

AKIS and advisory services in Luxembourg

Report for the AKIS inventory (Task 1.2) of the i2connect project

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Executive summary

Luxembourg is characterized by a utilized agricultural area (UAA) of 131,592 ha, representing 51 % of its territory, which in turn can be divided into arable land (47.1 %), permanent grassland (51.6 %), and vineyards or other cultivated land (1.3 %). A total of 4.4 % of the UAA is organically farmed. In 2019, the sector encompassed 1,872 agricultural farms having an average farm size of 70.3 ha. In terms of farm type and economic size, most farms in Luxembourg are specialised in grazing livestock (1220 farms in 2019 equalling 65.2 % of farms). This can be further distinguished into 530 specialised cattle – dairying farms, and 363 specialised cattle – rearing and fattening farms. The agricultural sector employs 3,342 annual work units (AWU) of which 68 % were covered by family members. The contribution of agriculture to the GDP is low with 0.2 %.

AKIS (agricultural knowledge and innovation system) actors in Luxembourg can be divided into non-governmental, governmental advisory services, research institutes, farmer and farmer-based organisations, cooperatives and producer groups, and private sector. Eight public accredited advisory organisations (PAAO) exist in Luxembourg and their accreditation is in charge of the Ministry of Agriculture, Viticulture and Rural Development (MAVRD). Next to the MAVRD with its administrations (the Administration of Agricultural Technical Services (ASTA), the Rural Economy Department (SER), the Wine Institute (IVV) and the Administration of Veterinary Services (ASV)), the Ministry of Environment, Climate and Sustainable Development (MECSD) is also involved in the Luxembourg AKIS mainly with its administrations Nature and Forest Administration (ANF) and Water Management Administration (AGE). The Chamber of Agriculture (LWK) is mandated with the coordination of the PAAO.

Semi-structured interviews carried out with six experts of public authorities, PAAO, research and education organisations and farmer-based organisations and online surveys filled in by five of the eight PAAO were used as the basis in this study to characterise the agricultural advisory services and the AKIS situation in Luxembourg. The eight PAAO employ 44 advisors with a 20 % female quota. These PAAO are the Chamber of Agriculture (LWK), CONVIS, Institute for Organic Agriculture (IBLA), E'slecker Setzgrompergenossenschaft (Synplants), Nature Park Oewersauer, Centrale paysanne, Privatwënzer (OPVI) and Domaines Vinsmoselle.

The advisory system is modular in which farmers receive 50-100 % funding per module from the MAVRD. The primary source of funding for the advisory services of the PAAO are national governmental funds (public funds) and cost-recovery from farmers (fee for service financing). The PAAO pointed to difficulties with financing of their advisory services, due to low funding rates and the fact that overhead costs are not included in the calculation of the hourly wage. The PAAO further stated that the module system did not allow time for dissemination and personal advanced training of advisors. Funding possibilities provided by the MAVRD were described as unsatisfactory and alternative funding sources are needed.

The median number of clients per year of the PAAO is 65. They were characterised by the respondents of the online survey as farmers with large commercial farms (>100 ha) and farmers with small/medium-scaled farms. The most frequently applied advisory methods were identified as mainly individual advisory via telephone or face to face on the farm. A shift from individual face to face advisory on the farm to individual advisory via telephone or via digital apps was described as a result of the COVID-19 pandemic. The main topics covered are production technologies, followed by legal regulations and grant applications, agri-environmental questions and general farm management (n=5). The main areas of competences of the PAAO are crop production, followed by livestock production, farm machinery, vegetables, fruits and vines (n=5).

To meet the challenges of the new CAP knowledge and skills on environmental protection, knowledge on markets and farm viability, mitigation and adaptation to climate change and specific technological knowledge were described as important by 100 % of the PAAO (n=5). Experts added the future importance of digitalisation and a holistic consultancy on farms.

Within the different AKIS a very good cooperation in viticulture areas was observed, while cooperation in agriculture was described as weak. Experts' opinion is that the module system inhibits innovation and collaboration between the PAAO, as a competition situation is created. Nevertheless, PAAO collaborate in research or dissemination projects. A lack of possibilities to consult farmers according to their needs was criticised by the advisory experts, as every advisory activity needs to be imbedded in an existing and to the respective organisation accredited module.



The different experts all presented visions and possibilities on how to improve the current advisory system to meet future challenges. These included ideas on how to move towards a better cooperation between AKIS actors, a more holistic approach of advisory, a better adaptation to currently relevant topics and an innovation-promoting system.

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Abbreviations

AGE	water management administration
AKIS	agricultural knowledge and innovation system
ANF	nature and forest administration
ASTA	administration of the agricultural technical services
ASV	veterinary services administration
AWU	annual work units
CAP	common agricultural policy
CECRA	certificate for European consultants in rural areas
EIP	European innovation partnership
ERIN	environmental research and innovation department of LIST
FAS	farm advisory system
FEMAL	federation of agricultural and industrial machinery enterprises of the Grand Duchy of Luxembourg
FILL	Fördergemeinschaft Integrierte Landbewirtschaftung Luxembourg
GDP	gross domestic product
IBLA	institute for organic agriculture
IVV	wine institute
LIST	Luxembourg institute of science and technology
LSG	Luxembourgish seed growing cooperative
LTA	agricultural school
LWK	chamber of agriculture
MAVRD	ministry of agriculture, viticulture and rural development
MBR	Maschinen und Betriebshilfsring Lëtzebuerg
MECSD	ministry of environment, climate and sustainable development
OPVI	Privatwënzer
PAAO	public accredited advisory organisation
SER	rural economy department
Synplants	E'slecker Setzgromperengenossenschaft
UAA	utilised agricultural area

1. Main structural characteristics of the agricultural sector

The Grand Duchy of Luxembourg is located in central Europe. It shares its borders with Belgium to the north-west, with France to the south and with Germany to the east. With a surface area of 2,586 km², it is regarded as one of the smallest EU member states. Its average population has considerably increased over the past 10 years from 502,100 inhabitants in 2010 to 626,100 inhabitants in 2020 (STATEC, 2020a).

With a utilised agricultural area (UAA) of 131,592 ha in 2019 (MAVDR, 2020a), Luxembourg has a large percentage of rural area with a total of 51 %. The UAA is divided between arable land (61,959 ha; 47.1 %), meadows and pastures (67,884 ha; 51.6 %) and vineyards or other cultivated land (1,749 ha; 1.3 %) (MAVDR, 2020a). Furthermore, 4.7 % of the UAA are under biodiversity contracts, in the framework of the grand-ducal regulation of 11 September 2017 establishing a set of aid schemes for the conservation of biological diversity in rural areas, and are managed accordingly by the farmers (Gouvernement de Luxembourg, 2017a; SER, 2020a).

In 2019, 1,872 agricultural¹ holdings existed with an average farm size of 70.3 ha (MAVDR, 2020a). A total of 510 holdings cultivated more than 100 ha, 483 holdings cultivated between 50 ha and 99.9 ha, 174 farms had between 30 ha and 49.9 ha, and 705 farms laboured less than 30 ha of agricultural land (STATEC, 2020b).

In 2019, the sector counted a total active agricultural labour force of 3,342 of annual work units (AWU), of which 2,278 were family members. Of the remaining 1,064 non-family workforce, 794 were employees and 271 day-labourers (MAVDR, 2020a). The AWU of the agricultural sector in Luxembourg is steadily decreasing, from 3,726 in 2010 to 3,342 in 2019 (MAVDR, 2020a)

The majority of the workforce was between 51 and 60 years of age (908); 21 were below 20 years of age, 364 were between 21-30 years of age, 546 were between 31-40 years of age, 634 between 41-50 years of age and 553 were over 60 years

¹ For the purpose of increasing readability, the terms agriculture, agricultural holding, farm, farmers and farm manager used throughout the report also refer viticulture, wineries and winegrowers, unless specified otherwise.

of age (MAVDR, 2020a). The average age of the farm manager was 53 years in 2019 (SER, 2020a).

In terms of farm type and economic size, most farms in Luxembourg are specialised in grazing livestock (1220 farms in 2019 equalling 65.2 % of farms) (MAVDR, 2020a). This can be further distinguished into 530 specialised cattle – dairying farms, and 363 specialised cattle – rearing and fattening farms. Holdings specialised in horticulture (38 farms), specialised in crop production (175 farms), or specialised in granivore husbandry (32 farms) all play a subordinated role in the Luxembourgish agricultural sector (MAVDR, 2020a).

In 2019, 5,817 ha were organically farmed or in the progress of being converted to organic farming, which represented 4.4 % of the total UAA (MAVDR, 2020a). The number of organic producers (farmers, horticulturists, winegrowers, fruit farmers and beekeepers) increased from 96 in 2010 to 146 in 2019. Looking specifically at organic farmers, the number climbed from 54 to 82 over the same time period (MAVDR, 2020b). Similar to the overall focus of the agricultural sector, specialised cattle – dairying (14 holdings) and specialised cattle – fattening and rearing (20 holdings) are also the prevalent orientations of the organic farms (SER, 2020b).

The importance of the specialised grazing livestock sector is also reflected in the number of livestock held by the farms. In 2019, a total of 193,575 cattle was raised in Luxembourg, of which 53,947 were dairy cows and 25,819 were suckler cows (MAVDR, 2020a). The number of cattle raised by farms has increased over the past decade, with 105 farms in 2010 raising more than 300 cattle to 135 farms in 2019. Over the same time period, the number of farms with less than 50 cattle decreased from 347 farms to 251 (MAVDR, 2020a).

The dairy sector produced 421,300 t of milk in 2019 with an average milk yield of 7,806 kg/cow/year (STATEC, 2020c). In terms of meat production, 14,816 t carcass weight of large cattle and 225 t carcass weight of veal were slaughtered in 2019, while a number of 23,258 cattle were exported (MAVDR, 2020a).

Looking at the granivore husbandry sector, 84,065 pigs and 132,128 poultry (broilers and laying hens) were raised in 2019. In the same year, 14,962 t carcass weight of pigs were slaughtered and exported, 9,474 piglets were slaughtered and

1,562 live piglets were exported. Furthermore, 2,216 t of eggs were produced and 283 t carcass weight poultry meat (MAVDR, 2020a).

Looking at crop production in Luxembourg, 160,001 t of cereals were produced on 27,393 ha in 2019 (MAVDR, 2020a). The three most important cereal crops species were wheat (74,933 t), barley (35,356 t) and triticale (28,239 t) (MAVDR, 2020a). The focus in animal production on grazing livestock is also reflected in crop production with 28,545 ha being dedicated to forage plants in 2019. In this category of crops, silage maize was grown on 15,070 ha, making it the most widely grown crop in Luxembourg in 2019 (MAVDR, 2020a). In the same year, potatoes were grown on 601 ha yielding 15,330 t. In 2018, horticultural production was carried out on 167 ha producing a total of 1,914 t of vegetables (MAVDR, 2020a). On the 1,286 ha of vineyards, 76,047 hl of wine were produced in 2019 (MAVDR, 2020a).

The country's gross domestic product (GDP) per capita has increased over the past decade. In 2010, it was 79,160 €/capita and increased to 102,200 €/capita in 2019 (EUROSTAT, 2020a). The agricultural sector, however, only contributed 0.2 % in 2019 (EUROSTAT, 2020b). This share has been stable around the 0.2 – 0.3 % mark for the past decade.

2. Characteristics of AKIS

2.1 AKIS description

In the following chapter, the agricultural knowledge and innovation system (AKIS) in Luxembourg is described. The description includes the most relevant AKIS actors and information on knowledge flows. Main sources for chapter 2.1 were the semi-structured interviews, which were conducted with six experts from public authorities, public accredited advisory organisations (PAAO), research and education organisations and farmer-based organisations. These interviews were conducted in the framework of the project for the purpose of this AKIS inventory update and the key questions can be seen in the AKIS country reports guideline (Knierim et al., 2020). A review of grey literature and websites complements the text. The interrelationship between the different PAAO and AKIS actors is illustrated in a diagram presented in chapter 2.2 (Figure 1).

2.1.1 AKIS actors and knowledge flows

There are eight PAAO in Luxembourg: Chamber of Agriculture (LWK), CONVIS, Institute for Organic Agriculture (IBLA), E'slecker Setzgrompergenossenschaft (Synplants), Nature Park Oewersauer, Centrale paysanne, Privatwënzer (OPVI) and Domaines Vinsmoselle. These eight PAAO are described in the following and further characterised in chapter 4. The Ministry of Agriculture, Viticulture and Rural Development (MAVRD) is in charge of the accreditation of these organisations. Besides these non-governmental advisory services, the administrations of the MAVRD (the Administration of Agricultural Technical Services (ASTA), the Rural Economy Department (SER), the Wine Institute (IVV) and the Veterinary Services Administration (ASV)) provide governmental advisory services, and acquire and process information in their respective thematic field of competences. Furthermore, two research institutes (Luxembourg Institute of Science and Technology (LIST) and IBLA), an agricultural school (LTA), different unions & farmers associations, cooperatives & producer groups, and input traders complement the AKIS of Luxembourg. It is important to note, that the advisory function is not the sole role of these organisations. Besides the MAVRD, the Ministry of Environment, Climate and Sustainable Development (MECSD) together

with its administrations Nature and Forest Administration (ANF) and Water Management Administration (AGE) play a role in the AKIS of Luxembourg.

Public authorities

The public sector plays a central role in the provision and financing of advisory services. The **MAVRD** is the responsible administrative body which regulates advisory services of the PAAO. Similarities exist between its four administrations (ASTA, SER, ASV and IVV) in the provision of advisory services for farmers free of charge, as well as in the processing and dissemination of agricultural information and knowledge.

ASTA focuses on advisory and information services on plant and animal production, plant protection, climate change and sustainable agricultural practices in general. Implementation of agriculture specific legislation (e.g. on agricultural products, factors of production, plant protection and agricultural cooperatives and syndicates) is a further task area of ASTA, as well as promotion and control of agricultural products. ASTA produces data on agro-meteorology and runs control and testing laboratories. Finally, ASTA is also responsible for the conduction of maize and grassland variety trials (MAVDR, 2020c).

SER is functioning as a link between the common agricultural policy (CAP) and the national agriculture sector. They translate, elaborate and implement the direct aid schemes under the CAP in Luxembourg (MAVDR, 2020d). Further fields of responsibility range from accounting, over advisory services on investment, business development and first installation of young farmers, to processing agricultural information in general, e.g. agrarian statistics or reports on topical developments in the Luxembourgish agricultural sector (MAVDR, 2020e).

The **ASV** is under the responsibility of two ministries: The MAVRD and the Ministry of Health. In their function as an administration of the latter, they are responsible for the control of animal products and public health; in their role as an administration to the former, their role includes animal welfare, prevention of animal diseases, and marking and registration of animals (MAVDR, 2020f). ASV ensures compliance with laws and regulations specific to animal health and the well-being of animals (ASV, 2020).

One of the main roles of the **IVV** is to provide advisory services to winegrowers. It also offers lectures, seminars and further training courses covering significant issues and subject areas in viticulture and oenology. The aim is to acquaint winegrowers with the latest findings and development in these areas. Furthermore, IVV conducts applied research on its own trial fields in the areas of plant protection, fungus resistant grape varieties, development of environmentally friendly production processes, vine nutrition, viniculture, wine treatment and oenology (MAVDR, 2020g).

The **MECSD** with the two administrations **ANF** and **AGE** are responsible for different environmental programmes relevant to agriculture. One of the tasks of ANF, related to agriculture, is the protection of nature, natural resources, biodiversity and landscapes. ANF is in charge of the nationwide coordination of the biodiversity programmes, in which farmers can participate. However, the task of concluding biodiversity contracts (to ensure the participation of the farmers in these programmes) is the responsibility of the **biological stations** and **nature parks** (MDDI & MAVPC, 2018). **AGE** is in charge of the initiation of corrective and curative measures necessary to improve water quality and flood control in Luxembourg (AGE, 2020). The future implementation of these measures into agricultural practice will be performed in collaboration with water protection cooperations. Such cooperations are currently being developed under the coordination of a moderator. The advisors of LWK, CONVIS, Nature Park Oewersauer and IBLA will be involved in these cooperations to facilitate the contact with the farmers.

Since 1993, it is possible to found nature parks in Luxembourg. While there currently exist three nature parks, the **Nature Park Oewersauer**, Nature Park Our and the Nature and Geo-Park Mëllerdall, only the Nature Park Oewersauer is a PAAO with accredited agricultural advisors. As this nature park is home to the Upper Sûre reservoir, which provides drinking water for approx. 80 % of Luxembourg's inhabitants, it is of the utmost importance to promote a sustainable regional and rural development in line with water protection (Nature Park Oewersauer, 2020). Agriculture is one of the seven main fields of action of the nature park and the aim of the park's agricultural advisory services is to encourage agriculture in harmony with drinking water protection and nature. The main focus areas of this PAAO are current agricultural laws and regulation, creation of fertilisation plans, crop production, sensibilisation for environmentally friendly practices and water protection consultation (Nature Park Oewersauer, 2020).

Since 2015, an agricultural cooperation (LAKU) between the nature park, the drinking water provider and the farmers exists in the nature park, in the framework of which the agricultural advisor is also active and offers their support.

Research and education organisations

LIST is a public research institute. Within this institute, the Environmental Research and Innovation (ERIN) department plays a role in the Luxembourgish AKIS. The department is further structured into four units that focus their efforts on the major environmental challenges of the society, including climate change mitigation, ecosystem resilience, sustainable energy systems, efficient use of renewable resources, and environmental pollution prevention and control (LIST, 2020a). The main working areas in agriculture and viticulture are: crop protection, precision farming, food safety and quality, alternative crops and organic farming (LIST, 2020b). LIST collaborates with other AKIS actors (e.g. LTA, LWK, IBLA) in different national and international research projects. Nationally, it is mainly involved in agricultural European Innovation Partnership (EIP) projects, where research, advisory services and farmers are encouraged to work together. Furthermore, LIST cooperates with other organisations such as LWK and LTA to run a warning and advisory platform for the main pests and diseases occurring in the major crops in Luxembourg (LIST, 2020c).

IBLA is the competence centre for research and advisory services in the field of organic agriculture and viticulture in Luxembourg. It is a non-profit organisation and is recognised as an official research institute in Luxembourg. According to its motto "research for the practice", IBLA aims to have rapid transfer of its research results and knowledge into the practice through its inhouse advisory services, seminars, field visits of trials and various information brochures and leaflets. The focus areas of its activities are inter alia protection of natural resources, biodiversity, sustainability assessment, preservation and improvement of soil fertility, variety testing, animal welfare and optimisation of crop rotation (IBLA, 2020). IBLA is in charge of the national variety trials in organic agriculture (cereals, grain legumes, potatoes, field fodder and maize), this in close collaborations with LTA, ASTA and the farmers. IBLA is also one of the main PAAO and their advisory services consult on all questions relating to organic agriculture and viticulture and their methods. They help farmers and winegrowers before, during and after the

process of converting their holding to organic management. Furthermore, IBLA provides conventional farmers and winegrowers support in applying methods from organic agriculture and viticulture (e.g. mechanical weed control) to their holding. The institute is also the contact point for advice on legume cultivation. Furthermore, IBLA works with other AKIS actors (e.g. LTA, LIST, Vereenigung fir Biolandwirtschaft Lëtzebuerg, BIOG, CONVIS, LWK) in different national and international research and dissemination projects (IBLA, 2020).

LTA is the only agricultural school in Luxembourg. Vocational training is the responsibility of the Ministry of Education, Children and Youth and the relevant professional chambers. There is therefore a close relationship between the LTA and the LWK at the level of agricultural training. Besides the role of education of the young farmers, LTA is also responsible for the official variety trials of cereals, grain legumes and potatoes in conventional agriculture in Luxembourg. They also conduct trials on production technologies in crop and permanent grassland. LTA participates in different national and European research consortia. Thus, LTA has a bilateral knowledge flow and a link exists between it, the research institutes and the third sector of farmer and farmer-based organisations (LTA, 2020).

Third sector farmer and farmer-based organisations

LWK is the chamber of agriculture of Luxembourg. LWK is the official representative of farmers, winemakers and gardeners. It was created by the law of 4th April 1924 (Gouvernement de Luxembourg, 1924). LWK has an advisory role in the legislative area: the government must ask the LWK for its opinion on any draft of laws and regulations that affects farmers, winegrowers and gardeners. LWK also has the right to formulate legislative proposals itself on topics in its area of responsibility that must be examined by the government and submitted to the Chamber of Deputies (LWK, 2020). An additional task is the vocational training and further education: LWK is involved in the organisation of training and teaching in the so-called "green" professions (e.g. farmer, gardener). As a professional chamber, LWK is authorised to carry out and certify further training activities. Through the law of 27th June 2016 on support for the sustainable development of rural areas, LWK is in charge of the coordination of the advisory system in Luxembourg (Gouvernement de Luxembourg, 2016). This gives it a double function in the AKIS, as LWK itself is also one of the main eight PAAO. LWK is active

in crop production and plant protection advice. It creates fertilisation plans for farmers. Another of its advice domains is water protection and nature conservation. LWK also organises applied field trials, mostly demonstration fields, to promote knowledge transfer. In addition, LWK manages the Luxembourgish food label "Produit du terroir - Lëtzebuenger ..." and the campaign "Sou Schmaacht Lëtzebuerg" (LWK, 2020).

In Luxembourg three **farmer unions** exist: **Centrale paysanne**, Bauerenallianz and Fraie Lëtzebuenger Bauer. Besides the role as a farmer's union, Centrale paysanne is also a PAAO, focusing mainly on advisory services in investment, accounting and economic issues. It also provides support and advice to young farmers at the new installation of their holding (Centrale Paysanne, 2020). Furthermore, Centrale paysanne conducts on farm field trials, in cooperation with LTA, and publishes an agricultural newspaper, as does the Bauerenallianz.

The ecological agricultural advice was founded in 1987 and is a joint initiative of **Landjugend & Jongbaueren** (a young farmers' association) and Oekozynter Pafendall (an environmental association) to conduct innovative projects for the development of sustainable agriculture (Oekozynter, 2020). While the ecological agricultural advice is no PAAO, it is still co-funded by the MAVRD. The main areas of activity include advising farmers on practices for the protection of drinking water sources, developing ideas for a sustainable agricultural policy, carrying out field trials in regards to protein strategy for Luxembourg, and the creation of suggestions for the national action plan for the reduction of pesticides in Luxembourg (Oekozynter, 2020). It is also involved in the project "Natur Genéissen" together with the nature conservation syndicate SICONA.

Further **farmers associations** could be named as AKIS actors, for example Vereenegung fir Biolandwirtschaft Lëtzebuerg, Fördergemeinschaft Integrierte Landbewirtschaftung Luxemburg (FILL), Fédération des associations viticoles, as they are also generally involved in the knowledge transfer.

A further important actor in the Luxembourgish AKIS are **cooperatives and producer groups**.

CONVIS is an animal production cooperative and offers different services such as herdbook keeping; organisation of performance tests; marketing, buying and selling of breeding, farm and slaughter cattle; organisation of animal exhibitions

and award shows; procurement, custody and reproduction of good breeding animals; safeguarding the interests of livestock breeding and production on a technical and social level (CONVIS, 2020a). Furthermore, CONVIS is one of the main PAAO and advises on all questions relating to livestock breeding, feeding, keeping and care. CONVIS' advisory services are also active in water protection areas and consult on grassland management. They create fertilisation plans for farmers and calculate a farm's energy and nutrient balances (CONVIS, 2020a). CONVIS is also involved in different national and international research projects, mainly in the domain of sustainability and animal production. They collaborate with national AKIS actors, for example with LTA and LIST.

Synplants is the association of seed potato producers with the purpose to promote the production of perfect seed potatoes and to process, store, collectively sell the resulting potatoes (Synplants, 2020). Synplants, as a PAAO, also offers technical production advice in its domain and a phytosanitary warning service in the framework of its advisory service.

OPVI regroups the independent winegrowers of Luxembourg with the objectives to take a stand on social and economic issues and to promote the quality of their wines (OPVI, 2020). OPVI is one of three PAAO in viticulture (OPVI, Domaines Vinsmoselle, IBLA). Its advisory service is specialised in vinification and is reserved for its members. The OPVI advisory service organises also knowledge transfer events.

Domaines Vinsmoselle is a Luxembourgish wine growers' cooperative and a PAAO. Its advisor is mainly active in viticulture, and focusses less on oenology. The main goal is the support in plant protection during the main winegrowing season and the implementation of measures to ensure good wine quality. Its advisory service is reserved for its members.

Maschinen und Betriebshilfsring Lëtzebuerg (**MBR**) is the machinery and operational aid ring in Luxembourg. Their main task is the mediation of services (machines, operational assistance) in agriculture, viticulture, forestry and landscape maintenance (MBR, 2020). As an AKIS actor, they play a role in offering training courses for farmers.

Further actors in this third sector are among others the Luxembourgish seed growing cooperative (LSG), the commercial cooperative De Verband, the organic

farmer's cooperative BIOG or the Luxemburgish milk producer's cooperative Luxlait. The main business of these actors is not supplying advisory service or creating innovation and knowledge. Nevertheless, they play a role in the Luxemburgish AKIS, as they indirectly bring information on different production processes and products to the farmers. The farmers are in close contact with their respective cooperation and in part dependent on decisions of the cooperatives.

Private sector (for profit)

Input traders as for example Barenburg, VERSIS, BAKO, Protvinges, FEMAL (Federation of Agricultural and Industrial Machinery Enterprises of the Grand Duchy of Luxembourg), feed retailers and dealers for milking parlours provide commercial advice to farmers and winegrowers, mainly with the intent to sell their products. Nevertheless, these actors can also be considered as innovation promoting actors, as some machine dealers, for example, are involved in research and dissemination projects assessing innovative new techniques in different agricultural domains. Agro-Projekt, an actor in stable construction advice for farmers, publishes the agricultural newspaper Alcovit.

2.1.2 Coordination Structures

According to the grand-ducal regulation of 17th may 2017 implementing the provisions of chapters 17 and 18 of the law of 27th June 2016 concerning support for the sustainable development of rural areas, the advisory service in agriculture and viticulture is governed by the MAVRD (Gouvernement de Luxembourg, 2017b). LWK is mandated with the coordination of the Luxemburgish advisory services. As mentioned above, this gives a double role to the LWK, as itself is a PAAO in Luxembourg. In the expert interviews conducted in the framework of the update of this report, some of the experts pointed out, that this double role is unfortunate, as there is no real separation of powers. LWK is also in charge of developing, coordinating and implementing a system of continuous training for agricultural advisers.

AKIS diagram

The diagram of AKIS actors in Luxembourg is presented in Figure 1. The different actors were described in detail in chapter 2.1.1

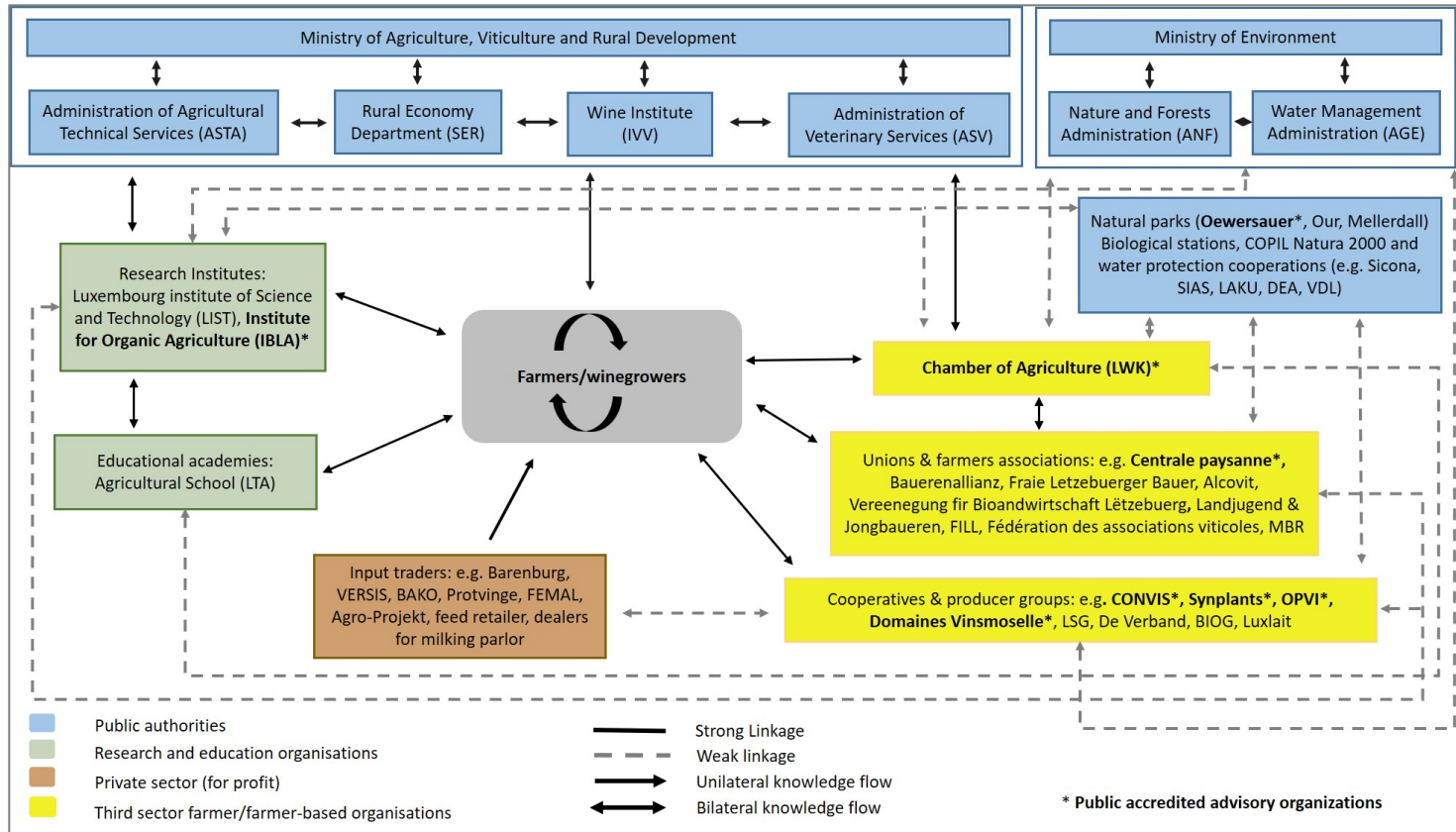


Figure 1: Diagram of AKIS actors in Luxembourg

3. History of the advisory system

This chapter focuses on the history of the advisory system of the PAAO in Luxemburg. Due to the absence of grey literature on the historic developments of advisory services in Luxembourg, the here-presented information was mainly derived from the internet pages of the respective PAAO organisations. The data is complemented with information gathered in the semi-structured interviews conducted in the framework of the project.

Some of the PAAO have a long history of providing advisory services to farmers. CONVIS, for example, was established in 1915 and LWK in 1924 (CONVIS, 2020b; LWK, 2020). Domaines Vinsmoselle was founded in 1921 (Domaines Vinsmoselle, 2020), Synplants in 1945 (Synplants, 2020) and Centrale paysanne in 1955. The other four PAAO are younger organisations founded in the last 10-20 years; e.g. OPVI exists since 1996, the Nature Park Oewersauer since 1999. The extension service for organic agriculture was founded in 1999 and was integrated into IBLA at its establishment in 2007. It is important to note, however, that not all the PAAO offered advisory services since their foundation.

All the PAAO are individual organisations, which have as a part of their mission the advisory service. They are accredited for specific responsibilities and areas of activities by the MAVRD. The previous legal rules and funding scheme are described in detail in the first AKIS report of Luxembourg by Paul et al. (2014). The Commission Regulation (EU) No 702/2014 of 25th June 2014 brought about major changes in the funding scheme of the PAAO; agricultural advisory services could no longer be funded by a direct payment of up to 80 % of their costs (European Commission, 2014). Since 2016, the Luxembourgish advisory system is organised in a module system. This change means, that it is no longer the organisation, or more specific the agricultural advisor position, which is financed, but rather the service the organisation renders, in form of modules. The farmers can book different advisory modules with the PAAO and receive financial support to cover between 50-100 % of the costs for advisory module. It is important to note, that during the switch from the old system to the new one, the priority of the Ministry was to maintain the same level of funding for the respective advisory services with their advisors employed. The existent foci of the different PAAO were formulated into different advisory modules for which the respective PAAO were then accredited. However, according to all the experts that were interviewed in the

framework of this project, no evaluation was done beforehand on what the actual knowledge needs of the farmers and winegrowers were. Further details of the actual regulation and the current funding scheme is described in chapter 4.2.

4. The agricultural advisory services

4.1 Overview of all service suppliers

In Luxembourg, there currently exist eight PAAO:

- LWK
- CONVIS
- IBLA
- Synplants
- Nature Park Oewersauer
- Centrale paysanne
- OPVI
- Domaines Vinsmoselle

A first description of these organisation and their specific roles in the Luxemburgish AKIS were given in chapter 2. In order to further characterise the different PAAO, a quantitative online survey (further details on the survey can be seen in the AKIS country reports guideline (Knierim et al., 2020)) was sent to the eight PAAO. Five of the eight PAAO participated in the survey (n=5) and the data was descriptively analysed. The insights for the chapter at hand are mainly derived from this. It is completed with information gathered from the review of documents and homepages. The results were further complemented with insights from the above-mentioned semi-structured interviews. In the following chapters, the sample size n indicates the number of PAAO that replied to a specific question of the online survey.

4.2 Public policy, funding schemes, financing mechanisms, advisory service providers

The MAVRD is in charge of the accreditation of the PAAO and their individual advisors for the different advisory modules (Article 10 of the grand ducal regulation of 17th May 2017 (Gouvernement de Luxembourg, 2017b)). The content of the advisory modules, funding rates and maximal funding height as well as minimum qualifications of providers are fixed in the ministerial regulation of the 28th February 2020 (Gouvernement de Luxembourg, 2020).

Table 1 summarises the most important information: title of the module, funding rate, maximum aid amounts and accredited PAAO for each module. The five PAAO, that participated in the online survey, confirmed, that the primary source of funding for their advisory services are national government funds (public funds) and cost-recovery from farmers (fee for service financing). The way the funding scheme works, is that farmers receive 50-100 % funding from the MAVRD for advisory modules they book at one of the eight PAAO. The specific funding rates are defined in the ministerial regulation of the 28th February 2020 (Gouvernement de Luxembourg, 2020). In order to ease the administrative burdens for the farmers, the share of the module costs subsidised by the MAVRD is directly paid by the ministry to the respective PAAO. In return, the PAAO need to indicate the total cost of the advisory module, the share funded by the MAVRD and the farmer's share, which they still need to pay, on the invoice. Two of the five organisations mentioned, that the funding of their advisory service is complemented by contributions from member fees.

In all expert interviews with PAAO, difficulties of financing their advisory service were reported, mainly due to the fact, that the funding rates for the different advisory modules are too low and overhead costs are not included in the calculation of the hourly wage. A further problem is the fact, that normal wage adaptation occurring in every organisation, is not considered. Bureaucracy was mentioned as an additional burden. Furthermore, in the old funding schemes, advisors were able to dedicate a part of their time to innovation support activities for teaching and training, for information/dissemination and for further development of their own knowledge and skills. This was found to be very difficult, nearly impossible, under the new funding schemes, as organisations do not have the possibilities to finance these activities anymore.

Table 1: Advisory modules, funding rates, maximum rate of aid and PAAO (1: CONVIS, 2: Centrale paysanne, 3: Domaines Vinsmoselle, 4: IBLA, 5: Lwk, 6: Naturpark Oewersauer, 7: OPVI, 8: Synplants) Modified according to MAVDR, 2020h.

Module		Funding rate	Maximum rate of aid	PAAO
Environmental and resource protection in plant and fodder production				
1.	Fertilisation plan	80%	840€ per holding and year	1,5,6
		100%	1.050 € per holding and year, when module 2 is claimed	1,5,6
			125 € per member of a community biogas plant	1,5,6
2.	Water protection zone	100%	1.100 € per holding and year	1,5,6
3.	Sensitive areas (Natura 2000, nature reserves, biotopes)	100%	1.100 € per holding and year	5,6
4.	Greening	80%	68 € per holding and year	5,6
5.	Integrated agricultural advice (according to agricultural law)	80%	1.500 € per holding	5
6.	Energy and nutrient balances	80%	840 € per holding and year	1
7.	Grassland advice	80%	520 € per holding and year	1
8.	Legume cultivation	80%	520 € per holding and year	4
9.	Arable crops (group advice max. 6 participants)	50%	280 € per holding and year	4,5
10.	Seed potatoes: Plant protection warning service	100%	900 € per holding and year	8
11.	Seed potatoes: advice on production technology	50%	1.450 € per holding and year, maximum of € 40 per hectare of seed potatoes	8
Livestock farming				
12.1	Advice in dairy farming: feeding advice	50%	600 € per holding and year	1
12.2	Advice in dairy farming: milk quality and milking technology	50%	260 € per holding and year	1
12.3	Advice in dairy farming: reproduction	50%	260 € per holding and year	1
13.	Advice on suckler cow husbandry	50%	600 € per holding and year	1
14.	Advice on pig breeding	50%	1.500 € per holding and year	1
Organic agriculture				
15.1	Organic agriculture – Pre-transitional initial consultation	100%	840 € per holding (for conventional holdings)	4

15.2	Organic agriculture – Pre-transition, intensive	100%	1.500 € per holding (for conventional holdings)	4
16.	Organic agriculture – Transition	100%	1.500 € per holding and year (for holdings under conversion)	4
17.1	Organic agriculture	80%	1.500 € per holding and year (for certified organic holdings)	4
17.2	Methods of organic agriculture	80%	520 € per holding and year (for conventional holdings)	4
Basic requirements / Compliance with standards				
18.1	Cross compliance - complete analysis	80%	1.500 € per holding and year	5
18.2	Cross compliance - update or partial analysis	80%	340 € per holding and year	5
Viticulture				
19.	Viticulture - basic module	80%	100 € per holding and year	3
20.	Viticulture - special module	80%	1.280 € per holding and year	3
21.	Oenology – Wines & AOP (protected designation of origin)	80%	940 € per holding and year	7
22.	Oenology – “Crémant de Luxembourg”	80%	1.060 € per holding and year	7
23.1	Organic viticulture – Pre-transitional initial consultation	100%	840 € per holding (for conventional holdings)	4
23.2	Organic viticulture – Pre-transition, intensive	100%	1.500 € per holding (for conventional holdings)	4
24	Organic viticulture – Transition	100%	1.500 € per holding and year (for holdings under conversion)	4
25a.1	Organic viticulture – soil fertility	80%	1.500 € per holding and year (for certified organic holdings)	4
25a.2	Organic viticulture – soil fertility	80%	520 € per holding and year (for conventional holdings)	4
25b.1	Organic viticulture – plant health	80%	1.500 € per holding and year (for certified organic holdings)	4
25b.2	Organic viticulture – plant health	80%	520 € per holding and year (for conventional holdings)	4
Diversification and economical advice				
26.	Special crops - strategic advice	100%	1.500 € per holding (for certified organic holdings)	5
		80%	1.500 € per holding (for conventional holdings)	5
27.	Special crops	80%	1.500 € per holding and year (for certified organic holdings)	5
		50%	1.500 € per holding and year (for conventional holdings)	5
28.1	Economical advice: Investments > 150.000€	100%	840 € per holding and year	2
28.2	Economical advice: business development concept	100%	1.500 € per takeover by a young farmer / winemaker	2
28.3	Economical advice: Accompanying newly installed young farmers / winemakers	100%	480 € per holding and year (max. 5 years)	2

Innovation development can, in part, be promoted through projects in the framework of the agricultural EIP funding scheme as defined in the law of 27th June 2016 concerning the support for the sustainable development of rural areas (Gouvernement de Luxembourg, 2016). The EIP funding scheme aims to promote innovation projects in agriculture implementing knowledge transfer and networking between research, advice and agricultural practice. In Luxembourg, it is financed by national funds. While some of the PAAO currently participate in EIP funded projects, most of the experts from the advisory domain stated in the semi-structured interviews, that they are not willing to participate in further national EIP calls: the length of the funding decision process and administrative burdens were mentioned as reasons as to why not.

Dissemination and knowledge transfer activities can also be funded in the framework of the law of 27th June 2016 (Gouvernement de Luxembourg, 2016). Project proposals need the assessment and evaluation of the LWK; however, it can itself submit proposals. Some of the experts pointed out, that this double role of the LWK is again unfortunate, as no separation of powers can be guaranteed.

Some experts described these three funding possibilities for the advisory services as cumbersome with a lot of administrative obstacles that do not cover the real costs. This is the reason why the PAAO also seek alternative funding sources, mainly not coming from the MAVRD.

4.3 Human resources and methods of service provision

The eight PAAO employ 44 advisors in total; 12 women and 32 men (MAVDR, 2020i). Thus, 27 % of officially recognised advisors are women.

A total of 38 advisors were employed by the five PAAO partaking in the survey, representing 86 % of total recognised advisory staff for agriculture and viticulture in Luxembourg. The number of advisors ranged between 1 and 15, while the share of woman advisory staff was between 0 to 50 % (n=5). Advisory staff numbers stagnated in two PAAO over the past five years, while they significantly increased in the other. The increase of staff number in some of the PAAO can be explained by the higher demand for advisory services in their specific domains (e.g. organic agriculture and agriculture in water protection areas).

The survey revealed that all advisors in the PAAO (n=5) possess an academic degree. This can be explained by the fact that the ministerial regulation of the 28th February 2020 requires officially recognised advisors to hold at least a bachelor's degree or equivalent (Gouvernement de Luxembourg, 2020). The percentage of staff possessing a master's degree ranged from 50 to 100 % (n=5); one advisor holds a PhD. Out of the 38 advisors employed in the five PAAO of the survey, 29 % had 0-3 years of professional experience, 32 % had between 3-10 and 39 % had more than 10 years. None of the PAAO (n=5) had a trainer or training unit responsible for developing staff capacity. Depending on staff or organisation requirements, some of the PAAO relied on further training offers from foreign organisations (mainly for new advisors). On average, advisors were able to dedicate 2 to 5 days per year on further training related to advisory knowledge and skills (n=3).

None of the organisations have mechanisms to reward good performance or to promote the development of advisors' skills (n=5). Advisors allocate a majority of their time to targeted advisory services (30-85 % of their total working hours, (n=3)). Between 3 and 30 % of their time was allocated to innovation support activities, 0-30 % to teaching and training and 2-20 % to information/dissemination (n=3). Advisors spent on average 5 % of their time on developing their own knowledge and skills (n=3). None of the advisory organisations nor their advisory staff hold an advisory certification. During the semi-structured interviews, the experts stated that financing of teaching and training is difficult. Since 2018, the MAVRD has co-financed an annual training workshop on soft skills for all accredited advisors based on CECRA (Certificate for European Consultants in Rural Areas). This was appreciated by the advisory experts not so much for the soft skills learned, but rather for the networking effect of such training days. These workshops allow the individual advisors from the different PAAO, who in their day to day work do not have much interaction, to get to know each other and to exchange ideas.

In Figure 2, the most frequently used advisory methods are presented (n=5, multiple choice was possible). All organisations used individual consultation by telephone as an advisory method, followed by individual face to face advice on the farm; and group advice via demonstrations or exchange visits with four mentions each. Individual face to face advice outside the farm; individual advice via digital apps; group advice outside the farm; group advice on the farm; mass media advice via internet; and mass media advice via printed publications, TV,

radio, newsletters; were other advisory services mentioned by two organisations each. One organisation mentioned the use of group advice via webinar.

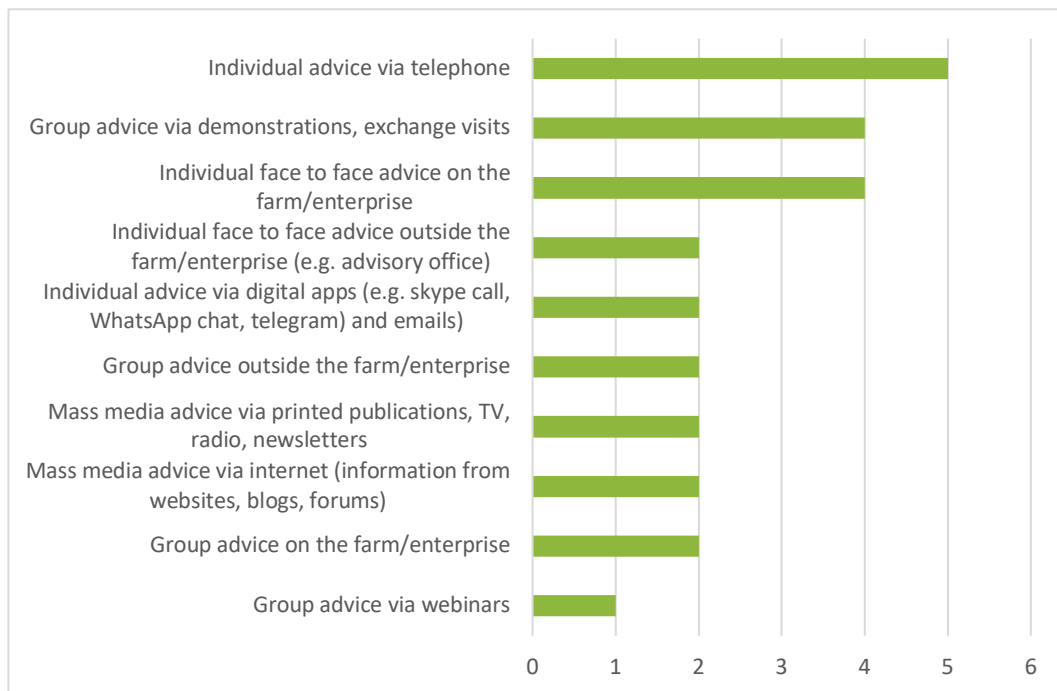


Figure 2: Advisory methods used most frequently from the advisory organisations (n=5, multiple choice was possible)

Regarding the three major advisory methods (individual, group and mass media), individual was the method used in 80-100 % of the advisory activities of four advisory organisations, whereas one organisation used this method in only 15 % of the cases. This organisation has a stronger use of the group advisory method with 80 %. Mass media is used by four organisations in 1-10 % of their advisory activities.

The COVID-19 pandemic in 2020 brought about a change in the advisory methods used in all PAAO (n=5). A shift from individual face to face advisory on the farm to individual advisory via telephone or via digital apps was described. Group advice decreased in the first part of the year 2020. In the second part of the year group advice was resumed, but under strict hygienic measures (social distancing, masks and barrier gestures).

4.4 Clients and topics

On average 194 farmers annually used the advisory services of the PAAO (n=4). However, there were large variations, with one PAAO providing advice to 600 clients. The median of the remaining three PAAO was 65 client contracts per year.

Respondents were asked about the primary target group to which they provide advice to. Figure 3 shows the primary target groups of the PAAO (n=5). Most of the PAAO provide advice to farmers with large commercial farms (>100 ha) and farmers with small/medium-scaled farms, followed by young farmers with three mentions. Agricultural advisors/consultants and part-time farmers were mentioned twice each, while producer groups, and small and medium enterprises were each mentioned once.

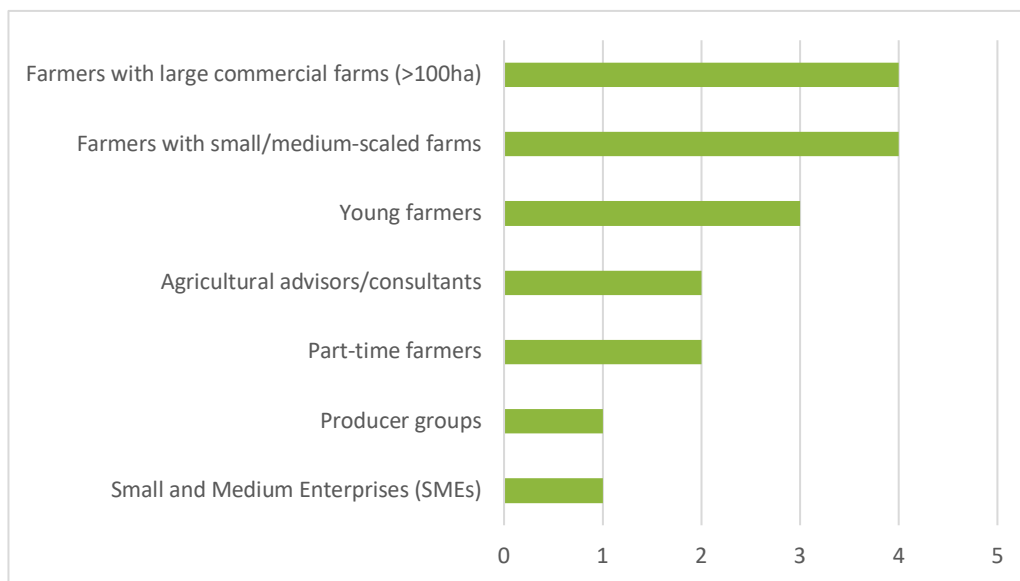


Figure 3: Primary target groups of advisory organisations (n=5, multiple choice was possible)

The cross-cutting advisory topics most demanded by farmers are shown in Figure 4 (n=5). The answers show an emphasis on production technologies, support with grant application and compliance with regulation and standards, agri-environmental stewardship measures and nature conservation, and entrepreneurship and farm management. In contrast, topics of rural development support and diversification, tax and legal device, accounting/bookkeeping or use of digital equipment and decision support systems play no role.

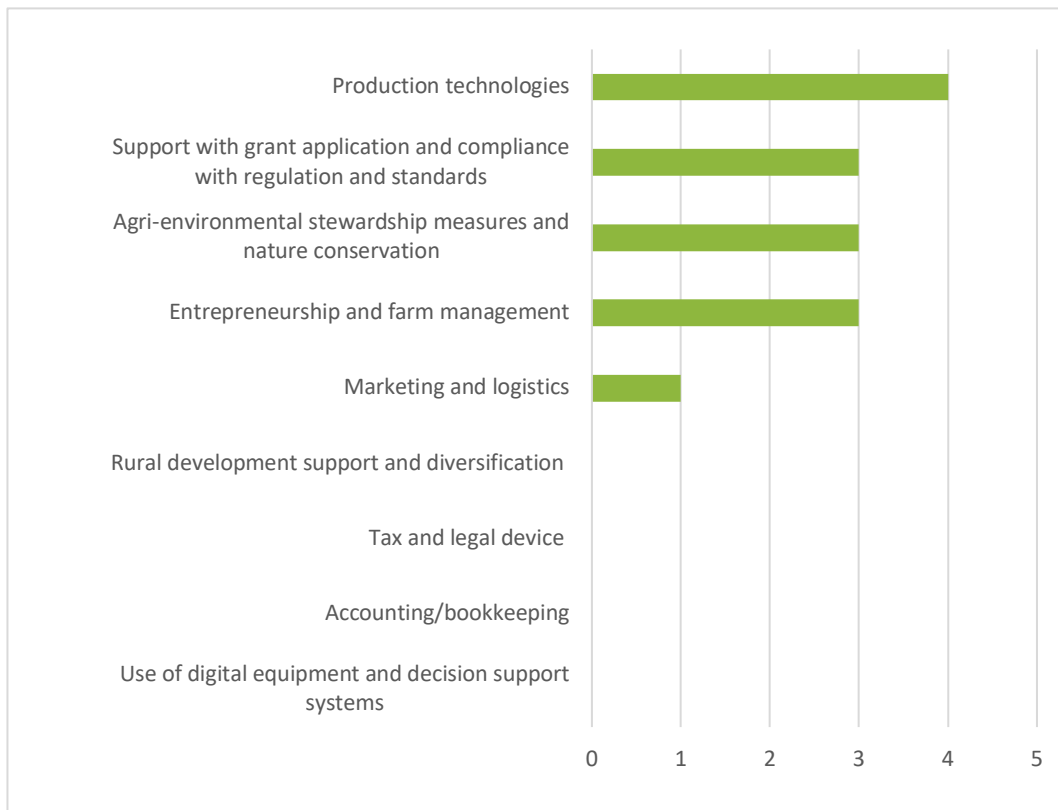


Figure 4: Cross-cutting advisory topics demanded by the farmers (n=5, multiple choice was possible)

Regarding the advisory topics provided mostly by the PAAO, crop production was mentioned four times, followed by livestock production, farm machinery, vegetables, fruit and vines with two mentions each (Figure 4, n=5, multiple choice was possible). Building/construction design and herbs were named each once. Additional mention (open entries) not fitting into the predetermined categories of advisory topics was sustainability monitoring (named once).

To the question, if certain topics are outsourced to external consultants, one of the five PAAO answered yes; mainly for highly specialised consulting areas (e.g. fruit production).

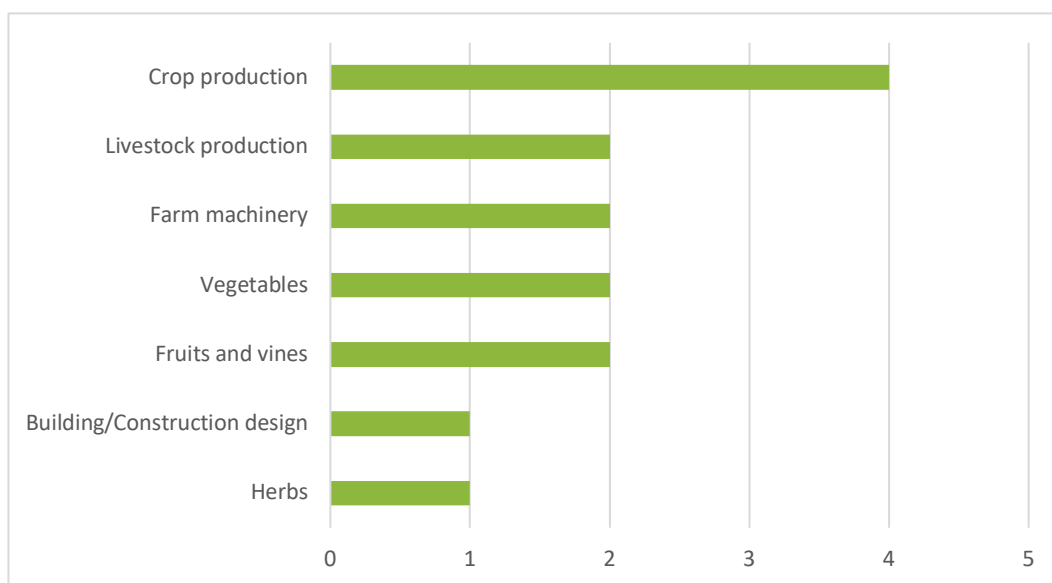


Figure 5: Advisory topics provided by the advisory organisations (n=5, multiple choice was possible)

To meet the challenges of the new CAP necessary technical knowledge and skills needed by advisors were identified by the responding organisations (Figure 6). All PAAO (n=5) perceived ecology and environmental protection, knowledge on markets and farm viability, mitigation and adaptation to climate change and specific technological knowledge (e.g. farming practices, production technologies) as important. Developing farm management strategy, skills related to subsidy application/grants, and diversification of sources of income were each mentioned four times, while increasing the value added of farm production was mentioned three times. Networking was mentioned as the most important methodological and communication skill in order to meet the challenges of the new CAP (n=5).

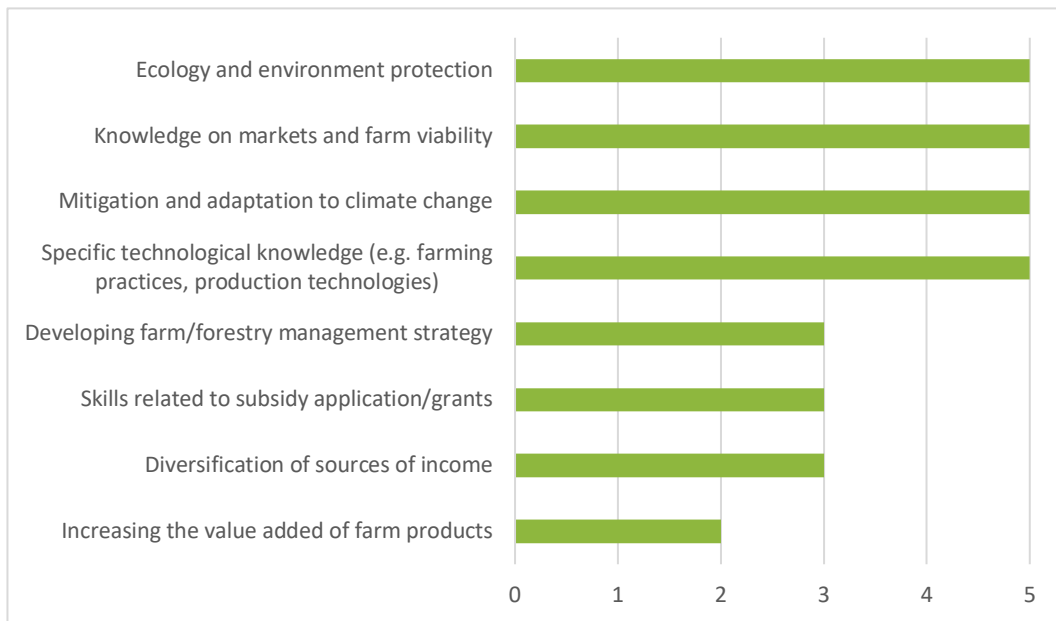


Figure 6: Technical knowledge and skill needs of advisory to meet the challenges of the new CAP (n=5, multiple choice was possible)

The intensified focus on environmental topics and the herewith coming regulations were also mentioned in the expert interviews. Another topic that came up is the digitalisation and the pertaining challenges farmers have encountered in recent years and are likely to encounter in the future. Furthermore, experts identified a holistic consultancy approach to become more and more important. Currently most of the advisors in many of the PAAO are highly specialised to their domain.

4.5 Linkages with other AKIS actors/knowledge flows

Some linkages and knowledge flows between the different AKIS actors were already described in chapter 2 and illustrated in Figure 1. The PAAO (n=5) could indicate the strength of these relationships on a 4-level scale: no, weak, medium or strong cooperation. The degree of cooperation with universities ranged from no cooperation (one mention), over weak cooperation (three mentions) to a medium cooperation (one mention). The cooperation with research institutes was characterised by four PAAO as medium and by one as strong. A strong cooperation with public authorities was indicated by three PAAO. For one PAAO this cooperation was medium and for one weak. Linkage with farmer based and professional organisations and advisory services is medium (two mentions) to

strong (three mentions). The link with private companies was rated as medium by one PAAO and as weak by two, while the remaining two PAAO did not cooperate with private companies. With upstreaming industries, the linkage also varies from no cooperation over weak to medium. For downstreaming industries most of the advisory services only have a weak linkage.

In terms of cooperation between the different PAAO, the semi-structured interviews with the experts indicated, that a good collaboration exists between the three viticulture PAAO Domaines Vinsmoselle, OPVI and IBLA. They also collaborate closely with the public administration IVV and the linkage is strong. Furthermore, they all cooperate in different research and dissemination projects.

In contrast, in agriculture, the collaboration and cooperation between the different PAAO is not as strong. In the expert interviews it was stated, that one reason is the history of the different advisory services and their different domains of competences (e.g. crop vs. livestock production). However, some experts were also convinced, that the situation was further aggravated with the implementation of the module system, as the various PAAO are now in a competitive situation. While in viticulture, the three concerned PAAO worked out the content of the modules together and in cooperation with the public authorities, a separate meeting was held between the different agricultural PAAO and the MAVRD.

This does, nevertheless, not mean, that no cooperation between the agricultural PAAO exists. They work together in different EIP or other research and dissemination projects. However, the focus of the cooperation in such projects is often on other AKIS actors and less on the other PAAO. A positive example of collaboration among the PAAO is a grassland focus group, where LTA, ASTA, SER, CONVIS and IBLA work closely together, some already for over 20 years.

The organic sector was mentioned by the majority of the experts as a positive example of a strong network among different AKIS actors. All the actors, from farmer's associations, cooperatives, producer groups over advisory organisation and research institute have a strong relationship and collaborate closely not only in agriculture, but also in viticulture. The information and dissemination flow to the farmers and winegrowers was described as direct and fast; the producers are well integrated and at the centre of this network.

4.6 Programming and planning of advisory work

As mentioned in chapter 4.2, the details pertaining to the advisory module system (e.g. funding rates) are defined in the ministerial regulation of the 28th February 2020 (Gouvernement du Luxembourg, 2020). The perception of the experts was that the module systems inhibits innovation, whereas the old systems promoted networking, innovation and cooperation among the AKIS actors and in particular the dissemination of knowledge to the farmers. They see the module system as too rigid and inert. To promote innovation a system has to be reactive. The experts from the advisory domain criticised a missing bottom up strategy and communication from authorities. Meanwhile, experts from public authorities described that they pursue a bottom up approach. Thus, different point of views regarding the definition of a bottom up approach exist and can inhibit the communication, collaboration and mutual trust between advisory organisations and public authorities. The PAAO experts did not feel sufficiently supported by public authorities. Some experts stated, that the actual and future challenges of the farmers and the agricultural sector were not known by the authorities or differed from the priorities set at public and political level.

Furthermore, the same experts regretted that some advisory topics cannot be addressed in the rigid framework of the module system. The experts from the advisory domain criticised a lack of possibilities to consult farmers according to their needs; every advisory activity needs to be imbedded in an existing and to the respective organisation accredited module. The majority of the experts from the advisory domain had visions of how the advisory system could be better organised in order to promote better cooperation of the AKIS actors, a more holistic approach of advisory, a better adaptation to currently relevant topics and an innovation-promoting system. However, none of them felt heard by the authorities. Experts from public authorities announced in the interview the upcoming launch of an “Innovation HUB” as an innovation platform with the target to link different actors in the domain of agriculture. The aim is to encourage collaboration on innovative solutions to face the existing and future challenges of the sector.

4.7 Advisory organisations forming the FAS and evaluation of their FAS implementation

As defined by the European Commission, “the farm advisory system (FAS) helps farmers to better understand and meet the EU rules for environment, public and animal health, animal welfare and good agricultural and environmental conditions” (European Commission, 2020). According to EU regulation Nr. 1305/2013, FAS has to provide specific information and services in order to be eligible for European financial support (European Parliament, 2013). The information provided by the Luxembourgish FAS and the modules through which it is implemented in Luxembourg are described by the European Commission (2020) as the following:

- *Obligations at farm level resulting from the statutory management requirements and the standards for good agricultural and environmental land conditions (“cross-compliance”). In Luxembourg this element is included in module Nr. 18, that was not booked by any farmer since the beginning of the module system.*
- *Agricultural practices beneficial for the climate and the environment and maintenance of the agricultural area (“greening”), represented in the modules Nr. 1, 2, 6, 15, 16, 17, 23, 24 and 25.*
- *Measures at farm level provided for in rural development programmes for farm modernisation, competitiveness building, sectorial integration, innovation and market orientation as well as for the promotion of entrepreneurship, being implemented in modules Nr. 26 and 18.*
- *Requirements for water protection, efficient and sustainable water use. This element is treated with modules Nr. 1 and 2.*
- *Use of plant protection products and integrated pest management, implemented in modules Nr. 2, 9, 10, 11, 19 and 20.*

Looking at the list above, it becomes clear that the FAS in Luxembourg is currently not fulfilling all its obligations, as no module Nr. 18 has yet been booked. This information was also confirmed during the interviews with the experts from the public authority domain. However, all advisory organisations stated, that they advise farmers on how to adapt their farms to comply with the cross-compliance requirements by EU-FAS, even if they do not do it in the framework of module Nr. 18. This highlights the problem with the rigidity of the module system: advisors will do their best to react to the farmers’ needs, even if they might not be

accredited to cover a specific topic or module, or if a farmer is not interested in booking a whole module to get the needed answers and advice.

With regard to an evaluation of the FAS in Luxembourg, none of the expert knew whether, when and how this would be done. Most of the experts did not even know that FAS existed and what it meant.

5. Summary and conclusions

It needs to be noted, that the description of the Luxemburgish AKIS presented in this report is based on information from officially available sources, the information provided by the PAAO through the online survey and the personal appraisal of the interviewed experts. The latter especially showed that opinions on the challenges, viability and future direction of the advisory system in Luxembourg differed between the different actors, and the report aimed to objectively highlight these different points of views.

5.1 Summary and conclusions on sections 1 – 3

For a relatively small country like Luxembourg, the agricultural sector is very diverse and its AKIS well positioned and good connected. The Luxemburgish AKIS includes actors from the categories public authorities, research and education organisations, private sector (for profit) and third sector of farmer/farmer-based organisations. In Luxembourg eight advisory organisations are recognised as PAAO. The MAVRD is in charge of the accreditation of these organisations. Besides the PAAO, the AKIS of Luxembourg is composed of two research institutes, an agricultural school as well as different unions & farmers associations, cooperatives & producer groups, and input traders. The linkage of all these actors with the farmers and winegrowers is strong. Nevertheless, the network between the different AKIS actors and especially between the eight PAAO could be stronger. As already noted by Paul et al. (2014), PAAO do not sufficiently cooperate. The PAAO of viticulture make an exception as they have a good and close cooperation, whereas the PAAO of agriculture have no substantial cooperation in their specific day-to-day advisory activities. The best linkage between actors is achieved within research and dissemination projects, such as variety trials, on-farm field trials or EIP projects. At the heart of these projects and the therewithin created networks are the primary producers. Outside of such projects, each actor pursues its own objectives; there is a lack of coordinated collaboration and knowledge flow between actors to promote innovation and capabilities to meet future challenges of the agricultural sector.

5.2 Summary and conclusions on section 4

While the MAVRD is in charge of the accreditation of the PAAO and their individual advisors for the different advisory modules, the LWK is mandated with its coordination. This gives it a double role, as itself is a PAAO in Luxembourg. In the expert interviews, it was pointed out, that this double role is unfortunate, as there is no real separation of powers. The content of the advisory modules, funding rates and maximal funding height as well as minimum qualifications of providers are fixed in ministerial regulation. Experts opinion is that the modules system inhibits innovation and collaboration between the PAAO, as a competition situation is created.

The eight PAAO employ 44 accredited advisors: 12 women and 32 men. The advisors all meet at least the minimum qualification requirements (Bachelor's degree or equivalent). Time spend for teaching and training of the advisors is limited, mainly due to the difficulties with financing of such activities. There exist some possibilities to receive public funding through the MAVRD for further training. The LWK is also in charge of the coordination of these programmes. This results again in issues with regard to separation of powers, as it is also eligible to receive funding through these channels. The soft skills training co-financed by the MAVRD was appreciated by the participants, mainly because of the networking opportunity they provide for the advisors of the different PAAO, who have little contact in their daily work.

Most frequently individual advice was used as an advisory method. Due to the COVID-19 pandemic a shift from individual face to face advisory on the farm to individual advisory via telephone or via digital apps was described. Clients of the PAAO are mainly farmers with small/medium-scaled farms to large commercial farms (>100ha).

With regard to advisory topics, a focus on production technologies could be determined, mainly regarding crop production. Given that more than 50 % of the Luxembourgish UAA consists of meadows and pastures and that the main farm type is specialised grazing livestock farms, it is surprising that the focus of advisory in Luxembourg is not on livestock and grassland production.

As further challenges ecology and environment protection, knowledge on markets and farm viability, mitigation and adaptation to climate change, and specific

technological knowledge (e.g. farming practices, production technologies) were named. The intensified focus on environmental topics and the herewith coming regulations were also mentioned in the expert interviews. Another topic that came up is the digitalisation and the pertaining challenges farmers have encountered in recent years and are likely to encounter in the future.

In the new module system implemented in 2016, the financing of the advisory services is switched from direct payments of the PAAO and the accredited advisory to service based financial system: farmers can take advantage of a catalogue of modules for which they receive between 50-100 % financial support to cover the costs. The content of the advisory modules, the funding rates and the maximal funding amount as well as the minimum qualifications needed of providers are defined in a ministerial regulation. This change has led to financial difficulties for the PAAO as funding rates for the different advisory modules are too low and overhead costs are not included in the calculation of the hourly wage. Furthermore, the new system has led to a higher bureaucratic burden for the PAAO and its reduction was mentioned as a future challenge. The rigidity of the new system has also led to difficulties in organising dissemination and knowledge transfer activities for farmers, due to the lack of funding possibilities within the module system. The instruments to fund research and dissemination project were described as not practical due to long decision processes and administrative burdens.

A lack of possibilities to consult farmers according to their needs was criticised by the advisory experts, as every advisory activity needs to be imbedded in an existing and to the respective organisation accredited module. When the content of the modules was initially formulated, the aim of the MAVRD was to maintain the existent amount of funding for the respective PAAO in an effort to continue to support them, rather than focusing on farmers' knowledge needs. The different experts all presented visions and possibilities on how to improve the current advisory system to meet future challenges. These included ideas on how to move towards a better cooperation between AKIS actors, a more holistic approach of advisory, a better adaptation to currently relevant topics and an innovation-promoting system.

6. Acknowledgement of partners, information sources and gaps

Main information sources are the semi-structured expert interviews and the results from the quantitative online survey. The semi-structured interviews were conducted with six experts from public authorities, public accredited advisory organisations, research and education organisations and farmer-based organisations. The interviewees were guaranteed anonymity, which is why no further details on their identity (name, workplace, etc.) are given and no direct citations are used. The latter could also point to the identity in the small agricultural sector of Luxembourg.

Five of the eight PAAO participated in the survey. This corresponds to a response rate of 62.5 %. These five PAAO employ 38 of the 44 accredited advisors of Luxembourg. It can, thus, be concluded that a fair representation of PAAO in Luxembourg was achieved and relevant insights were won.

As was stated by Paul et al. (2014), grey literature on specific topics (e.g. the history of the advisory system) was and still is very limited. Therefore, the main sources of information, apart from the survey and the expert interviews, is gathered from the homepages of the AKIS actors, especially in regards to the history for chapter 3.

A more complete picture of the AKIS and the current advisory system could have been achieved, would the farmers also have been questioned on their views. The report at hand highlights the challenges the PAAO encounter; however, it does not touch on how well the farmers feel supported. Do they receive the necessary assistance and are their advisory needs covered?

The authors would like to take this opportunity to thank all the respondents of the online survey and the experts for their time and the participation in the study. The authors extend a further thank you to Sangeun Bae (University of Hohenheim) for her support and the great coordination the AKIS inventory update.

7. References

AGE, 2020: Missions of Administration de la gestion de l'eau.

<https://eau.public.lu/administration/missions/index.html> (last accessed 05/11/2020)

ASV, 2020: Administration of veterinary services.

<https://logistics.public.lu/fr/formalities-procedures/agencies/administration-veterinary-services.html> (last accessed 05/11/2020)

Centrale Paysanne, 2020: Dienstleistungen.

https://centralepaysanne.lu/WordPress3/?page_id=19 (last accessed 27/11/2020)

CONVIS, 2020a: CONVIS: Aer Genossenschaft fir Déierenproduktioun.

<https://www.convis.lu/abteilung/convis.html> (last accessed 09/11/2020)

CONVIS, 2020b: CONVIS Satzung. [https://www.convis.lu/fileadmin/data](https://www.convis.lu/fileadmin/data/departments/Allgemein/Verwaltung/Satzung_20170621.pdf)

[/departments/Allgemein/Verwaltung/Satzung_20170621.pdf](https://www.convis.lu/fileadmin/data/departments/Allgemein/Verwaltung/Satzung_20170621.pdf) (last accessed 09/11/2020)

Domaines Vinsmoselle, 2020: Präsentation Domaines Vinsmoselle.

<https://www.vinsmoselle.lu/de/prasentation-vinsmoselle> (last accessed 09/11/2020)

European Commission, 2014: Commission Regulation (EU) No 702/2014 of 25

June 2014 declaring certain categories of aid in the agricultural and forestry sectors and in rural areas compatible with the internal market in application of Articles 107 and 108 of the Treaty on the Functioning of the European Union.

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R0702> (last accessed 27/11/2020)

European Commission, 2020: Farm advisory system.

https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/income-support/cross-compliance/fas_en (last accessed 13/11/2020)

European Parliament, 2013: Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural

development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R1305> (last accessed 29/11/2020)

EUROSTAT, 2020a: Gross domestic product at market prices. <https://ec.europa.eu/eurostat/databrowser/view/tec00001/default/line?lang=de> (last accessed 20/10/2020)

EUROSTAT, 2020b: Breakdown of gross domestic product and income by A*10 industry. <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do> (last accessed 26/11.2020)

Gouvernement de Luxembourg, 1924: Loi du 4 avril 1924 portant création de chambres professionnelles à base électorale.
<http://legilux.public.lu/eli/etat/leg/loi/1924/04/04/n1/jo> (last accessed 27/11/2020)

Gouvernement de Luxembourg, 2016: Loi du 27 juin 2016 concernant le soutien du développement durable des zones rurales.
<http://legilux.public.lu/eli/etat/leg/loi/2016/06/27/n7/jo> (last accessed 27/11/2020)

Gouvernement de Luxembourg, 2017a: Règlement grand-ducal du 11 septembre 2017 instituant un ensemble de régimes d'aides pour la sauvegarde de la diversité biologique en milieu rural.
<http://legilux.public.lu/eli/etat/leg/rgd/2017/09/11/a863/jo> (last accessed 25/11/2020)

Gouvernement de Luxembourg, 2017b: Règlement grand-ducal du 17 mai 2017 portant exécution des dispositions des chapitres 17 et 18 de la loi du 27 juin 2016 concernant le soutien au développement durable des zones rurales.
<http://legilux.public.lu/eli/etat/leg/rgd/2017/05/17/a497/jo> (last accessed 27/11/2020)

Gouvernement de Luxembourg, 2020: Règlement ministériel du 28 février 2020 fixant le contenu des modules de conseil dans le domaine de l'agriculture, le taux d'aide et le montant maximal de l'aide ainsi que les qualifications minimales des

prestataires. <http://legilux.public.lu/eli/etat/leg/rmin/2020/02/28/a109/jo> (last accessed 28/11/2020)

IBLA, 2020: General information on IBLA. <https://ibla.lu/en> (last accessed 30/11/2020)

Knierim, A.; Bae, S.; Birke, F. M. and Gerster-Bentaya, M., 2020: AKIS Country Reports Guideline. Version 1. Project 12connect – Connecting advisors to boost interactive innovation in agriculture and forestry. University of Hohenheim

LIST, 2020a: LIST: Environment. <https://www.list.lu/en/environment> (last accessed 05/11/2020)

LIST, 2020b: LIST: Agriculture & viticulture. <https://www.list.lu/en/cooperation/lines-of-business/agriculture-viticulture> (last accessed 05/11/2020)

LIST, 2020c: LIST: Sentinelle IV. https://www.list.lu/en/cooperation/lines-of-business/agriculture-viticulture/project/?tx_listprojects_listprojectdisplay%5BlistProjects%5D=543&tx_listprojects_listprojectdisplay%5Barchive%5D=&cHash=e109d562d18b29829deccbd13a2cd57a (last accessed 05/11/2020)

LTA, 2020: Das Lycée Agricole in Ettelbrück. <https://www.lta.lu/> (last accessed 27/11/2020)

LWK, 2020: Die Landwirtschaftskammer: Funktionen und Aufgaben. <https://www.lwk.lu/landwirtschaftskammer/funktionen-und-aufgaben> (last accessed 09/11/2020)

MAVDR, 2020a. Rapport d'activités 2019. https://agriculture.public.lu/dam-assets/publications/ma/rapports_d%27activites/MAVDR-Rapport-dactivites-2019.pdf. (last accessed 20/10/2020)

MAVDR, 2020b. Dossier: Entwicklung der biologischen Landwirtschaft von 2009 bis 2019. <https://agriculture.public.lu/content/dam/agriculture/publications/asta/bio/DOS%20SIER-Entwicklung-BLW-2009-2019-Juni-2020-DE.pdf> (last accessed 20/10/2020)

MAVDR, 2020c: Administration des services techniques de l'agriculture (ASTA). <https://agriculture.public.lu/de/dienststellen/asta.html> (last accessed 27/11/2020)

MAVDR, 2020d: Service d'économie rural (SER). <https://agriculture.public.lu/de/dienststellen/ser.html> (last accessed 05/11/2020)

MAVDR, 2020e: Betriebsführung – Beratung. <https://agriculture.public.lu/de/betriebsfuhrung/beratung.html> (last accessed 05/11/2020)

MAVDR, 2020f: Die Veterinärverwaltung. <https://agriculture.public.lu/de/dienststellen/asv.html> (last accessed 05/11/2020)

MAVDR, 2020g: Wine Institute (IVV). <https://ma.gouvernement.lu/en/administrations/ivv.html> (last accessed 05/11/2020)

MAVDR, 2020h: Geförderte Beratungsmodule und akkreditierte Beratungsorganisationen.
<https://agriculture.public.lu/de/publications/beihilfen/beratungsmodule.html>
(last accessed 29/11/2020)

MAVDR, 2020i: Personal communication. (12/10/2020)

MBR, 2020: Statuten. <https://mbr.lu/statuten/> (last accessed 27/11/2020)

MDDI & MAVPC, 2018: Naturschutz durch Landwirtschaftliche Nutzung. Luxemburg.
<https://agriculture.public.lu/de/publications/beihilfen/biodiversitaet.html> (last accessed 25/11/2020)

Nature Park Oewersauer, 2020: Landwirtschaftsberatung.
<https://www.naturpark-sure.lu/projects/landwirtschaftsberatung/> (last accessed 29/11/2020)

Oekozenner, 2020: Landwirtschaftsberatung. <https://www.oekozenner.lu/de/dienstleistungen/landwirtschaftsberatung/> (last accessed 20/11/2020)

OPVI, 2020: Privatwënzer: Welcome of President. <http://www.privatwenzer.info/en/ueber-uns/grusswort.html> (last accessed 09/11/2020)

Paul, C.; Ndah, H.T.; Knierim, A. (2014): AKIS and advisory services in Luxembourg. Report for the AKIS inventory (WP3) of the PRO AKIS project.
<https://430a.uni->

hohenheim.de/fileadmin/einrichtungen/430a/PRO_AKIS/Country_Reports/Country_report_Luxembourg16_05_2014.pdf (last accessed 25/11/2020)

SER (2020a): Personal communication. (22/10/2020)

SER (2020b): Personal communication. (25/11/2020)

STATEC (2020a): Population by sex and nationality on 1st January. Online:
https://statistiques.public.lu/stat/TableViewer/tableView.aspx?ReportId=12853&IF_Language=eng (last accessed 20/10/2020)

STATEC (2020b): Agricultural holdings by size classes 1907 – 2019. Online:
https://statistiques.public.lu/stat/TableViewer/tableView.aspx?ReportId=13349&IF_Language=eng&MainTheme=4&FldrName=2&RFPath=7274 (last accessed 20/10/2020)

STATEC (2020c): Milk production 1937 – 2019. Online:
https://statistiques.public.lu/stat/TableViewer/tableView.aspx?ReportId=13376&IF_Language=eng&MainTheme=4&FldrName=2&RFPath=7276 (last accessed 20/10/2020)

Synplants, 2020: Willkommen bei Synplants. <http://www.synplants.lu/default-de.aspx> (last accessed 09/11/2020)

Appendices

Annex 1: List and contact of organisations forming AKIS

English Name	Name and address	Website	Organisational status
Administration of Technical Agricultural Services (ASTA)	Administration des Services Techniques de l'Agriculture 16, route d'Esch, L-1470 Luxembourg; B.P. 1904, L-1019 Luxembourg	https://agriculture.public.lu/de/dienststellen/asta.html	Public
Rural Economy Department (SER)	Service d'Economie Rurale 115, rue de Hollerich, L-1471 Luxembourg B.P. 2102, L-1021 Luxembourg	https://agriculture.public.lu/de/dienststellen/ser.html	Public
Wine Institute (IVV)	Institut viti-vinicole 8, rue Nic Kieffer, L-5551 Remich B.P. 50, L-5501 Remich, Luxembourg	https://agriculture.public.lu/de/dienststellen/institut-viti-vinicole.html	Public
Veterinary Services Administration (ASV)	Administration des services vétérinaires 7B, rue Thomas Edison, L-1445 Strassen B.P. 1403, L-1014 Luxembourg	https://agriculture.public.lu/de/dienststellen/asv.html	Public
Nature Park Öewersauer	Naturpark Öewersauer 15, route de Lultzhausen, L-9650 Esch-sur-Sûre	www.naturpark-sure.lu	Public/NGO
Nature Park Our	Natur Park Our 12, Parc, L-9836 Hosingen	www.naturpark-our.lu	Public/NGO
Nature and Geopark Mëllerdal	Natur- & Geopark Mëllerdall 8, rue de l'Auberge, L-6315 Beaufort	www.naturpark-mellerdall.lu	Public/NGO
Agricultural School (LTA)	Lycée Technique Agricole 72, avenue Salentiny, L-9080 Ettelbruck	www.lta.lu	Research and Education

	B.P. 76, L-9001 Ettelbruck		
Institute for Organic Agriculture Luxembourg (IBLA)	Institut fir Biologesch Landwirtschaft an Agrarkultur Luxembourg 27, Op der Schanz, L-6225 Altrier	www.ibla.lu	Research and Education
Luxembourg Institute of Science and Technology (LIST)	Luxembourg Institute of Science and Technology 5, avenue des Hauts-Fourneaux, L-4362 Esch-sur-Alzette	www.list.lu	Research and Education
Chamber of Agriculture (LWK)	Chambre d'Agriculture 261, route d'Arlon, L-8011 Strassen	www.lwk.lu	FBO
Centrale Paysanne Luxembourgeoise	Centrale Paysanne Luxembourgeoise 44, rue de la Gare B.P. 48, L-7501 Mersch	www.centralepaysanne.lu	FBO (agrl. trade union)
Independent Farmer's Association (FLB)	Fraie Lëtzebuenger Baureverband 27, rue des Tisserands, L-6792 Grevenmacher	https://www.facebook.com/FraieBauer/	FBO (agrl. trade union)
Farmer's Alliance	Bauern Allianz Address not found	https://www.facebook.com/BauernAllianz/	FBO (agrl. trade union)
CONVIS	CONVIS s.c. 4, Zone Artisanale et Commerciale, L-9085 Ettelbruck	www.convis.lu	FBO (Agrl. association)
Independent winegrower's association	Organisation Professionnelle des Vignerons Indépendants Asbl (O.P.V.I.) 115, route du Vin, L-5416 Wormeldange	www.privatwenzer.lu	FBO
Domaines Vinsmoselle	Domaines Vinsmoselle 12, route du Vin, L-5450 Stadtbredimus BP 40, L-5501 Remich	www.vinsmoselle.lu	FBO
Young farmers association	Lëtzebuenger Landjugend a Jongbaueren a.s.b.l.	www.jongbaueren.lu	FBO

	5, avenue Marie-Thérèse, L-2132 Luxembourg		
Seed potatoe association (SYNPLANTS)	E'slecker Setzgromperegenossenschaft 46, Burewee, L-9748 Eselborn	https://www.facebook.com/Synplants-316706642209170	FBO
Machinery and operational aid ring (MBR)	Maschinen und Betriebshilfsring Lëtzebuerg 12A, Cité Morisacker, 7735 Colmar-Berg B.P. 19, L-7701 Colmar-Berg	www.mbr.lu	FBO
Luxemburgish seed growing cooperative (LSG)	Luxemburger Saatbaugenossenschaft 5, rue François Krack, L-7737 Colmar-Berg	http://www.lsg.lu	FBO
Commercial cooperative De Verband	De Verband 3, rue François Krack, L-7737 Colmar-Berg	https://www.de-verband.lu	FBO
Federation of winegrower's associations	Fédération des Associations Viticoles 23, route de Trèves, L-6793 Grevenmacher B.P. 57, L-6701 Grevenmacher	No website	FBO
Organic farmer's association BIOG	Bio-Bauere-Genossenschaft Lëtzebuerg (BIOG) 13, rue Gabriel Lippmann, L-5365 Munsbach	www.biog.lu	FBO
Luxemburgish milk producer's cooperative Luxlait	Luxlait 3, Am Seif, L-7759 Roost / Bissen	https://www.luxlait.lu	FBO
Agricultural cooperation Upper Sûre (LAKU)	Landwirtschaftliche Kooperation Uewersauer (LAKU) 15, rue de Lultzhausen, L-9650 Esch-Sauer	www.naturpark-sure.lu/projects/laku/	FBO
Association for Organic Farmers	Vereenegung fir Biolandwirtschaft Lëtzebuerg 13, rue Gabriel Lippmann, L-5365 Munsbach	www.biovereenegung.lu	FBO
Association to promote integrated agriculture (FILL)	Förderungsgemeinschaft Integrierter Landbau Luxembourg 115, rue de Hollerich, L-1741 Luxembourg	No website	FBO
Ecological Movement	Mouvement Ecologique asbl 6, rue Vauban, L-2663 Luxembourg	https://www.meco.lu/de	NGO

Environmental association Oekozenfer Pafendall	Oekozenfer Pafendall asbl 6, rue Vauban, L-2663 Luxembourg	https://www.oekozenfer.lu/de	NGO
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