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SWOT ANALYSIS AND REQUIREMENTS FOR DEMONSTRATION FARMS: DEVELOPMENT TRENDS IN THE FRUIT SECTOR IN LATVIA, LITHUANIA AND POLAND

InnoFruit project report

Anda Adamsone-Fiskovica, Mikelis Grivins, Sandra Sumane, Talis Tisenkopfs, Emils Kilis
(Baltic Studies Centre; Institute of Horticulture)

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Output 2.1: SWOT ANALYSIS AND REQUIREMENTS FOR DEMO FARMS
Synthesis of WP2 Activity 2.1 (Tasks T1, T2, T3, T4, T5)
(Final version, December 2018)

Work package No 2 (WP2): Development of a conceptual framework for the establishment of demo-farms

Activity 2.1 (A2.1): Analysis of SMEs for the creation of the demo-farm network

Task 1 (T1): Identification of key national sectoral characteristics, scope and profile of SMEs

Task 2 (T2): Identification and review of the existing national studies on the fruit-growing/ processing sector

Task 3 (T3): Identification of good practice cases of demonstration activities in the fruit-growing sector

Task 4 (T4): Identification of demand for demonstration activities

Task 5 (T5): Presentation and approbation of key findings with relevant stakeholder groups

The present document provides an analysis synthesising part of the quantitative and qualitative data provided as country-specific inputs by the INNOFRUIT project partners under the work package devoted to the development of a conceptual framework for the establishment of demo-farms in the fruit-growing and processing sector in Latvia, Lithuania and Poland (with selected input on Sweden as an associate partner of the project). Specifically, this document brings together analysis carried out under one of the two activities of this work package – namely, Activity 2.1 "Analysis of SMEs for the creation of the demo-farm network", which shall be seen as complementary to the synthesis report "Study report on innovation and knowledge transfer" (O2.2) based on the work carried out under Activity 2.2 ("Analysis of existing knowledge transfer practices in research organisations") of this work package. The document provides a sectoral analysis, trend analysis and comprehensive assessment of the role and potential of demonstration farms in the involved Baltic Sea Region countries, including SWOT analysis.

Project partners involved in the implementation of Task 1, Task 2, Task 3, Task 4 and Task 5 were supplied with guidelines for data gathering.

Country-specific inputs under the given tasks have been provided by the following partners:

PP1 - Institute of Horticulture (LatHort) (Latvia)
PP2 - Institute of Horticulture, Lithuanian Research Centre for Agriculture and Forestry (Lithuania)
PP3 - Research Institute of Horticulture (Poland)
PP4 - Latvian Fruit Growers' association (Latvia)
PP9 – Faculty of Agriculture, Latvia University of Life Sciences and Technologies (Latvia)

This analysis has been performed by the team of social scientists (Baltic Studies Centre) subcontracted by PP1: *Anda Adamsone-Fiskovica, Mikelis Grivins, Sandra Sumane, Talis Tisenkopfs and Emils Kilis*.

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1. **Sectoral characteristics** (WP2, A2.1, T1)

To speak of the role and potential of demonstrations in the fruit growing and processing sector (FGPS) in Latvia (LV), Lithuania (LT) and Poland (PL) it was deemed important to outline the general socio-economic characteristics of the sector in the three countries in terms of its role in the national economy, structure of farms and businesses, production capacity, workforce, cooperation and innovation capacity.

A matrix for national statistical data was developed with an ideal in mind of collecting detailed information on a range of indicators and their dynamics in specific years (see list of all indicators in Box 1). However, due to differences and gaps in data availability, the actual data feature a more limited scope of quantitative information. The main problems have been related to the differing definitions of specific indicators in one or several of the analysed countries, as well as a lack of or difficulties accessing specific data on SMEs (rather than all commercial units).

BOX 1: Key indicators used in statistical data collection

Growing and harvesting capacity

- Total plantation area of fruit trees and berry bushes (ha)
- Total plantation area of fruit trees and berry bushes (% of total utilised agricultural area)
- Harvested production of main fruit and berry species (t)
- Production shares by main fruit and berry species (%, based on tonnage)
- Yield capacity by main fruit and berry species (t/ha)
- Industrial use (processing) by main fruit and berry species (% of all the locally harvested production of the given species)

Economic impact

- Value added of FGPS (EUR)
- Share of fruit and berries in the final agricultural output (%)
- Trade balance in fruit-growing sector (import/export)
- Trade balance in fruit-processing sector (import/export)
- Fruit and berry production per capita (kg)
- Fruit and berry consumption per capita (kg)
- Self-provision with fruit and berries (%)

Scope of commercial actors

- Number of companies (farms, agricultural enterprises, etc.) in fruit-growing sector
- Share of companies (farms, agricultural enterprises, etc.) in fruit-growing sector (% of all companies)
- Number of companies (farms, agricultural enterprises, food companies, etc.) in fruit-processing sector
- Share of companies (farms, agricultural enterprises, etc.) in fruit-processing sector (% of all companies)

Innovation capacity of companies

- Share of innovative companies (farms, agricultural enterprises, food companies, etc.) in FGPS (% of all FGPS companies)

Workforce profile

- Number of employees in fruit-growing sector (FTE)
- Number of employees in fruit-processing sector (FTE)
- Workforce age structure in FGPS
- Workforce education levels in FGPS

Cooperation

- Number of FGPS cooperatives
- Number of members in FGPS cooperatives
- Number of demonstration farms in FGPS

In the following sections project partners' assessment of fruit sector is given. In many cases, their expert assessment differs from the official statistics and this forms an interesting conclusion on its own – the way experts see the sector might differ from the way it is perceived by other actors. Thus, this part of the report should be mainly seen as a partners' cross-country comparison of selected indicators. However, to add a level of comparability the data gathered were supplemented by Eurostat data (see ANNEX 1). It should be noted, however, that according to Eurostat agricultural statistics, strawberries (along with melons and water melons) are included under vegetables rather than under fruit.[1]

Notwithstanding the above-mentioned methodological problems, the provided data sets a comparatively good ground for making some general conclusions on the sectoral trends in Latvia, Lithuania, and Poland with regards to the scope and main characteristics of commercial actors (number, innovative capacity, workforce), cooperation, production capacity, and economic impact.

a. Growing and harvesting capacity

On the EU scale the share of fresh vegetable and fruit area in the project countries, with an exception of Poland, is a negligible one, each making up less than 1% of the EU-28 areas (see Fig. 1). Poland, in turn, comes with the third largest share of these areas in the EU-28 after Spain and Italy, and it features by far the largest area and share of harvested apples (34% and 25%, respectively) in the EU-28.

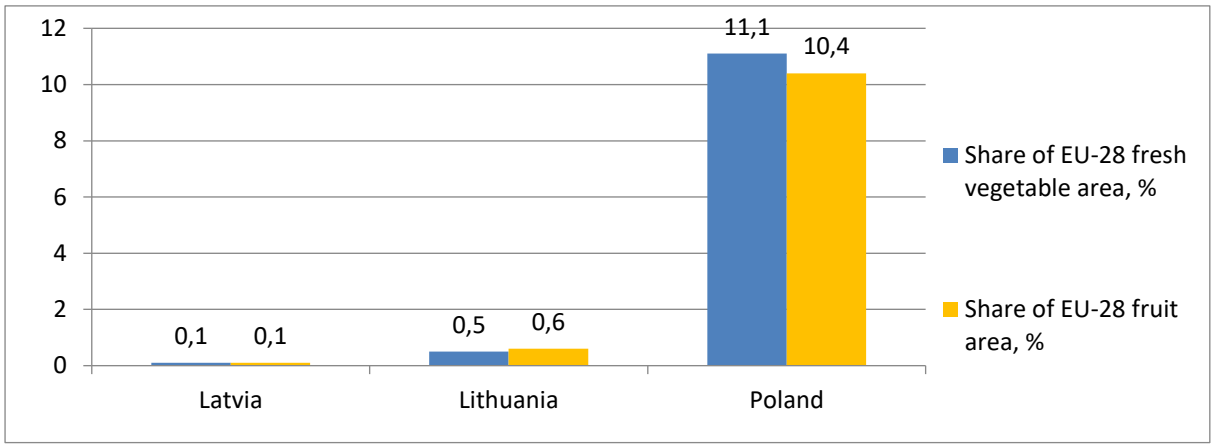


Figure 1. *Shares of fresh vegetable and fruit areas in EU-28, 2015. Source*: Based on De Cicco (2017).

Also, on a national level, and specifically with regards to fruit and berry plantations, in Latvia and Lithuania these occupy a minor area of total utilised agricultural area (UAA). In Latvia and Lithuania, fruit and berries are grown on 0.3% of total utilised agricultural area. In absolute numbers, as reported by project partners, in Latvia, there are around 3,000 ha of commercial plantations of fruit and berries and 7,000 ha total plantations, including old apple tree plantations. In Lithuania, 10,272 ha of UAA are planted with fruit and berries. **In Poland, the sector has a notably higher importance,** whereby fruit and berry plantations occupy 390,800 ha that constitutes 2.7% of utilised agricultural area.

There is a variety of fruit and berry species grown in the three countries (see ANNEX 1). **The principal species in all three countries by far is the apple** (also in Sweden) – in terms of both harvested area and harvested production (see Fig. 2). According to Eurostat, between 2000 and 2015 the three countries had witnessed somewhat different trends of apple farming. The **overall harvested area for apples had decreased in Latvia and Lithuania while it had grown in Poland**. The

[1] De Cicco, A. (2017) *The fruit and vegetable sector in the EU – a statistical overview*. Eurostat: Statistics Explained. Available at: http://ec.europa.eu/eurostat/statistics-explained/pdfscache/53634.pdf

same trends could be observed in the tonnage of apples harvested: apple harvests in Latvia and Lithuania had dropped while harvests in Poland had grown. Yet, the more recent trends show that, for instance, in 2017 the total planted area of commercial apple tree orchards in Latvia reached 3.2 thousand ha, which is 0.8 thousand ha or 33.5 % more than in 2012, thus pointing to the trends of intensification of fruit production.[2] Additionally, it is worth noting that **harvests in Lithuania and Poland show a significant raise in productivity** if the volume of harvested apples is considered.[3]

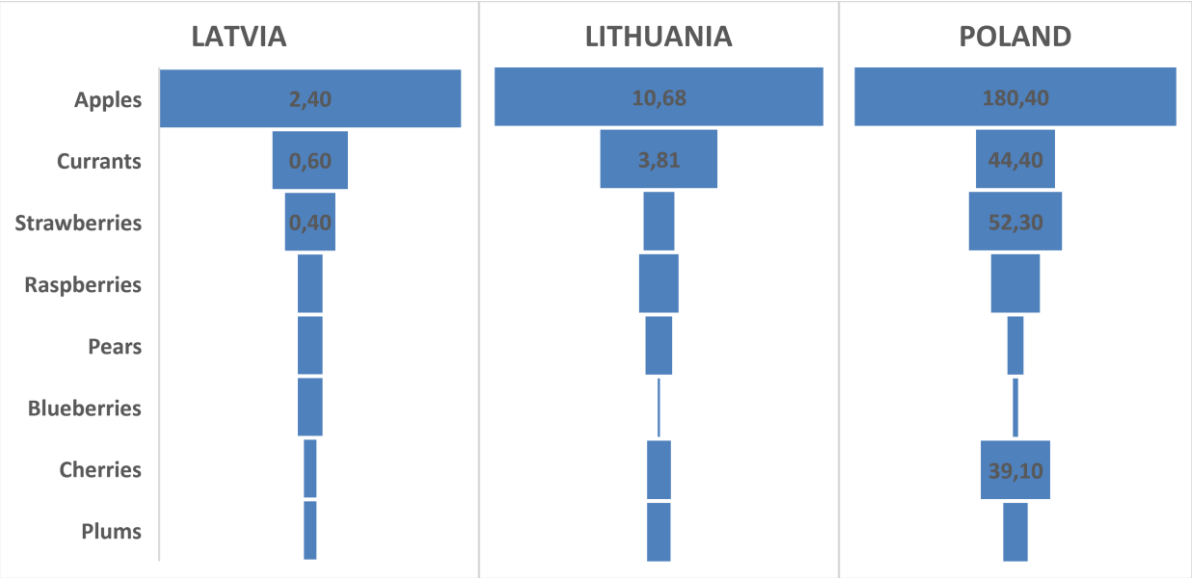


Figure 2. *Biggest harvested crops by harvested area (1000 ha), 2015. Source:* Eurostat.

Note: The ratios of crops are visualised per type of crop in each country but are not comparable per crop across the three countries since the absolute figures are notably different in each country.

The other species of fruit and berries produced in all three countries, aside from apples, are also quite similar (see ANNEX 1 and Fig. 2). In Lithuania, these are black currants (4,360 t in 2015), strawberries (3,200 t), raspberries (2,620 t), pears (1,540 t), plums (610 t), and cherries (350 t). In Latvia, major species include: strawberries (1,400 t), black currants (600 t), pears (500 t), and raspberries, blueberries and plums (each 200 t). In Poland, major produced species are: cherries (227,500 t), strawberries (214,600 t), black currants (159,900 t), plums (94,900 t), raspberries (79,900 t), and pears (69,600 t).

On the whole, it can be said that in terms of harvested crops by both harvested area and harvested production over the period between 2000 and 2015, **in Latvia the importance of the fruit sector had been notably decreasing; in Lithuania, with an exception of apples and some growth in the harvested production of strawberries and raspberries, the sector seemed to be stagnating; in Poland, on the contrary, though with some variation among species, the overall importance of the sector had been considerably growing.**

As for the yield capacity, based on a partners' calculation of harvested production tonnage per harvested area (t/ha), it makes up 13.8 t/ha for apples in Lithuania and 11.3 t/ha for pears. In Poland, the average yields for main fruit and berry species are estimated as "rather not impressive" and in 2015 were as follows: apples – 17.6 t/ha, strawberries – 3,9 t/ha, sour cherries – 6 t/ha, black currants – 3.35 t/ha, plums – 6.8 t/ha, raspberries – 2.9 t/ha, pears – 7.6 t/ha, and sweet cherries – 5.1 t/ha. The **yields in leading commercial farms are much higher** than presented above –

[2] https://www.csb.gov.lv/en/statistics/statistics-by-theme/agriculture/agricultural-prices/search-in-theme/2406-apple-tree-plantations-2017

[3] When speaking of productivity per land unit, it is worth noting that, on the one hand, there are new yet still non-productive orchards, and, on the other hand, old orchards which are no longer being harvested.

depending on the year and technology of cultivation (irrigations, covers, etc.) they could be three to five times higher.

b. Trade balance and consumption

According to Eurostat data, the **trade balance with regards to the volume of imported and exported fresh and dried fruit is negative in all three countries** (see Fig. 3). The trade deficit is also the case for Latvia and Lithuania regarding preserved fruit and fruit preparations as well as fruit (and vegetable) juices, where Poland, in turn, shows a positive balance with a notable trade surplus.

There are rather considerable differences in the fruit consumption whereby, according to Eurostat data, **in 2014 the share of population consuming fruit at least once a day ranged from 40% in Latvia and 48% in Lithuania to 59% in Poland** (EU28 average – 56%), featuring higher levels of consumption in cities compared to towns and suburbs and rural areas as well as by females compared to males.

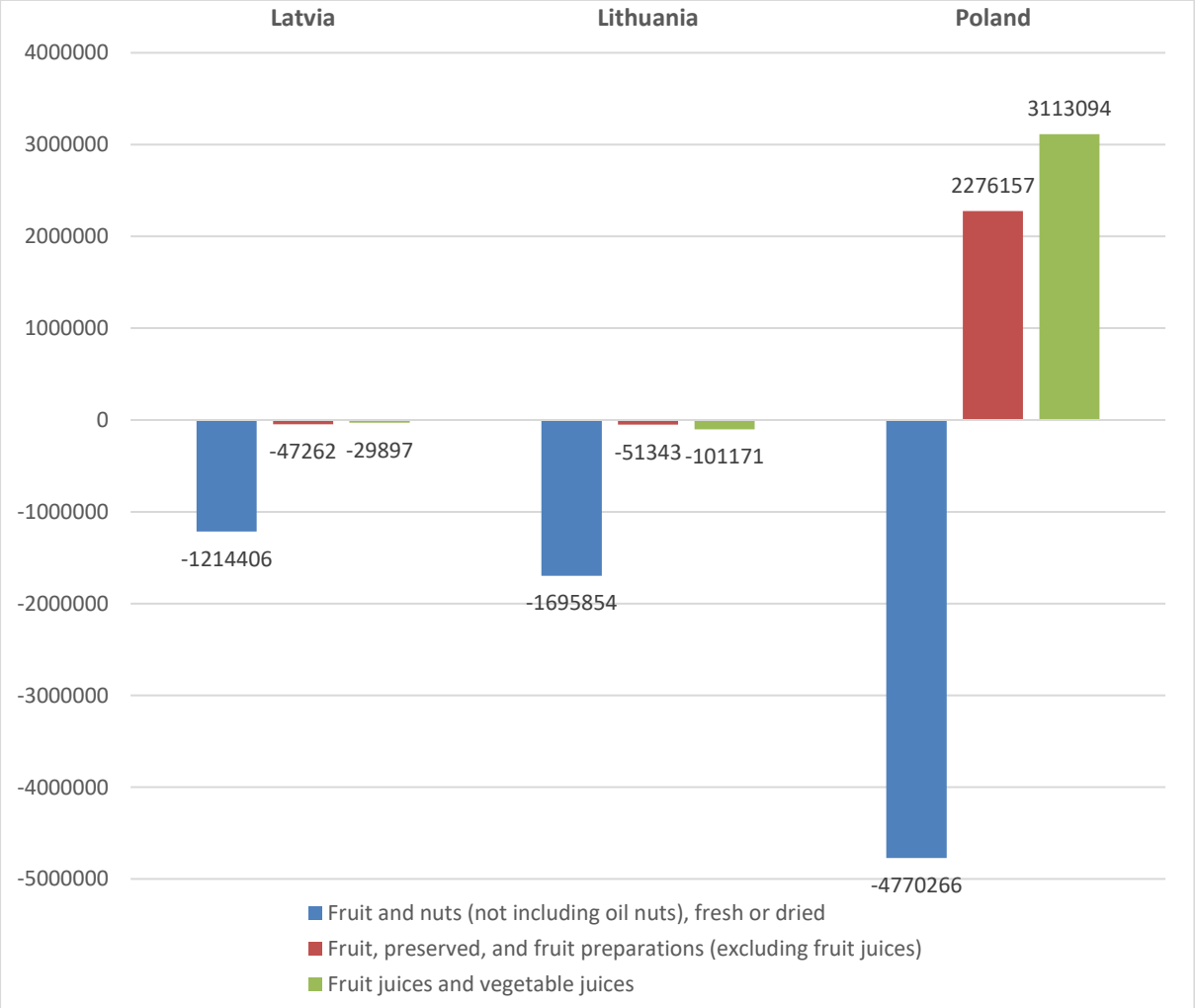


Figure 3. *Trade balance of fruit (quantity in 100 kg), 2017. Source:* Eurostat.

Fruit consumption statistics indicate that there is potential for increasing both fruit production (in Latvia and Lithuania) **and consumption** (in all three countries) as a considerable share of the population do not consume fresh fruits daily (2014: 49% in Latvia, 42% in Lithuania, and 33% in Poland; 37% in Sweden) or consume them less than the recommended intake by the World Health

Organisation which is 400 g or 5 portions per day.[4] In all three countries there are generally higher levels of consumption in cities compared to towns and suburbs and rural areas as well as by females compared to males.

It is worth noting that according to Eurostat data on the selling prices of selected crop products in 2016 there were notable differences in the selling prices (EUR per 100 kg) of dessert apples among the three countries, ranging from EUR 13,4 in Poland to EUR 36,7 in Lithuania and EUR 44,5 in Latvia.[5] **The selling price of dessert apples in Poland is about three times lower than in Lithuania and Latvia**, which also potentially bears an impact on the consumption trends. There are, of course, considerable annual price fluctuations depending on the harvest in the given season which can either feature an overproduction (as in 2016 and 2018) or underproduction (as in 2017), but the general trend is that prices in Latvia and Lithuania strongly depend on the amount and the resultant price of apples produced in Poland.

c. Scope of commercial actors

The fruit growing and processing sector (FGPS) has a varied importance in the agricultural sector in the Project countries in terms of the number of companies. According to the data provided by Project partners **comparatively few farms are specialised in fruit growing in Lithuania and Latvia**. In absolute numbers, there were 1,600 holdings in Lithuania in 2015, 900 in Latvia in 2010, and they account for around 1% of all agricultural companies. In Poland, there were 284,755[6] fruit holdings in 2010, and they composed around 15% of all agricultural holdings. Still, the data gathered represent different periods of time and thus this comparison should be used with caution.[7]

Typically, fruit growing is a specialisation of small and medium-sized companies: all FG farms in Lithuania and Latvia[8] and almost all in Poland are small or medium-sized; 90% of Latvian FG companies can be considered as micro companies. **In all three countries there is a negative dynamic in the number of FG companies** – their number is decreasing. However, according to Eurostat the overall trends were caused by different processes (the data discussed here cover the period up to 2013). In Latvia, farms of all sizes were leaving the sector during the last decade. Meanwhile, in Poland and Lithuania mainly the smaller farms were abandoning the sector. If decade long trends are considered, in Poland and Lithuania the number of fruit and berry plantations with an area of over 50 ha has remained almost the same. Furthermore, the average size of the farms exceeding 50 ha in these two countries has grown.

Likewise, **the fruit processing (FP) sector involves few companies**: in absolute numbers there were 90 FP companies in Lithuania, 49 in Latvia[9], and around 1,000 in Poland, which compose from 0.05% (LV) to 0.1% (LT) of all processing companies in the country (no data for Poland). Also, fruit processing is dominated by small and medium-sized companies – their share is estimated at over 95% in Poland (no data for Lithuania and Latvia). **The number of companies in FP sector has been**

[4] http://ec.europa.eu/eurostat/statistics-explained/index.php/File:T11_newbis_EU-28_Daily_consumption_of_fruit_and_vegetables,_2014_.png; FRESHFEL EUROPE (2012) *A Review of the EU regime for the fruit and vegetables sector*. Available at: http://ec.europa.eu/agriculture/sites/agriculture/files/fruit-and-vegetables/policy/consultation/registered-organisations/freshfel_en.pdf

[5] Eurostat (2017) Agricultural production – crops. Available at: https://ec.europa.eu/eurostat/statistics-explained/pdfscache/26212.pdf

[6] With area no smaller than 0,1 ha.

[7] Eurostat data for 2013 (http://ec.europa.eu/eurostat/statistics-explained/index.php/File:F7_National_diffusion_of_fruit_holdings_and_area,_2013.png) show that in Lithuania the share of fruit holdings is over 40%, in Latvia – less than 10%, and in Poland – around 15%.

[8] According to the definition for SMEs applied in Latvia: micro enterprise - employees <10, turnover <€2m, balance sum <€2m; small enterprise – employees <50, turnover <€10m, balance sum <€10m; medium enterprise – employees <250, turnover <€50m, balance sum <€43m.

[9] Excluding very small companies and artisanal producers.

growing in Poland. In Poland, particularly the number of companies producing juices has increased considerably.

d. Innovative capacity of companies

Based on the Eurostat approach whereby innovation is defined as "the implementation of a new or significantly improved product (good or service), process, new marketing method, or new organisational method in business practices, workplace organisation or external relations"[10], data from the Community Innovation Survey 2014 demonstrate that on the country level the share of innovative companies among all companies was as high as 43.3% in Lithuania, followed by Latvia with 25.5%, and Poland with 21.0% (with Sweden featuring 54.2%). Yet, there are no disaggregated data available on the number of innovative companies specifically in FGPS.

According to project partners' own estimations, innovative companies in FGPS make up from 2% (PL) to 8% (LT) of all fruit processing companies. There are no estimations made for Latvia; however, there are examples of companies introducing new technologies and products by themselves or in cooperation with scientists (e.g., *Rāmkalni, Very Berry*). In Poland, the innovativeness is related to such factors as "*extensive use of internet to establish and develop foreign contacts, and for distribution of their products, gaining new technological knowledge, buying special machines, acquiring new varieties, etc. Personal business travels are also common in this group of farms."* The Polish report also states that **processing companies and supply firms are much more innovative than fruit growing holdings**, particularly due to higher level of education and language skills of their leaders and better access to capital.

e. Workforce profile

There are around 6,000 employees working in fruit growing companies in Latvia, 8,250 in Lithuania, and 200,000 in Poland. In addition to this number, Poland reports about twice as many seasonal workers who find short-term employment during the harvest season. According to calculations made by the Ministry of Agriculture in Latvia the seasonal staff required by the fruit sector amounts to 19,603 agricultural workers.[11] The fruit processing sector, in turn, presently employs around 700 people in Latvia, 544 in Lithuania, and around 50,000 permanently employed in Poland.

The workforce age structure is slightly different in the studied countries (data are available only for Latvia and Poland); a comparison is difficult, though, due to different age groups used and data representativeness and differences in the period the given statistics represent – in Latvia the data characterise only members of the Latvian Association of Fruit Growers in 2015, not the whole sector. In Latvia, FG is rather 'old' as mostly elder farmers work in it: 59% are between 45 and 64 years, and 29% – over 65. **Fruit growers are older than farmers on average in Latvia**. This age structure of farmers in Latvia is close to the one observed in the European Farm Structure Survey 2013. In Poland, in turn, the majority (79%) of fruit farm owners were in the age group between 30 and 59 years. Although it is hard to tell from the data available, it still seems that the age structure of Polish fruit farmers does not differ from the age structure of Polish farmers in general. The youngest group in both countries is the smallest one; in Latvia those between 18 and 24 years compose only 2%, in Poland those below 29 were 4%.

Data on the education level of workforce in FGPS are not comparable as they refer to different groups: the Lithuanian report considers all FGPS workforce, while the Polish report regards only those farm owners with professional education in horticulture (data not available for Latvia).

[10] Innovation activities include the acquisition of machinery, equipment, buildings, software, and licenses; engineering and development work, feasibility studies, design, training, R&D and marketing when they are specifically undertaken to develop and/or implement a product or process innovation. This includes also all types of R&D consisting of research and development activities to create new knowledge or solve scientific or technical problems. See http://ec.europa.eu/eurostat/cache/metadata/en/inn_cis9_esms.htm

[11] http://www.laas.lv/wp-content/uploads/2018/02/ZM_Aktualitates.pptx (slide 13)

However, data show a similar trend that **majority of fruit growers hold basic professional education, and a minority has university education**. In Lithuania, 19% of all FGPS workforce had university education, 26% – higher education, 55% – professional education. In Poland, only 20% of farm owners had any horticultural education, but their share has doubled in comparison to 2007. Among those with horticultural schooling, 54% had basic vocational education, 24% – secondary, 7% – tertiary, and 15% – other type of professional education.

f. Cooperation

In Latvia, the number of cooperatives in FGPS sector is 5 to 7 (depending on the source). Rough estimations indicate that they have around 150 members in total. Given the minor share of FG in Latvian agriculture, this small number of cooperatives is a comparatively big one (in total the Ministry of Agriculture reports of 47 farmers' cooperatives in 2015). Some of these cooperatives are working with both fruits and vegetables. Meanwhile each of these cooperatives features a specific focus or specialisation. For example, "Rūjienas OGA" has strong geographical ties with the territory it is in; "Zaļais grozs" focuses on biological products, "Baltijas ogu kompānija" works with berries, while some other cooperatives are specialising mainly in apples. **The number of fruit growers' cooperatives has been growing in Latvia**.

The report from Lithuania indicates that there are only 3 FG cooperatives with 19 members in total: "Ažuožerių sultys", "Šiaurės Lietuvos uogynai", and "Mūsų gojus". Two of these – "Ažuožerių sultys" and "Mūsų gojus" – are mainly specialised in apples and apple juice production. Meanwhile the third cooperative is working with berries. In Lithuania in general cooperatives unite around 10% of all farmers (incl. also close relatives with individual farms which are split among family members) and thus the **level of cooperation in fruit sector in Lithuania is low**. This trend is partially attributed to the historical legacy of keeping some large apple farms established in the soviet period, which are large and strong enough on their own and don't see an incentive for cooperation with others. Cooperatives are accountable for around 5% of Lithuanian fruit and vegetable production. In Sweden, for instance, a single cooperative of apple growers "Äppelriket" brings together 95 members, which constitute around 60% of all apple producers in the country.

In Poland, in 2014 there were 1,173 producer groups granted preliminary recognition with fruit and vegetable production with more than 2.6 thousand members, and 139 acknowledged groups of fruit and vegetables producers with about 0.3 thousand members.

Main sectoral similarities and differences

The brief overview of the fruit sector in Latvia, Lithuania and Poland provides some basic information for making selected comparisons between the countries and identifying some implications for innovation potential and demonstration activities in the sector:

- There are pronounced differences between data reported by project partners on selected quantitative **indicators** characterising the fruit sector and how some of these are presented by Eurostat. This might have some further implications for differing perceptions of the sector's profile and view on its perspectives among practitioners, researchers and policy makers;
- The three countries are different in terms of the role the fruit sector plays in the national economies both in terms of the number of companies and workforce involved in the sector and the share of the sector in the total agricultural output, with Poland notably standing out with regards to the **economic importance and scale of the fruit sector**;
- Nevertheless, a common feature is the predominance of small and medium-sized **companies in FGPS** in all three countries, with a somewhat shared tendency for the smaller fruit farms to leave the sector, simultaneously demonstrating growing activity in terms of fruit processing;

- All three countries have rather similar main **produced species** of fruits and berries, unanimously dominated by apples and followed by black currants, strawberries, and raspberries, thus providing a good basis for shared interests and peer-to-peer learning across Latvia, Lithuania, and Poland;
- Some of the common problems faced by the fruit sector in all three countries, though to varying degrees, include **ageing and comparatively low share of formally educated farmers** that might have an impact on the succession, sustainability, and advancement prospects of the fruit farming community and modern knowledge-based practices;
- **Formal business cooperation** in the fruit sector has been developing in all three countries, yet with a notable untapped potential especially in Lithuania;
- So far there have been limited or no hard data on the presence and scope of existing **demonstration farms** in the fruit sector that would allow to make any assessments regarding their density and spread in the three countries;
- The overall **innovative capacity of companies** operating in the fruit sector is presently hard to assess given the lack of representative and reliable data, nevertheless individual examples of companies, especially in fruit processing, demonstrate the willingness and efforts made by those in introducing both product and process innovations along with innovations in organisation and marketing; this is of particular importance in relation to demonstration activities of innovative farming approaches in real-life environments and the readiness of farmers, processors, advisors and other relevant stakeholders to engage in collaborative relations facilitating mutual learning, generation and uptake of innovative solutions along the various stages in the supply chain;
- The **production and processing capacity of local companies** in all three countries, but especially in Latvia and Lithuania, still has considerable room for development and expansion given the present size of the sector and the possibilities for increasing the level of local consumption of both fresh and processed fruit and berries.

2. **Scope and profile of national socio-economic research studies on the fruit sector** (WP2, A2.1, T2)

One of the initial tasks for the project was also to map the scope of coverage and thematic diversity of key issues analysed in national socio-economic research studies on the fruit sector in Latvia, Lithuania, and Poland. To review the present landscape of socio-economic research on the fruit sector in the three countries, identification of relevant national studies and expert assessments published on Latvia, Lithuania, and Poland over the last decade (2006-2016) was carried out (see ANNEX 2).[12] The focus was on academic publications and strategic policy documents dealing with the social and economic development of the sector, specifically in terms of market conditions, economic performance, main stakeholders, cooperation forms and practices, learning and knowledge transfer processes, capacity for innovation, etc. that help in identifying the main strengths, weaknesses, opportunities, and threats faced by the sector. This exercise has been intended to map the representation and coverage of topics so far addressed by social research with regards to the fruit sector to see the present trends and the still untapped potential of such studies in the three countries.

The **number** of identified earlier studies of socio-economic profile dealing with the fruit growing and processing sector in Latvia, Lithuania, and Poland (see Table 1) partially reflect the territorial differences of the countries and the respective national economic significance of the fruit sector, with the largest set of related publications (n=32) demonstrated by Poland. At the same time Latvia features at least twice as many publications (n=14) as Lithuania (n=6) thus demonstrating a comparatively higher intensity of studies carried out on different aspects of this thematic field over the last decade.

Table 1. *Identified publications on socio-economic aspects of fruit growing and processing sector in Latvia, Lithuania, and Poland by country (2006-2016)*

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
LV	2		1		1	2	2	3	1	1	1	**14**
LT	2		2	1							1	**6**
PL		1		3		2		3	6	14	3	**32**
Total	**4**	**1**	**3**	**4**	**1**	**4**	**2**	**6**	**7**	**15**	**5**	**52**

Poland also stands out with regards to the **timeline** and dispersion of publications with most of the listed articles published between 2013 and 2016, whereas in Lithuania most studies were carried out between 2006 and 2009 with a notable lack of published studies in more recent years. Latvia is somewhere between these two cases with relevant identified publications spanning rather evenly over the whole decade between 2006 and 2016.

As for the **sources** of the identified documents, the comparatively high number of subject-related publications in Poland can also be attributed to the presence of several nationally published

[12] Account should to be taken of the fact that the initial lists of earlier studies (LV=9, LT=6, PL=16) were compiled by different INNOFRUIT project partners for their respective country thereby potentially leaving room for different approaches used in the selection of reportable documents. This includes both the thematic relevance and scope (level of focus on fruit sector) of individual studies and the initial suggested limit of approximately 10 publications. Nevertheless, an additional search made by the authors of this synthesis in the *Web of Science* and *Scopus* databases (keywords: fruit AND Latvia OR Lithuania OR Poland; time span: 2006-2016) largely confirmed the initially identified balance in the respective research landscape [the additional search of internationally peer reviewed publications generated no socio-economic studies on the fruit sector in Lithuania, while highlighting several additional articles on fruit consumption as well as fruit supply chains in Poland, and a couple of additional articles on the assessment of fruit-growing industry and self-sufficiency in Latvia].

academic periodicals.[13] While many of the full texts of the listed articles are available in Polish, this does not rule out the fact that Polish scientists also feature almost as many articles in English for a wider scientific audience in internationally peer reviewed foreign journals[14]. In the case of Latvia, the identified studies mostly include selected strategic policy documents or studies commissioned by the Ministry of Agriculture, or expert analysis either by researchers representing the fruit-growing sector in Latvia or by the Latvian Fruit Growers' association. In contrast to Poland, these are mainly stand-alone reports rather than articles in peer reviewed publications.[15] As in the case of Poland, publications in Latvian and English are of equal number among the identified documents. As for Lithuania, the few identified publications represent a mix of policy and research reports all of which are accessible in full only in the national language, thereby strongly limiting the audience for, as well as wider spread and uptake of, the findings and conclusions by international peers.[16]

It can be generally concluded that in quantitative terms the fruit sector has been more widely researched in Poland, whereby Latvia and Lithuania demonstrate a more limited scope of relevant studies and level of international outreach (especially for Lithuania). The latter fact, in turn, limits the possibilities for becoming acquainted with, and building on the results of, earlier studies for advancing the comparative dimension with regards to the socio-economic aspects of the fruit sector.

While a comprehensive analysis of all the identified studies has been limited by restrictions imposed by the language factor, the generated pool of these studies nevertheless allows to go beyond the rough quantitative calculations and draw some conclusions regarding their broader **thematic coverage**.

Firstly, it should be noted that the reviewed studies are either sector specific or cover the fruit sector along with, or as part of, other sectors such as agriculture more generally, horticulture, food industry, organic farming, etc. This is especially marked in the case of Poland and Lithuania where fruit and vegetable sectors are frequently analysed together. This trend seems to illustrate the presence of many commonalities between related agricultural sectors, yet it could also be indicative of the lack of research aimed at making a more in-depth analysis of the specific socio-economic features, challenges, and opportunities of the fruit sector. Of course, one should also consider the economic weight of the fruit sector vis-à-vis other agricultural sectors (e.g. dairy, wheat) in the three countries that can also have an impact on the level of political prioritisation and research efforts devoted specifically to fruit growing.

Secondly, the identified studies in all three countries predominantly focus on the national (macro) level dealing with the sector, while leaving other levels of analysis – micro (farms), meso (organisations) – uncovered. So far, there have been only three identified studies/projects dealing with surveys and/or interviews with fruit farmers and other stakeholders – BALTHORT (2005-2006), GOODFRUIT (2008-2011), and SOLINSA (2011-2014).

[13] *Scientific yearbooks of the Polish association of agricultural and agribusiness economists* (*Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*), the scientific journal of the Warsaw University of Life Sciences (Faculty of Economic sciences) *Problems of World Agriculture* (*Problemy Rolnictwa Światowego*), the open access *Journal of Agribusiness and Rural Development* founded by the University of Life Sciences in Poznan, scientific journal *Acta Scientiarum Polonorum-Hortorum Cultus* issued by the University of Life Sciences in Lublin, *Annals of Agricultural Economics and Rural Development* (*Roczniki Naukowe Ekonomii Rolnictwa I Rozwoju Obszarów Wiejskich*), scientific journal of the University of Life Sciences in Warsaw *Economics and Organization of Agri-food Economy* (*Ekonomika i Organizacja Gospodarki Żywnościowej*), *The Issues of Agricultural Advisory Service (Zagadnienia Doradztwa Rolniczego*).

[14] *Acta Horticulturae*, *Annals of Nutrition and Metabolism*, *Journal of Horticultural Science & Biotechnology.*

[15] Except for the few ones published in the peer-reviewed journal *Proceedings of the Latvian Academy of Sciences* and conference proceedings.

[16] The academic sources include the scientific journal *Management theory and studies for rural business and infrastructure development* (*Vadybos mokslas ir studijos - kaimo verslų ir jų infrastruktūros plėtrai*) issued by the Aleksandras Stulginskis University in Kaunas and the Lithuanian Institute of agrarian economics, along with the national peer-reviewed journal of the scientific works by the Institute of Horticulture of the Lithuanian Research centre for agriculture and forestry (*Sodininkysė ir daržininkystė*).

Most of the reviewed studies tend to look at the sector in the given country, while some also consider the broader EU context. There are also a few studies that feature more comprehensive cross-country comparisons dealing specifically with the fruit sector (e.g. between Poland and (a) the Netherlands, Italy, (b) the Netherlands, Greece, Spain). A regional focus on the fruit sector within the country is more characteristic of Poland, while Latvia and Lithuania, given the size of the countries, look at the sector only on a national scale.

Table 2. *Main themes of the identified publications on socio-economic aspects of fruit growing and processing sector in Latvia, Lithuania, and Poland by country (2006-2016)**

	Production capacity & efficiency	Policy & regulation	Producers' organisations & cooperation	Consumer demand	Economic relevance (import & export)	Knowledge transfer & innovation	Environment & health
LV	12	7	5	5	5	6	2
LT	6	3	4	1	0	0	0
PL	16	13	9	12	12	2	6
Total	**34**	**23**	**18**	**18**	**17**	**8**	**8**

* *Note*: One study can also address several themes thus the numbers in the table are higher than the total number of identified studies.

A general examination of the available publications (mainly based on abstracts) allowed to identify in total seven main themes which were then used to map their coverage in Latvia, Lithuania, and Poland (see Table 2). Some of these themes are represented by single papers, while others appear to be more cross-cutting for a larger pool of studies as well as for at least two or all three countries.

Some conclusions stemming from the available summaries of the different documents are:

- The most widely represented and cross-cutting theme in the case of all three countries is related to the various aspects dealing with the **production capacity and efficiency** in the fruit sector regarding both growing (e.g. acreage of orchards/plantations, annual yields) and processing; the theme frequently also goes hand in hand with future prospects of the sectoral development (incl. policy recommendations); it also covers issues related to the provision of labour force and producers' economic and social well-being, yet these specific subthemes are comparatively marginal in the overall research landscape;
- The theme of **policy and regulation** deals with the diverse policy conditions as regards both internal (e.g. change in national regulations or support) and external (e g. impact of accession to the EU, the Russia's trade ban) affairs; there are several cases also where special attention is devoted to the role of various financial and non-financial support instruments made available to fruit growers;
- The issue of **cooperation** in the fruit sector is being addressed in all three countries, yet with a more marked focus on cooperation between fruit growers or processing companies (e.g. producers' organisations) rather than research-industry or cross-sectoral collaboration; the broader concept and view of supply chain is only marginally addressed in the reviewed studies;
- **Consumer demand** and consumption practices (preferences, frequency) of fresh and processed local fruit both generally and in specific groups of the population (e.g. children, adults) is a theme addressed by selected studies in all three countries, yet with a much higher prominence in Poland; issues related to product marketing seem to be underrepresented in the identified documents;

- Many of the reviewed publications deal with the **economic relevance** of the fruit sector in the given countries with a focus on domestic and foreign market trends as well as import and export balance and factors exerting influence on these trends;
- Except for Latvia, **knowledge and technology transfer** along with research and innovation potential in the fruit sector does not feature prominently as a theme among the identified studies with only some references in the case of Poland made to the role of advisory services and training activities, as well as new niche products;
- While only marginally covered by the reviewed set of publications **the environmental and health aspects** of the fruit sector feature as a supplementary theme highlighting concern over public health and quality standards in fruit production.

The analysis allows to conclude that, while earlier studies have addressed many important topics related to the present role and future development of the fruit sector in the individual countries, there is a very limited number of those looking more closely at processes and mechanisms of both peer-to-peer and researcher-practitioner knowledge transfer. While occasionally dealing with issues of competitiveness, cooperation, and innovation, none of the articles have explicitly addressed the role of demonstration activities that lie at the core of the INNOFRUIT project and deserve special attention as an important knowledge exchange and learning mechanism and a key source for developing and spreading innovative solutions in agriculture. There is also a lack of cross-country comparisons in this domain that bears notable potential for mutual learning and further advancement of demonstration activities in the fruit sector based on the assessment, adjustment, and wider spread of the existing practices within and across the involved countries.

3. Good practices of demonstration (WP2, A2.1, T3)

An additional task carried out within the project was related to the **identification of good practice cases of demonstration activities** in the fruit-growing sector in Latvia, Lithuania and Poland. The selection of the reportable farms was based on the principle of demonstrating their diversity in terms of their type, location, size, durability, aim and frequency of demonstration activities, type of demonstration objects, sources of funding and knowledge, collaboration partners, scope of visitors. Since the focus was on the identification of good practices, demonstration farms (incl. farms hosting demonstrations from time to time) that are considered successful in this domain were prioritised. Identification of the key success factors and the main problems faced by these farms in organising and implementing demonstrations as well as their readiness to become involved in a joint network of demonstration farms constituted an important part of this exercise.

In total, **29 farm profiles** were collected – out of those 17 in Latvia, 7 in Lithuania and 5 in Poland (see full list in ANNEX 3). The surveyed units included farms, companies, and cooperatives of different profiles notably ranging in their size (from 6 hectares in Latvia to 280 hectares in Poland) as well as in the type and diversity of cultivars (from monocultures to a wide variety of fruit and berries, incl. apples, pears, plums, sweet/sour cherries, black/red currants, blueberries, strawberries, raspberries, gooseberries, chokeberries, cranberries, blackberries, saskatoon berries, sea buckthorn, honeysuckle, Japanese quince, and elder).

One of the items to be reported on the identified demo farms was devoted to key **success factors in the organisation and implementation of demonstration activities**. Based on the provided information these can be organised into several broader categories of factors as described below:

- One the key set of factors identified is related to human resources in terms of the **experience and knowledge** possessed by the demo host, which are seen indispensable in the field of demonstrations. A successful demonstration, first, requires the demonstrator to have practice-(also, possibly, research-) based experience and knowledge in fruit-growing. But there is also a range of other kinds of knowledge and skills that are deemed important - including former informal or formal experience in knowledge communication and engagement with different audiences that represent crucial social skills required in the demonstration process. It was also acknowledged that there is a need for marketing knowledge and skills that are beneficial in ensuring that information on the demonstration reaches the target audience, in mobilising potential visitors, and ensuring a wide use of the provided mode of learning and knowledge sharing. This largely goes hand in hand with the need for strong managerial skills to ensure a well-organised demonstration process both prior, during and after the actual demonstration. A success of a demonstration depends also on the knowledge the demonstrator has of the needs of fruit-growers and trends in the sector and his/her ability to take account of that when choosing and developing demo objects. Finally, a recurrently mentioned factor was the importance of educated and progressive employees who are able and willing to work as a team towards a common goal.
- Aside from these factors related to human resources, a range of **personal qualities** of the demonstrator were mentioned among those that are conductive for a successful demonstration. One of the key qualities is the readiness of the person to master and introduce innovative farming practices (incl. new technologies, varieties) on his/her own farm thus pointing to the value of progressive thinking and readiness to experiment with new things. Yet, it is important that the person is also willing to share his/her own experience with other peers and is ready to open the farm for visitors. Other valued qualities include the readiness of the demonstrator not only to provide knowledge to others but also to learn from other fruit-growers all along the process – both with regards to the specific demonstration object and to other farming-related practices. In the actual process of doing a demonstration the communication skills frequently

play a decisive role, along with the person's responsiveness to peer inquiries irrespective of the sophistication of the questions posed.

- Another group of factors is related to the provision of technical resources in terms of the **infrastructure** for a demonstration. What has been mentioned here is related to quite a diverse range of items, from an adequate size of plantations for demonstration (e.g., not too small to carry out a demo on a specific topic) to modern technical equipment and facilities for production activities to ensure that up-to-date practices are demonstrated. Last, but not least, factors related to infrastructure also have to do with the availability of premises suitable for hosting demonstrations (incl. seminars, training events).
- It has also been acknowledged that a crucial factor for ensuring a successful demonstration has to do with the availability of **financial resources**. And this is as much about the availability and use of financial support specifically for carrying out demonstration activities but also more generally about the availability and investment of financial resources in the farm's modernisation to enable demonstration of various sectorial novelties. This factor also somewhat resonates with the emphasis placed on the profitability of the given farm as another precondition for a successful demonstration, implying the importance of good economic performance of the farm's production/processing activities and an overall record of its successful entrepreneurial experience to prove the economic feasibility of the farming practices pursued by the demo farm.
- A specific set of factors is associated with the **farming profile** of the demo farm, which can be quite varied, though, without a single universal solution applicable for ensuring the success of a demonstration. What seems important here is that it is vital that in the whole set of demos available for fruit-growers there is a coverage of demonstration sites that offer a diversity of crops/varieties as well as ones that are more specialised ones with a focus on monocultures. The same holds true for a balance between demos that deal more with mainstream or more popular fruit and berry varieties and those that provide an opportunity to become acquainted and learn of certain niche crops that are not that widely cultivated in the country but present new opportunities for fruit-growers. Likewise, it is deemed important that there are demonstrations related to farming under specific production systems (e.g., organic farming). There is also perceived value in the provision of demos that feature or, are appropriate for, distinct conditions of farming (e.g., regional climate/weather conditions) which can make a big difference for fruit-growers in specific parts of the country where knowledge from other locations are not directly applicable. This largely has to do with the suitability of the chosen crops/varieties for the given topographical area and climate conditions to ensure the relevance and appropriateness of the demo object. In terms of the farming profile of demonstration farms, an important requirement is related to the applicability of the demonstrated technical and organisational solutions to producers with a smaller or larger scale of farming. A pragmatic consideration that also has an impact on the success of a demonstration in terms of ensuring its viability is related to the possibility of using demonstrations also as a means for broadening the client base for the core business of the demo farm/company.
- The final set of factors identified as conducive for a successful demonstration is related to the broader concept of **cooperation**. More generally, this implies the overall comprehension and acknowledgement by the demo host of the importance of collaboration and knowledge sharing, which largely relates to the complex of personal qualities reviewed above. But in more concrete terms this is represented by establishing good collaboration of the demonstration farm with local authorities, NGOs, scientists, and advisory services, as well as the importance of maintaining good contact and long-term relationships with existing clients. With regards to the latter, it is deemed important that the demonstration providers encourage and ensure the possibility of feedback from users on the implementation of the demonstrated practices to promote mutual learning and advancement of these practices.

The other set of items reported in the profiles of the identified demo farms was related to the **main problems faced in organising and implementing demonstrations**. While these resonate quite strongly with the success factors, they shed some additional light on the factors that should be considered when planning and implementing demonstration activities:

- One of the reported obstacles relates to the availability of external support whereby a **lack of financial aid** for demonstration activities can limit the scope and type of demonstrations that are made available to fruit-growers.
- Sometimes a factor inhibiting the value and success of a demonstration has to do with the presence of **knowledge gaps** faced by the existing or potential demo hosts both with regards to the accessibility of scientific information and/or the knowledge on requirements for setting up and carrying out demonstrations.
- For many farms willing to undertake demonstrations the usual challenge is the **lack of prior experience** in hosting demonstrations, which can also be scarce at the sectoral or even country level.
- The process of setting up, implementing and maintaining demonstrations is rather **time-consuming and costly** and the present incentive structures, including the limited economic benefit of demonstration activities for the farm, might not be enough in motivating the demo hosts.
- An inhibiting factor for the success of a demonstration can be the **unfavourable location** of the demo farm, whereby, for instance, a non-central location of the farm can inhibit its physical accessibility by visitors.
- In terms of human resources, an issue is also related to the **lack of qualified employees** that could be engaged in demonstration activities on a regular basis.
- Some demo farms also face problems related to the provision of technical means where **lack of equipment for presentations** can inhibit the possibilities for undertaking certain kinds of demonstrations.
- Another source of concern deals with specific **weather/climate conditions**, which play an important role if it is necessary to hold demonstrations in an open field (which is mostly the case in agricultural demonstrations). This can have a negative impact both on the very practice to be demonstrated and the conditions for farm walks on the day of the demo. While an issue or a limiting factor is the seasonality of different demonstrations (cannot be provided all-year-round), there can also be cases where the broader effects climate change can bear a negative impact on the profile and efficiency of the demonstrated practices thus making them redundant.
- A problem faced by demonstration farms is sometimes also related to the regulatory framework whereby **changes in legal requirements** at the national and EU level can make certain demonstrated practices outdated or require specific adaptations that might be difficult or unworkable on the farm.
- There is also a role for **social factors** that can become inhibiting for demonstrations as, for instance, due to the individualisation trends in society, given the limited record of (positive) experiences of cooperation, or due to the low uptake of the provided advice and demonstrated practices by demonstration visitors that reduces the motivation of demonstration providers.

A valuable addition to the presented insights into the enabling and inhibiting factors in the organisation and implementation of demonstrations as seen by the demonstration farms themselves was provided through a **user perspective on demonstrations**. This was captured through a survey of the group of experts from Latvia (fruit-growers, extension service providers (agricultural advisors), scientists) carried out as part of the evaluation feedback on the visited demo sites in Lithuania and Poland during the INNOFRUIT study trip organised in August 2017 (n=41) and June 2018 (n=36). While the main body of the questionnaire asked for a quantified rating of the various dimensions of the attended demonstrations (i.e. demonstration topic, infrastructure, demo objects, demonstration

process) (see ANNEX 4 and ANNEX 5 for the quantitative evaluation results of demo objects in Lithuania and Poland), the questionnaire also provided room for individual comments on these dimensions. A qualitative analysis of these reflections by demo attendants allowed researchers to identify a range of **characteristics that are deemed important for a successful demonstration**:

- **Demonstration farm (*where*):** The expected and valued qualities attributed to the demo host in terms of farm characteristics were related to a high level of commercial and technological development, modern facilities, as well as the ability and drive for following the newest trends in the sector, incl. cultivation of rare/non-traditional varieties, production of innovative products and application of novel methods. It was also noted that a crucial factor for qualifying for a good demo farm is the capacity of ensuring planned and systematic development of the farm, along with a well-organised production process. It was also acknowledged that farm size matters for encouraging and increasing the applicability and relevance of the pursued and demonstrated farming practices. Consequently, while big farms were considered more impressive, smaller farms were more relatable.
- **Demonstrator (*who*):** Experts deemed the personal qualities of the person who is doing the demonstration to be highly important, emphasising not only his/her knowledgeability and competence in the given field, but also traits of character such as hospitality, charisma, expressiveness, as well as optimism, positivism, and a sense of humour. Frankness of the demo host in sharing both positive and negative experiences – mistakes made, problems encountered in one's own practice – was also highly appreciated by the demo visitors. Likewise, the person's verbal and presentation skills as well as openness to various catch questions that are not easy to answer was also noted as an important quality. The host's perseverance despite difficulties and setbacks was also highly regarded. Last, but not least, experts also mentioned the significance of the demo host having a vision of the future of the farm, indicating enthusiasm about and a long-term commitment to one's work.
- **Demonstration objects (*what*):** As for the actual things to be demonstrated, it was emphasised that it is important to have the possibility for the visitors to see both the process and the end-result to get a comprehensive and clear view of the given practice/method. Also, with regards to equipment or specific technologies, their demonstration in action, rather than mere static display, was highly appreciated. It was deemed important that the demonstration covers both production and processing techniques. Disclosure of the different nuts and bolts (know-how) of the applied solutions was noted to be of high value. With respect to gardens/orchards used for demonstration purposes, the things attracting user attention and interest were related to the demonstrations of different varieties, as well as diverse methods of planting, cultivation, fertilisation, pruning, pest control, harvesting, crop load management, tree growth regulation, etc. In general, it was appreciated that there is a diversity of demo objects ensuring the comparability of different methods/varieties. An important feature acknowledged by the experts was the provision of the economic justification of the demonstrated practices to give some tangible evidence of their efficiency in economic terms. Furthermore, some noted that the innovations presented during the demonstration should be relatable and of use to the visitors on their own farms. Additional insight into marketing activities is also deemed valuable.
- **Demonstration process (*how*):** In assessing the format and process of the actual demonstration the visitors appreciated an initial (PowerPoint, video) presentation or leaflet about the site, varieties grown, and products produced, combined with a field visit featuring practical demonstrations in the garden/orchard or storage/processing facilities. The presentation is advised to take place in appropriate facilities rather than the production area. The presentation should not be too technical and provide practical advice. Visitors should be allowed to see the farm and production process in its totality, if possible, to get a better sense of innovations in practice. Clear labelling of specimen of different varieties is much appreciated. It was deemed important that the farm manager is actively present during the whole visit to allow for on the

spot inquiries and commentaries. The experts appreciated the possibility of splitting up into smaller groups for guided tours/demonstrations to ensure better information perception and facilitate mutual communication. With regards to the narrative of the demo host it is expected to be well-developed and thorough, ensuring consistency and accuracy of statements to avoid any confusion and misinterpretation of the communicated information. Any effort in minimising the language barriers with international groups of visitors as well as in facilitating a free and easy atmosphere during the demonstration visit is appreciated. A very crucial element of a good demonstration is the allocation of enough time and opportunities for face-to-face «question and answer» sessions, especially at the end of the visit, along with the encouragement of both sophisticated and elementary questions from the audience. A tasting activity is advised to leave a more lasting impression of the demonstration.

- **Infrastructure:** There are also quite a few practical considerations that were mentioned by the demo visitors and that can have an impact on the overall quality of the demonstration. These range from ensuring easy access to the demo site by buses or cars on good quality roads, along with convenient and well-managed on-site walking/driving paths for visitors, to providing a well-maintained (clean and tidy) working and surrounding area and a good overview of the demonstration site. Other practical items noted include the availability and use of portable sound equipment for better audibility by larger groups, benches for visitors at selected places in the garden for longer demonstrations, large enough in-door premises/facilities suitable for group visits and bad weather conditions, as well as accessibility and sufficient number of toilets (that is not only an issue of convenience of individual visitors but also of time-planning of visits by larger groups).

Summarising the items identified with regards to the factors facilitating and impeding organisation and implementation of agricultural demonstrations in the fruit sector (also applicable to agricultural demonstrations in general both in the project countries and beyond), it can be concluded that these factors represent **a broad mix of physical, human, and financial resources**. The account of the various considerations under each of those is quite a diverse one, and it is unlikely that all of these can be taken on-board in each demo case. Ensuring all the listed conditions is also challenging given the fact that these include ones that are both within and beyond the control of the individual demo farm, with quite a few context-dependent factors. Therefore, the account can be rather seen as a benchmark or checklist of considerations that can be kept in mind in both guiding and assessing demonstrations with an aim of making them as efficient and user-oriented as possible to maximise the knowledge exchange potential of this mode of instruction and learning.

4. **Demand for demonstrations** (WP2, A2.1, T4)

An important task for the assessment of the prospects of demonstrations in Latvia, Lithuania and Poland was related to the identification of demand for this kind of instruction and learning. With this aim in mind a **user survey** was carried out in all three project countries during February 2018.

The **aim** of the survey was to gather information on the previous experience and engagement of practitioners with horticultural demonstrations, using insights from the work done earlier in the project in identifying the good practices of demonstration. The survey looked at, among other things, existing practices, attendance of demonstrations and their impact on farm management, preferred profile of demo farms and demonstrations, and obstacles to the operation of demo farms (see questionnaire in ANNEX 6).

Due to the small and ad hoc nature of the **sample**, the results of the survey are not representative and cannot claim to provide an accurate description of the context for demonstrations and demo farms in the project countries. Nonetheless, the results illustrate potential avenues of inquiry for future studies on demo farms in Eastern Europe and indicate differences between Latvia, Lithuania and Poland that merit further exploration.

Profile of respondents:

- A total of **157 respondents** participated in the survey: 54 from Latvia, 52 from Lithuania and 51 from Poland. 75% of respondents were male and 25% were female. Latvia had the highest percentage of female respondents with 44%, whereas all respondents from Poland were male. While this may suggest that horticulture is dominated by males, further exploration is necessary. Sampling strategies were different in all three countries, which means that the overall result was likely the outcome of the methodological limitations of this survey.
- **Regional coverage** varied between countries**.** All the planning regions of Latvia were represented. In the case of Lithuania, a total of 22 different districts were represented, with Kaunas being the best represented. In Poland, all respondents were from the Mazowsze region.
- On average, respondents from Latvia were older**.** While respondents from Poland and Lithuania had a similar average **age** with 42 and 41 years respectively, respondents in Latvia skewed older. The average age was 50.5 years, with approximately half being older and half being younger.
- **Educational attainment** of respondents varied between countries. Most respondents from Poland had secondary education (63%), followed by higher or vocational education in horticulture (27%). 90% of respondents from Lithuania had higher or vocational education, with 42% possessing a degree in horticulture and 48% having earned a higher degree or vocational diploma in a different field. The situation was broadly similar in Latvia with 43% of respondents holding a degree in horticulture and 46% having earned a higher degree or vocational diploma in a different field.
- Respondents represented different levels of **horticultural experience.** 82% of all respondents from Poland worked for farms and business that had been active in the field of horticulture for more than 11 years, with 44% of all respondents being active for more than 21 years. The situation was similar in Latvia where 72% of respondents had more than 11 years of experience in horticulture. In Lithuania, however, 31% of all respondents worked for farms and businesses that were active for no more than five years, and 25% of respondents indicated that their farm or business is still being established.
- Respondents in Lithuania represented farms and business with smaller average **turnovers.** In Latvia, 19% of respondents represented farms with an annual turnover of up to 15 000 EUR. In Poland, 39% of respondents worked for farms or business with an annual turnover of 15 000 EUR or less. In Lithuania, just over half of all respondents (52%) worked for a farm or business with an annual turnover of up to 15 000 EUR.

- As for the **produced crops**, a significant share of respondents in all countries grew or processed fruit, but berries were more common in Latvia and Lithuania, while vegetables were more prominent in Poland. 52% of respondents in Latvia grew or processed fruit, while 47% and 37% of respondents grew or processed fruit in Poland and Lithuania respectively. Lithuania was the leader in terms of respondents growing or processing berries (83%), and berries were also popular in Latvia (59%), though less so in Poland (18%). Poland, however, was the leader when it came to vegetables (35%).

While respondents in all countries collaborated with scientists, collaboration with other horticulturists was less prominent in Poland. In Poland, scientists and advisers were the most popular choices with 33% and 31% of respondents selecting them. In Lithuania, the leaders were other horticulturists (67%), with scientists in second place (50%). Other horticulturists were the most popular choice in Latvia (83%), followed by sectorial associations (54%) and scientists (52%).

Most respondents had attended a demonstration in the field of horticulture, and Latvia had the highest percentage of respondents who had attended a demonstration abroad. 83% of respondents from Lithuania and 75% of respondents from Poland had attended a demonstration in the field of horticulture, while only 37% of Lithuanian respondents and 18% of Polish respondents had attended a demonstration abroad. 91% of respondents from Latvia had attended a demonstration, and 56% had attended a demonstration abroad.

Most respondents were planning to attend a demonstration in the next 12 months, but respondents from Poland were less likely to go abroad. 82% of respondents in Latvia indicated that they are planning to attend a demonstration in the next twelve months, and just over half (42%) answered that they are thinking of going to a demonstration abroad. In Lithuania, 79% of respondents were planning to attend a demonstration in the next 12 months, with 42% indicating that they may also travel abroad. In Poland, 71% of respondents were planning to attend a demonstration in the next 12 months, but only 22% were planning to go abroad for this.

In all three countries, public events at research institutions were the most popular form of demonstration. 58% of respondents from Poland answered that they had attended a public event at a research institution. In Lithuania, 70% of respondents had attended this form of demonstration. In Latvia, the three most popular were public events at research institutions (65%), public events on commercial farms (61%) and organised group trips to commercial farms (61%).

In all countries, attendance of demonstrations has often led to changes or encouraged attendees to consider introducing changes (see Fig. 4). 55% of respondents from Poland answered that they were planning to introduce at least minor changes after attending a demonstration, and 13% of respondents had already introduced some. Only 11% said that no changes are planned. While 19% of respondents in Lithuania had not introduced any changes or could not say whether they had introduced any changes, most respondents had introduced some changes (65%) or were considering doing so (44%). In Latvia, only 10% of respondents indicated that attendance of demonstrations has had no effect on their farm or business. More than half (55%) noted that small changes have been introduced and 31% of respondents indicated that significant changes have been introduced.

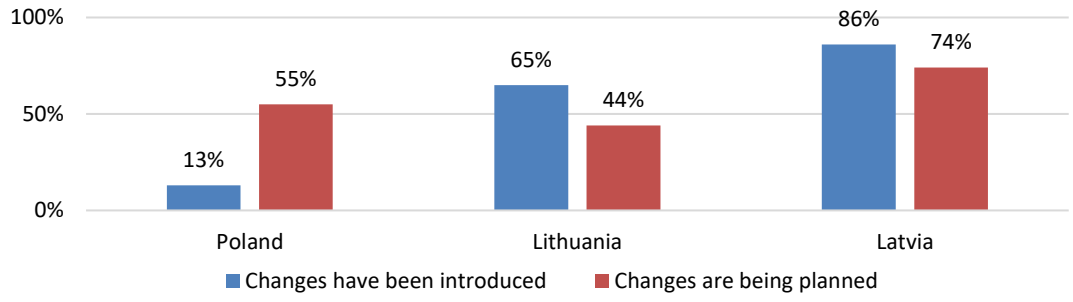


***Figure 4**: Impact of attending demonstrations on farm.*

Lack of information and bad timing (e.g. season) appear to be the most prominent obstacles to attending demonstrations (see Fig. 5). A considerable portion of respondents in all three countries said that there have been no obstacles to attending demonstrations. Among the respondents who did feel that there are obstacles to attend demonstrations, the lack of information was the most frequently mentioned one, with 49% of Polish respondents, 33% of Lithuanian respondents, and 32% of Latvian respondents selecting this option. Bad timing was also a popular choice among respondents from Latvia and Lithuania.

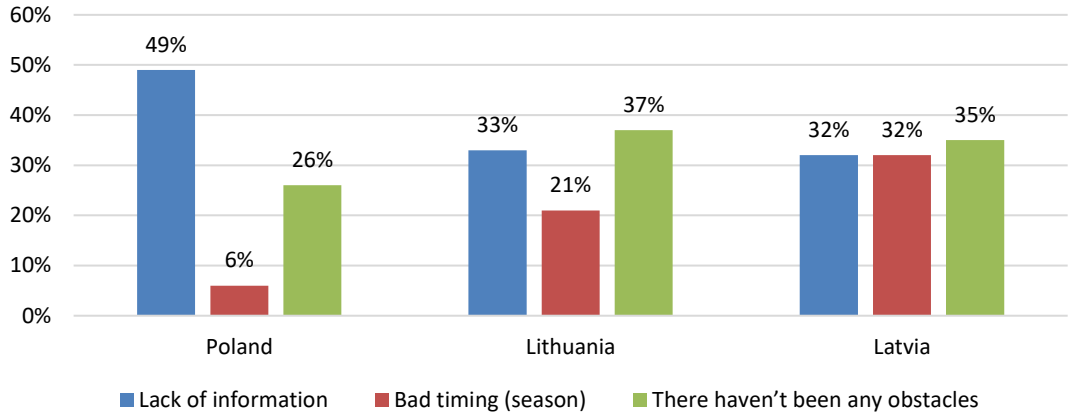


***Figure 5**: Main obstacles to attending demonstrations.*

Respondents from the three countries have slightly different demonstration needs (see Fig. 6). Respondents were asked to rate a list of topics on a scale of 1 to 5. Even though there was interest in all areas, it appears that priorities are slightly different in each of the countries. The results suggest that in Poland the greatest demand is for demonstrations on sales and marketing, and storage. In Lithuania, the greatest demand is for demonstrations on cultivation, and sales and marketing. In Latvia, processing, storage and cultivation appear to be the most popular of the listed demonstration areas. It is worth noting, though, that economic analysis is also deemed rather important, especially by respondents in Poland and Latvia.

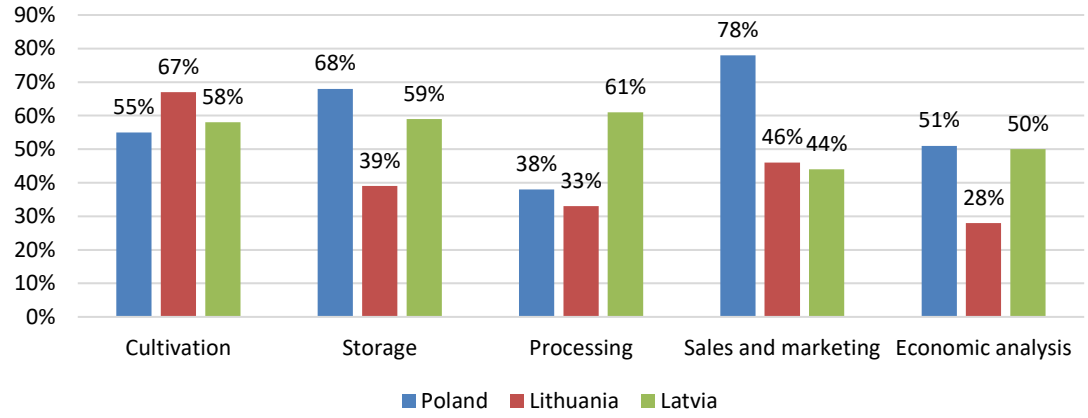


***Figure 6**: Preferred topics of demonstrations.*

The importance of protection against pests and diseases is the main recurring theme in all three countries, though there are other common issues. Respondents were asked to list up to three issues in horticulture that are currently relevant to them. The most popular issues listed by respondents from Poland were (i) plant protection against pests, diseases and frost, (ii) help with selling products and (iii) lack of workers. In Lithuania, the issues were (i) plant protection against

diseases and pests, (ii) fertilisation, and (iii) sales and marketing. In Latvia, plant protection against pests and diseases was also prominent, followed by storage, cultivation, and fertilisation.

When it comes to demonstration organisers, practical experience in horticulture and willingness to share both positive and negative experiences were important in all countries (see Fig. 7). In Poland, the results suggest that all characteristics of demonstration organisers are important, though professional education in horticulture and peer recognition appear to be slightly less important. In Lithuania, (i) practical experience in horticulture, (ii) openness to innovation, and (iii) readiness to share both positive and negative experiences were the most important characteristics. In Latvia, practical experience in horticulture and willingness to share both positive and negative experiences were the most prominent desirable characteristics of a demonstration organiser.

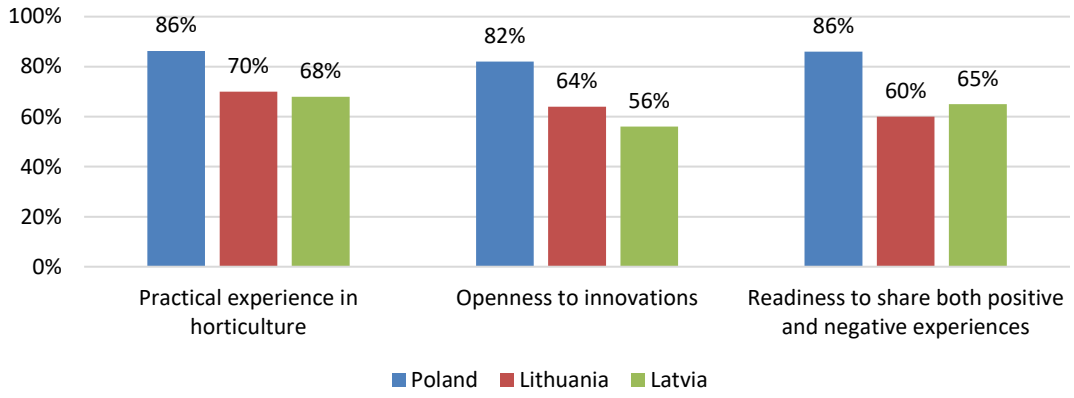


Figure 7: *Characteristics of a demonstration organiser – important.*

In all countries, cooperation with scientists and advisors was deemed to be an important characteristic of demo farms (see Fig. 8). In Poland, it appears that suitability of facilities, good economic performance, and cooperation with scientists and advisors are the most important characteristics of a demo farm. In Lithuania, cooperation with scientists and advisors appears to be the most important characteristic of a demo farm from the ones listed, though good economic performance and variety of demonstration objects are also important. In Latvia, cooperation with scientists or advisors and variety of demonstration objects are the most desirable characteristics of a demo farm, though other characteristics were also deemed important.

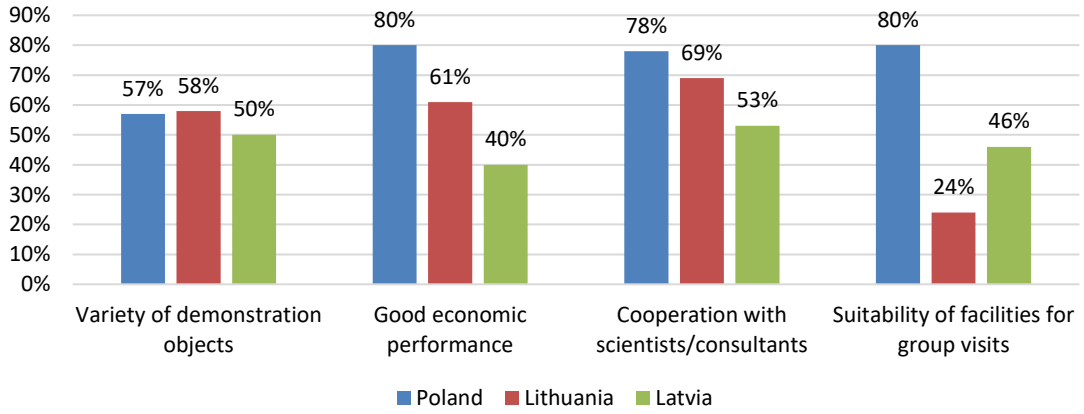


Figure 8: *Characteristics of demo farms – important.*

Viewing of the demonstration objects on site was believed to be the most desirable form/method of demonstration, though other methods were also popular. In Poland, viewing of the demonstration object on site was the most desirable form/method of demonstration with 53% of

respondents choosing this option. Oral seminars and presentations were in second place with 26%. In Lithuania, all forms of demonstration were believed to be desirable by more than half of the respondents but viewing the demonstration object on site was believed to be the most desirable (81%). Similarly, in Latvia all demonstration methods were believed to be desirable by more than 50% of respondents, but the most desirable was viewing of the object on site (96%), followed by discussions (80%).

Based on the results, each country has its own obstacles to the operation and development of demo farms. 31% of respondents from Poland indicated that, in their opinion, there are no obstacles to the development and operation of demonstration farms, but lack of funds for demonstration organisers (28%), difficulty in physically reaching farms (24%), and lack of time for organising demonstrations (22%) were the most popular perceived obstacles. In Lithuania, lack of technologies or innovations to demonstrate was the most popular perceived obstacle to the development and operation of demonstration farms (39% of respondents selected it), though four other obstacles were chosen by more than 20% of respondents. While majority of the listed obstacles were frequently chosen in Latvia, the most popular choices were lack of time (48%), reluctance to share knowledge and experience (44%), and lack of funds (41%).

On average, respondents from Lithuania were willing to pay the most for attending demonstrations, while respondents from Poland were willing to pay the least. Overall, Polish respondents indicated that they would be willing to make small payments for attending demonstrations. 51% said they would be comfortable with a price between 1 and 5 EUR, while 41% of respondents said they would not want to pay anything. 73% of respondents from Lithuania were open to paying 16 EUR or more for attending demonstration. Meanwhile, 41% of respondents from Latvia were willing to pay between 6 and 10 EUR for attending a demonstration, though other options were also frequently chosen, suggesting that Latvia is somewhere between Poland and Lithuania in terms of willingness to pay for demonstrations.

Respondents from Latvia were the most open to the idea of organising a demonstration on their farm. 17% of respondents from Latvia are already organising demonstrations, and 46% are already planning or considering organising demonstration events. In Lithuania, only 6% of respondents indicated that they are already organising demonstrations, compared to 54% of respondents who did not want to organise demonstrations on their farms. However, 11% of respondents answered that they were planning or considering organising demonstrations. Polish respondents were the least open to organising demonstrations, with 49% of respondents indicating that they do not want to organise demonstrations, while 51% could not say.

5. **Feedback from national stakeholders** (WP2, A2.1, T5)

As a final task, to validate the key findings with relevant stakeholder groups a set of **national workshops** (one per each country (see Table 3)) was organised to present and discuss the results of the project activities at the national level. The purpose of these workshops was to have a country level discussion of both the experience so far gained by the relevant project partners in the implementation of the project, especially with regards to the development of new demo objects and mobilisation of demonstration farms, and specifically of the insights gained over the course of WP2.

Table 3. *National stakeholder workshops*

	Latvia	**Poland**	**Lithuania**
Date	23 April 2018	21 May 2018	19 September 2018
Location	Jelgava	Skierniewice	Babtai
Number of participants	17	30	67

The workshop in **Latvia** was organised in April 2018 at the Latvia University of Life Sciences and Technologies in Jelgava. It was attended by 17 participants representing researchers, advisors, NGOs, and officials from the Ministry of Agriculture. In total 10 fruit growers involved in the demo network were also invited, but none of them could come to the meeting, which is somewhat indicative of the difficulties in mobilising practitioners in high season and for discussing the development prospects and needs of the sector. Nevertheless, the workshop provided a good ground for an exchange of views and ideas that were valuable for contextualising, getting a better understanding of the conclusions and enriching recommendations stemming from the work undertaken in the project. Especially the dialogue between researchers/advisors and national policy-makers allowed to better grasp and align the different perspectives on the problems and potential solutions regarding the future development of the sector and demo activities.

In **Poland** the national workshop was organised in May 2018 at the Institute of Horticulture in Skierniewice. It was attended by 30 participants including researchers, representatives of demo farms as well as officials from growers' unions and producer organisations. Due to very pessimistic forecasts for the Polish apple production (notable drop in production volumes and apple quality in 2017/18 due to frost damage; effects on export by the Russian trade ban; increasing competition of producers from the East and the South; potential overproduction and lack of profit in 2018/19) it was difficult to manage the meeting as most of the speakers were inclined to focus upon the urgent situation on the apple market. The given context thus points to the role of priory setting for the sector and the overall debate on it and the resulting challenge of developing and promoting demo farms under conditions of major uncertainties with regards to the future development of the sector.

In **Lithuania** the workshop was held in September 2018 at the Institute of Horticulture, Lithuanian Research Centre for Agriculture and Forestry in Babtai as part of the seminar "Innovation in fruit growing sector". While it was almost impossible to mobilise people over the summer period, in the end the autumn event was attended by 67 participants, incl. fruit growers, researchers, lecturers, students, representatives of certifying and controlling bodies, officials from the Ministry of Agriculture. The programme included reports on problems and prospects of fruit-growing business, sources of knowledge and skill development of fruit-growers, and government policies and support programmes. These reports were supplemented with practice-oriented presentations on innovations in apple tree growth and yield optimisation, and on plant diseases and pests, alongside a visit to the experimental orchards of Institute. The discussion allowed also to gather insights by the attending stakeholders on the role of agricultural demonstrations.

Notwithstanding some of the obstacles faced by the organisation of the workshops, the input and feedback received from the participants were useful in both refining the overall SWOT analysis of demonstration activities (see Section 6) and in providing further input into the development of policy recommendations of the project.

6. SWOT analysis of demonstration activities

The present concluding section summarises the main conclusions derived from the knowledge generated over the course of the project (WP2 in particular) in the form of SWOT analysis of demonstration activities in the fruit sector in the project countries (see Table 4 for the SWOT matrix). While there is a range of strengths, weaknesses, opportunities, and threats that are common to Latvia, Lithuania and Poland, there are also specific issues attributable to each of the three countries separately.

The main **strengths** for all three countries lie in the demand for knowledge provided by demo farms, as peer-to-peer learning is increasingly recognised as an important source of farmers' knowledge. These farms promote not only individual learning but also mutual learning between farms of different sizes and profiles, and foster cross-border knowledge exchange. A common feature is the presence of a diversity of formalised knowledge transfer practices complementing demo activities, along with some initial, frequently project-based, experience with on-farm demonstrations that has contributed to the promotion of cooperation. National research institutes dealing with the fruit sector demonstrate a willingness and capacity to organise and host demonstrations. The distinctive qualities of northern fruit and berries (intense aroma, taste, limited use of chemicals) are seen to represent the competitive advantages against their southern counterparts, thus providing a platform for further development or the sector at large and demonstration activities in particular to tap the full potential of this niche. In **Latvia,** farmer networks are increasingly used to obtain formal and informal advice and exchange information, and trust has successfully been established between fruit growers and fruit scientists allowing to further build on this resource. Potential users have access to and make use of both practical services and advice on fruit production and processing offered by local scientists as well as study trips to neighbouring countries organised by them. In **Lithuania,** farmers generally demonstrate a willingness to participate in demonstrations, with the more progressive keen in implementing various innovations on their farms. In **Poland,** advisory centres provide extensive support for farmers and entrepreneurs regarding fruit cultivation, storage, and processing. The diversity of crops produced at demo farms attracts many growers, and an increasing number of experienced farmers demonstrate a willingness to travel abroad to learn new things.

The major common **weaknesses** in all countries relate to a lack of research on demo farms and limited experience with the organisation of demonstrations on commercial farms and facilitation of peer-to-peer learning. Other weaknesses relate to a lack of financial resources and long-term financial support for demonstration activities. The criteria for qualifying as a demo farm are unclear in all three countries, and there are few incentives for farms to become demo hosts. Other practical obstacles are a shortage of skilled staff as well as unsuitable technical infrastructure and facilities for hosting organised demonstrations. In addition, there is a perceived general reluctance to cooperate and fear of competition in the farmers' community. In **Latvia,** an important weakness is that the fruit sector is small and economically insignificant, and policymakers have a poor understanding of sectoral needs. There is a shortage of advisors specialising in fruit-growing, and there are difficulties in identifying and selecting suitable demo farms (e.g. hosts willing to share knowledge). Projects for demonstration activities are sometimes shorter than necessary, and there is a lack of demo farms where students can practice their skills as interns as part of the curriculum. In **Lithuania**, also there is a shortage of specialised advisors in horticulture, along with a marginal role played by demonstration activities in the official mission of research institutions. Furthermore, on-farm innovations available for demonstration are scarce and costly, while farmers that would have things to demonstrate are reluctant to devote time to interact with visitors. In **Poland**, the strict regulations regarding on-site facilities necessitate higher initial capital investments. As for the potential visitors, the advanced age of many farmers prevents them from visiting more distant demo farms.

There are multiple **opportunities** that are common to all three countries. Firstly, there are those at the policy level. An increasing recognition of the value of demonstrations by policymakers at the EU

and national levels, in conjunction with a targeted use of EU funds, can further stimulate learning among farmers and the establishment of demo farms. Implementation of efficient policy could be facilitated by adjustment of support measures for demonstration activities in the new programming period after 2020 based on a comprehensive assessment of existing policy measures. Secondly, there are practical opportunities. A continuous involvement of scientists in demonstration activities to provide practical and theoretical knowledge to both farmers and advisors, coupled with an intensification and diversification of publicity tools and channels for demo activities are among the factors that could increase the value and more widespread use of this form of learning. Demonstrations have the potential of promoting a wider uptake of economically and environmentally sustainable innovations in fruit production. A more fundamental change in the mindset of farmers in favouring cooperation over competition and mutual rivalry is crucial in taking full advantage of the benefits of knowledge sharing. Development of a coordinated network of demo farms presents a valuable resource for enhanced and diversified national and cross-border learning and cooperation. In **Latvia**, opportunities should be taken to capitalise on the existing informal practices of knowledge exchange among peers and between different advisors and farmers. Demo farms have the potential to become places where students can practice new skills and acquire the material to produce good quality undergraduate/postgraduate theses. In **Lithuania**, more extensive use and targeted ways of addressing the interest demonstrated by fruit growers and processors in introducing new crops and develop and produce innovative products can be applied. In **Poland**, there is an opportunity to encourage demo hosts with the prospect of (i) increased sales of demonstrated products and (ii) new customers. University students specialising in horticulture should be engaged in demonstrations, and EU grant funding can be used for organising and maintaining a country-wide network of demo farms.

The most notable **threats** for the future of demonstration activities in the region are represented by general uncertainty about the future of the sector (e.g. ageing, export markets) in all three countries, which can inhibit the long-term commitment of potential and existing demo farms. Concerns have been expressed regarding the diminishing relevance of older demonstration farms and the low uptake of demonstrated practices by fruit-growers that undermine the value added of demo activities. In addition, the huge reliance of demo objects and the demonstration process on weather conditions, which are becoming less predictable, represents a notable factor hindering efficient implementation of demonstration activities. In **Latvia**, a potential threat is the periodic oversaturation with demonstration activities due to the prevalence of project-based activities, as well as discouragement of new demo activities due to demanding formal requirements. In **Lithuania**, the prohibitive costs of many innovations and limited possibilities for marketing manufactured products by fruit producers due to a strongly monopolised sales market are prominent threats. Furthermore, slow overall development of the horticultural sector can potentially be a factor that diminishes the need and demand for innovation. In **Poland**, other urgent problems faced by the sector may lead to giving low priority to issues related to the development of demonstration activities, while low profits can prevent farmers from spending the money for travelling to demo farms.

Table 4. *SWOT analysis of demonstration activities in the fruit sector in Latvia, Lithuania and Poland*

STRENGTHS	WEAKNESSES
COMMON FOR LATVIA, LITHUANIA AND POLAND	
- Demand for knowledge provided by demo farms among various profiles of farmers - Peer-to-peer learning as an increasingly recognised source of farmers' knowledge - Diversity of already established formalised knowledge transfer practices to complement demo activities - Cooperation between farmers and already existing demo farms developed during former project-based demonstrations - Contribution made by demo farms in the promotion of mutual learning between farms of different sizes - Readiness and capacity of national fruit research centres to organise and host demonstrations - Established practices of organised study visits to demo sites in the neighbouring countries and cross-border knowledge exchange - Distinct qualities of northern fruit and berries enhancing their competitiveness against their southern counterparts as a niche produce	- Lack of former research and evidence-based knowledge on the performance and contribution of demo farms in the sector - Limited experience with organisation of demonstrations on commercial farms and facilitation of peer-to-peer learning - High costs of establishing demo farms - Lack of long-term/regular financial support for demonstration activities (incl. establishment of demo objects, training of demo hosts, advertising) - Unclear criteria for qualifying as a demo farm - Restricted scope of incentives for farms to become demo hosts - Shortage of skilled staff for regular on-farm demonstrations - Unsuitable technical infrastructure and facilities for hosting organised demonstrations on commercial farms - General reluctance to cooperation and fear of competition in farmers' community
LATVIA	
- Emerging networks of farmers used for mutual formal and informal advice and information exchange - Established trust-based relations between fruit growers and fruit scientists - Access by (new) companies to practical services and advice offered by scientists on fruit production and development of novel processed fruit produce and processing technologies - Farmers' access to and use made of foreign experience (e.g. study visits)	- Small size and low economic significance of the fruit sector - Poor understanding of the sectoral needs at the policy level - Lack of full-time state-funded advisors in fruit-growing and processing nationally and regionally - Difficulties in identifying and selecting suitable demo farms (hosts willing to share knowledge) - Insufficient lengths of some projects for developing demos on selected crops/varieties that need longer breeding and monitoring time - Lack of demo farms where students can practice their skills as interns
LITHUANIA	
- Farmers' willingness to attend demonstrations - Progressive farmers interested in learning of innovations taking place both in the country and abroad and applying those on their farms	- Shortage of specialised advisors in horticulture - Marginal role attributed to demonstration activities in the mission of research institutions - Lack of on-farm innovations for demonstration and funding for their introduction - Farmers' reluctance to devote time for visitors
POLAND	
- Renowned advisory centres providing extensive support for farmers and entrepreneurs on fruit cultivation, storage, processing - Crop diversity in the production at the demo farms attracting many growers - Increasing number of farmers with experience, good foreign language skills and willingness to learn and to travel	- Demanding regulations regarding adequate facilities for visitors considerably increasing initial capital investments - Aging of farmers restraining them from visiting more distant demo farms

OPPORTUNITIES	THREATS
COMMON FOR LATVIA, LITHUANIA AND POLAND	
- Increasing recognition of the value of demonstrations by policymakers on EU and national level - Targeted use of EU funds for further stimulation of farmers' learning and establishment of demo farms - Adjustment of support for demonstration activities in the new programming period after 2020 based on a comprehensive assessment of existing policy measures - Continuous involvement of scientists in demonstration activities for providing practical and theoretical knowledge to both farmers and advisors - Advanced farms using demos to showcase new varieties/technologies and promote wider uptake of economically viable and environmentally sustainable innovations - Increased recognition by individual producers of the benefits of knowledge sharing and cooperation counterbalancing the potential losses caused by new competitors entering the market - Intensification and diversification of publicity tools and channels for demonstration activities - Development of a coordinated network of demo farms - Promotion of demo farms as a platform for fostering farmer cooperation	- Uncertainty about the future of the sector (e.g. ageing, export markets) inhibiting long-term commitment by potential and existing demo farms - Diminishing value and relevance of individual demonstrations on older demonstration farms to cater for the needs/interests of regular demo attendants - Low uptake of selected demonstrated practices by fruit-growers disincentivising demo organisers and hosts - High dependence of demo objects and demonstration process on weather conditions
LATVIA	
- Capitalisation on the already existing informal practices of knowledge exchange among peers and between different advisors and farmers - Potential of demo farms to become places where students can practice new skills (i.e. internships) as well as produce good quality undergraduate/ postgraduate theses as part of their studies	- Periodic oversaturation with demonstration activities due to project-based activities - Too demanding formal requirements
LITHUANIA	
- Interest in the introduction of new crops and development of innovative fruit products by fruit growers and processors	- Too high costs of many innovations for small farms - Restricted possibilities for marketing of manufactured products due to strongly monopolised sales market - Slow overall development of horticultural sector serving as a factor diminishing the needs for innovations
POLAND	
- Increased sales volumes of demonstrated products and attraction of new customers as a positive economic effect and incentive for the demo hosts (input suppliers) - Systematic engagement of university students specialising in horticulture in demonstrations to boost and optimise the use of demo farms - Use of EU grant funding for organising and maintaining a network of demo farms	- Urgent problems faced by the sector in terms of trade etc. leading to understating of issues related to the development of demonstration activities - Very low profits inhibiting farmers from spending the money for traveling to demo farms

ANNEX 1: Selected indices of fruit and berry production in Latvia, Lithuania and Poland (EUROSTAT)

10 biggest harvested crops by harvested area (1000 ha)

Latvia

	2000	2005	2010	2015
Apples	8.10	8.50	3.30	2.40
Currants	0.80	0.90	0.60	0.60
Strawberries	0.80	0.70	0.30	0.40
Raspberries	0.00	0.20	0.20	0.20
Blueberries	:	:	:	0.20
Pears	0.50	0.80	0.20	0.20
Cherries	0.70	0.90	0.10	0.10
Plums	0.80	1.00	0.10	0.10
Gooseberries	0.20	0.10	0.00	:

Lithuania

	2000	2005	2010	2015
Apples	:	17.51	9.57	10.68
Currants	:	5.00	4.18	3.81
Raspberries	:	0.42	0.80	1.29
Strawberries	0.77	2.97	0.93	1.01
Pears	:	0.69	0.72	0.87
Cherries	:	0.78	0.77	0.78
Plums	:	0.73	0.72	0.77
Blueberries	:	:	:	0.08
Walnuts	0.00	0.00	0.04	0.06
Hazelnuts	0.00	0.00	0.00	0.03

Poland

	2000	2005	2010	2015
Apples	1 65.10	1 69.70	1 70.40	1 80.40
Strawberries	62.00	55.10	51.73	52.30
Currants	33.50	47.10	42.66	44.40
Cherries	51.40	44.00	45.10	39.10
Raspberries	12.60	17.80	29.60	27.40
Plums	31.70	20.80	17.90	13.90
Pears	18.30	12.60	8.40	9.20
Hazelnuts	:	2.60	3.60	3.60
Blueberries	:	:	:	3.20
Walnuts	:	2.30	29.10	2.50
Peaches	10.30	3.30	3.40	2.40

10 biggest harvested crops by harvested production (1000 t)

Latvia

	2000	2005	2010	2015
Apples	35.40	37.50	10.30	7.80
Currants	:	5.20	0.40	0.60
Strawberries	4.60	4.00	0.60	1.40
Raspberries	0.10	0.50	0.20	0.20
Blueberries	:	:	:	0.20
Pears	1.30	2.00	0.20	0.50
Cherries	1.40	1.90	0.10	0.10
Plums	2.10	2.40	0.00	0.20
Gooseberries	0.60	0.80	0.00	:

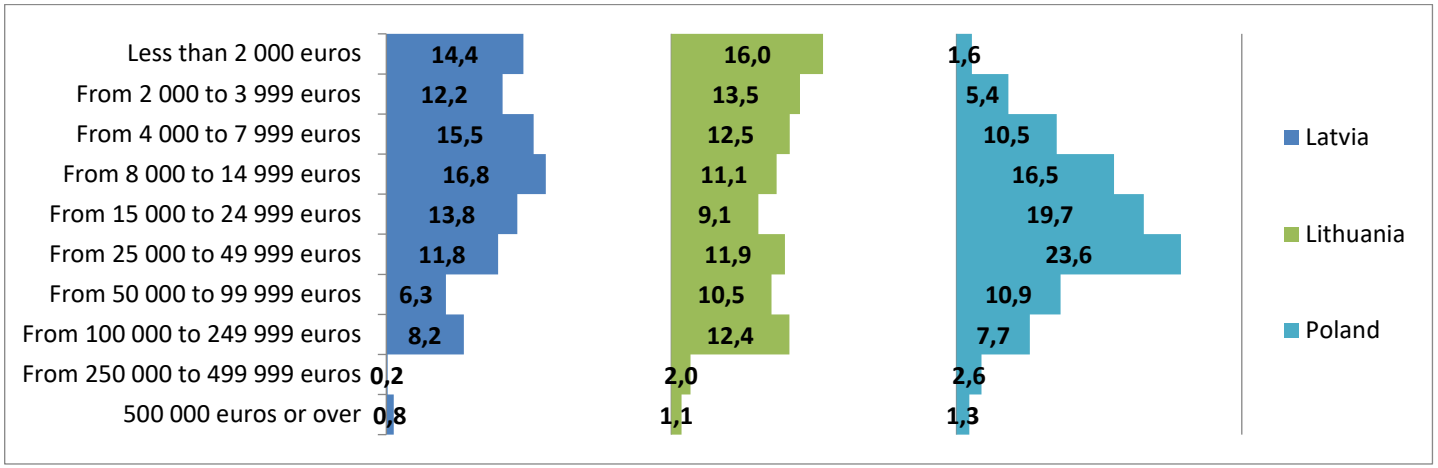
Lithuania

	2000	2005	2010	2015
Apples	:	84.38	29.22	64.97
Currants	:	7.66	4.03	4.36
Raspberries	:	0.54	1.22	2.62
Strawberries	1.38	10.18	2.10	3.20
Pears	:	1.92	0.96	1.54
Cherries	:	0.85	0.24	0.35
Plums	:	1.57	0.75	0.61
Blueberries	:	:	:	0.11
Walnuts	0.00	0.00	0.01	0.04
Hazelnuts	0.00	0.00	0.00	0.04

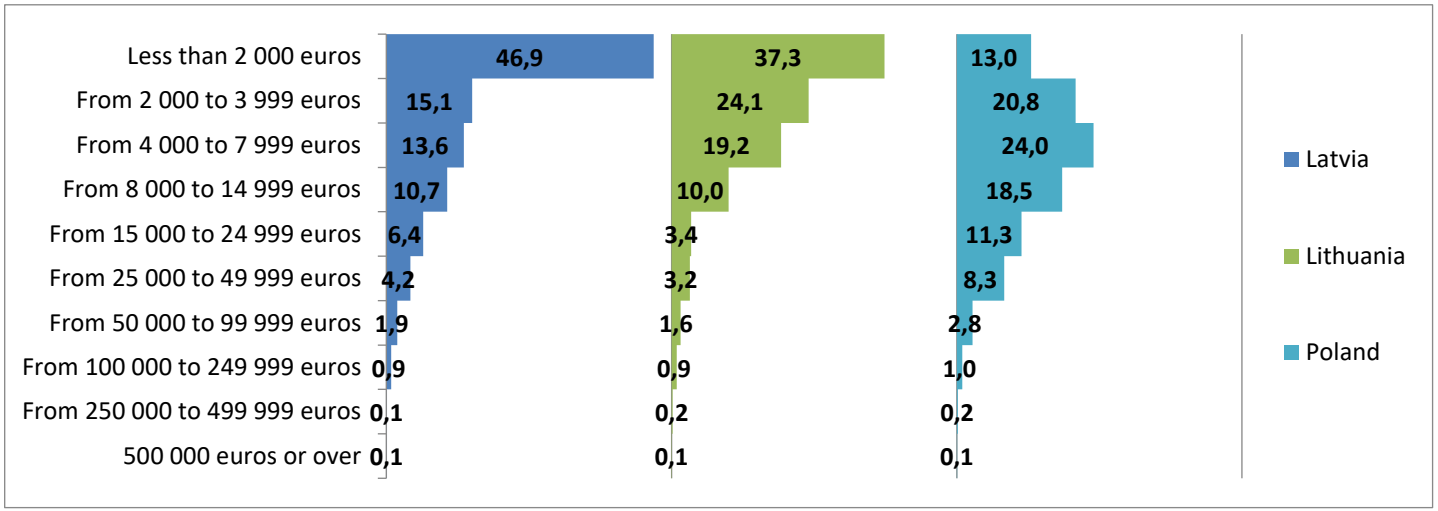
Poland

	2000	2005	2010	2015
Apples	14 50.40	20 75.00	18 77.90	31 68.80
Strawberries	1 71.30	1 84.60	1 76.75	2 14.60
Currants	1 46.80	1 86.80	1 90.78	1 59.90
Cherries	1 78.10	1 77.40	1 87.40	2 27.50
Raspberries	39.70	65.50	92.90	79.90
Plums	1 06.90	91.40	83.80	94.90
Pears	81.60	59.30	46.50	69.60
Hazelnuts	:	3.10	2.60	5.40
Blueberries	:	:	:	14.10
Walnuts	:	5.80	9.20	7.10
Peaches	20.00	9.60	9.30	9.90

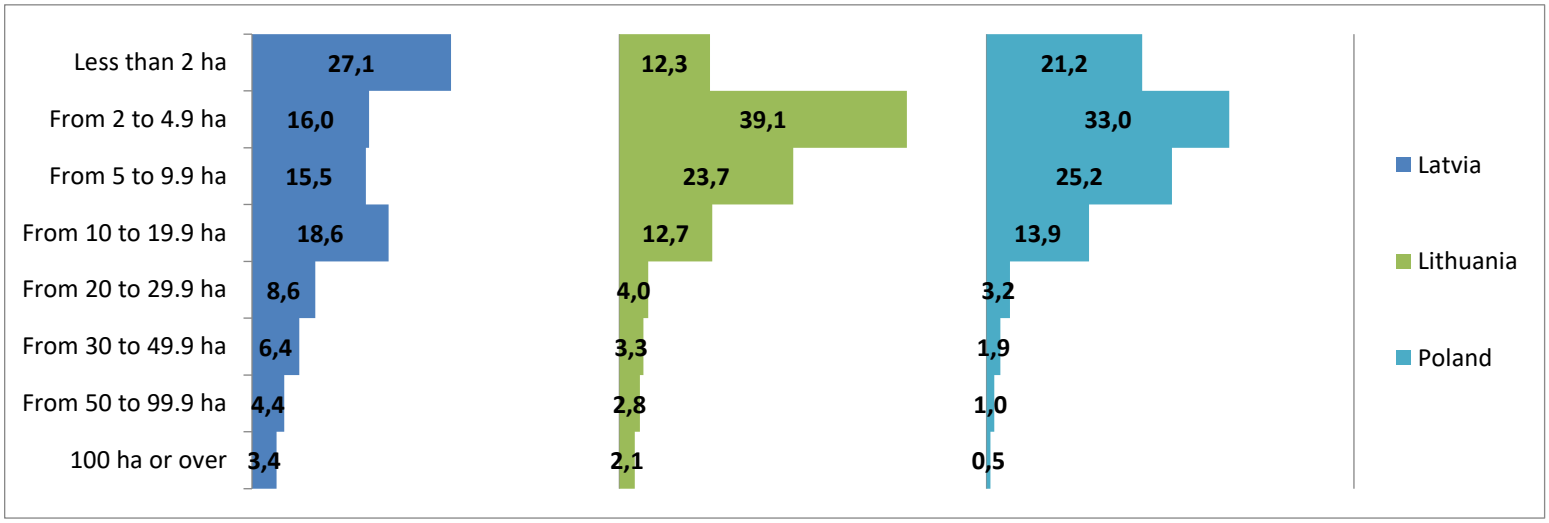
Land use: Standard outputs in Euros for Fruit and Berry plantations in 2013 by ha



Land use: Standard outputs in Euros for Fruit and Berry plantations in 2013 by units



Land use: Fruit and Berry plantations in 2013 by agricultural size of farm



ANNEX 2: List of previous socio-economic studies/publications on the fruit sector by country (2006-2016)[17]

LATVIA

1. Kaufmane, E., Skrīvele, M., Ikase, L. (**2017**). Fruit-growing in Latvia - industry and science. *Proceedings of the Latvian Academy of Sciences. Section B. Natural, Exact, and Applied Sciences* 71(3): 237–247.
2. Rivža, P., Bērziņa, L., Priekulis, J., Lauva, D., Mozga, I., Valujeva, K. (**2015**). *Lauksaimniecības rādītāju un SEG emisiju no lauksaimniecības sektora prognoze 2020., 2030. un 2050. gadiem ar papildus pasākumiem emisiju samazināšanai.* [Forecast of the agricultural indices and GHG emissions from the agricultural sector for the years 2020, 2030 and 2015 with additional measures for reducing emissions]. Riga: Ministry of Agriculture, Latvia University of Agriculture. Available at: http://zm.gov.lv/public/ck/files/Lauksaimniecibas_prognozes_2050_gads.pdf (in Latvian)
3. Pilvere, I. et al. (**2014**). *Zemes ekonomiski efektīva, ilgtspējīga un produktīva izmantošana lauksaimniecības un mežsaimniecības produkcijas ražošanai*. [Economically effective, sustainable and productive use of land for the production of agricultural and forestry goods]. Final report. Latvia University of Agriculture. Available at: http://www.lvm.lv/images/lvm/Petijumi_un_publikacijas/Petijumi/Atskaite_zemes_janvaris_gala_2014_1.pdf (in Latvian)
4. Kaufmane, E., Skrīvele, M., Rubauskis, E., Strautiņa, S., Ikase, L., Lācis, G., Segliņa, D., Moročko-Bičevska, I., Ruisa, S., Priekule, I. (**2013**). Development of Fruit Science in Latvia. *Proceedings of the Latvian Academy of Sciences, Section B: Natural, Exact, and Applied Sciences* 67(2): 71-83.
5. Fruit Growers' Association of Latvia (**2013**). *Nozares eksperta ziņojums augļkopībā*. [Expert report in fruit-growing]. Available at: http://www.laukutikls.lv/sites/laukutikls.lv/files/informativie_materiali/auglkopibas_nozares_ekspertu_zinojums_2013.pdf (in Latvian)
6. Tisenkopfs, T., Kunda, I., Šūmane, S. (**2013**). *The Latvian fruit-growing network. LINSA Case Study Report: Latvia*. Baltic Studies Centre. Available at: http://www.solinsa.org/fileadmin/Files/deliverables/LINSA_Reports/LATVIA_FINAL_Linsa_Fruit.pdf
7. Fruit Growers' Association of Latvia (**2012**). *Augļkopības nozares ziņojums*. [Report on the fruit-growing sector]. Available at: http://www.losp.lv/sites/default/files/articles/attachments/publications/15.01.2013_-_2041/3453_auglkopibas_nozares_zinojums_2012_laa.pdf (in Latvian)
8. Silina, L., Zeiferte, Dz. (**2012**). Assessment of Fruit-Growing Industry in Latvia. In: *Economic Science for Rural Development Conference Proceedings*, Issue 29: 128-133. Latvia University of Agriculture.
9. Fruit Growers' Association of Latvia (**2011**). *Nozares eksperta ziņojums augļkopībā*. [Expert report in fruit-growing]. Available at: http://www.laas.lv/files/108_atskaitelosp2011.doc (in Latvian)
10. Ministry of Agriculture (**2011**). *Stratēģija ilgtspējīgām augļu un dārzeņu ražotāju organizāciju darbības programmām Latvijā 2011-2017*. [Strategy for sustainable operational programmes of fruit and vegetable producers' organisations in Latvia for 2011-2017]. Riga. Available at: https://www.zm.gov.lv/public/ck/files/Strategija%20ilgtspejigam%20auglu%20un%20darzenu%20RO%20darbibas%20programmam%20LV%202011-2017.pdf (in Latvian)

[17] Listed in a descending order by year of publication (in an alphabetical order for the same year).

11. Dance, D., Kindzulis, Ģ., Seleckis, V., Čarbarts, J. (**2010**). *Horticulture industry: Production, preservation and processing of fruits and berries in Estonia and Latvia.* Available at: http://www.kandavaspartneriba.lv/f/uploads/Horticulture_industry_11122011.doc
12. Skrīvele, M., Kaufmane, E., Strautiņa, S., Ikase, L., Ruisa, S., Rubauskis, E., Blukmanis, M., Segliņa, D. (**2008**). Fruit and berry growing in Latvia. In: Proceedings of International Scientific Conference „Sustainable Fruit Growing: From Plant to Product", Jurmala-Dobele, May 28-31; pp. 5-14. Available at: http://www.lvai.lv/pdf/Raksti-viss-drukai.pdf
13. BALTHORT (**2006**). Baltic Sea Region INTERREG III B project "Promotion of durable cooperation between Latvian and Lithuanian fruit growers for sustainable development of horticulture". Reports on Latvia available at: http://www.puresdis.lv/balthort/index_eng.html
14. Vanags, J. et al. (**2006**). *Lauksaimniecības nozares, zinātnes un lauku vides attīstības stratēģijas izstrāde.* [Elaboration of the development strategy of agricultural sector, science and rural milieu]. Project funded by the Ministry of Agriculture.

LITHUANIA

1. Kviklys, D., Ramanauskas, J., Žukovskis, J., Radzevičius, G. (**2016**). Lietuvos vaisių ir daržovių sektoriaus darnaus vystymosi strateginių krypčių galimybių studija [Study of a strategy of sustainable development of fruit and vegetable sector]. Report to the Ministry of Agriculture. (in Lithuanian)
2. Ramanauskas, J., Vaznonis, V. (**2009**). Vaisių ir daržovių sektoriaus plėtros strategijos formavimo aspektai [Aspects of formation strategy for fruits and vegetables sector development]. V*adybos mokslas ir studijos - kaimo verslų ir jų infrastruktūros plėtrai,* Nr. 18(3):59-64. Available at: http://mts.asu.lt/mtsrbid/article/viewFile/478/504 (in Lithuanian with English summary)
3. Vaznonis, V., Ramanauskienė, J., Ramanauskas, J. (**2008**). Vaisių ir daržovių sektoriaus strategijos koncepcija [Conception of fruits and vegetables sector strategy]. *Vadybos mokslas ir studijos - kaimo verslų ir jų infrastruktūros plėtrai*, Nr. 15(4):200-207. Available at: http://etalpykla.lituanistikadb.lt/fedora/objects/LT-LDB-0001:J.04~2008~1367164767246/datastreams/DS.002.0.01.ARTIC/content (in Lithuanian with English summary)
4. Vaznonis, V., Ramanauskienė, J., Ramanauskas, J. (**2008**). Vaisių ir darţovių sektoriaus veiksmų programų strategijos mokslinis pagrindimas [Scientific substantiation of action plan programs for fruit and vegetable sector]. Report to the Ministry of Agriculture. (in Lithuanian)
5. Kviklys D., Uselis N., Bobinas Č., Kviklienė N., Lanauskas J. (**2006**). Vaisių ir uogų auginimo Lietuvoje koncentracija ir specializacija [Concentration and specialization of fruit and berry production in Lithuania]. *Sodininkystė ir daržininkystė*, 25(1), 81-89. Available at: http://vddb.library.lt/fedora/get/LT-eLABa-0001:J.04~2006~ISSN_0236-4212.V_25.N_1.PG_81-89/DS.002.0.01.ARTIC (in Lithuanian with English summary)
6. Kviklys, D., Uselis, N., Kviklienė, N., Lanauskas, J., Lepsis, J., Bite, A. (**2006**). *Lietuvos ir Latvijos sodininkystės verslo studija* [Study of Lithuanian and Latvian fruit growing sector]. Lietuvos sodininkystės ir daržininkystės institutas [Institute of Horticulture]. Babtai, 62 p. (in Lithuanian)

POLAND

1. Czernyszewicz, E. (**2016**). Long-term trends in production and consumption of apples in Poland, Europe and worldwide. *Acta Scientiarum Polonorum-Hortorum Cultus* 15(3): 95-104. Available at: http://www.acta.media.pl/pl/full/7/2016/000070201600015000030009500104.pdf

2. Klepacka, A. M., Florkowski, W. J. (**2016**). Poland's apple sector and the embargo on fruit exports to Russia. *Acta Horticulturae* 1132: 31-38. http://www.actahort.org/books/1132/1132_5.htm
3. Lemanowicz, M. (**2016**). Importance and development of fruit sector in Poland - cooperation of producers. In: *Proceedings of the 2016 international conference „Economic science for rural development" No 42,* pp. 261-267. Available at: http://llufb.llu.lv/conference/economic_science_rural/2016/Latvia_ESRD_42_2016-261-267.pdf
4. Baran, J. (**2015**). Porównanie efektywności wybranych branż polskiego przemysłu spożywczego [Comparison of efficiency of selected industries of polish food industry]. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu* 17(5): 11-16. Available at: http://yadda.icm.edu.pl/yadda/element/bwmeta1.element.agro-ee46a6bf-6454-4855-bb01-417426d84fd7/c/17-5-Baran.pdf (in Polish with English summary)
5. Bugala, A. (**2015**). Eksport polskich produktów ogrodniczych poza UE i WNP[Polish export of horticultural products to non-EU and non-CIS markets]. *ZeszytyNaukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie. Problemy Rolnictwa Światowego* 15(30) |2|: 16-25. Available at: http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-60a949ba-b53c-438d-8317-504c59be889a/c/16-25.pdf (in Polish with English summary)
6. Kierczynska, S. (**2015**). Produkcja i eksport owoców w Polsce w latach 1994-2014 [Fruit production and export in Poland in the 1994-2014]. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu* 17(5): 131-135. Available at: http://ageconsearch.umn.edu/bitstream/233402/2/17-5-Kierczynska.pdf (in Polish with English summary)
7. Klepacka, A. M., Florkowski, W. J., Meng, T. (**2015**). Changes in fruit consumption preferences in EU countries: the example of Poland. *Acta Horticulturae* 1103: 175-180 https://doi.org/10.17660/ActaHortic.2015.1103.26
8. Klepacki, B., Krajewski, J. (**2015**). Wykorzystanie środków pomocowych Unii Europejskiej w rozwoju infrastruktury logistycznej grup producenckich w ogrodnictwie [The European Union funds for logistic infrastructure development in the fruits producers group use]. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu* 17(5): 136-140. Available at: http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-16f59db3-edac-45ac-8785-33b7abf845f5/c/17-5-Klepacki.pdf (in Polish with English summary)
9. Komorowska, D. (**2015**). Znaczenie rolnictwa ekologicznego w Polsce [Importance of organic farming in Poland]. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu* 17(2): 119-126. Available at: http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-88180912-8f3e-4e06-9a98-711f0cc70f06/c/1.pdf (in Polish with English summary)
10. Krzyzanowska, K., Trajer, M. (**2015**). Regionalne zróżnicowanie integracji producentów w sektorze owoców i Warzyw [Regional diversification of producer integration in fruit and vegetables sector]. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu* (17)3: 217-224. Available at: http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-ece4aad6-79a0-449e-b2b6-d08149e0543a/c/17-3-Krzyzanowska.pdf (in Polish with English summary)
11. Kutkowska, B., Szewczuk, A., Pilawka, T. (**2015**). Produkcja sadownicza w województwie dolnośląskim na tle kraju [Orchard production in Lower Silesia voivodship against the background of the country]. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu* 17(4): 142-149. Available at: http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-db81b55b-c38a-4373-913f-302e1236e73d/c/17-4-Kutkowska.pdf (in Polish with English summary)

12. Mickiewicz, A., Mickiewicz, B. (**2015**). Specyfika funkcjonowania grup producentów owoców i warzyw w Polsce [The specificity of producer groups of fruits and vegetables in Poland]. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu* 17(6): 185-190. Available at: http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-fc9bd8de-80d0-4b31-a73c-6734f1e33659/c/17-6-Mickiewicz.pdf (in Polish with English summary)
13. Pawlewicz, A., Szamrowski, P. (**2015**). Działania grup producentów owoców i warzyw poprawiające ko nkurencyjność w łańcuchu dostaw żywności [Chain food activities to improve competitiveness in fruit and vegetables groups]. *Journal of Agribusiness and Rural Development* 2(36): 267-272. Available at: http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-06582487-3a54-453f-8f8b-f701fb1be074/c/13_2_2015_267.pdf (in Polish with English summary)
14. Rys-Jurek, R., Stefko, O. (**2015**). Sytuacja ekonomiczno-finansowa gospodarstw ogrodniczych w Polsce na tle gospodarstw z Holandii i Włoch w 2012 roku [The economic and financial situation of horticulture farms in Poland in comparison with the farms from the Netherlands and Italy in 2012]. *Zagadnienia Doradztwa Rolniczego* 1: 16-24. Available at: http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-6038e746-94bf-4ef6-bec5-a4a3ed6b0975?q=f387fea8-e0fe-49bb-ab11-dcf85f1dcb6c$12&qt=IN_PAGE (in Polish with English summary)
15. Szpyrka, E., Kurdziel, A., Rupar, J., Slowik-Borowiec, M. (**2015**). Pesticide residues in fruit and vegetable crops from the central and eastern region of Poland. *Roczniki Państwowego Zakładu Higieny* 66(2): 107-113. Available at: http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-cdd8b624-2bc0-4246-831a-5ff1218d862d/c/2.pdf
16. Wolnicka, K., Jarosz, M., Charzewska, J., Chabros, E. (**2015**). Frequency of fruit and vegetables consumption among school-age children in Poland**.** *Annals of Nutrition and Metabolism* 67 (Supplement 1): 116-117. http://www.karger.com/Article/Pdf/440895
17. Wroblewska, W., Chudzik, A. (**2015**). Zmienność cen owoców i środków produkcji a sytuacja ekonomiczna producentów w Polsce [Impact of fruits' and means' of production prices volatility on economic situation of fruit producers in Poland]. *Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego. Ekonomika i Organizacja Gospodarki Żywnościowej* 109: 123-132. Available at: http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-cf6c6319-13eb-40b8-8e2b-d5f59da0a282/c/123-132.pdf (in Polish with English summary)
18. ARR (**2014**). *Fruit market in Poland.* Agricultural Market Agency. Available at: http://www.arr.gov.pl/data/00321/rynek_owocow2014_en.pdf
19. Czernyszewicz, E., Wiśniewska, M. (**2014**). Determinants of fruit quality system implementation in Poland. *Zywnosc. Nauka. Technologia. Jakosc [Food. Science Technology. Quality]* 21(3): 190-205. Available at: http://pttz.org/zyw/wyd/czas/2014,%203(94)/15_Czernyszewicz.pdf
20. Jabłońska, L., Olewnicki, D. (**2014**). Rozwój i znaczenie sektora ogrodniczego w Polsce w ostatnim półwieczu [The development and importance of the horticultural sector in Poland in the last half-century]. *Roczniki Naukowe Ekonomii Rolnictwa i Rozwoju Obszarów Wiejskich* 101(3): 25-35. Available at: http://www.wne.sggw.pl/czasopisma/pdf/RNR_2014_T101_z3_s25.pdf (in Polish with English summary)
21. Jabłońska, L., Olewnicki, D. (**2014**). Przygotowania sektora owoców i warzyw do wdrożenia integrowanej ochrony roślin [The willingness of fruit and vegetables sector for the implementation of integrated pest management]. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu* 16(3): 92-98. Available at:

http://ageconsearch.umn.edu/bitstream/201831/2/16-3-Jablonska.pdf (in Polish with English summary)
22. Klepacka, A. M., Meng, T., Florkowski, W. J. (**2014**). Apples or oranges? Recent household fruit consumption in Poland. *Stowarzyszenie Ekonomistów Rolnictwa i Agrobiznesu* 16(6): 220-229. Available at: http://ageconsearch.umn.edu/bitstream/205471/2/16-6-Klepacka.pdf
23. Kracinski, P. (**2014**). Polski eksport jabłek na tle światowego handlu jabłkami [Polish export of apples on the background of world market]. *Stowarzyszenie Ekonomistów Rolnictwa i Agrobiznesu* 16(3): 159-164. Available at: http://ageconsearch.umn.edu/bitstream/204918/2/16-3-Kracinski.pdf (in Polish with English summary)
24. Filipiak, T. (**2013**). Uwarunkowania prawno-organizacyjne sektora owoców i warzyw w Polsce [Legal and organizational aspects of the fruit and vegetables sector in Poland]. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu* 15(50): 63-69. Available at: http://seria.com.pl/images/Pliki/repozytorium/15-5/15-5-Filipiak.pdf (in Polish with English summary)
25. Sobczak, W., Jablonska, L., Olewnicki, D. (**2013**). Stopień zorganizowania producentów owoców i warzyw w Polsce [The degree of fruit and vegetables growers' self-organization in Poland]. *Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie. Problemy Rolnictwa Światowego* 13[28] |1|: 119-127. Available at: http://yadda.icm.edu.pl/yadda/element/bwmeta1.element.agro-9acfb480-6156-4353-8333-61f522a2fa9f/c/Sobczak_W__Jablonska_L__Olewnicki_D.pdf (in Polish with English summary)
26. Wolnicka, K., Jarosz, M., Jaczewska-Schuetz, J., Taraszewska, A. (**2013**). The school fruit scheme impact on fruits and vegetables consumption by children in Poland. *Annals of Nutrition and Metabolism* 63: 878. Available at: https://www.yumpu.com/en/document/view/39970850/354245/878
27. Lemanowicz, M., Krukowski, A. (**2011**). Development of fruit industry and fruit supply chains in Poland. In: *Science for Rural Development: Production and Taxes, Proceedings of the International Scientific Conference "Economic Science for Rural Development",* Mazure, G. (ed.), Jelgava. pp. 78-84. Summary available at: http://aggr.ukm.um.si/vufind/EdsRecord/edsagr,edsagr.LV2011000349
28. Szymona, J. (**2011**). Status and perspectives of organic pomological production development in selected farms. *Vegetable Crops Research Bulletin* 75: 117-124. Available at: https://www.degruyter.com/downloadpdf/j/vcrb.2011.75.issue--1/v10032-011-0023-5/v10032-011-0023-5.xml
29. Czernyszewicz, E. (**2009**). Changeability of consumer preferences concerning the methods of fruit production. *Journal of Agribusiness and Rural Development* 1(11): 5-14. Available at: http://www.jard.edu.pl/pub/1_1_2009.pdf
30. Czernyszewicz, E. (**2009**). Stan i perspektywy ekologicznej produkcji owoców w Polsce [State and perspectives of fruit organic production in Poland]. *Pamiętnik Puławski* 151(2): 425-438. (in Polish with summary in English)
31. Lemanowicz, M., Krukowski, A. (**2009**). Comparisons of qualitative and quantitative issues in the fruit supply industries in The Netherlands, Poland, Greece, and Spain. *Journal of Horticultural Science & Biotechnology*, Special issue: 13-17. Available at: http://www.jhortscib.com/isafruit/isa_pp013_017.pdf
32. Halicka, E. (**2007**). Dynamics of fruit and vegetable supply and demand in Poland. *Annals of Nutrition and Metabolism* 51: 325. Available at: http://www.karger.com/Article/Pdf/105121

ANNEX 3. List of demo farm profiles for assessing good demo practices

LATVIA

1. “Very Berry” Ltd.
2. “LUBECO” Ltd.
3. “Skoru dārzi” Ltd.
4. “Krogzeme” Ltd.
5. “JVB” Ltd.
6. “Staķi” Ltd.
7. IK “MIGL DĀRZI”
8. Farm “Gaidas”/”Akmentiņi”
9. Farm “Eglāji”
10. Farm “Kurpnieki”
11. Farm “Mucenieki”
12. Farm “Lejasdārzi”
13. Farm “Ezermala”
14. Farm “Ķirši”
15. Farm “Eži”
16. Farm “Sprogas”
17. Farm “Vīksnas-1”

LITHUANIA

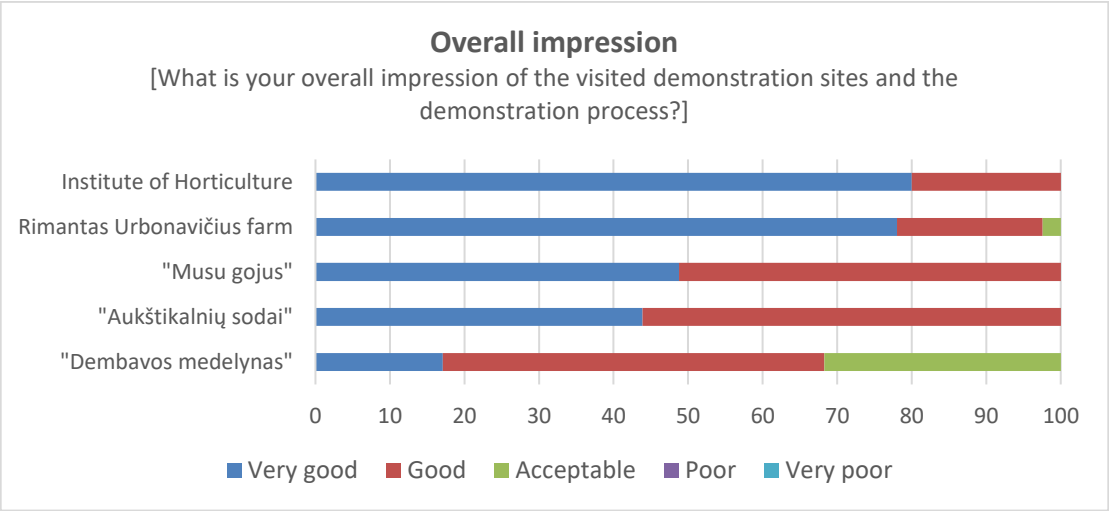
1. Experimental farm of The Institute of Horticulture, Lithuanian Research Centre for Agriculture and Forestry
2. Vitalijus Petronis farm
3. Closed Joint-Stock Company “Aukštikalnių sodai”
4. Closed Joint-Stock Company “Dembavos medelynas”
5. Rimantas Urbonavičius farm
6. Closed Joint-Stock Company “Ažuožerių sodai”
7. Cooperative “Mūsų gojus”

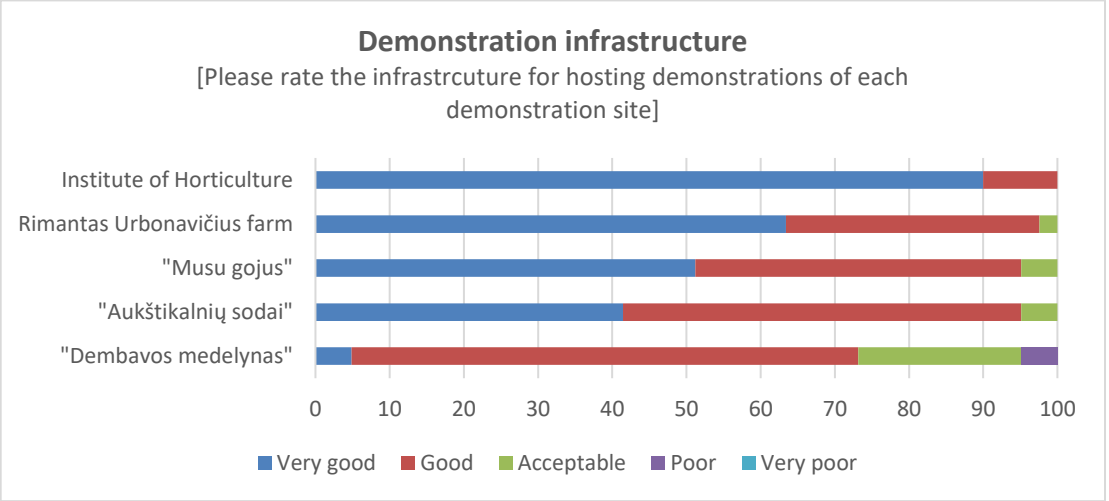
POLAND

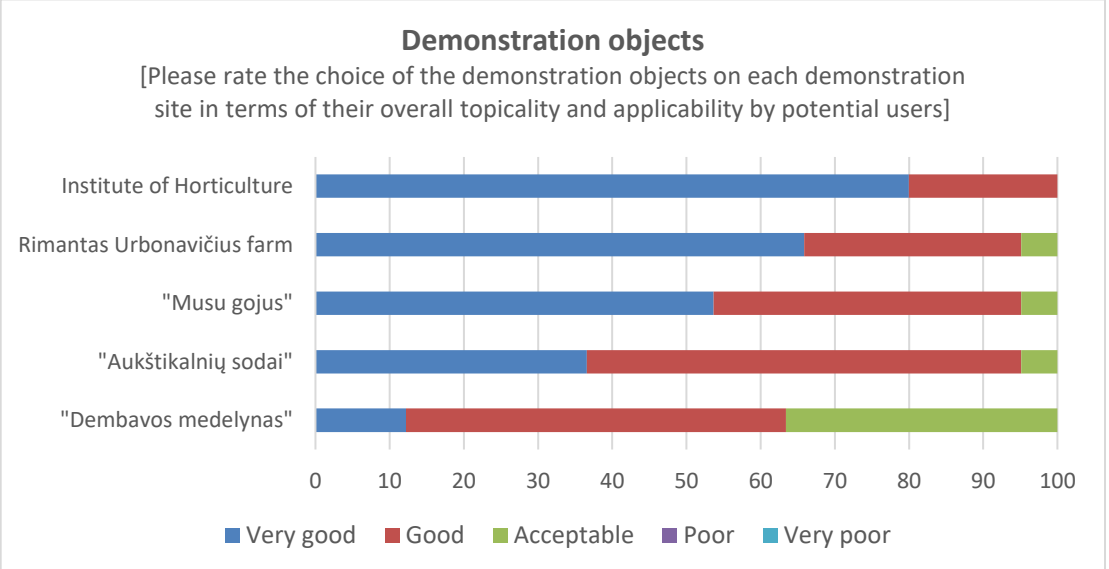
1. Jagoda JPS
2. Agrosimex
3. LaSAD
4. APPLE TEAM
5. Nursery certificated farm (Licencjonowane Gospodarstwo Szkółkarskie Krystyna Krzewińska)

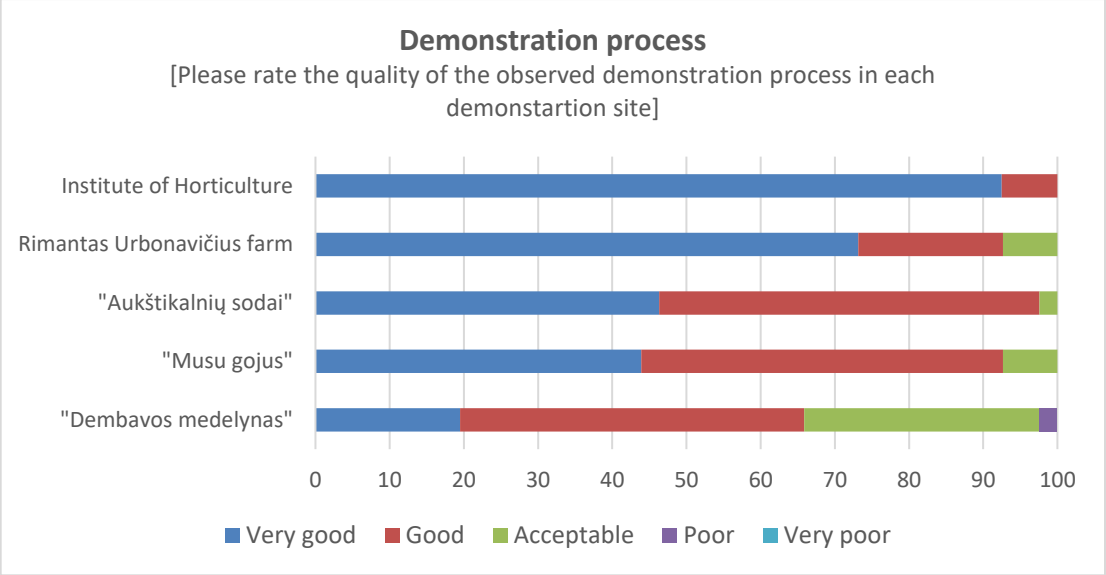
ANNEX 4. Evaluation of demonstration sites of the INNOFRUIT study trip to Lithuania an and Poland (August 2017) by Latvian fruit-growers (n=41)

LITHUANIA

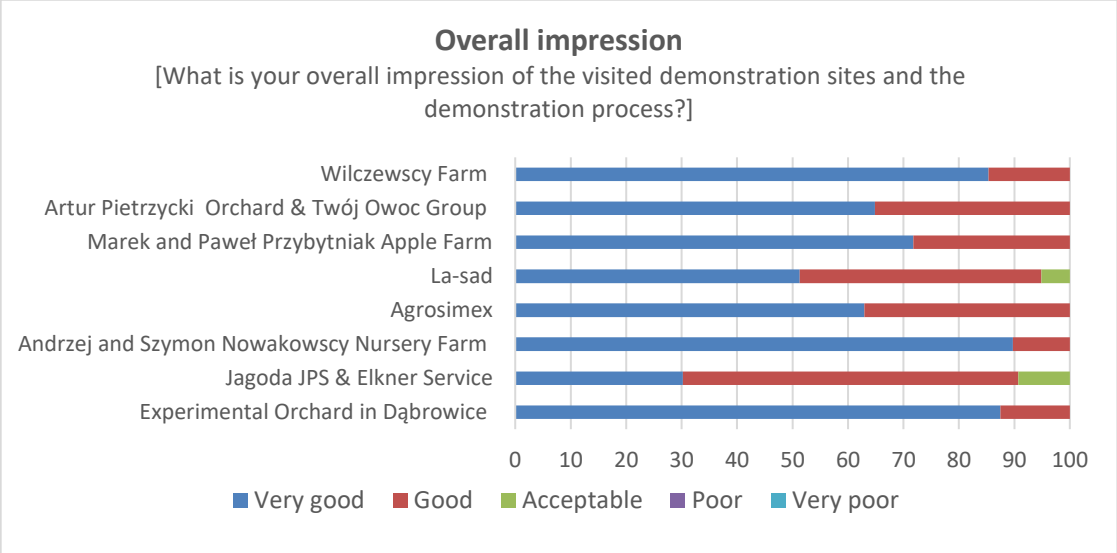


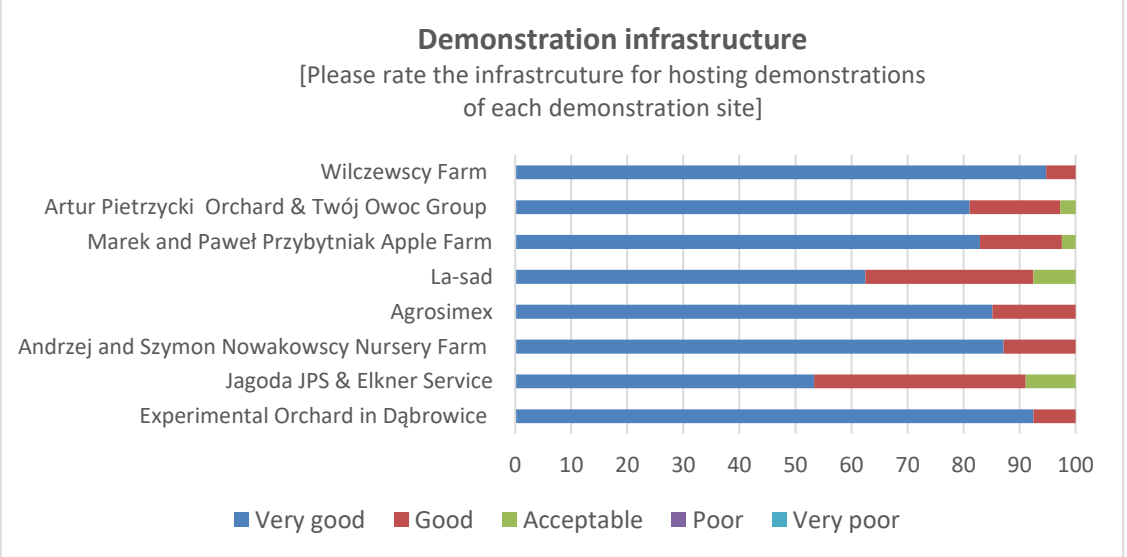


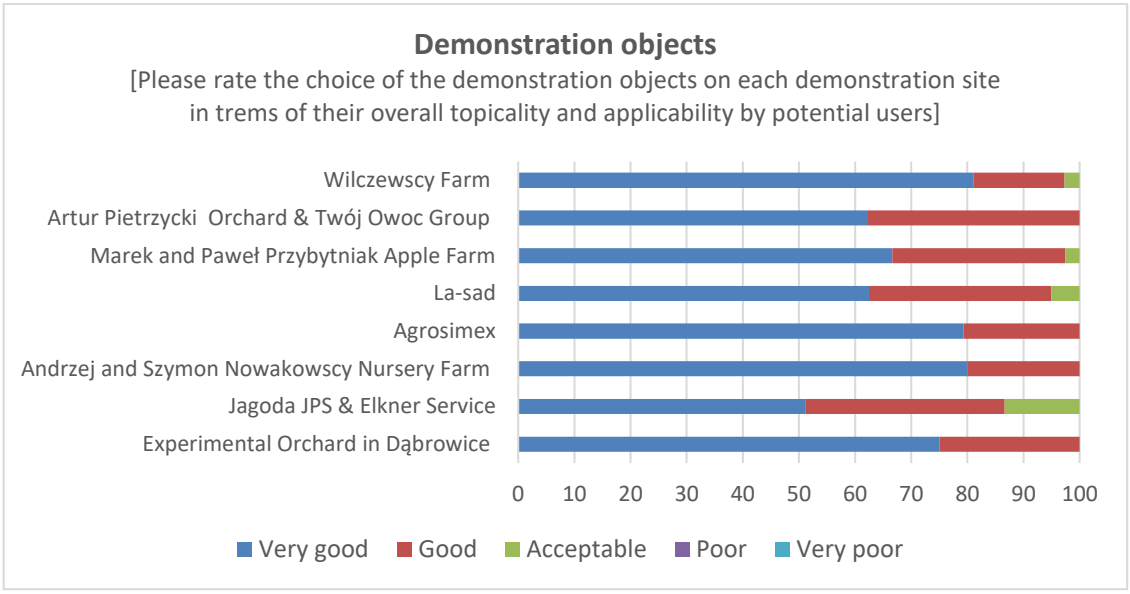


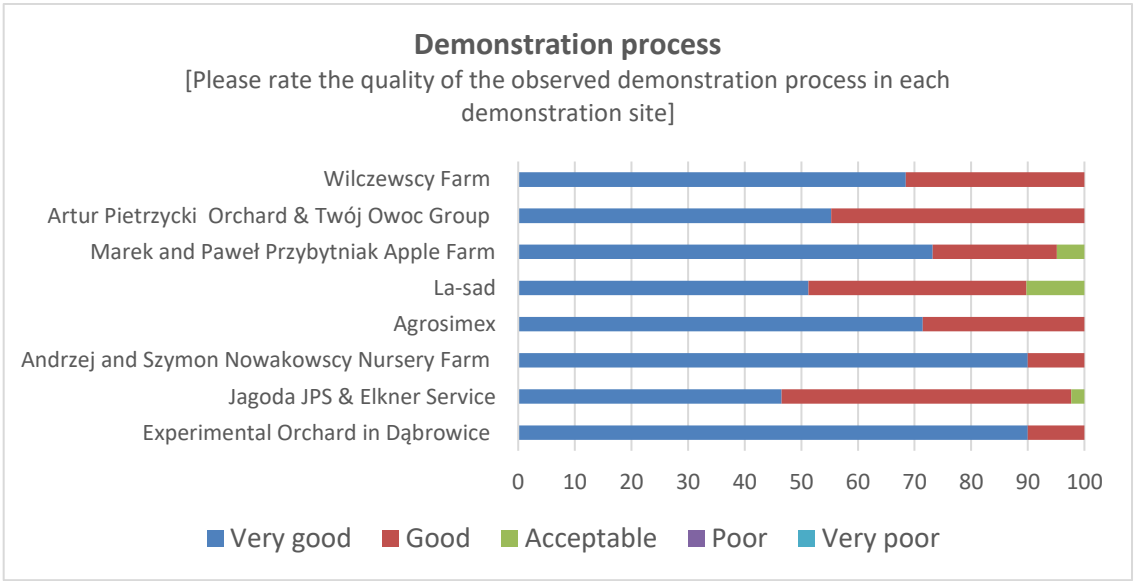

Demonstration process
[Please rate the quality of the observed demonstration process in each demonstartion site]
Institute of Horticulture
Rimantas Urbonavičius farm
"Aukštikalnių sodai"
"Musu gojus"
"Dembavos medelynas"
0 10 20 30 40 50 60 70 80 90 100
Very good
Good
Acceptable
Poor
Very poor

POLAND


Overall impression
[What is your overall impression of the visited demonstration sites and the demonstration process?]
Wilczewscy Farm
Artur Pietrzycki Orchard & Twój Owoc Group
Marek and Paweł Przybytniak Apple Farm
La-sad
Agrosimex
Andrzej and Szymon Nowakowscy Nursery Farm
Jagoda JPS & Elkner Service
Experimental Orchard in Dąbrowice
0 10 20 30 40 50 60 70 80 90 100
Very good
Good
Acceptable
Poor
Very poor

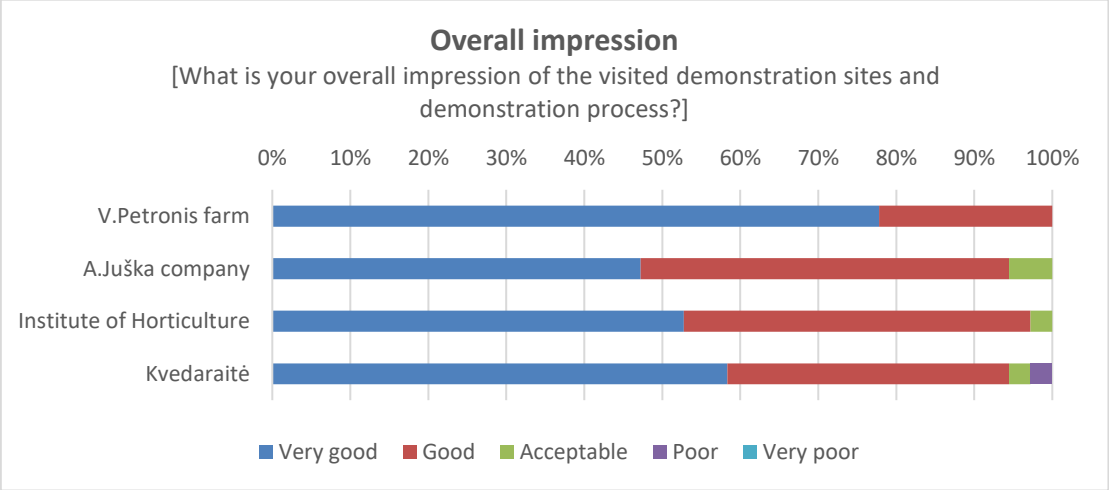

Demonstration infrastructure
[Please rate the infrastrcuture for hosting demonstrations of each demonstration site]
Wilczewscy Farm
Artur Pietrzycki Orchard & Twój Owoc Group
Marek and Paweł Przybytniak Apple Farm
La-sad
Agrosimex
Andrzej and Szymon Nowakowscy Nursery Farm
Jagoda JPS & Elkner Service
Experimental Orchard in Dąbrowice
0 10 20 30 40 50 60 70 80 90 100
Very good
Good
Acceptable
Poor
Very poor

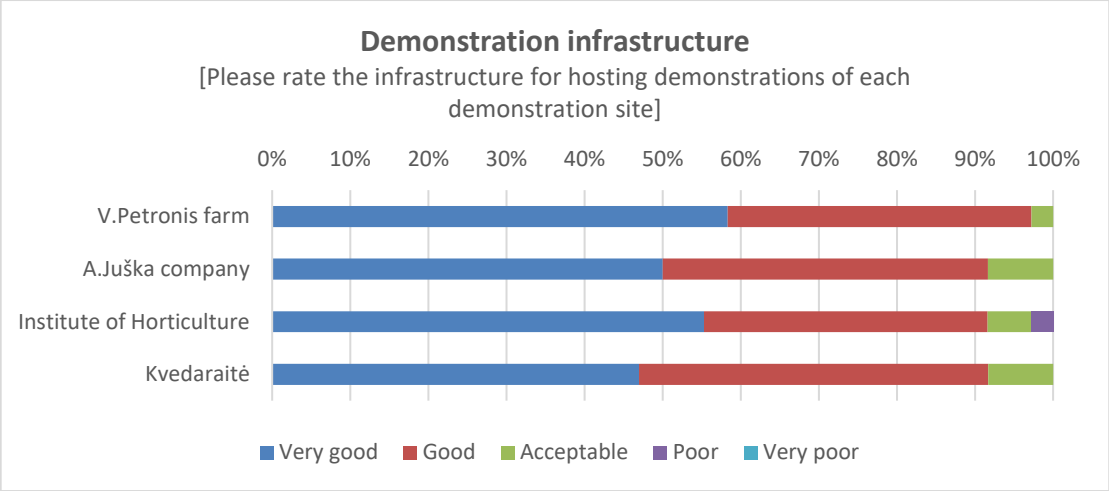

Demonstration objects
[Please rate the choice of the demonstration objects on each demonstration site in trems of their overall topicality and applicability by potential users]
Wilczewscy Farm
Artur Pietrzycki Orchard & Twój Owoc Group
Marek and Paweł Przybytniak Apple Farm
La-sad
Agrosimex
Andrzej and Szymon Nowakowscy Nursery Farm
Jagoda JPS & Elkner Service
Experimental Orchard in Dąbrowice
0 10 20 30 40 50 60 70 80 90 100
Very good
Good
Acceptable
Poor
Very poor

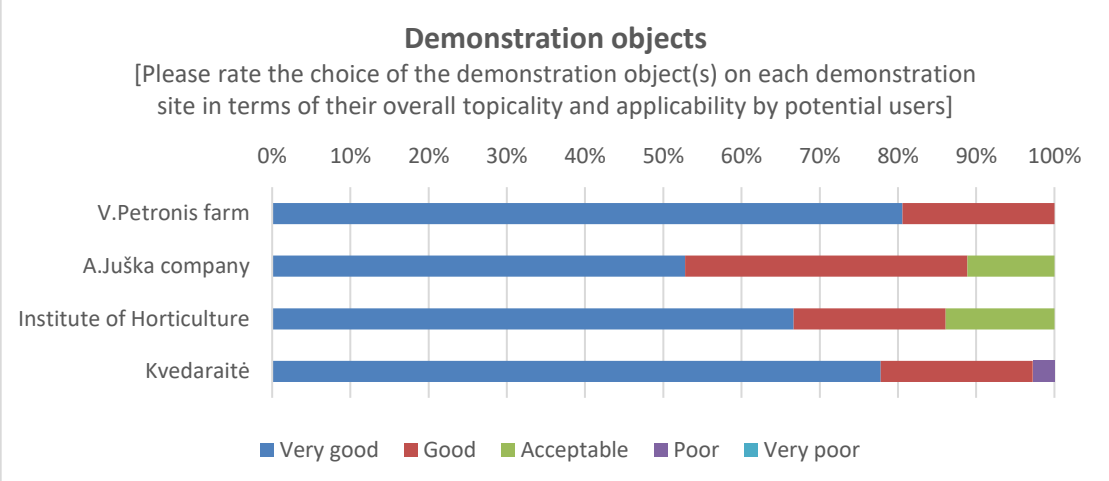

Demonstration process
[Please rate the quality of the observed demonstration process in each demonstration site]
Wilczewscy Farm
Artur Pietrzycki Orchard & Twój Owoc Group
Marek and Paweł Przybytniak Apple Farm
La-sad
Agrosimex
Andrzej and Szymon Nowakowscy Nursery Farm
Jagoda JPS & Elkner Service
Experimental Orchard in Dąbrowice
0 10 20 30 40 50 60 70 80 90 100
Very good
Good
Acceptable
Poor
Very poor

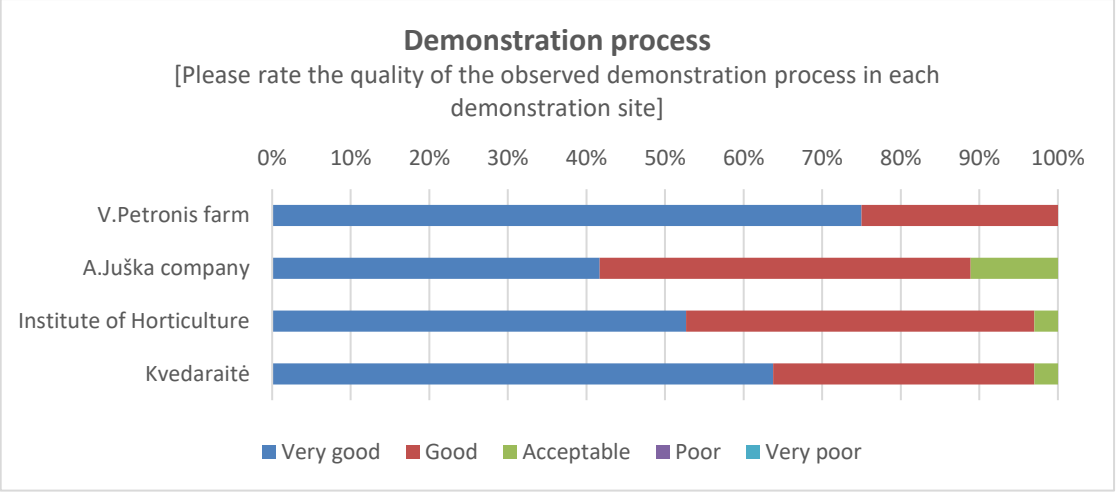
ANNEX 5. Evaluation of demonstration sites of the INNOFRUIT study trip to Lithuania an and Poland (June 2018) by Latvian fruit-growers (n=36)

LITHUANIA

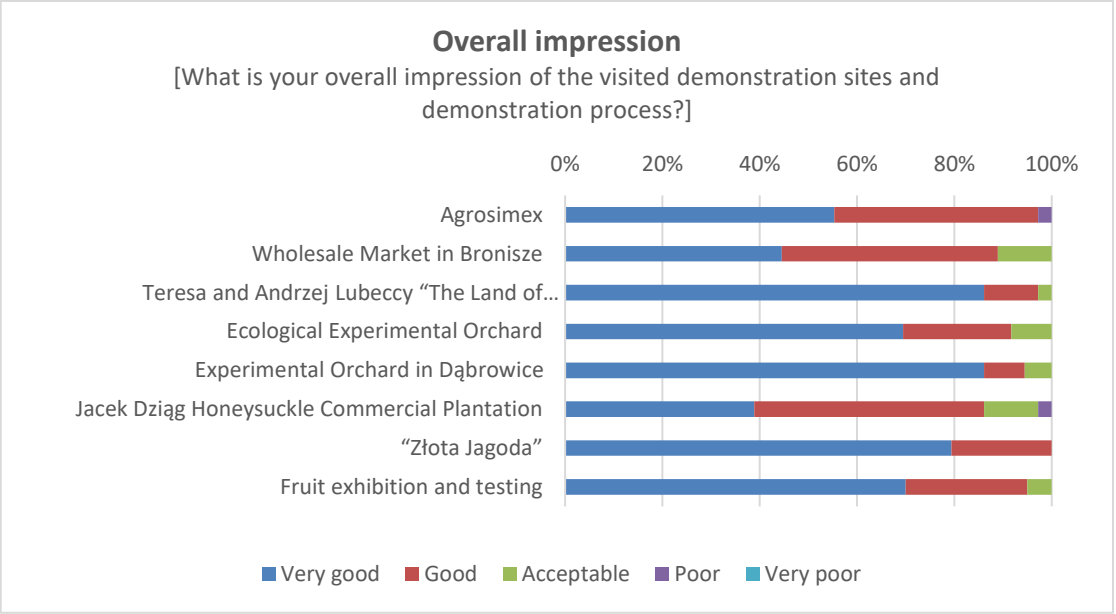


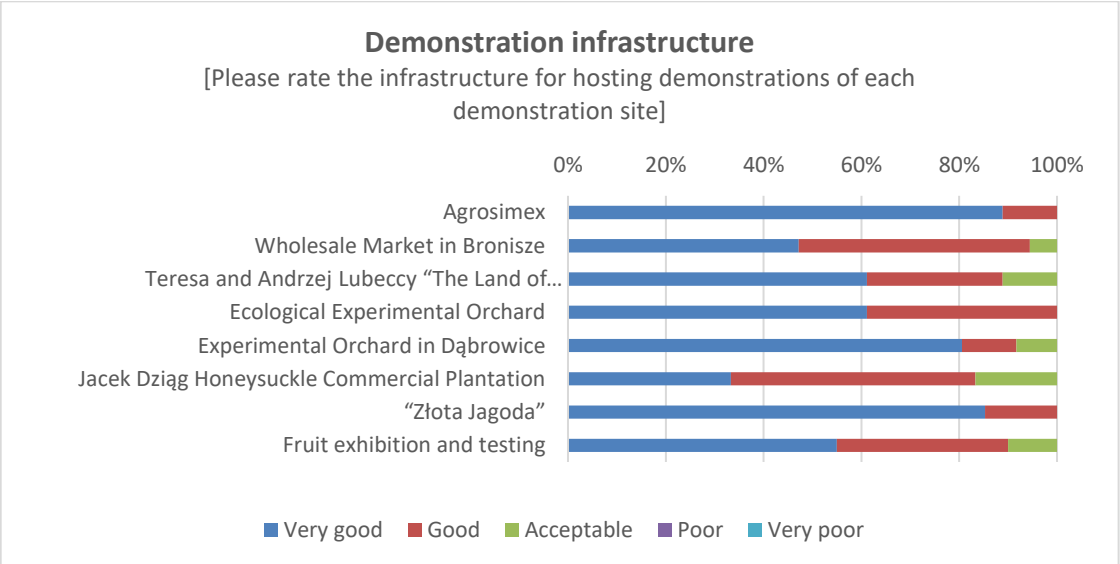


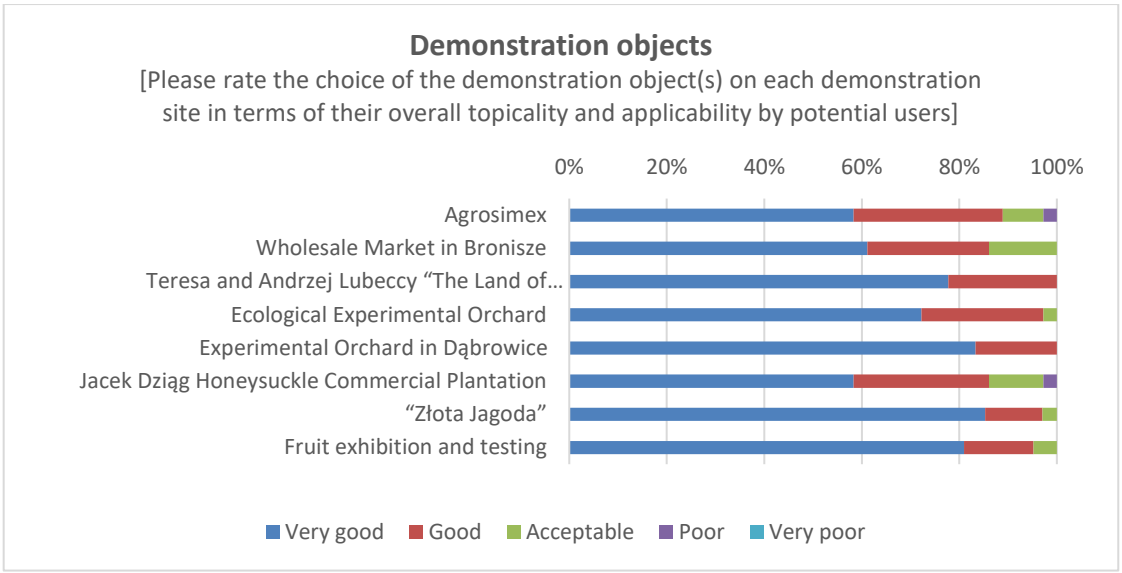


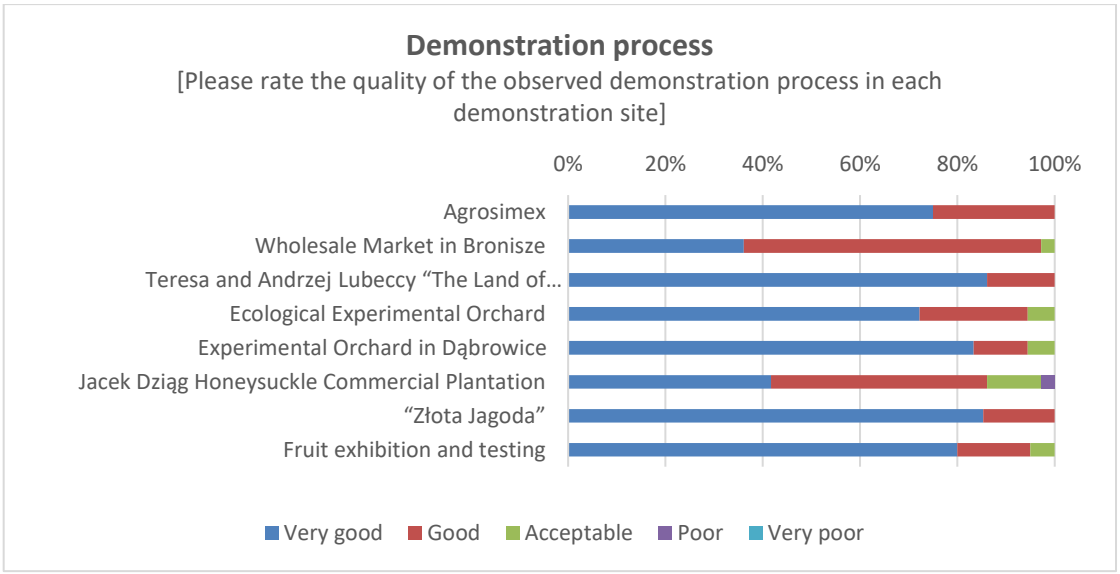

Demonstration process
[Please rate the quality of the observed demonstration process in each demonstration site]
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
V.Petronis farm
A.Juška company
Institute of Horticulture
Kvedaraitė
Very good
Good
Acceptable
Poor
Very poor

POLAND


Overall impression
[What is your overall impression of the visited demonstration sites and demonstration process?]
0%
20%
40%
60%
80%
100%
Agrosimex
Wholesale Market in Bronisze
Teresa and Andrzej Lubeccy "The Land of...
Ecological Experimental Orchard
Experimental Orchard in Dąbrowice
Jacek Dziąg Honeysuckle Commercial Plantation
"Złota Jagoda"
Fruit exhibition and testing
Very good
Good
Acceptable
Poor
Very poor


Demonstration infrastructure
[Please rate the infrastructure for hosting demonstrations of each demonstration site]
0%
20%
40%
60%
80%
100%
Agrosimex
Wholesale Market in Bronisze
Teresa and Andrzej Lubeccy "The Land of...
Ecological Experimental Orchard
Experimental Orchard in Dąbrowice
Jacek Dziąg Honeysuckle Commercial Plantation
"Złota Jagoda"
Fruit exhibition and testing
Very good
Good
Acceptable
Poor
Very poor


Demonstration objects
[Please rate the choice of the demonstration object(s) on each demonstration site in terms of their overall topicality and applicability by potential users]
0%
20%
40%
60%
80%
100%
Agrosimex
Wholesale Market in Bronisze
Teresa and Andrzej Lubeccy "The Land of...
Ecological Experimental Orchard
Experimental Orchard in Dąbrowice
Jacek Dziąg Honeysuckle Commercial Plantation
"Złota Jagoda"
Fruit exhibition and testing
Very good
Good
Acceptable
Poor
Very poor


Demonstration process
[Please rate the quality of the observed demonstration process in each demonstration site]
0%
20%
40%
60%
80%
100%
Agrosimex
Wholesale Market in Bronisze
Teresa and Andrzej Lubeccy "The Land of...
Ecological Experimental Orchard
Experimental Orchard in Dąbrowice
Jacek Dziąg Honeysuckle Commercial Plantation
"Złota Jagoda"
Fruit exhibition and testing
Very good
Good
Acceptable
Poor
Very poor

ANNEX 6. Questionnaire of the user survey of horticultural demonstrations.

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You are invited to participate in a survey on practical demonstrations in the field of horticulture. The survey is being carried out by the Institute of Hortculture of the Latvia University of Agriculture as part of the INNOFRUIT project (*Advancement of non-technological innovation performance and innovation capacity in fruit growing and processing sector in selected Baltic Sea Region countries*).

For the purposes of this survey, demonstrations are understood to be either demonstration events that are organised specifically for this purpose, or informal visits to other farms, that are organised with the aim of practically demonstrating knowledge of farm management approaches, methods, technologies and other topics of interest to farmers.

Your answers will help to better assess the demand for demonstrations and improve their implementation. Thank you in advance for your time and answers!

Previous experience

1. With whom have you collaborated in the exchange/acquisition of knowledge in the field of horticulture in Latvia?	***Circle all appropriate options***
Advisor/s	1
Scientist/s	2
University staff	3
Sectorial association/s	4
Other horticulturists (peers)	5
None of the above	6

2. Have you ever attended a demonstration in the field of horticulture?	***Circle only one option***
Yes, only in Latvia	1
Yes, only abroad	2
Yes, both in Latvia and abroad	3
No *(proceed to Question 5)*	4

3. What kind of horticultural demonstrations have you attended, either in Latvia or abroad?	***Circle all appropriate options***
Public event (field/rural day) at a research institution	1
Public event (field/rural day) at a commercial farm	2
Organised group study trip to a research institution	3
Organised group study trip to a commercial farm	4
Private visit to a research institution	5
Private visit to another farm	6
Other *(please specify):*	7

4. What has been the impact of attending demonstrations on your approach to farm management?	***Circle all appropriate options***
Significant changes have been introduced	1
Minor changes have been introduced	2
Significant changes are being planned	3
Minor changes are being planned	4
Planned changes have been cancelled/postponed	5
No changes have been introduced, nor are there plans to introduce any	6
Don't know/Hard to say	7
Other *(please specify):*	8

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Future plans and needs

5. Are you planning to attend a horticultural demonstration in the next 12 months?	***Circle only one option***
Yes, only in Latvia	1
Yes, only abroad	2
Yes, both in Latvia and abroad	3
No	4
Don't know/Hard to say	5

6. What, if anything, has prevented you from attending horticultural demonstrations in Latvia?	***Circle all appropriate options***
Lack of information	1
Distance (too far)	2
Bad timing (season)	3
Topic not relevant	4
Unappealing from of demonstration (e.g. lecture, field walk)	5
Unappealing host (organisation and/or person)	6
I have all the necessary knowledge	7
I can obtain the necessary knowledge from other sources	8
There haven't been any obstacles	9
Other *(please specify):*	10

7. On average, how many organised horticultural demonstrations would you be willing to attend in a year? (*Give a specific number*)	

8. What kind of horticultural demonstrations would be important to you? ***(Please rate on a scale of 1 to 5; 1 – very important, 5 – unimportant)***						
1.	Cultivation	1	2	3	4	5
2.	Storage	1	2	3	4	5
3.	Processing	1	2	3	4	5
4.	Sales and marketing	1	2	3	4	5
5.	Economic analysis	1	2	3	4	5
6.	Other (*please specify*):					

9. Please provide 1-3 specific problems/issues in horticulture that are presently relevant to you.
1.
2.
3.

10. How important to you are the following characteristics of a demonstration organiser? ***(Please rate each on a scale of 1 to 5; 1 – very important, 5 – unimportant)***						
1.	Professional education in horticulture	1	2	3	4	5
2.	Practical experience in horticulture	1	2	3	4	5
3.	Openness to innovations	1	2	3	4	5
4.	Readiness to share both positive and negative experiences	1	2	3	4	5
5.	Peer recognition/reputation among horticulturists	1	2	3	4	5
6.	Public speaking skills	1	2	3	4	5
7.	Other *(please specify):*					

11. How important to you are the following characteristics of a demonstration farm? ***(Please rate each on a scale of 1 to 5; 1 – very important, 5 – unimportant)***						
1.	Size of farm	1	2	3	4	5
2.	Variety of demonstration objects	1	2	3	4	5
3.	Good economic performance	1	2	3	4	5
4.	Cooperation with scientists/consultants	1	2	3	4	5
5.	Suitability of facilities for group visits	1	2	3	4	5
6.	Other *(please specify):*					

12. What is the desirable form/method of the demonstration?	***Circle all appropriate options***
Oral presentation/seminar indoors	1
Viewing of the demonstration object on site	2
Practical (hands-on) activities	3
Discussions	4
Other *(please specify):*	5

13. How much would you be willing to pay for attending a demonstration?	***Circle only one option***
0	1
1-5 EUR	2
6-10 EUR	3
11-15 EUR	4
16 EUR and more	5

14. What are the main obstacles to the development/operation of horticultural demonstration farms in Latvia?	***Circle up to 3 options***
Lack of professional knowledge	1
Lack of technologies/innovations to demonstrate	2
Lack of experience in organising demonstrations	3
Lack of funds for demonstration organisers	4
Lack of technical tools for organising demonstrations	5
Lack of time for organising demonstrations	6
Difficulty in physically reaching farms	7
Reluctance to share one's knowledge and experience	8
Reluctance to allow unknown persons on the farm	9
Lack of interest from potential visitors	10
There are no obstacles	11
Don't know/Hard to say	12
Other *(please specify):*	13

15. Does your business/farm already organise demonstrations or would be willing to organise them?	***Circle only one option***
Yes, demonstrations are already being organised	1
Yes, demonstrations are planned	2
Yes, this option is being considered *	3
No	4
Don't know/Hard to say	5

* *If you are interested in joining the network of demonstration farms, please contact Edgars Rubauskis, lead researcher at the Institute of Horticulture (edgars.rubauskis@llu.lv)*

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Information about you

16. Gender	***Answer***
Female	1
Male	2

17. Age (in years)	

18. Highest level of completed education	***Answer***
Basic/lower-secondary education	1
Secondary education	2
Higher or Vocational education (horticulture)	3
Higher or Vocational education (other field)	4

19. How long your farm/business has been active in the field of horticulture	***Answer***
It is still being established	1
1-5 years	2
6-10 years	3
11-20 years	4
21 and more	5

20. Location of your farm/business *(please specify region)*	

21. Area of horticulture	***Answer***
Production	1
Processing *(if only processing, proceed to Question 24)*	2

22. Area of land dedicated to horticulture on your farm (in hectares)	

23. Total size of your farm (in hectares)	

24. Your farm's/business' annual turnover	***Answer***
0-15 000 EUR	1
15 001-70 000 EUR	2
70 001-100 000 EUR	3
100 001-150 000 EUR	4
150 001-200 000 EUR	5
More than 200 000 EUR	6

25. Products grown/processed by your farm/business	***Circle all appropriate options***
Fruit	1
Berries	2
Vegetables (open field)	3
Vegetables (greenhouse)	4
Ornamental plants	5
Seedlings	6

26. Recommendations to demonstration organisers, comments

Thank you for participating in the survey!

If you have any questions, please send an email to info@bscresearch.lv