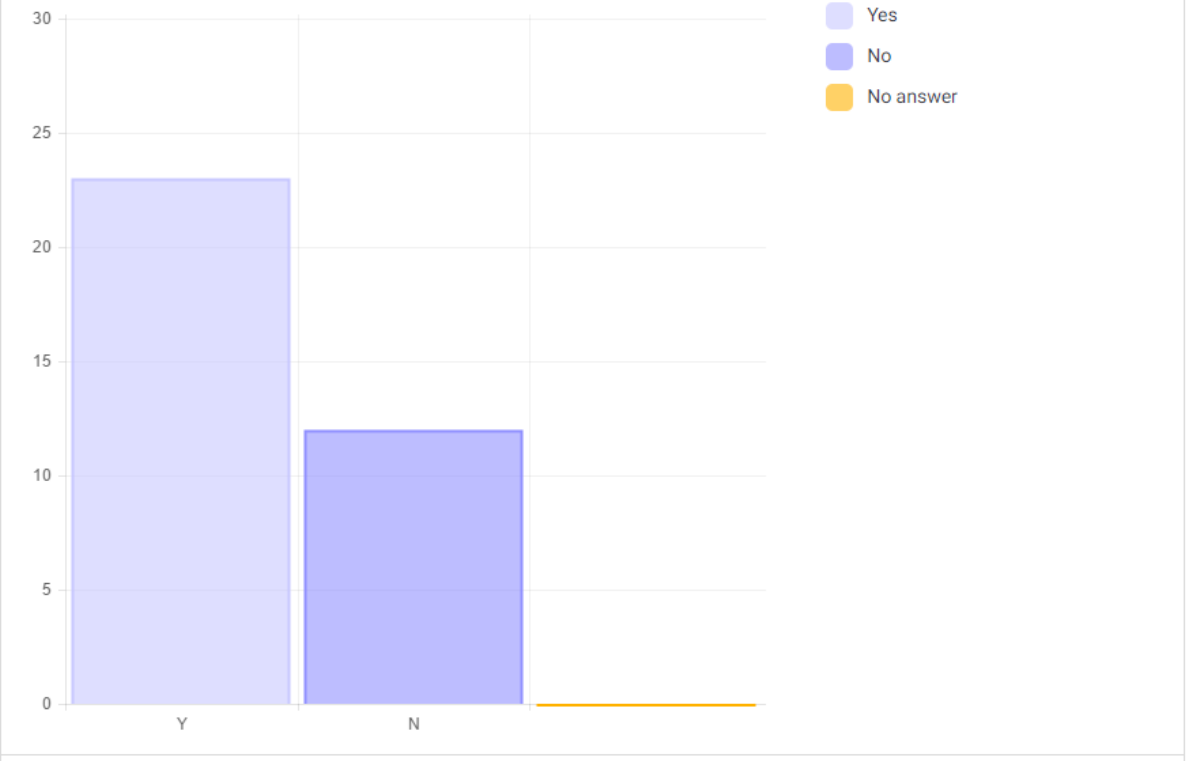


Figure 49 SFT catalogue

From those who said that they are implement SFT 65.71% said that their catalogue include options for new and used agricultural vehicles and 34.29% doesn't - Figure 49.

68.57% of them also said that they are having connectivity problems with tractors or any other SFT from other manufacturers and slightly less than one third (31.43%) that they don't have any connectivity problems - Figure 50

Are you having connectivity problems with tractors or any other SFT from other manufacturers?

Answer	Count	Percentage
Yes (Y)	24	68.57%
No (N)	11	31.43%
No answer	0	0.00%

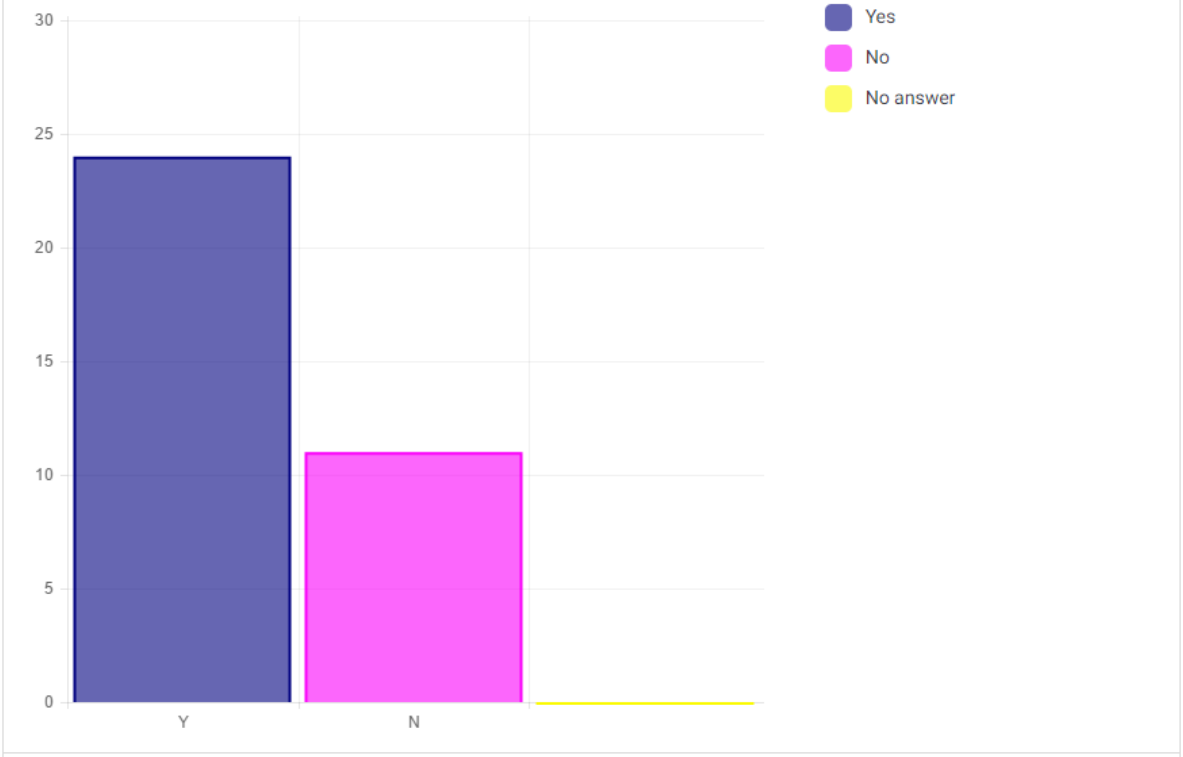


Figure 50 Connectivity problems

When talking about connectivity, 54.90% of company representatives claimed that wired connection is more reliable, while 45.10% stated that wireless connection is better - Figure 51.

Ta

Which kind of SFT are more reliable as machines connectivity is concerned?		
Answer	**Count**	**Percentage**
Wired (A1)	28	54.90%
Wireless (A2)	23	45.10%
No answer	0	0.00%

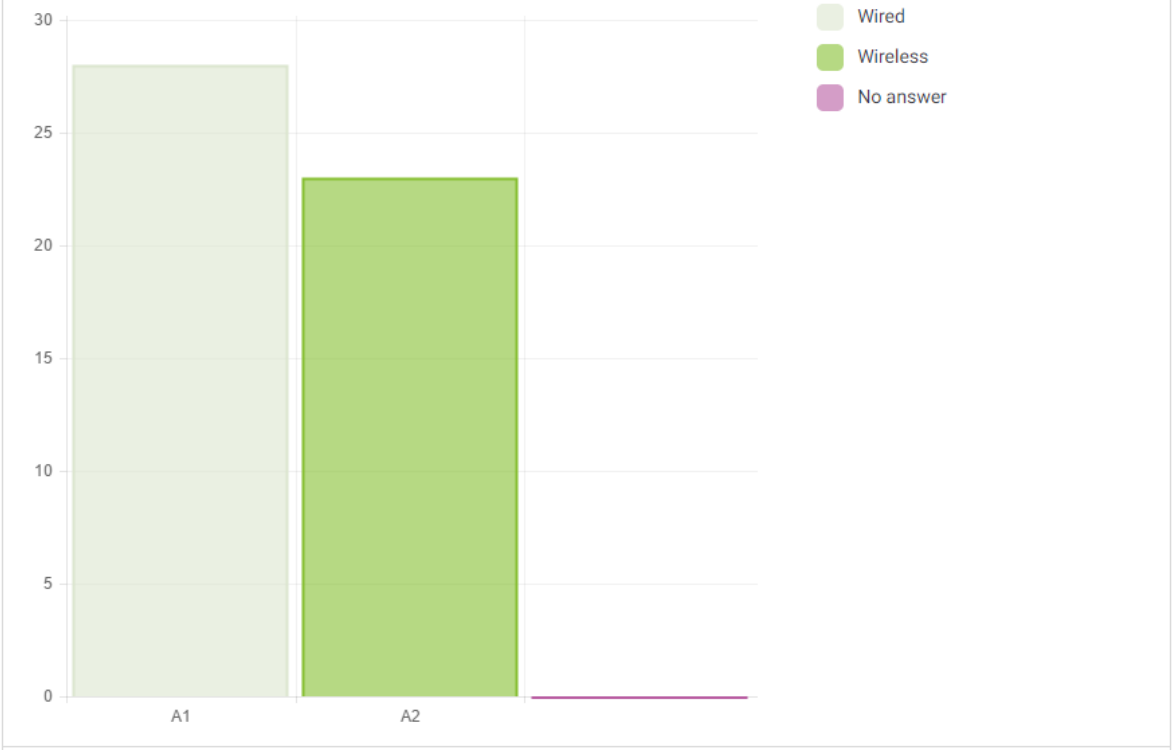


Figure 51 Reliable SFT

84.31% of all company representatives also think that SFT should be included in the scope of future EU legislation and 15.69% is against that - Figure 52.

Do you think that SFT should be included in the scope of future EU legislation (road traffic / labour safety)		
Answer	**Count**	**Percentage**
Yes (Y)	43	84.31%
No (N)	8	15.69%
No answer	0	0.00%

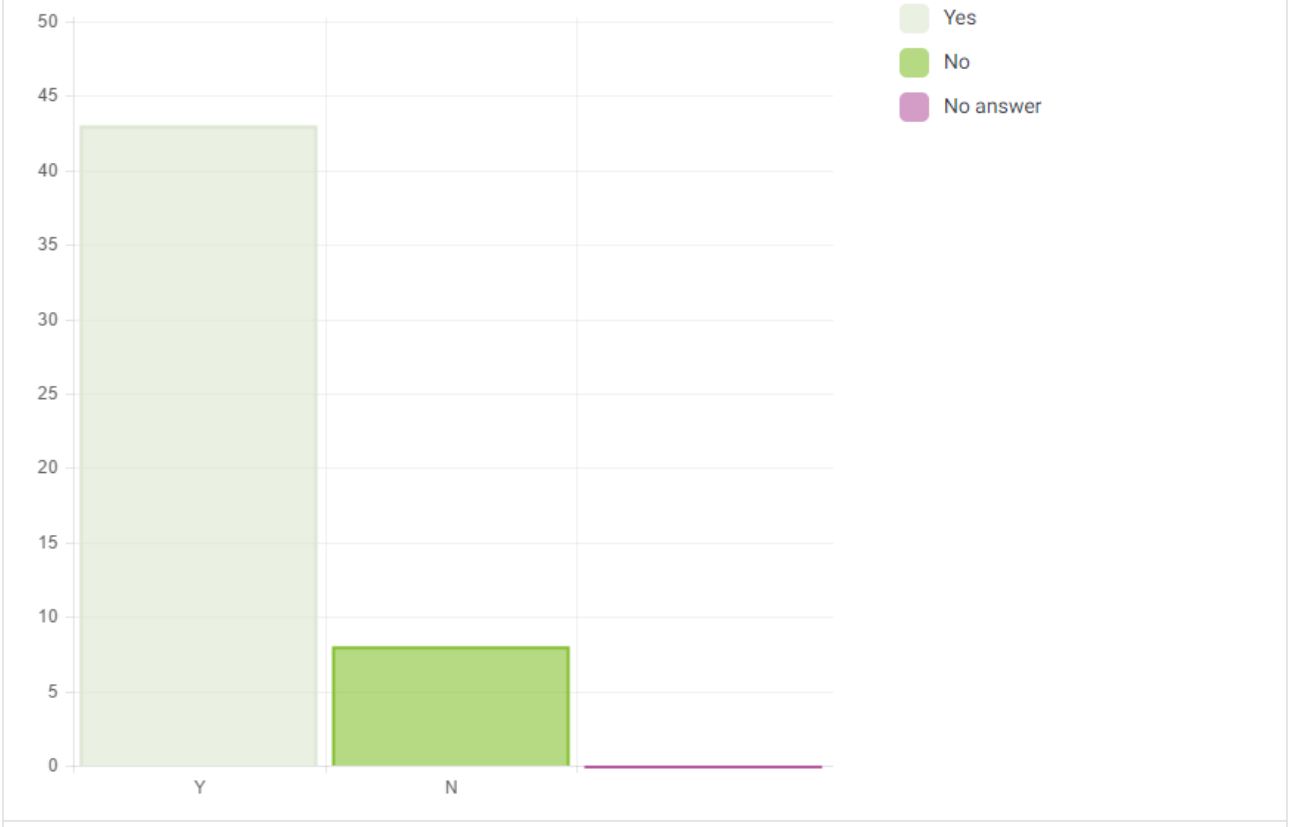


Figure 52 EU legislation

When asked: **What operating aspects shall SFT cover?,** offering Productivity, Environmental, Cost efficiency and Safety, asking them to indicate % in every choice to sum up to 100, answers are following:

Field summary for Productivity:

What operating aspects shall SFT cover? Please indicate % in every choice to sum up 100.

Calculation	Result
Count	51
Sum	1510
Standard deviation	13.32
Average	29.61
Minimum	10
1st quartile (Q1)	20
2nd quartile (Median)	25
3rd quartile (Q3)	40
Maximum	70

Null values are ignored in calculations
Q1 and Q3 calculated using **Minitab method**

Field summary for Environmental:

What operating aspects shall SFT cover? Please indicate % in every choice to sum up 100.

Calculation	Result
Count	51
Sum	1020
Standard deviation	10.8
Average	20
Minimum	0
1st quartile (Q1)	10
2nd quartile (Median)	20
3rd quartile (Q3)	25
Maximum	50

Null values are ignored in calculations
Q1 and Q3 calculated using **Minitab method**

Field summary for Cost efficiency:

What operating aspects shall SFT cover? Please indicate % in every choice to sum up 100.

Calculation	Result
Count	51
Sum	1610
Standard deviation	12.93
Average	31.57
Minimum	10
1st quartile (Q1)	25
2nd quartile (Median)	30
3rd quartile (Q3)	40
Maximum	70

Null values are ignored in calculations
Q1 and Q3 calculated using **Minitab method**

Field summary for Safety:

What operating aspects shall SFT cover? Please indicate % in every choice to sum up 100.

Calculation	Result
Count	51
Sum	1050
Standard deviation	8.89
Average	20.59
Minimum	0
1st quartile (Q1)	10
2nd quartile (Median)	20
3rd quartile (Q3)	25
Maximum	40

Null values are ignored in calculations
Q1 and Q3 calculated using **Minitab method**

On question: **Do you think that open data (both supply and demand) is needed to improve SFT?**, 86.27% answered with Yes and 13.73% with No.

Similar answers were on question: **Do you think that an unbiased comparison of available SFT could foster its implementation among end users?**, where 84.31% said Yes and 15.69% No.

As shown in Figure 53, 90.20% are convinced that external training from multidisciplinary experts would be useful to their staff and dealerships and just 9.8% said that don't think the same.

Do you think that an external training from multidisciplinary experts would be useful to your staff and dealerships?

Answer	Count	Percentage
Yes (Y)	46	90.20%
No (N)	5	9.80%
No answer	0	0.00%

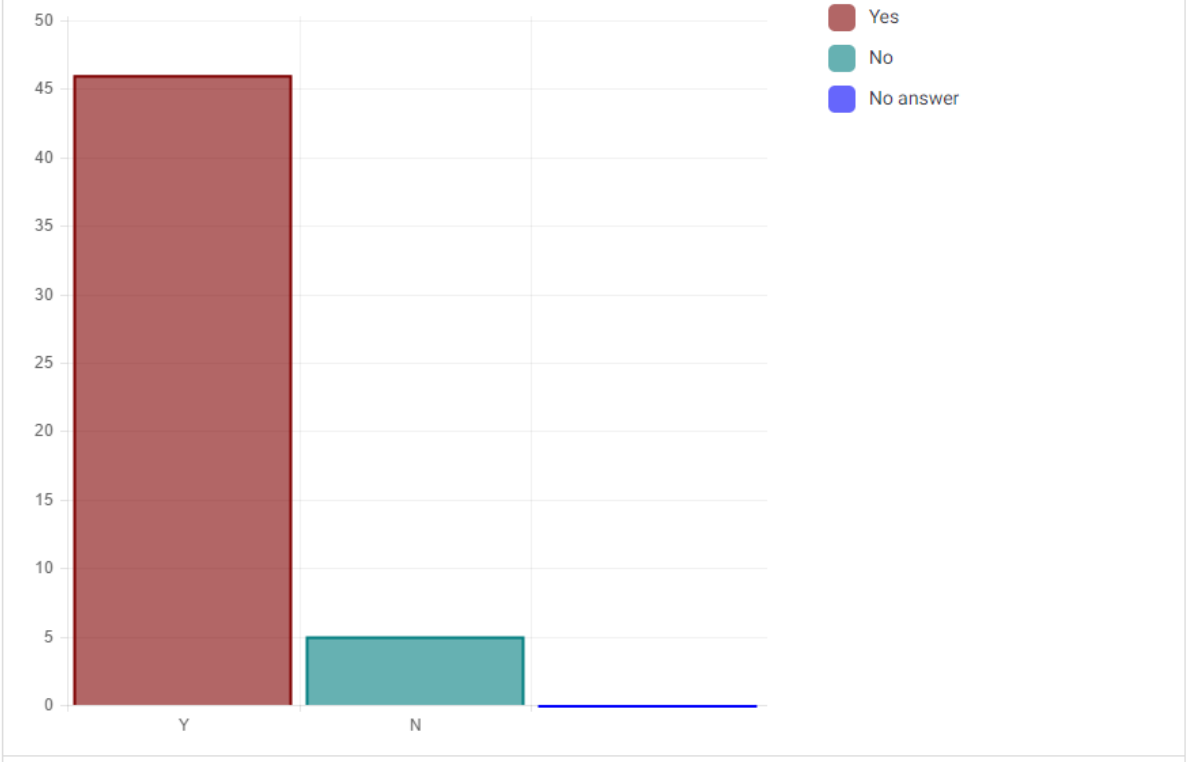


Figure 53 External training

- Majority of company representatives stated that their speciality are arable crops and two thirds are already implementing SFT on the machinery, which means that they are highly aware of SFT importance but there is a still room for improvement.
- Those who are not implementing SFT yet, claim that they will implement it in the future and that main reason is "no demand" which can be correlated with farmers' statement that that main reason for not using SFT is lack of knowledge. By helping farmers to increase their knowledge it will lead to higher demands for SFT on machineries.
- They think that SFT is needed to increase their potential market and that GATES should cover cost efficiency and productivity aspects within its simulation and that open data is needed to improve SFT.
- Like students and farmers, 90% of company representatives are convinced that external training would be helpful for their staff and dealerships.

4.5 Contact details

Although it was planned as completely anonymous survey, one third of interviewees were willing to leave their first and last name (Figure 54) and more than a half left their email addresses (Figure 55) in order to stay in touch with GATES team members and follow progress of the GATES training platform and serious game. Namely, 35.42% of farmers, 77.08% of students, 63.64% of SFT specialists and 43.13% of company representatives left their emails. Because of data privacy those answers will not be listed in this document but just some blurred samples.

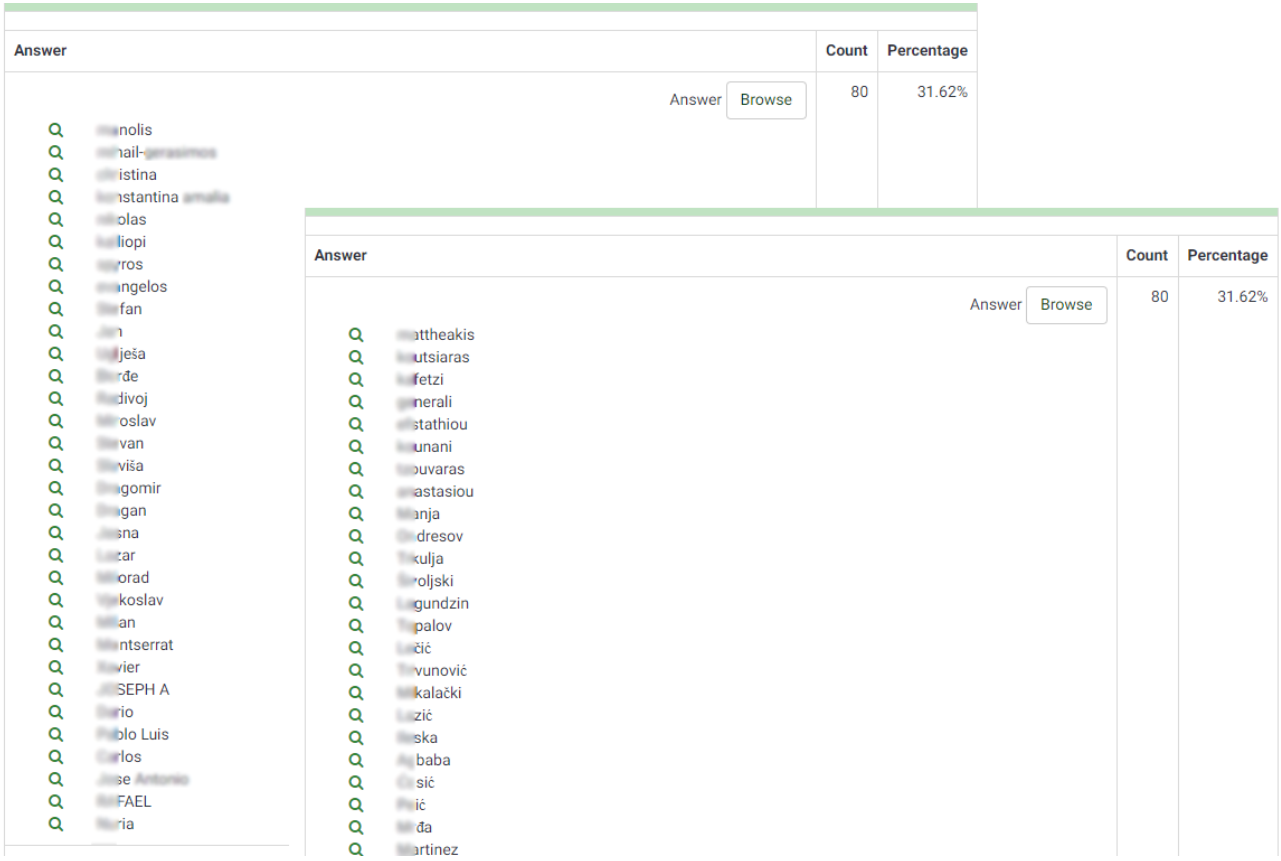
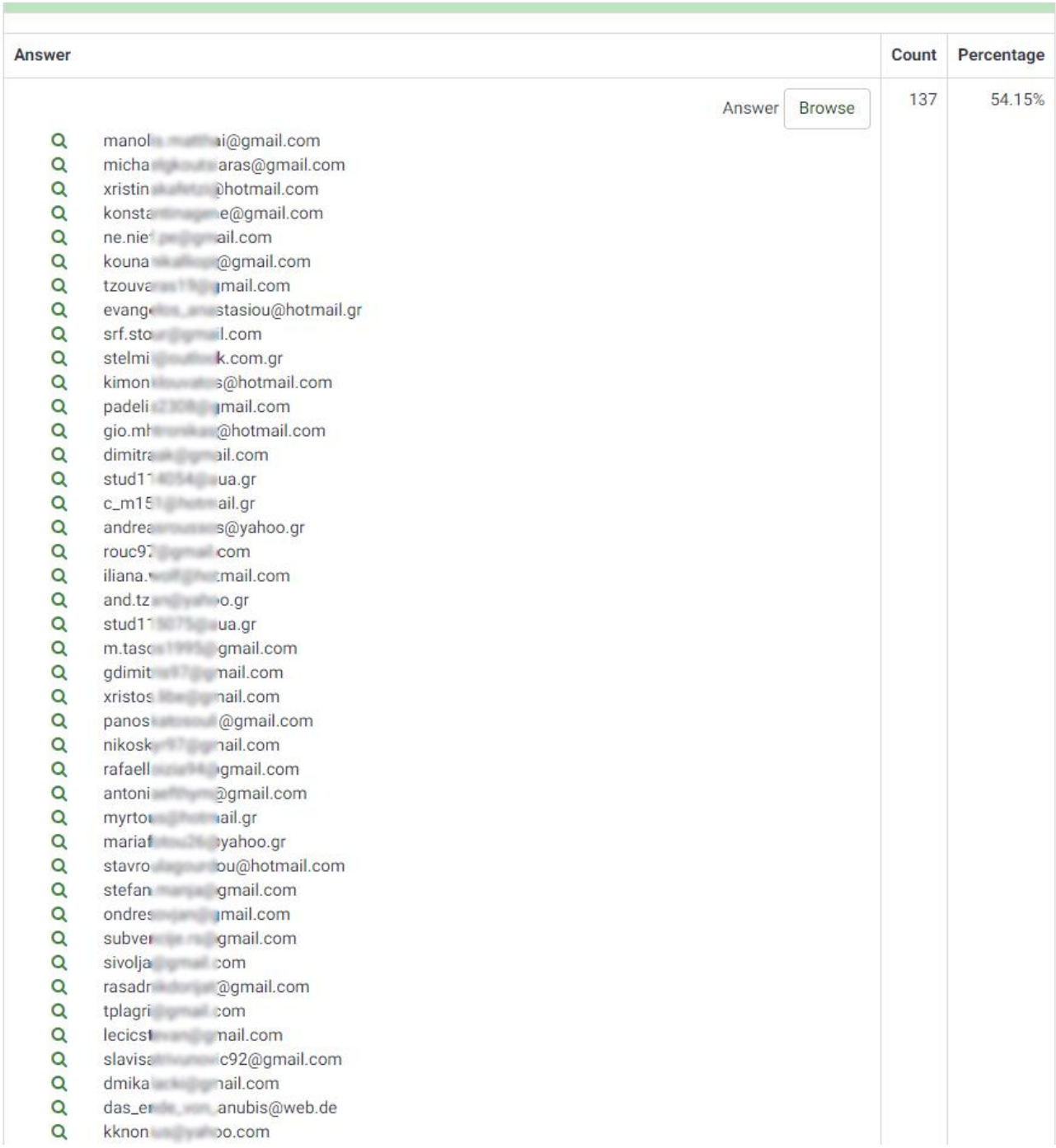


Figure 54 First and last name



Answer	Count	Percentage
Answer Browse	137	54.15%

manol[illegible]i@gmail.com
micha[illegible]aras@gmail.com
xristin[illegible]@hotmail.com
konsta[illegible]e@gmail.com
ne.nie[illegible]ail.com
kouna[illegible]@gmail.com
tzouva[illegible]mail.com
evange[illegible]stasiou@hotmail.gr
srf.sto[illegible]l.com
stelmi[illegible]k.com.gr
kimon[illegible]s@hotmail.com
padeli[illegible]mail.com
gio.mh[illegible]@hotmail.com
dimitra[illegible]ail.com
stud1[illegible]ua.gr
c_m15[illegible]ail.gr
andrea[illegible]s@yahoo.gr
rouc97[illegible]com
iliana.[illegible]mail.com
and.tz[illegible]o.gr
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gdimit[illegible]mail.com
xristos[illegible]nail.com
panos[illegible]@gmail.com
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rasadr[illegible]@gmail.com
tplagri[illegible]com
lecicst[illegible]mail.com
slavisa[illegible]c92@gmail.com
dmika[illegible]nail.com
das_e[illegible]anubis@web.de
kknon[illegible]o.com

Figure 55 E-mail addresses

5. Conclusions

Results of the interview-based questionnaire performed with various value chain participants are essential to shed ample light on the diverse and largely complex agrifood ecosystem and even GATES's data sample can explain how complex the European agrifood ecosystem is.

Three general conclusions of the survey and corresponding GATES overall recommendations are summarized in the Table 2.

Table 2 General conclusions and overall recommendations

Status quo	GATES Recommendations
***Low to medium level of SFT acceptance*:** Each of the four large stakeholder groups involved has experienced so far different levels of activities regarding the SFT implementation, but the general impression is that potentials that exist are not utilized sufficiently.	With its design, GATES platform aims to capture the dynamics of SFT usage benefits and ***motivate stakeholders from the most various niches to develop synergies, empower innovation collaboration and help them in launching products/services to the market.*** Additionally, it aims to provide an integrated educational supporting framework that will help target groups to gain more knowledge about SFT.
***Need for training*:** All target groups expressed clear need for proper guidance about the benefits of SFT usage and are willing to improve their skills in this respect.	The supporting educational mission of GATES will include a ***learning-through-play experience for all the target groups***. GATES beneficiaries will be continuously supported to access developed simulations and benefit from the rapid growth of emerging trends.
Technology provision and business actions: It is clearly understandable that GATES target groups require dual-layer approach from the GATES platform that complements absorption of new technologies with market penetration.	GATES capitalizes upon the diverse know-how of its partners to develop symbiotic services and develops the ***channel for diffusion of knowledge***. This will be very useful more adopting more SFT knowledge within the value chain and creating useful business models.

In the concluding section, the report summarizes the needs of each target group questioned, main barriers they encounter that are preventing them to use SFT at the moment, as well as the main characteristics that form them and that are important for GATES as a basis for future game development (as visible in

This user requirements interview targeted to capture the different types of target groups that exist in the agrifood ecosystem in terms of their 'level of readiness' to capitalise the potential of SFT and its implantation. This is essential in order to design well-tailored and diversified gaming features that will encompass appropriately escalating functionalities and tools per different target group profile.

Figure 56 Needs, Barriers and Characteristics – farmers and agricultural students

Figure 57 Needs, Barriers and Characteristics – company representatives and SFT specialists

Based on detailed analysis and reflection on gathered answers from main target groups, the following paragraphs picture the profiles for all target groups regarding the characteristics, needs, barriers and level of readiness for accepting SFT (as given in Figure 56 and Figure 57).

Farmers **need** more education in the field of SFT implementation. On the other hand, they do experience currently severe **barriers** in their attempts to utilize SFTs - in most of the cases lack of knowledge and lack of available funding for investments. The main **characteristics** of this core target group are that they usually own their own land that is rather smaller in size, require help from family members and are willing to invest more in equipment than they used to.

Students **need** more interactive educational tools in their study curricula. When it comes to **barriers** that are preventing them to gain knowledge about SFT, they are not of technology nature but rather due to a fact that no educational platforms are that much available. The main **characteristics** of this target group are that they enjoy multiplayer environment and could adopt equally mobile and desktop version of a game.

SFT specialists **need** more small-scale farmers to offer them their services. When it comes to **barriers** that are preventing them to utilize more SFT opportunities, they are usually connected with the fact that their clients lack knowledge. The main **characteristic** of this target group is that they act as a bridge between manufacturers and farmers.

Company representatives **need** more demand from their clients and the main **barrier** they experience is actually on the clients' side since they lack knowledge about SFT. The main **characteristic** of this target group is the openness to engage interactively with the clients and provide input that could support gaming development.

Anex 1

GATES User Requirements

Smart Farming Technologies have the potential to contribute to the wider goal of meeting the increasing **demand** for agricultural outputs **while ensuring the sustainability of primary production**, based on a more precise and resource-efficient approach to agricultural production.

GATES, the acronym of "***Applying GAming TEchnologies for training professionals in Smart Farming***", is a European Project, supported by the European Union's Horizon 2020 Research and Innovation Programme, whose **overall objective** is to develop a **serious game-based training platform** in order to train professionals across the agricultural value chain on the use of **Smart Farming Technology**, thus allowing deploying its full economic and environmental potential in European agriculture.

The **GATES gaming platform** will be marketed as a **white-label app** within 1-2 years of project's end (June 2019), with the possibility of being customized according to the needs of paying customer (SFT companies, universities and extension services /agricultural consultants). It will function either as a stand-alone or as a complementary tool to traditional training methods, covering a wide range of agricultural settings in order to cater for the needs of different professionals in the SFT value chain. An in-depth **market analysis** and a **Business Plan** will be conducted during the project for facilitating the entry of the GATES gaming platform in the market.

There are 62 questions in this survey

General questions

Are you? *

Please choose **all** that apply:

☐ Farmer

☐ Agricultural student

☐ Smart Farming Technologies (SFT) specialist

☐ Company representative (Food processor, Logistics and sales, Supporting industry)

☐ Other:

Your age? *
Choose one of the following answers

Please choose **only one** of the following:

○ <25

○ 25-34

○ 35-44

- ○ 45-54
- ○ 55-64
- ○ >65

Where do you live? *

Choose one of the following answers

Please choose **only one** of the following:

- ○ Germany
- ○ Greece
- ○ Serbia
- ○ Spain
- ○ Other

Do you play video games? *

Choose one of the following answers

Please choose **only one** of the following:

- ○ Every day
- ○ Once a week
- ○ Once a month
- ○ From time to time
- ○ I don’t play the games at all

What kind of games do you play? *

Only answer this question if the following conditions are met:
Answer was NOT 'I don’t play the games at all' at question '4 g4' (Do you play video games?)

Please choose **all** that apply:

- ☐ Fun
- ☐ Serious (Educational)

Did you ever use any training platform for agricultural machineries/services? *
Please choose **only one** of the following:

- ○ Yes
- ○ No

Have you ever considered to play video games where your level of progress and expertise would help you out in your daily real work? *
Please choose **only one** of the following:

- ○ Yes
- ○ No

You have the opportunity to use a convenient and pleasant platform like a game on your mobile phone, tablet or laptop to become more familiar with smart farming equipment:

Which do you think are the most important features this platform should have? *
Please choose the appropriate response for each item:

	1	2	3	4	5
Availability of a game on any platform (device)?	○	○	○	○	○
Availability of a game on any browser?	○	○	○	○	○
Availability of a game on standalone mode?	○	○	○	○	○
Simulation of any business model concept?	○	○	○	○	○
Simulation of a specific model concept?	○	○	○	○	○
Elements of the ecological aspect the game will include?	○	○	○	○	○
Simulation of any business problem?	○	○	○	○	○
Simulation of a specific business problem?	○	○	○	○	○
The usage of machinery in a simulation?	○	○	○	○	○
A possibility to purchase machinery in a simulation?	○	○	○	○	○
Simulation on a specific machinery brand?	○	○	○	○	○

Which do you think are the most important areas this platform should help you become better? *
Please choose the appropriate response for each item:

	1	2	3	4	5
Learn the Configuration/set-up/usage of smart farming equipment	○	○	○	○	○
Learn good agricultural practices using smart farming equipment	○	○	○	○	○
Learn efficient farm management using smart farming equipment (improve decision-making for better income)	○	○	○	○	○
Help others to use smart farming equipment	○	○	○	○	○
Think of new ways to use smart farming equipment in everyday farming tasks	○	○	○	○	○

Farmers

Do you? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)

Please choose **all** that apply:

☐ Own your land

☐ Rent a lend

☐ Provide services to other farmers

How much land do you cultivate? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)
Please choose **only one** of the following:

○ 0 ha

○ < 2 ha

○ 2 - 4.9 ha

○ 5 - 9.9 ha

○ 10 - 19.9 ha

○ 20 - 29.9 ha

○ 30 - 49.9 ha

○ 50 - 99.9 ha

○ > 100 ha

Your average plot size is? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)
Choose one of the following answers

Please choose **only one** of the following:

- ○ < 1 ha
- ○ 1 - 2 ha
- ○ 2 - 5 ha
- ○ 5 - 10 ha
- ○ 10 - 50 ha
- ○ 50 - 100 ha
- ○ > 100 ha

Do you have any help to cultivate your land? (tick those that apply to you): *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)

Please choose **all** that apply:

- ☐ family
- ☐ friends
- ☐ other farmers
- ☐ agronomist
- ☐ consultant
- ☐ smart farming expert
- ☐ none

Do you have any knowledge/training regarding SFT? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes

○ No

If using of some special equipment in farming jobs can help you improve your income are you open to find out more about it? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)
Please choose **only one** of the following:

○ Yes

○ No

If you have the chance to control various farming tasks like irrigation, fertilization etc. through a mobile phone or a tablet or a laptop to save you time and money from spending in fuels to get to the farm or use more material than needed, would you like to know more? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)
Please choose **only one** of the following:

○ Yes

○ No

If you have the chance to increase your profits by using machinery that allows you, for instance, to plant seeds with more precision, or sow with more precision, or harvest trees with less strain on the tree or the fruit, would you like to know more? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)
Please choose **only one** of the following:

○ Yes

○ No

If you have the chance to use smart farming equipment like the ones described in the previous questions, for which crops would you use them? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)

Please choose **all** that apply:

☐ Arable crops

☐ Bush and tree crops

☐ Greenhouses

☐ Vegetables

☐ Orchards

How much money do you spend in a 5-year period to buy specialized equipment, like the ones described in questionnaire intro? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)
Choose one of the following answers

Please choose **only one** of the following:

○ 0 Eur

○ 1 - 1999 Eur

○ 2000 - 4999 Eur

○ 5000 - 9999 Eur

○ 10 000 - 19 999 Eur

○ 20 000 - 49 999 Eur

○ 50 000 - 100 000 Eur

○ > 100 000 Eur

How much money are you willing to spend in a 5-year period to buy specialized equipment, like the ones described in questionnaire intro? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)
Choose one of the following answers

Please choose **only one** of the following:

○ 0 Eur

○ 1 - 1999 Eur

○ 2000 - 4999 Eur

○ 5000 - 9999 Eur

○ 10 000 - 19 999 Eur

○ 20 000 - 49 999 Eur

○ 50 000 - 100 000 Eur

○ > 100 000 Eur

Are you using SFT equipment? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Why are you not using SFT? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you) *and* Answer was 'No' at question '22 f12' (Are you using SFT equipment?)

Please choose **all** that apply:

- ☐ Topography / Farm structure limits use by farmers
- ☐ Farm income pressure limits use of precision services
- ☐ Customers lack confidence in site-specific recommendations
- ☐ Soil types in area limits profitability of precision
- ☐ Cost of precision services to customers greater than benefits
- ☐ Interpreting / decisions too time consuming for customers
- ☐ Lack of knowledge related with SFT

If you already use smart farming equipment like the ones described in the previous questions:

For which crops do you use them? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you) *and* Answer was 'Yes' at question '22 f12' (Are you using SFT equipment?)

Please choose **all** that apply:

- ☐ Arable crops
- ☐ Bush and tree crops
- ☐ Greenhouses
- ☐ Vegetables
- ☐ Orchards

What is the degree of your satisfaction in using it? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you) *and* Answer was 'Yes' at question '22 f12' (Are you using SFT equipment?)
Please choose **only one** of the following:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

What SFT are you already using? *

Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you) *and* Answer was 'Yes' at question '22 f12' (Are you using SFT equipment?)

Please choose **all** that apply:

- ☐ GPS Guidance (Auto control / Auto steer)
- ☐ GPS Guidance (Manual control)
- ☐ Precision services offered
- ☐ GPS-enabled sprayer control
- ☐ Satellite / Aerial imagery for internal use
- ☐ Field mapping (GIS)
- ☐ GPS for logistics
- ☐ Telemetry
- ☐ UAVs/ Drones
- ☐ Soil electrical conductivity mapping
- ☐ Other vehicle mounted soils sensors
- ☐ Chlorophyll / Greenness sensors

How would you describe your level of knowledge/skills about them? (5 is the best) *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you) *and* Answer was 'Yes' at question '22 f12' (Are you using SFT equipment?)
Please choose **only one** of the following:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

What do you need additionally? (5 is the best) *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you) *and* Answer was 'Yes' at question '22 f12' (Are you using SFT equipment?)
Please choose the appropriate response for each item:

	1	2	3	4	5
More knowledge	○	○	○	○	○
An expert available	○	○	○	○	○
Better manuals	○	○	○	○	○
Direct contact with the manufacturer	○	○	○	○	○
Help on how to use it best to get more benefits and better income	○	○	○	○	○

How often do you need help in managing them or making decisions concerning them? *
Only answer this question if the following conditions are met:
Answer was 'Farmer' at question '1 g1' (Are you) *and* Answer was 'Yes' at question '22 f12' (Are you using SFT equipment?)
Choose one of the following answers

Please choose **only one** of the following:

- ○ I don’t need the help
- ○ Daily
- ○ Weekly
- ○ Monthly
- ○ Monthly
- ○ Per season
- ○ Other

Agricultural students

Do you have any knowledge/training regarding SFT? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Do you know anything about SFT best practice? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Do you know what the environmental benefits of SFT usage are? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Do you know what the farm expenditures of SFT usage are? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Do you think that SFT have a future in agriculture practice? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Do you think that agricultural students should be the ambassadors of SFTs in agricultural practice? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Would you prefer to have more courses related to SFT in your curriculum? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Would you be interested in having more interactive tools for your education related to SFT and other new trends in agriculture? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Do you think that simulation platforms based on actual technical information would help you to improve? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Do you think that simulations platforms should be? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)

Please choose **all** that apply:

- ☐ Webpage allocation
- ☐ Mobile applications
- ☐ Installed on the computer

Do you consider that a multiplayer environment would be beneficial for the learning experience? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Choose one of the following answers

Please choose **only one** of the following:

- ○ Yes (user scoring would foster the use of the serious game since increases competitiveness among users)
- ○ No (a serious game platform should not be intended as entertainment)
- ○ Other

Would you prefer a serious game for SFT should be played by a single user or competitively with a student colleague? *
Only answer this question if the following conditions are met:
Answer was 'Agricultural student' at question '1 g1' (Are you)
Choose one of the following answers

Please choose **only one** of the following:

- ○ Alone
- ○ With a student colleague
- ○ With more people on a group

Smart Farming Technologies (SFT) specialist

To whom do you sell your products/services? *
Only answer this question if the following conditions are met:
Answer was 'Smart Farming Technologies (SFT) specialist' at question '1 g1' (Are you)

Please choose **all** that apply:

- ☐ Small size farms
- ☐ Medium size farms
- ☐ Large size farms
- ☐ Small/medium agrifood companies
- ☐ Enterprise agrifood companies

How often they ask for your help? *
Only answer this question if the following conditions are met:
Answer was 'Smart Farming Technologies (SFT) specialist' at question '1 g1' (Are you)
Choose one of the following answers

Please choose **only one** of the following:

- ○ Daily
- ○ Weekly
- ○ Monthly
- ○ Per season
- ○ Other

Please rate the knowledge and understating of your customers regarding SFT (5 is the best) *
Only answer this question if the following conditions are met:
Answer was 'Smart Farming Technologies (SFT) specialist' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

As you are concerned, do you think that companies provide the minimum technical information about their SFT products? *
Only answer this question if the following conditions are met:
Answer was 'Smart Farming Technologies (SFT) specialist' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

In your opinion, currently which are the main obstacles for the SFT implementation? *
Only answer this question if the following conditions are met:
Answer was 'Smart Farming Technologies (SFT) specialist' at question '1 g1' (Are you)

Please choose **all** that apply:

- ☐ Lack of IT training of farmers
- ☐ Inadequate user information from manufacturers

☐ Low investment level

☐ Average age of machinery in use

☐ Increasing second-hand machinery market

☐ Farm structure not suitable for available SFT

☐ Data coverage in rural areas

☐ Other:

Which would be the more efficient drivers to enhance the use of SFT? *

Only answer this question if the following conditions are met:
Answer was 'Smart Farming Technologies (SFT) specialist' at question '1 g1' (Are you)

Please choose **all** that apply:

☐ Foster its cost-efficiency benefits

☐ Highlight its environmental aspects (CAP greening)

☐ Ergonomic issues and labor safety

☐ Other:

Which kind of tools shall be necessary to move current farming to digital? *

Only answer this question if the following conditions are met:
Answer was 'Smart Farming Technologies (SFT) specialist' at question '1 g1' (Are you)

Please choose **all** that apply:

☐ Improve the quality and volumen of technical information from manufacturers

☐ Better communication and practical learning among end-users

☐ Creation of a information network among all SFT players (farmers, specialists, contractors, dealers, manufacturers)

Would a simulation platform on SFT satisfy these topics? *

Only answer this question if the following conditions are met:
Answer was 'Smart Farming Technologies (SFT) specialist' at question '1 g1' (Are you)
Please choose **only one** of the following:

○ Yes

○ No

Company representatives

What is your specialty? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you)

Please choose **all** that apply:

☐ Arable crops

☐ Bush and tree crops

☐ Greenhouses

☐ Vegetables

☐ Orchards

Are you already implementing SFT on the machinery? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you)
Please choose **only one** of the following:

○ Yes

○ No

Does your SFT catalogue include options for new and used agricultural vehicles? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you) *and* Answer was 'Yes' at question '51 c2' (Are you already implementing SFT on the machinery?)
Please choose **only one** of the following:

○ Yes

○ No

Are you having connectivity problems with tractors or any other SFT from other manufacturers? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you) *and* Answer was 'Yes' at question '51 c2' (Are you already implementing SFT on the machinery?)
Please choose **only one** of the following:

○ Yes

○ No

Which is the main reason that led you to choose not implementing SFT? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you) *and* Answer was 'No' at question '51 c2' (Are you already implementing SFT on the machinery?)

Please choose **all** that apply:

- [ ] No demand
- [ ] No availability of internal resources (revenue) or training
- [ ] Needed connectivity with self-propelled vehicle
- [ ] I will implement SFT in the future
- [ ] Lack of data coverage in rural areas

Do you think that SFT is needed to increase your potential market? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you) *and* Answer was 'No' at question '51 c2' (Are you already implementing SFT on the machinery?)
Please choose **only one** of the following:

- ○ Yes
- ○ No

Which kind of SFT are more reliable as machines connectivity is concerned? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you)
Choose one of the following answers

Please choose **only one** of the following:

- ○ Wired
- ○ Wireless

Do you think that SFT should be included in the scope of future EU legislation (road traffic / labour safety)? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you)
Please choose **only one** of the following:

- ○ Yes
- ○ No

What operating aspects shall SFT cover? Please indicate % in every choice to sum up 100. *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you)
Please write your answer(s) here:

Productivity

Environmental

Cost efficiency

Safety

Do you think that open data (both supply and demand) is needed to improve SFT? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you)
Please choose **only one** of the following:

○ Yes

○ No

Do you think that an unbiased comparison of available SFT could foster its implementation among end users? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you)
Please choose **only one** of the following:

○ Yes
○ No

Do you think that an external training from multidisciplinary experts would be useful to your staff and dealerships? *
Only answer this question if the following conditions are met:
Answer was 'Company representative (Food processor, Logistics and sales, Supporting industry)' at question '1 g1' (Are you)
Please choose **only one** of the following:

○ Yes

○ No

Contact details

If you are willing to be one of the first test players of GATES simulation platform, please fill your contact details
Please write your answer(s) here:

Your first name

Your last name

Your e-mail address

Submit your survey.
Thank you for completing this survey.

Applying GAming TEchnologies
for training professionals in Smart Farming

GATES
SMART FARMING SIMULATION PLATFORM

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