



Prospects for Farmers' Support: Advisory Services in European AKIS
WP 4 – AKIS ON THE GROUND: FOCUSING KNOWLEDGE FLOWS SYSTEM | Topic 1
Country Report for Portugal

The effectiveness of advisory services in responding to demands of diverse types of small-scale farmers

New small-scale farmers in the small fruits sector in Portugal

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List of acronyms

ADL	Local Development Association
AGIM	Socio Professional Association for Small fruits and Business Innovation
AKIS	Agricultural Knowledge and Information System
COTHN	National Vegetable/Fruit Technological Centre
DRAP	Regional Directorate of Agriculture
DRAPC	Central Region Directorate of Agriculture
FBO	Farmer Based Organization
IFAP	Agricultural and Fishery Financial Institute
INIAV	National Institute for Agricultural and Veterinary Research
NSSF	New small-scale farmers
PRO AKIS	Prospects for Farmers' Support: Advisory Services in the European Agricultural Knowledge and Information Systems'
PRODER	Regional Development Programme
SERIDA	A regional Spanish agricultural/food research centre
WP	Work Package

Executive Summary

The main aim of the report is to provide a comprehensive description of the effectiveness of advisory services for small-scale farmers, providing a picture of the services from the perspective of the farmers and some key advisors. In Portugal the case study focused on new small-scale farmers in small fruit production, in the central-north region of Portugal, specifically blueberries. The report includes a general description of the case study, methods and data collection, results, discussion and conclusion.

This report represents an output of the PRO AKIS project (Prospects for Farmers' Support: Advisory Services in the European Agricultural Knowledge and Information Systems'). It is one of 4 country reports that were produced, in 2014, by project partners (Portugal, UK, Poland and Bulgaria) compiling a description for advisory services to small-scale farmers. The Advisory Service is one component of the Agricultural Knowledge and Information System (AKIS) and provides support to farmers. Findings from the 4 country reports for the Work Package 4 (WP4) will be presented at a regional workshop in Bulgaria during January 2015, and the result will be discussed with stakeholders and experts, and the feedback integrated in the reports.

In Portugal, Blueberry production is a new crop that has been introduced in the central-north region (Sever do Vouga County) during the 90s, when the Carel Lockorn Foundation experimented with blueberry plots in the municipalities of Sever do Vouga and Trancoso. They verified that this area had conditions to ensure the production of blueberries. The county of Sever do Vouga has ideal conditions, associated to good characteristics of soil, availability of water and an adequate microclimate. After the initial wave of blueberry production, in the 90s, there were another two waves: a rebirth in 2006 and a boom in 2011, giving new impulses to blueberry production. This study includes basically, the last two cycles, a period that has been marked by a weak national economy in financial crisis with a high unemployment rate. To fight against this situation and the desire by local leaders to cooperate together to alter the rural economy, the alternative for many people has been to take advantage of family lands (that in many cases had been abandoned) and create their own employment or supplement their current professional income. As a result, the region within the study witnessed an expanding adherence to blueberry production requiring additional knowledge needs and demands for this "new crop" in Portugal.

In response, today, the farmer advisory service is a mix of private enterprises, farmer based organizations (FBOs) and public institutions that provide advice and services about how to plant, grow, produce and harvest blueberries, as well as how to package for sale, and provides a central location to store and next sell the product from the contiguous production area of the Portuguese central-north region. This interconnected system resembles a commodity-based extension (UNDP, 1991) or advisory service that is predominately privatised. The private-public mix is also promoting the entry and installation of farmers into the blueberry production area.

1 Introduction

As a partner in WP4 AKIS “AKIS on the ground: focusing knowledge flow systems”, the Portuguese case study concentrates on the advisory services and knowledge flow systems for a blueberry production area.

The overall output of the work package is a picture of typical structures and procedures of advisory services, derived from the multitude of empirical cases in the EU and thus inform about the diversity of knowledge flows. Outputs will be assessed with the International Stakeholder Board and the Policy Advisors Board (WP 5) and lead to the definition of future research needs and policy recommendations (WP 7).

This report represents an output of the WP4 of the PRO AKIS project. It is one of 4 case studies (Bulgaria, Portugal, Poland, UK) involving topic 1 (New small-scale farmers and challenges for advisory) for this package.

The specific goal addressed by this topic 1 (WP4) is to investigate the performance of advisory services with regard to new entrants to small-scale farming and part-time farming. Here, PRO AKIS WP 4 explored the following themes:

- (i) The known and unknown needs for knowledge, skills and services of farmers;
- (ii) Farmers access to classical as well as to innovative forms of advisory services;
- (iii) The capacities of the supply side to respond to these types of clients demand and;
- (iv) Farmer role as active creator of knowledge.

The key issue on topic 1 is “New small-scale farmers and challenges for advisory”, but there are some additional research questions, such as:

- (i) How does the provision of advisory services to new small-scale farmers differ from the overall provision of agriculture advice?
- (ii) What types of novel methods addressing the specificities and needs of small farmers have been developed?
- (iii) How do small-scale farmers resort to ICT as a tool to get knowledge and information? What for?

Meanwhile, other themes have emerged from the fieldwork in Portugal:

- (i) Sustainability of small-scale blueberry fruit production;
- (ii) The role of leaders in advisory services and knowledge flows;
- (iii) The role of private consultant entities and *Instituto de Financiamento da Agricultura e Pescas* (IFAP) in the investment projects for the blueberry installation/setting-up by new entrants;
- (iv) Inter-organizational cooperation and communication in the advisory services system;
- (v) Abandoned land vs land bank;
- (vi) Availability of external labour vs family labour.

2 Selecting and delimiting the case-study

The case study was selected from a production area that is growing. The berry sector in Portugal sells their product throughout Europe and the national market. The blueberry production system was selected for its dynamic promotion by public and private organizations, while having many new small-scale farmer entrants.

The stakeholders also reflect the WP3 AKIS scheme, involving advisory services, FBO's, Regional Directorate (Ministry of Agriculture), private consultancy firms, agricultural universities and polytechnics, the National Institute for Agricultural and Veterinary Research (INIAV) and, additionally, input and commercial entities.

In Portugal, there are two principal areas of blueberry production, one is the sub-region of *Médio Vouga* (Central-North Portugal) and the other is sub-region of *Alentejo Litoral* (Southern Portugal). In the selection for the case study, the central-north geographical area had an adequate sample of small-scale investments made in the blueberry sector and represents historically the initiation of blueberry production in Portugal. The interviews to new small-scale farmers took place in central-north Portugal.

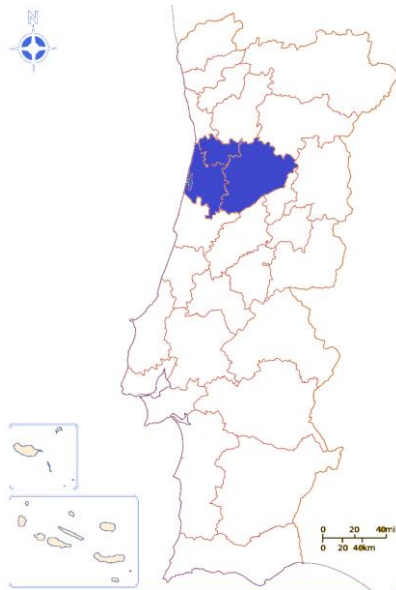


Figure 1: Case study - territorial units
Source: Adapted from pt.wikipedia.org

The final choice for the three contiguous territorial units (in blue, in the picture above) was the following: Entre-Douro e Vouga, Baixo Vouga and Dão-Lafões, reflecting the three distinct phases of the blueberry production expansion (1990's, 2006 and the most recent in 2011).

3 General description of the case study

Portugal was one of the few European countries without a small fruit production tradition, and none within the blueberry area. According to Fonseca e Oliveira (nd), the first experimental plots for blueberries occurred at the “Centro Experimental do Vimeiro” in the 1980s, that was under the control of the Regional Agricultural Directorate of Trás-os-Montes. Years later at different experimental facilities, in Caria and Ribatejo, the Ministry of Agriculture cooperated in projects with German and American foundations to continue the experimentation. However, it was during the 90s, that the influence of Dutch engineers in the Carel Lockorn Foundation strengthened the entry by Portuguese farmers in the production of blueberries, particularly in the central and north region. At this stage, a more dynamic and crucial linkage to the work of the Dutch Foundation and two Portuguese entities, Hortobeira (private horticultural company) and Fundação Bernardo Barbosa de Quadros (Private foundation for Social Solidarity), in Sever do Vouga, improved the installation of farmers in blueberry production. The success, in terms of fruit quality and plant productivity, quickly translated into incentives to increase the number of farms, from 11 producers to 40 producers by 1995. These core farmers established Mirtilusa, the first farmer based organization for the marketing of small fruit. In later years, Mirtilusa changed into a commercial society. This was necessary in order to have more control in the certification and marketing process. The control process would be similar to the organic farm certification process (Ferreira [coord.], 2012). The blueberry sector, in 2008, had about 70 to 80 blueberry producers. Meanwhile, also in the 1990s, the first trials under the auspices of the then Department of Horticulture and Floriculture in the Ministry of Agriculture were established in southern Portugal.

In 2006, in an attempt to boost the local economy in the county of Sever do Vouga and support the installation of farmers, a coordinating and monitoring unit¹ raised funds for the creation of the Association for Management, Innovation and Modernization of the Sever do Vouga Center (AGIM²). This business association is a partnership between the municipality of Sever do Vouga and SEMA (local Chamber of Commerce) that represents the municipalities of Sever do Vouga, Estarreja, Murtosa and Albergaria-a-Velha. Two years later (2008), an additional partnership between AGIM and Mirtilusa supported 42 project applications for the installation of farmers in blueberry production, while embracing other initiatives in the sector, such as the organization of the first Blueberry Fair. This annual event promotes consumers’ awareness of the blueberry fruit and its uses.

In recent years, the Portuguese agriculture sector has been transformed and the entire industry of small fruits has made progress both in terms of new areas and the number of new farms. With high unemployment and fighting against a weak economy in financial crisis, the alternative for many young people has been to take advantage of family lands that in many cases had been somewhat abandoned. The desire to do something for the neglected rural areas, generated a proliferation of candidates to the installation of new farmers under the requirements determined by Regional Development Programme

¹ Within the URBCOM (Incentive Scheme for Commercial Projects Urbanism): Axis 1 (Measure 2) the Incentive Program for Modernization of Economy (PRIME).

² Nowadays AGIM means AGIM - Association for Small Fruits and Business Innovation.

(PRODER) that financed up to 100% of the investment value. In the particular case for blueberry installation, this was further enhanced by being adapted to the smallholdings within the family structure found in north and central Portugal, by the vast majority of farmers installed from 2009 to 2011.

However, the young and small-scale farmers often need assistance in the preparation of their financial projects for funding, certification and subsidized investments. There are project developers that assist in this process to secure subsidized investments and loans. This has been documented as well in the greenhouse flower production in Trás-os-Montes (Koehnen *et al.*, 1999). The private consulting entities assist in developing the financial projects (young farmer installation - action PRODER 113) so the small-scale farmers can receive subsidized investment to enter the blueberry production sector. The final project approval for young farmer installation is the public stakeholder IFAP that can backstop the approval process. In this economic and bureaucratic scenario, the stakeholders and public and private organizations work to overcome the installation and production challenges of inexperienced new producers.

Central/North Portugal has witnessed a huge appetite and adherence to blueberry production, with the above dynamic, and as the initial epicentre, the municipality of Sever do Vouga, spreading to the neighbouring territories, especially the municipalities of Vouzela, Vale de Cambra, Águeda, Albergaria-a-Velha and São Pedro do Sul, and even more recently the municipalities that are further away as the case of Viseu, Penalva Castelo and Satão. Statistically, during the European Community support framework for Rural Development 2007-2013, there were 897 hectares of blueberries planted in Portugal, where 306 hectares are within the three territorial units in this case-study.

The majority of new small-scale farmers, in the blueberry marketing chain in the region being studied are under 40 years of age and applied for financial projects. In general, the case-study sample depicts young people with high educational qualifications, part-time farming ambitions as they have another professional activity and, finally, they obtained the necessary installation through the abandoned lands of their extended and nuclear families.

Along with the increasing installation of blueberry producers, there emerged knowledge needs and concerns to address the requirements of this "new crop" in Portugal. Throughout this area of study, the dynamic system developed diversity, but also complementarity, namely the creation of new farmer based organizations, led by qualified and experienced farmers, who played an important role in the dissemination of knowledge with new small-scale farmers and participated in training and support to the farmers and technicians. The accumulation of knowledge at this early stage was supported by links to Spain and distant e-learning platforms from American and Canadian universities. Simultaneously, gravitating in the small-scale farmer's orbit, appeared a number of private companies at various points on the supply side, including nurseries, agricultural machinery and irrigation companies, certification and training consulting firms, businesses of plant protection products, among others. Under this upstream production process, these entities provide agricultural advice and support in order to collaborate and fuse the vertical value chain. To do so, these companies position themselves through inter-institutional linkages to affiliated companies or other entities in conjunction with a win-win strategy.

At present there is a strong proliferation and fragmentation of private and public advisory agents with an important role both in the attempt at organization and consultation within the blueberry sector. The advisory/training role is concerned with the creation, accumulation, transmission and dissemination of knowledge, either independently or in conjunction with other entities and technicians with known experience in the blueberry production area at the national or international level.

The key stakeholders in the blueberry production and marketing process will be highlighted in this section. In the history of blueberry and small fruit production, AGIM has had a critical role in the development and growth of small fruits not only in Sever do Vouga but throughout Portugal. They are working to strengthen small fruit production by developing proposals with *Centro Operativo e Tecnológico Hortofrutícola Nacional* (COTHN – a national vegetable/fruit technological centre), INIAV and Portugal Foods to create clusters within the small fruit sector. The inter-institutional linkages will improve the production and marketing process by creating networks with farmer based organizations involved in the small fruit sector. One of the major objectives is to contribute to the knowledge dissemination through diverse training programs and workshops with demonstration about fertilization, pruning, harvest preparation and management of harvest and storage with national and international technicians.

Mirtilusa, historically, dominated the commodity based advisory services in the knowledge flow system as well as fomenting cooperation through projects such as “Myrtillus”, along with AGIM and the municipal government of Sever do Vouga. In 2011, “Myrtillus” established research partnerships with the Catholic Portuguese University, the Centre for Pharmacology and Chemical Biopathology in the Faculty for Medicine at Porto University, the UTAD and Frulact. These partners aim to scientifically validate the nutritional and antioxidant properties of the blueberry cultivars produced by the 100 producers from Mirtilusa, with a view to obtain new processed products, from the lesser valued fruit, that will create a new line of functional blueberry products. This concern for the downstream stage in the production process attempts to create value-added processed products, such as frozen and dried fruit, fruit juices and jams, in order to boost the company's growth in national and international markets.

In the public sector of the private and public mix in the blueberry production process, the Central and North Regional Directorates of Agriculture continue to have an important role to play in the blueberry sector. For instance, the Central Region Directorate of Agriculture (DRAPC) has been involved in experimentation at the “Estação Agrária de Viseu”, where they set up plots to compare blueberry varieties, irrigation and drainage trials and additional tests to evaluate the nutritional needs of the blueberry plants. In the agricultural research endeavour, the collaboration with *Servicio Regional de Investigación y Desarrollo Agroalimentario* (SERIDA – a regional Spanish agricultural/food research centre) and Asturian Berries from Oviedo, Spain, was important for the implementation of pruning trials in the region. The need to know more about pruning can be associated to a producer that communicated her concerns to DRAPC. This producer is a leader and public sector technician within the blueberry production area.

4 Methods and data collection

The overall research methods and data collection process can be identified as a qualitative case study design that followed procedures suggested by Creswell (1994), Isaac and Michael (1991) and others. The steps in the gathering of information will be presented.

The design of the research methodology was initiated by a literature review, World Wide Web platform visits and the gathering of news clips to glean information that permitted an introductory analysis and characterization of the blueberry sector. These preliminary steps assisted in selecting the region of study and identifying the key stakeholders within the AKIS system, concentrating on the advisory services.

After this preliminary step, an exploratory study was done with contacts and interviews (semi-structured) with key stakeholders in order to test the instruments to be used with the producers and advisors. The semi-structured interview was designed to identify potential producers, key actors and entities. The key actors interviewed in this phase were: 1) producer/trainer and leader within three FBOs; 2) AGIM (professional association, non-profit); 3) DRAPC – an agricultural delegation from Viseu Ministry of Agricultural (public sector); 4) and the leader of Mirtilusa. These key actors confirmed the relevance of the following knowledge topics: fertilization, certification and project incentives and installation.

These initial interviews enabled us to gather and build a list of potential data producers to interview and make an adjustment with the interview guides. The team carried-out the semi-structured interviews with the producers and advisors, and these contacts resulted in identifying other contacts in a snow ball fashion. The total number of valid interviews with new small-scale farmers was 25. In the next page, the reader can find a table with descriptive characteristics of this group. The study completed six interviews with blueberry production and marketing advisors/technicians.

The study operationally filtered and defined the small-scale blueberry farmers with diverse economic criteria, namely:

- Blueberry small fruit production;
- Less than 1,5 hectares in agricultural production;
- Earning less than 25.000 Euros/year from agricultural production;
- Farm installation from 2007/2008 in blueberry production with at least one harvest.

Table 1: Characteristics of the 25 new small-scale producers' from interviews

ca	Age	Gender	Education	Agricultural area (ha)	Small fruits area (ha)	Sales volume (2013, euros)	Installation Year (Small Fruits)
1	44	M	11 th grade	1,2	0,2	5.000,00	2013
2	39	F	Secondary diploma	1,2	0,2	5.000,00	2013
3	35	F	University Degree	0,4	0,4	2.000,00	2010
4	38	M	Secondary diploma	1	1	8.000,00	2009
5	31	M	University Degree	0,5	0,5	1.500,00	2010
6	40	M	University Degree	0,8	0,8	4.000,00	2011
7	31	F	University Degree	1	1	3.000,00	2011
8	42	M	University Degree	1,2	1,2	5.000,00	2010
9	38	M	University Degree	0,8	0,8	2.500,00	2011
10	36	M	University Degree	0,7	0,7	1.500,00	2011
11	34	M	University Degree	0,2	0,2	2.000,00	2009
12	38	M	University Degree	1,1	1	3.500,00	2011
13	70	M	9 th grade	0,1	0,1	2.000,00	2008
14	62	M	6 th grade	0,25	0,25	3.000,00	2010
15	52	F	University Degree	1	1	5.000,00	2010
16	36	M	University Degree	0,9	0,9	4.500,00	2010
17	31	F	University Degree	1,5	1	200,00	2012
18	42	M	Secondary diploma	1	1	400,00	2012
19	36	M	University Degree	1,5	1,1	3.000,00	2013
20	36	M	9 th grade	0,6	0,6	2.500,00	2011
21	36	M	University Degree	1,2	1,2	6.000,00	2011
22	34	M	Secondary diploma	0,8	0,8	6.000,00	2008
23	48	M	11 th grade	1,5	1,5	15.000,00	2009
24	34	M	University Degree	0,2	0,2	300,00	2011
25	32	M	University Degree	0,4	0,4	1.000,00	2011

5 Results

5.1 New small-scale farmer's needs and demands for knowledge

The blueberry crop in Portugal is considered a new commodity considering the recent adoption of this farming practice. For this reason, and in addition to the increase appetite and accession by new farmers, the blueberry production chain has strengthened knowledge needs and demands at a relatively high rate. However, despite being recent, within the AKIS it is worth noting an obvious accumulation of knowledge, skills and information by some actors for specific topics. These specific topics and competencies addressed in the tables were identified in this case study as important in the training process of these new small-scale farmers.

The knowledge, skills and information in terms of content can be systematized into three groups: pre-harvest, harvest and post-harvest. We can include in the contents of the pre-harvest the technical support and training, in general, throughout the various stages of installation, production and maintenance of the blueberry orchard. As an example, Table 2 identifies information and skills needed

for the preparation and installation of the orchard and subsequently other production operations and plant maintenance.

Table 2: Pre-harvest competencies and skills

Contents	Description
Preparation and Installation of the Orchard	Soil testing and assessment of climatic conditions; Ordering varieties and pollinators; Choosing planting density and planting on mounds; Soil preparation (cleaning, stone removal, constructing tunnel frame and ground cover); Basic fertilization; Plant pruning; Support and protection systems (anti bird nets and fruit protection, for example); Irrigation system; Supporting infra-structure (cold storage equipment and/conservation); Initial training.
Orchard: Production / Maintenance	Pruning maintenance and floral development concerns such as flower removal; fertilization; weed control; control irrigation time and cycle; Plant protection

Source: Adapted from Martins, S. (coord.), 2008

Within the harvest group (see Table 3), the guidelines for certification and technical skills for cleanliness and hygienic standards for the management of harvest and quality control for blueberry packaging constitute the main contents.

Table 3: Harvest competencies and skills

Contents	Description
Harvest management	Health and safety standards at work; Training workers about health and hygiene concerns in the harvest; Preparation of transport vehicles; Identify the time of harvest; Packaging (standards, packaging and weighing zone); Transportation
Quality parameters	Monitoring and inspection of the quality parameters: Frequently grouped into two subgroups: major defects (rot, presence of foreign bodies, etc.) and minor defects (absence of fungi, smaller size, presence of stems, among others).
Certification	Global GAP; Manners of Production (Biological) and other certifications.

Source: Adapted from Martins, S. (coord.), 2008

Finally, in the post-harvest sub-group (see Table 4), it includes information about the national and international markets and the marketing of the fruit, processing and preservation of fruit and other more general and transversal information, such as, for example, legislation and cross-compliance concerns, the application for incentives, and training.

Table 4: Post-harvest competencies and skills

Contents	Description
Post-harvest technology	Processing and preservation
Markets	Commercialization/sales; Distribution channels; marketing
Generalists	Cross-compliance; Legislation; Application for incentives; Training and development; Management; Innovation

Source: Adapted from Martins, S. (coord.), 2008

The data analysis from the interviews has shown that new small-scale producers value specific knowledge about the following content: 100% of the respondents identified the level of fertilization and irrigation (pre-harvest sub-group) as a primary concern, orchard certification was assessed as valuable for 92% of the respondents (harvest sub-group) and finally, the application to financial incentives (post-

harvest sub- group) was selected by 72% of the respondents as important. For these sub-group issues, the respondents identified the predominant needs associated to their informational and skill needs in the various sub-groups.

The needs and demand of content for the new small-scale farmers, for this new crop, and the accompanying of the life cycle of their commodity still falls within the growth phase. Arising from this growth in the knowledge and information curve, the unfelt needs for genetic improvement are the highlighted issues such as: varieties that produce best for a specific plot or site; longer shelf life storage; berry plumpness and easier to harvest.

The sustainability of farms associated to the new small-scale farmers within the small-holding structure of the region, where issues that are in other cases a barrier to entry, do not apply in the sector, region and type of producers found in this study. The new small-scale farmers seek to take advantage of family land somewhat abandoned and have the desire to be part of a new dynamic in rural areas. This has enabled these new small-scale farmers to overcome the primary barrier for other new entrants into agriculture that do not have access to land (84% had access to family lands). Also, most respondents are within a group where the blueberry activity is not full time, the size of the farm is small (average 0.8 hectares) and the extended family residences are near the farm location where they can count on family labour to hand pick the fruit, explaining why 84% of the respondents consider positively the availability of hand labour for the sector. For this reason, they have access to temporary family labour to perform intensive work and tasks, particularly within the pruning and harvesting activities. The interviews recorded a minimum of one employee and a maximum of eight, and on average there were four workers (88%) per farm.

On the other hand, there is an unknown hovering in the sustainability and viability of small-scale farms, when there is no access to land, less temporary family labour is available and they dedicate the production to a full-time activity. These could constitute barriers and in order to mediate these issues, training and qualification of new small-scale farmers must not only prepare them as technicians, but also as orchard managers.

In addition, the new small-scale farmers will need information and skills to possibly strengthen the marketing of their products by on-farm sales and permit consumers to harvest blueberries on the farm (u-pick). These short supply chains approaches have had success in many other areas. Also, these producers might need knowledge and skills to produce processed goods such as jams, juices and bakery goods that can be included within on-farm sales or sold at gourmet shops, restaurants or local markets.

5.2 Processes, actors and methods to obtain and use knowledge

The small-scale farmer sample in this study does not represent the national average in educational levels for the general population of farmers in Portugal. The average Portuguese farmer is 63 years old and has completed the 1st cycle of basic education and works exclusively in the agricultural sector. In this new small-scale farmers (NSSF) group, the average age is 40 years old, 64% have an undergraduate University Degree and 16% have a diploma. The majority (56%) are professionals with other activities, representing the farming activity of less than 50% of their time. They are part-time farmers taking advantage of

underutilized family lands and labour and often (48%) their residence is different from the farm. They (60% of the sample) supplement their professional income with their farm income (50% of total income). In this group, you have an active concern in building relationships with other young farmers within the group as well as with dynamic technicians in the private and public sectors.

They have participated (84%) in training programs, workshops, seminars and other events in the blueberry production area. Farm visits have also contributed to their knowledge about blueberry production. They share information through face-to-face visits and ICT networks such as *Facebook* and e-mail accounts. They cruise the network in search of information platforms about blueberry production. For example, one small-scale farmer linked to the University of Florida in search of varieties that had plumper fruit, longer shelf life and easier to harvest from the plant. He did not have strong capacities in reading and understanding the English language so the translation platform within *google* assisted him to translate these documents to Portuguese.

The small-scale farmer's role in creating knowledge is limited. They are able to visualize the value of a market for their blueberry fruit using the underutilized family property and labour, but the role as an active creator of knowledge, was not completely confirmed in the interviews. In many cases, they are only interested in complementing income for their families and themselves. As a majority of small-scale farmers in this sample are part-time producers, they are not focusing on knowledge development. The problem-solving capacity for creating knowledge is side tracked by the social aspects in their lives, while maintaining a professional career and their part-time farming endeavour.

The time to be an active creator of knowledge is associated to a few farmer/technicians that experiment with blueberry varieties on their farm conditions. These specific knowledge concerns of these actors, in this case, the varietal information, as well as pruning skills for their plants (for e.g.) are afterwards shared within a small-scale farmer network.

In addition, these farmers have to be certified in order to offer their fruit for sale as a commodity by the entities in the marketing chain. The certification process establishes the criteria to produce and harvest the fruit. The control in the process is also associated to the packaging and delivery of the fruit to a central storage point.

5.3 The supply of knowledge to the new small-scale farmers

The small-scale farmers are assisted by a farmer advisory system that is a mix of private and public institutions that provide advice and services about how to plant, grow, produce and harvest blueberries, as well as how to package for sale and provides a central location to store and next sell the product from the contiguous production area of Sever de Vouga. This inter-connected system resembles a commodity-based extension (UNDP, 1991) or advisory service that is predominately privatised. The private-public AKIS mix is also promoting the entry of farmers into the blueberry production area. Some of the stakeholders in the AKIS system are the Sever do Vouga municipal government, public organizations (Regional Agricultural Directorate, INIVA and IFAP), Local Development Associations, as well as entities such as FBOs (AGIM and COAPE) and private entities like Centro Berry; Biolafões and Mirtilusa.

The advisory service system has produced written training materials, ICT platforms and established a demonstration field in Sever de Vouga for farmers. These are some diverse tools and methods developed

to communicate to farmers along with the on farm visit and farm demonstrations. There are also training programs and workshops offered to the small-scale farmers. The provision of advisory services, in the opinion of the small-scale farmers interviewed, determined no major inequality among the different types of blueberry producers. And yet, 40% felt that small-scale farmers were at a disadvantage in comparison to the large-scale producers in the services offered by the knowledge system.

As documented above, the knowledge system is also concerned with promoting new entrant, small-scale farmers into the blueberry production area, in order to reduce unemployment in the region. In this study, 84% of the small-scale farmers are tied to a young farmer installation project – action PRODER 113. However, the young and small-scale farmers often needed assistance in the writing of their financial projects for funding, certification and subsidized investments. There were project developers that assisted in this process to secure subsidized investments and loans. This has been documented as well in the greenhouse flower production in Trás-os-Montes (Koehnen *et al.*, 1999).

The private consulting entities assisted in developing the financial projects so the small-scale farmers can receive subsidized investment to enter the blueberry production system. Unfortunately, the product pricing market for blueberries can change (as is the case in 2014 when the harvest period was later in the year) and the project's estimated returns for the small-scale farmer is now at a lower value than the project one. The production, packaging and other filial costs do not match the price within the project. This could interfere with advisory service objectives and a backlash in trust when the price for the fruit does not reach new entrants and small-scale farmers expectation and the mortgage still needs to be paid. Also, many small-scale farmers felt that the project developers did not have a clear reality of the blue berry production and sometimes did copy and paste of other projects. Sometimes, the result was the non-approval of the project or in other projects where the costs did not match the investment figure. We had one interview where the new entrant's project was not financed and his comments about the project developer was that she did not visit his farm to better appreciate the selection of varieties and a minimum plantation area. The lack of time (pre-project) for young farmers and new entrants to test their interest and capacities in producing blueberries on a small-scale (trial-ability) was cited as a constraint for the projects.

In this economic and bureaucratic scene, the stakeholders and organizations work to overcome many challenges. As a consequence, the inter-institutional linkages to mediate these difficulties are strengthened as a result of years of cooperation and organizational learning (see Korten, 1980 to visualize the learning process approach). However, the organizational learning curve should be revisited in the project approval sphere. IFAP, a public organization and private consulting entities backstop and assist the installation projects for the new entrant small-scale farmers. These installation projects in the future should be evaluated and assessed in order to determine the weaknesses and strengths in the project writing and approval process where both IFAP and the consulting entities are assessed, in order to learn from the past experiences.

However, there are some hurdles to overcome. Interestingly, most of the small-scale farmers that were interviewed had land in the family that was somewhat abandoned and needed to be accessed by this production system. One new small-scale farmer interviewed felt that he would not have had a viable

financial project without this access to family land. We had only two respondents that bought land and one of the two increased the family owned land with an additional parcel. The small-scale entrants have from 0.2 hectares to 1.5 hectares in blueberry production.

The Regional Agricultural Directorate also maintains the “Quinta de Fontelo - Estação São João da Carreira”, a research station where applied research in fertilization and irrigation levels are carried out along with variety testing, fruit fly pest assessment and identification of best pruning techniques to assist these blueberry farmers compete in the international market. INIAV also carries out blueberry research, while developing international partnerships and next organizing international seminars to disseminate pertinent data.

Nurseries in the area are supplying the blueberry plant material for propagation and selling plant materials that are bought by the small-scale farmers and new entrants. These blueberry propagation materials are brought in from the outside via Spain and England. The unknown or unfelt need by these farmers is possibly related to genetic improvement of blueberry plants based on the soil, climatic conditions and capacity to stay eatable for more days after harvest in the contiguous growing area in Sever de Vouga. The varieties need to be adapted to the micro-conditions.

Interestingly, some blueberry farmers that have entered the production process earlier and have a stable certification as a blueberry producer have transformed themselves into dynamic social and economic entrepreneurs. They are now active in project writing and training of the new entrant small-scale farmer through their own private consultancy entities or in traditional farmer-based advisory service organizations.

An annual blueberry fair promoted by the municipal government, Regional Tourism Office, farmer based organizations, and Regional Agricultural Directorate is an event that improves the inter-connectedness of the public and private organizations in this system. The major objective of the fair is to inform the consumer about the nutritional value of blueberries and the uses for the fruit in food products. The fair uses kitchen workshops to demonstrate how to make jams, bake with the fruit for homemade pies, muffins and pastries as well as other products with the fruit. These method demonstrations are historical tools in advisory services. There were also booths to inform the public about the private businesses and public organizations involved in irrigation, packaging, production inputs, nurseries and the farmer-based organizations.

5.4 The knowledge flows for small-fruit producers in the central-north region of Portugal

In the design of the knowledge flow figures to be depicted, the information to construct these figures was collected byway of the responses to the research study questions. The questionnaire asked these small-scale farmers to identify the institutions responsible for the knowledge flow and how it is transmitted to them or, in other words, how they obtain the information.

In the knowledge flow for fertilization (see Figure 2), NSSF used a third party to solve fertilization application problems (100%) and additionally through individual contacts (12%). The ICT search is carried

out in a periodic manner (2-3 per year), by 88% of farmers to seek information from other farmers and also exchange experience in these contacts.

Fertilization application knowledge is created mostly in private supply companies (Chemical and Private consulting companies as well as nurseries), who transmit to the NSSF. This information exchange is very dominant and one-way in this particular knowledge flow system.

The knowledge flows between the NSSF, FBOs and other producers is bidirectional, existing an exchange of knowledge, especially embodied in meetings during plot and farm visits. A few NSSF share fertilization information as a result of their on-farm experimentation. This is also happening in the on-farm tests of blueberry varieties. There is cooperation between producers to share their fertilization and varietal concerns.

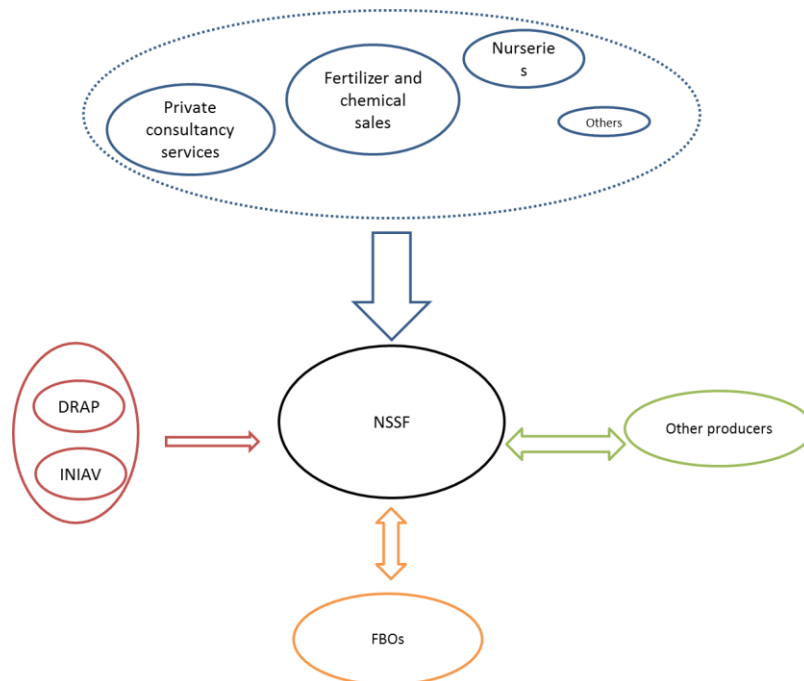


Figure 2: *Fertilization knowledge flows*

Figure 2 shows that there is a strong top-down communication flow from both private and public entities in the knowledge flow system that was documented by the interviews. The sharing of fertilization information by FBOs and other farmers is a two-way flow.

Figure 3 represents the pre-certification and certification processes and explains the informational flows to the NSSF. The predominant entities are the private consulting agencies and FBOs that suggest what the NSSFs should prepare and accomplish prior to the certification visits. They use farm visits to advise the NSSF to complete the necessary farm activities and recommendations to be approved by the certification process.

The certification and control organism accompanies and make inspections on the farm to certify the orchard. These entities control and approve the certification process for the NSSF to produce and market their fruit. The role of other farmers is secondary.

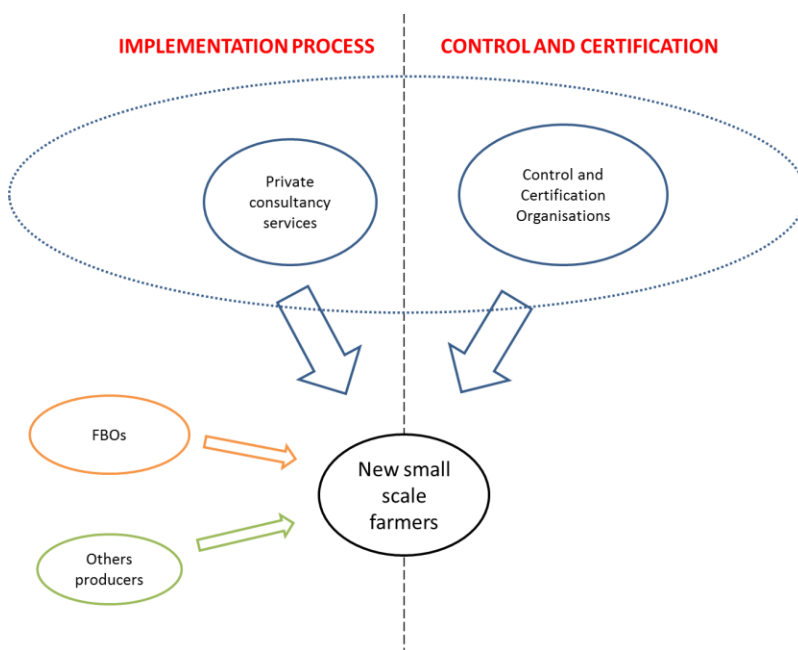


Figure 3: *Certification knowledge flows*

Figure 4 depicts the knowledge flow for PRODER incentives, direct payment and project installation. The primary actors in this process are the private consulting agencies. The NSSF have difficulties in completing the forms in this process. For this reason, there is a very strong one-way flow from the private consulting agencies to these farmers.

The public sector is responsible for the approval of these projects and sometimes serves as a backstop for incorrect or incomplete proposals. The FBOs and ADLs (Local Development Associations) are more responsible for the farm applications to direct payments and market measures. The knowledge flows are all one-way to assist the NSSFs.

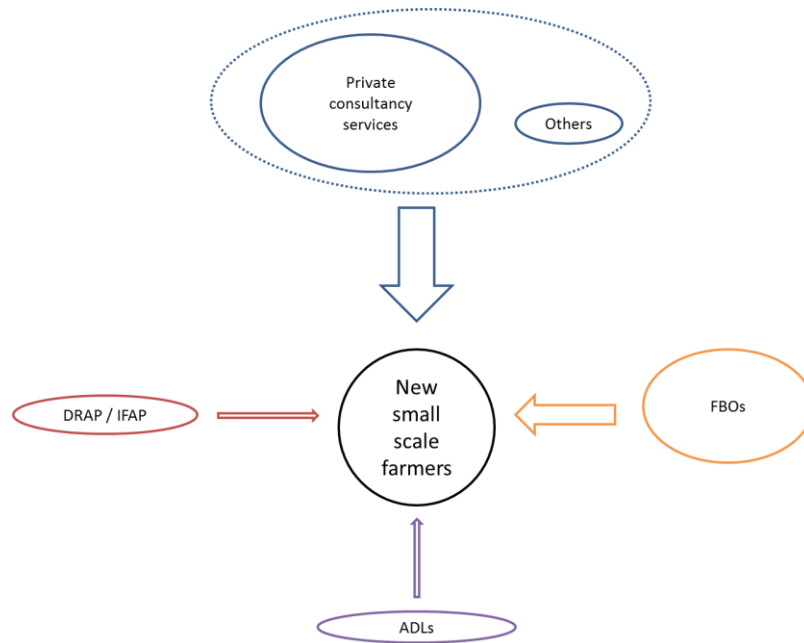


Figure 4: Project installation and application for PRODER incentives knowledge flows

6 Discuss and assess the performance of the knowledge flows and identify best-fit practices for advisory services

The best-fit practices introduced certification and control measures in the production and marketing of the blueberry commodity. The certification and control process has an objective to produce and sell a high quality product with attention to the health and nutritional concerns of the consumers and the rigorous quality standards for producing and packaging. The knowledge flows tend to be top-down as the new small scale-farmers lacked knowledge capacities and skills to produce, harvest and sell a high quality product without rigorous control in the advisory services and knowledge flow.

As the sector is relatively new, the PRODER – installation of young farmer investment process was facilitated by governmental and non-governmental entities playing a major role in the project writing and approval for the new small-scale farmers, who had limited blueberry installation knowledge (see Figure 4). A weakness in this project approval process is an all or none acceptance to the installation project according to the size of the orchard. The new small-scale farmer has no opportunity to experiment with blueberry production on a smaller scale within their orchard. This lack of trial-ability could be a barrier for potential new entrants into the blueberry sector.

The high standards for fruit quality also influenced the best-fit practices in this case study. As the shelf life of this product is limited, the necessary controls have been implemented so the fresh fruit product can be sold through the blueberry chain both nationally and internationally. In 2014, the fruit price

dropped and this could destabilize the financial situation of these new entrants as this farm advisory system is financed by the price and sale of the commodity.

The knowledge system, in general, has benefited the region, through strong and vibrant leadership in both private and public organizations. These public/private entities have established a very robust inter-organizational communication process for developing a dynamic and cooperative blueberry network. The centralized leadership style is concerned with strengthening communication and cooperation linkages to the small-scale farmers although it is still pre-dominantly one-way.

The management in the present best-fit is a vertical controlled structure that in the future might not be sustainable, because of price fluctuations and social-economic issues. Both the small-scale new entrant farmers and the established farmers will need to become more active in learning, exchanging information and creating knowledge to off-set production and marketing challenges.

7 Conclusions

Highlighting conclusions on the goals/research questions:

What are the challenges new small-scale farmers pose to advisory services?

The blueberry sector is emergent and relatively new in Portugal. There was little or no knowledge about blueberry production by traditional agricultural actors or small-scale farmers. In the early cycle, the FBO had little control over quality standards and cultural practices with these blueberry farmers. The early initiative had to make drastic changes in controlling the production and marketing of the fruit. The re-birth resulted in the present commodity advisory service. The present boom cycle is now facing other challenges for these small-scale farmers.

The advisory service's sustainability will be challenged in a relatively short time period as world-wide competition and price fluctuations for the blueberry sector are pertinent factors in an advisory system dependent upon price or sale of the commodity to finance the system. In 2014, the fruit price diminished and in the interviews the farmers addressed their concerns for payment of the PRODER financial project under these conditions. In addition to the price for their fruit, the small-scale farmers identified other issues such as the need for variety testing; resolution of certification issues; managing on-farm storage and fruit preservation; learning more about on-farm sales and safe food processing or transformation of fresh fruit to other saleable products. These concerns are the challenges for both the grower and the advisory service.

Are new small-scale farmers knowledge creators?

Unfortunately, we can conclude that the new small-scale farmers are not creators of knowledge for these new challenges. They basically interact with each other to share orchard concerns and issues. The

pre dominant topics are selecting the best varieties for their orchards, fertilization and irrigation interests. And like all farmers, they discuss the price for their fruit, but creation of knowledge has a minor role and might be considered questionable. They will require more time to learn from trial and error. The advisory service tools can play a role, but innovative dynamic processes must be identified and adopted by small-scale farmers to become knowledge creators.

How does the provision of advisory services to new small-scale farming differ from the overall provision of agriculture advice?

Future challenges in maintaining a quality product and continuing to be competitive in the marketing of blueberry products at a price that covers production costs and ensures profitability for small-scale farming is a provision for the work carried out by the advisory services. This provision does not differ from the overall concerns in agricultural advice. Therefore additional learning experiences and activities should be considered for these new small-scale farmers. All stakeholders in the AKIS will need to be more active in participating in small group learning networks. The advisory services must play a role to construct novel learning networks through ICT tools and traditional methods such as meetings and workshops.

What types of novel methods addressing the specificities and needs of small farmers have been developed?

The farm visit, workshops, training courses and demonstration plots are all relevant tools in the present blueberry sector, but are not novel methods. These methods are contributing to improving small farmer competencies and capacities to plant and grow blueberries in this region. The transfer of knowledge and information to these inexperienced growers has been important to produce a quality agricultural product. These methods will continue to be important to address the specificities and needs of small farmers.

How do small-scale farmers resort to ICT as a tool to get knowledge and information?

The ICT tools such as Facebook and e-mail interaction that occurs among and within the new small-scale entrant farmers has been documented as relevant in this case-study. The searches for information about varieties, pruning and fertilization on the World Wide Web were important. Nevertheless, the advisory services must become more active in developing additional learning agendas or platforms with ICT to mediate future challenges.

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