AKIS and advisory services in *Slovak Republic*

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

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INTERACTIVE INNOVATION

Executive summary

Advisory is an independent professional consulting service supporting the activities of managers and organizations to fulfill the goals and mission of companies by solving specific problems. Management of advisory is rapidly changing the world wherever new players, disciplines and capacities are systematically integrated into the profession. It is changing the world where the limits of opportunity are still widening in a globally interconnected business covering a wide range of areas that a few years ago practically did not even exist in human thought. Today, the world is much more than in the past a place of never-ending rapid change. This brings a big challenge for business consultants to make the most of the changes for their customers. The presented report deals with the system of functioning of advisory services in the Slovak Republic, the institutional organization of agricultural advisory services with existing advisory services. Requirements for consultants who provide advisory services are changing dynamically, especially in areas such as technical knowledge and skills, communication skills. With globalization and volatile change, we are becoming part of the virtual environment and virtual teams, and we are more and more dependent on virtual contacts. Among other aspects, the work of consultants is dominated by project approaches, with fundamental issues of project management.

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Table of Contents

List of Figures

List of Tables

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Abbreviations

AFC	Agriculture and Food Chamber
AFSE	Association of Forest Sector Employers
AFW	Association of Forestry Workers
AFKIS	Agricultural and Forestry Knowledge and Information System
ARVI	Agency for Rural Development
APA	Agricultural Payment Agency
CAP	Common Agricultural Policy
CNFOA	Council of Non-state Forest Owner Associations
DESIPAP	Development of Extension Services to Improve Primary Agricultural Production
EU	European Union
EUR	euro
FAS	Farm Advisory System
FPS	Forestry Protection System
GDP	Gross Domestic Product
Ha	hectare
IFEE	Institute for Forestry Extension and Education
IFCE	International Forestry and Consultancy in Zvolen
IETFWMW	Institute for the Education and Training of Forestry and Water Management Workers
PEFC SK	Forest Certification Body
MOARD	Ministry of Agriculture and Rural Development
NFC	National Forestry Centre
SAPARD	Special Accession Programme for Agriculture and Rural Development
SMRs	Statutory Management Requirements
SO	Statistical Office
SPU	Slovak University in Nitra
STU	Slovak Technical University
TANAP	Tatras National Park
TUZVO	Technical University in Zvolen

1. Main structural characteristics of the agricultural and forestry sector

The agricultural and forestry sectors underwent significant structural changes in the last three decades. Great challenges and opportunities had been launched by the transition process of the economy which has started in 1990. This process caused the substantial decline of crop and animal production about one-third in comparison with the year 1989. The majority of collective farms were dismantled, state farms have been gradually privatized, small and family farms appeared among the business units in agriculture. The sectors during this period were heavily underfinanced and minimum investments have been realized. Despite, numerous disadvantages the sectors were gradually prepared for the EU accession in 2004 as well as the preconditions of the market economy's environment have been fully met in this year.

The EU accession was connected with great expectations both from farmers as well as food processors' sides. The EU direct payments despite their starting unequal conditions for EU-15 new member states at least partly inhibited the procurement of the agricultural technologies and brought to the sectors innovation processes. In the first year after the accession, the farmers and food processors could successfully compete with their counterparts from EU-15. The EU accession had also positive effects on crop production which scaled-up about 16, 1 %, on the contrary; animal production has declined about 19,1%.

Great opportunities have been introduced to the farmers with high food prices from 2006-2007, as their income for agricultural production has been significantly upgraded. However, this tendency has converted to the development of volatile prices for agricultural commodities which had once more negative impact on the farmers' income. The most critical development in sectors was connected to the financial crises which have started in 2008 and lasted till 2009. These crises negatively affected first of all small fragile farmers. A large number of small and family farms has disappeared and they were procured or leased by the owners/managers of the larger agricultural enterprises. The overall number of farms has declined reasonably.
The permanent crisis scenarios in these sectors are continuing with the climate changes which lead due to the high temperatures, great droughts, or visa-versa

severe floods or other natural disasters, to the lower yields and hence decreased incomes of primary producers. On top of this, the situation is complicated with the outbreak of the COVID-19 pandemic, which in Slovak conditions so far has no impact on the lower yields of crop or animal productivity, however, the farm-gate prices are staying at their lowest level while the food prices are significantly raising.

The development of the basic macroeconomic indicators in the agriculture, food, and forestry sector in the economy of the Slovak Republic in 2017 is continuing in its decline.

According to the Slovak Statistical Office in 2017 population of the Slovak Republic represented 5, 439, 232 citizens. The share of citizens employed in agriculture represents – 2, 99**%** (47.7 thousand persons 2017). Before the transition of agriculture till 1990 the number of employees working in agriculture was 301 thousand. The share of employees working in the food processing industry is achieving 2,18 % (in total 32 100 persons).

The contribution of forestry to employment is 0.7% (2017). The number of employees both in agricultural primary production farms and in the forestry is dramatically declining since 1990 when this indicator represented more as 330 thousands citizens. By this process, the agricultural production was significantly scaled-up, but it was not embodied to the positive trends of the efficiency indicators' development.

- The average wage in agriculture increased to 735.00 Euros from 718.00 Euros in 2016. In the same year, the average wage in the food processing industry was 882 Euro There is still a significant wage disparity between the agri-food and forestry sectors and the other branches of the national economy in Slovakia. Compared to the average of the other branches of the Slovak economy, the wages in agriculture were lower about 22.96 %.
- GDP per capita in the national economy achieved 15.600 EUR (2017). The share of agriculture on GDP is sharply scaling-down by achieving the result 1, 6 % in 2017. The strong decline was most visible after the EU accession.

- According to data, in 2017 the number of agricultural holdings was 18 840 Eur. Especially, after the financial crisis, 2008-2009 in this field is noted the continuous decline of the number of the agricultural holding.
- Concerning the age of agricultural holders, it is noted the similar development as in the other part of the world. The average age of the agricultural holdings' owners is about 58 years. The Government of the Slovak Republic is introducing various measures to attract young people to agriculture. Among the other incentives is dominating the financial support of 50 000 Euro to the farmers up to age 40 provided in two tranches. Nonetheless, there is the challenging issue of access to the land, low wages, crucial working conditions, and overall underestimation of the sector from the societal point of view.
- In 2017, the acreage of the total utilized agricultural land accounted for 1 910 654 ha. A decrease in acreage was recorded in all types of land, namely in the case of permanent grassland to 17, 761 ha (3.16 %), arable land to 1, 342, 885 ha (0.33 %), permanent meadows and pastures to 517 679 ha (0.72 %) and home gardens to 32 329 ha (by 0.09 %) compare to 2016. The average rent paid by agricultural entities in selected regions of Slovakia accounted for 50.26 Euro.ha^{-1}. The highest rent per hectare of leased agricultural land was paid by entities in the districts of Dunajská Streda 125,00 Euro.ha^{-1}, Nitra 83.17. Euro. ha^{-1} and Trnava 78.94. Euro. ha^{-1}. On contrary, the lowest rent was paid by agricultural entities in the districts of Liptovský Mikuláš 22.45. Euro. ha^{-1}, Banská Bystrica 24.70 Euro.ha^{-1}, Prešov 27.63.Euro. ha^{-1} and Žilina 29.43.Euro.ha^{-1}.
- The average size of one agricultural holding is 80,7 ha (in EU-28 – 16,1 ha). The highest number of the agricultural holdings - 7,826 is cultivating in total 19,910 hectares, while those who are operating farms with higher acreage than 500 hectares (1003) are in total cultivating more as 1, 336 995 hectares. From table one is clear that owners/farmers/farm managers do have an interest in the farms with higher acreages, as from this is stemming advantage connected with higher incomes linked to the direct payments. Besides for utilization of modern, smart, and data-driven technologies, is more favorable the environment of the larger agricultural holdings.

Table 1 Agricultural Holdings by Size in Hectares, 2017 (number of holdings)

Interval of agr.land	**Up to 5**	**5-10**	**10-50**	**50-100**	**100-250**	**250-500**	**Above 500**	**TOTAL**
Number of enterprise	7,826	3,370	4,295	928	897	524	1,003	18,843
Total managed agricultural land in ha	19, 910	24,117	94,508	65,524	142,624	187, 571	133,6 995	1,871, 249

Source: Eurostat,2018

In 2018, the area of forest land (forest stands) was 1,947,752 ha. In addition to forest land covered by forest stands, the forest land registry also includes plots with temporary restriction of forest functions (e.g. forest road network, depots, forest nurseries, seed orchards, etc), which altogether accounted for 2,020,926 ha in 2018. In 2018, forest cover reached 41.2 %, which can be considered as a high share.

In 2018, the state-owned 784,684 ha (40.3%) of forest land and managed 1,005,208 ha of forest land (51.6%). The remaining area of forest land was managed by non-state forest enterprises that own and manage private, municipal, church, and community forests as well as forests of agricultural cooperatives (Table 2).

Table 2 Ownership and Use of Forest Land

	Forest land		
	Owned	Managed	Managed
	area (ha)		share (%)
State	785,000	1,050,000	51.6
Private	233,000	152,000	7.8
Cooperatives	384,000	596,000	30.6
Church	47,000	16,000	0.8
Agri-cooperatives	5,000	7,000	0.4
Municipal	157,000	171,000	8.8
Unknown	372,000	-	-

Source: Green Report, 2019

According to preliminary data for 2017, agriculture reached a positive economic outturn, i.e. profit before tax of 60.2 mil. Euro compared to 2016, its level slightly increased by 11.5 mil. Euro (23.6 %). The positive development was affected by a price factor – an increase in prices, with a weight decrease in gross agricultural production, especially plant production. The positive economic outturn was also reached due to the influences of stability in the payment of subsidies with a simultaneous year-on-year improvement in the sale of animal production, which partially compensated the total decrease in sales from plant production. Without subsidies, most enterprises would be loss-making (Table 3). In 2017, agricultural enterprises optimized their cost factors to achieve a more favorable economic outturn. The economy of product industries was decisive in the changes in the production structure. Revenues reached 2,389.4 mil. Euro, costs accounted for 2,239.2 mil. Eur and they were growing with slower rates (3.5 %) than revenues (4.0 %). The increase in the prices of inputs, especially energies, was reflected in the cost of revenues (99.60 mil. Eur). Revenues from the sale of own agricultural products reached 1,650.2 mil. EUR, of which the sale of plant products reached 921.0 mil. Eur and the sale of animal products noted 729.2 mil. Eur.

Table 3 Economic Data for Agricultural Enterprises – Legal Entities in 2017, In Eur. ha-1 of a.l., in %

Indicator	**Legal entities**	**Agricultural cooperatives**	**Trading companies**
Value added	305	253	349
Total subsidies	315	321	307
Production	1251	1 041	1436
Income costs	95,7	98,5	93,8
Debt to equity ration, in %	46,8	37,8	52
The profit share of enterprises in %	72	70	76

Source: Green report, 2019

In 2018, forest sector earnings and revenue amounted to 1,105.05 million Eur. The largest share of earnings was from forest enterprises' products and services (79.8 %). The total earnings and revenue of forest enterprises reached 595,610 million euros. The largest share of earnings and revenue generated by forest enterprises originated from the sale of timber (79.2 % of the total market production). Other earnings and revenue represent income from the trading with other forest-based products, transplants, by-products of forest production, hunting, tourism, and

forest services, as well as revenue from leasing and selling of forest properties, commercial activities, fiscal capital, and bonds.

Service providers in the forest sector reported earnings of 509.44 million Euro, of which 73.5% were earnings for their own products and services, 22.2 % earnings from the sale of goods, and the rest were other earnings and revenue (Table 4).

Table 4 Earnings and revenue of forest enterprises in current prices (in million Eur)

Indicator	Forest enterprises			Service providers			Forest sector
	State	Non-state	Total	Business companies	Self-employed	Total	
∑ Earnings and revenues	300.66	294.95	595.61	228.56	280.88	509.44	1,105.05
Goods sale	0.25	9.68	9.93	68.88	44.19	113.07	123.00
Earning from own products and services	266.42	241.45	507.87	148.37	226.09	374.46	882.33
- of which timber earnings	245.82	225.95	471.77				471.77
Other earnings and services	33.99	43.82	77.81	11.31	10.6	21.91	99.72

Source: Green Report 2019

Timber is the most important source of income for maintaining forest functions and sustaining employment in the forest sector. Timber sales account for approximately 80 % of earnings and revenue achieved by forest enterprises. In addition to the forest sector, timber is also a basic raw material for the timber processing industry, thus securing employment, earnings, and revenue also in this sector of the national economy. In 2018, the volume of timber supply in total was 9,603,000 m^3. In supplies of softwood log grades, 58.2 % of the total volume was the saw logs and 28.5 % the pulpwood. Hardwood supplies have long been dominated by pulpwood which in 2018 accounted for 53.2 % of the total supply. The supply of hardwood sawlogs was 37.5 %. Out of the total supplies, some 2,099,000 m^3 of timber was exported; most of it by timber trading companies. In 2018, the total volume of domestic timber consumption was 8.899 million m^3 (Table 5).

Table 5 Consumption of timber in Slovakia (1000 m3)

Log grade	Production	Import	Export	Consumption
Softwood (I-III grade)	3,855.67	305.00	860.00	3,300.67
Softwood (IV-V grade)	1,671.59	152.00	632.00	1,191.59

Hardwood (I-III grade)	1,514.63	436.00	468.00	1,482.63
Hardwood (IV-V grade)	2,037.34	319.00	81.00	2,275.34
Fuelwood	523.62	183.00	58.00	648.62
Total	9,602.85	1,395.00	2,099.00	8,898.85

Source: Green Report 2019

Crop production

The cereals market is one of the most important markets in Slovak agriculture. Currently, cereals account for approximately 55% of arable land and 37 % of the value of gross crop production. The basic crops are wheat, barley, and maize. The supply of cereals consists, on the one hand, from domestic production and, on the other hand, on the output from imports. In 2018, 1,928 thousand tones of wheat were produced, 487, 000 tones of barley and 1,516 tones of maize, with wheat and maize production reporting 2,000 growing trend (Table 6).

Table 6 Crop production in 2017-2018 in the Slovak Republic [th.t]

Crop	**2017**	**2018**
Cereals total:	3484,1	4037,8
Wheat	1770,7	1927,9
Barley	545,3	486,9
Maize	1066,2	1515,8
Sugar beet	1230,7	1311,9
Potatoes	149,7	170,0
Oilseeds	775.9	794,7
From which: rape	448,6	480.0
Sunflower	246.4	218.8
Legumes	1.07	17.9
Fodder roots	4.1	6.6
Fruits	38,1	51.7
Vegetables	96.2	105.6

Source: Green Report, 2019

From table 6 is clear that Slovak agriculture is not marked with the main traits of industrial agriculture. To the sector are dominating 8 crops alongside fodders, fruits and vegetables. Diversification tendencies in this sector are obvious.

Animal Production

In cattle farming, there was a slight decrease in the number of cattle rearing in 2018. The number of cattle decreased year-on-year, with dairy cow populations remaining at 2017 levels. Numerous conditions of suckle cows have been significantly strengthened. At the end of 2017, there were 438, 9 thousand bovine animals (Table 7).

Table 7 The Structure of Animal Production in the Slovak Republic in 2017-2018

Commodity	**Unit of measure**	**2017**	**2018**
Slaughter animal total	t.slau. w.	103, 667	102,893
Of which: Bovine animals	t.slau. w.	25, 872	24, 853
Pigs	t.slau. w.	79,575	76, 558
Sheep	t.slau. w.	1,090	1, 150
Goats	t.slau. w.	335	331
Slaughter poultry	t.slau. w.	91, 874	92, 158
Cow milk	T	938, 004	932, 592
Eggs	th.pieces	1, 232, 901	1, 248, 055
Sheep milk	T	12, 811	10, 553
Sheep wool	T	592	609

Source: SO SR-figures

2. Characteristics of AKIS

2.1. AKIS description

The entire system is created by public authorities (Ministry of Agriculture and Rural Development (MORD) and its organizations/agencies), public research and education institutes (universities, secondary and vocational schools, research institutes), private sector companies and freelancers, farmers, forest owners based organizations (associations, chamber, unions) and the third sector non-governmental organizations (EKOTREND, EKOPOLIS, forest certification bodies, ENGOs, etc.).

From a legal and institutional point of view, the main coordinator of agricultural extension is MOARD. De facto the all respective works are delegated to Agroinstitut Nitra or in the field of forestry to the Institute for Forestry Extension and Education (IFEE).

For initiation and approval of legislative activities are responsible:

- MOARD,
- Government of the Slovak Republic,
- National Council of the Slovak Republic.

It should be noted, that in this regard important role is played by the initiatives/guidelines, of the European Union and especially prior the each EU programming period, the respective legislation is adopted or accepted. The key methodological and managerial activities including planning, programming, implementation of FAS, monitoring, and evaluation are under the responsibility of Agroinstitut and IFEE. However, in their respective areas with the analogical activities are dealing with cooperating research and academic institutions, furthermore self–governing bodies, as well as advisors and agricultural extension agencies. The target groups are farmers, forest owners, and other stakeholders in the agrifood sector.

2.2. AKIS actors and knowledge flows

As the main actors of the agricultural extension are involved following institutions:

- Ministry of Agriculture and Rural Development,
- National Paying Agency

- Agricultural and Food Chamber
- Food Chamber
- Agricultural Chamber
- Chamber of Forestry
- Chamber of Veterinary Doctors,
- Agroinstitut at Nitra,
- National Agricultural and Food Centre,
- National Forest Centre,
- Slovak Agricultural University at Nitra,
- University of Veterinarian Sciences at Kosice
- Technical University at Zvolen
- Slovak Technical University in Bratislava
- Institute for Forestry Extension and Education,
- Agricultural, Forestry and Veterinary Vocational Schools
- Union of Cooperatives and Business Association
- Youth Farmers Association
- Agency for Rural Development
- Trade Unions, NGOs, NPOs
- Advisors
- Upstream and Downstream Industries

Except for the Ministry of Agriculture and Rural Development and financial/bank institutions, the all above-listed institutions are fulfilling the tasks of dissemination of knowledge and information, as well as the transfer of knowledge/innovations and new technologies. Notwithstanding, they all are dealing with education and training activities. Agroinstitut in Nitra is responsible for:

- coordination of the agricultural extension,
- operating the internet portal – Agroporadenstvo (Agro- Extension),
- taking responsibility for organization and administration of agriculture extension,
- dealing with education activities directed towards advisors,
- is responsible for the accreditation of advisors and certification of extension service's agencies,
- taking care of Central Register of agricultural advisors and advisors.

The Institute for Forestry Extension and Education fulfills analogical activities as Agroinstitut except for Central Registry.

Other cooperating institutes are specialized research organizations, or specialized public agencies, universities, secondary professional schools, vocational schools, farmer's associations, NGOs, NPOs, and private extension service organizations. The receivers of the knowledge, information, education/training, innovations, and new technologies are individual holdings, agricultural enterprises (cooperatives, share-holding companies), food processing factories, farmers´ associations, and the other organizations dealing with farmer's activities and their needs. The recent national structure of agricultural extension governance and coordination structures is deployed in the diagram (Figure 1).

2.3. AKIS diagram

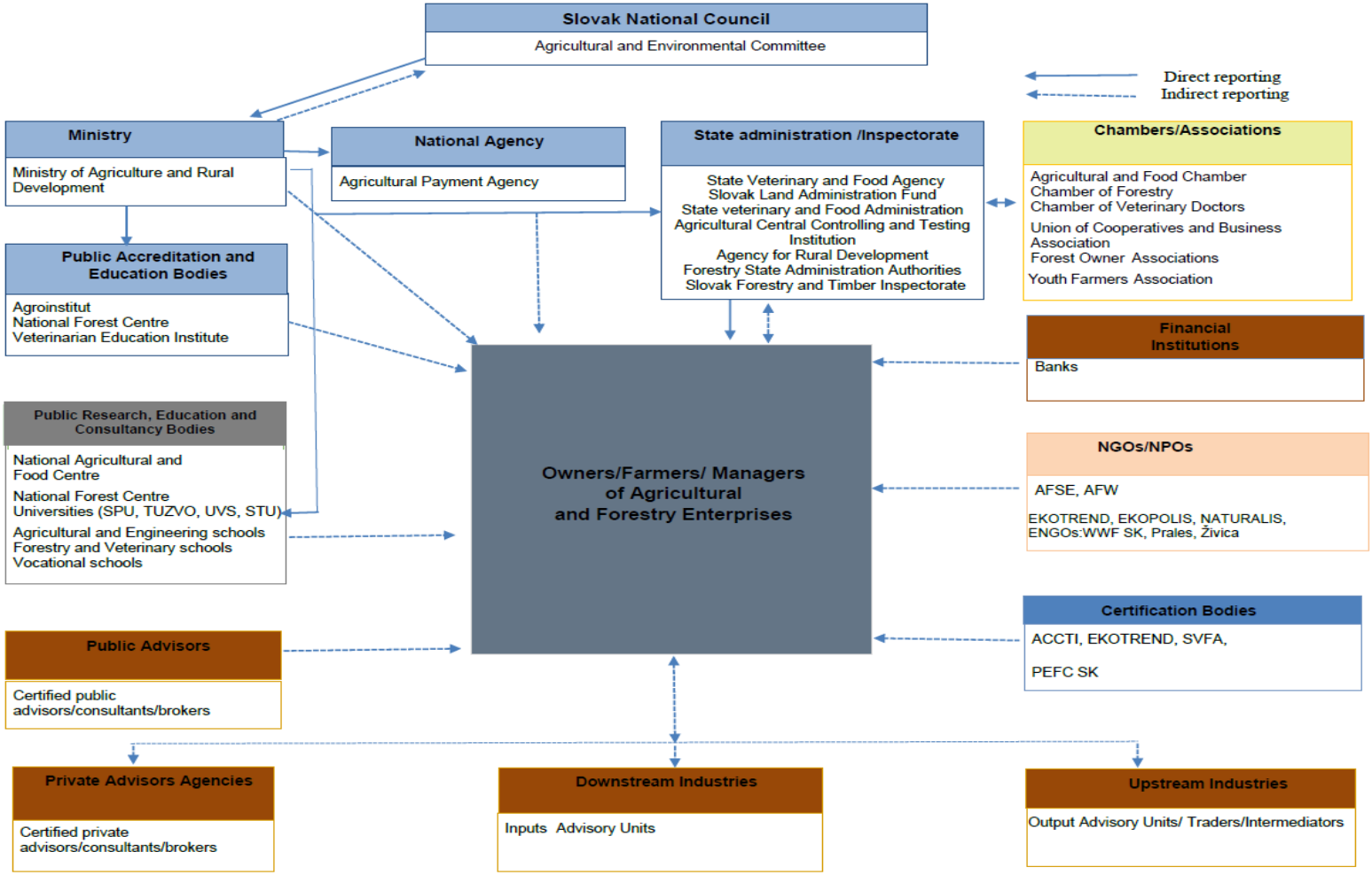

Figure 1 Structure of the Slovak National Agricultural and Forestry Knowledge Information System

The architecture of the Slovak and forestry Advisory System is built upon two pillars from which the first has almost state nature, it is directed from upward to downturn and represents a major driving force in this field, while the second one is composed of the stakeholders with a private business background, or they are formed by the volunteers grouped to the NGOs/NPOs, etc. The management and initiative relationships have the nature of all directions from upward to downturn and vice versa, vertical, horizontal and diagonal. Especially, in the last 15 years, the second pillar is becoming an important driving force in the development of advisory services.

In the frame of the first pillar, the most important task is played by the Ministry of Agriculture and Rural Development, under which direct supervision are three institutions, originally established for continuing education. At the outset of the official advisory system's appearance in Slovakia, these three institutions had been empowered to coordinate legal, professional and educational activities in the field of extension. Agricultural advisory services are coordinated by Agroinstitut located at Nitra. Forestry advisory services are coordinated by the National Forest Centre at Zvolen and in the field of Veterinarian activities the responsibility is undertaken by the Veterinarian Education Institute at Košice.

The second group of public institutions is comprised of public, research, education, and consultancy bodies, which are playing important role in the field of research outputs, knowledge and education. In this respect leading role is with the National Agricultural and Food Centre which is managing all research institutes under the responsibility of the agricultural and forestry sectors.

Within the educational institutions generating new knowledge system in Slovakia are dominating four following universities: the Slovak University of Agriculture at Nitra, Technical University at Zvolen, the University of Veterinarian Sciences at Košice, Slovak Technical University in Bratislava. Into the transfer of knowledge, especially with such an activity as the training of farmers are involved in secondary agricultural /forestry/veterinarian schools, as well as the vocational schools.

The third group of this pillar is created by public and private certified advisors/consultants and brokers. The financial flows supporting three main institutions in the field of advisory services are directed from the MOARD, while to the receivers of the advisory services as well as to advisors the financial supports are provided from Agricultural Paying Agency.

Dominating roles in the second pillar belongs to the three chambers: Agricultural and Food Chamber, Chamber of Forestry and Chamber of Veterinary Doctors. The strengths of the above chambers are in their ability to negotiate policy matters and budgetary issues with the Ministry of Agriculture and Development. They are also directly supported by MOARD, except for the activities with concrete advisory tasks.

The significant and very influential role is fulfilled by downstream industries, namely with inputs suppliers, which are alongside the delivery of inputs undertaking the related advisory services costs of which are incorporated into the procurement prices.

Among the important advisors in the financial field are belonging to various financial and insurance institutions, which are continuously more open towards the agricultural/forest enterprises' needs.

NGOs/NPOs are becoming reasonable providers of advisory services, especially in the field of organic farming and agro-ecological approaches to agriculture.
The recent structure of the Slovak public agricultural and forestry advisory services still require further improvements, namely the competencies have to be more precisely defined, on the other side, significant progress was made so far and the needs of primary producers in agriculture and forestry are gradually met by public and private advisors.

2.4. Policy framework at national level

In the Slovak Republic, AKIS is representing a triangle composed of agricultural and forestry science and research, agricultural and forestry education, and agricultural and forestry extension. These main three players are focusing their respective activities on farmers, forestry owners, owners of land (arable, grassland, etc.), food processors, and other involved stakeholders.

The architecture of the Slovak agricultural and forestry knowledge system was built upon the three pillars represented by Ministry 7.

3. History of the advisory system

Broad changes are taking place in the food and agricultural systems worldwide and the Slovak Republic is not an exception. Since 1990, several changes have had a significant impact on the performance and role of the Slovak agricultural sector. The transformation process, building of institutional support, the accession process to the EU global financial crisis, and the increased world commodity prices are the most crucial facts that the agricultural sector faced during the last 30 years.

Up to 1990, the innovation system in former Czechoslovakia was developed under the supervision of the Ministry of Agriculture. In Slovakia, the main role in this regard was played by the so-called Institute for Systems Management in Agriculture. Besides, a significant function was undertaken by the sector's research institutions and universities, which collaborated first of all with departments for science and development, usually located next to large-scale production companies and economic units. In 1990, the one year after the socio-economic changes, next to the Livestock Production Research Institute at Nitra has been established the first agency dealing with agricultural extension entitled AGROSERVIS. This was the central leading agency for coordinating all research institutions acting in the field of agriculture. During the same period a new teaching subject, "Business Consultancy", was introduced at the Slovak University of Agriculture, Nitra. In 1991, British ADAS, in cooperation with the British Know-How Fund, organized a two-year intensive course on agricultural extension in former Czechoslovakia. From an institutional viewpoint, to achieve the next development stage, a very significant role was played by the EU PHARE Programme:" Development of Extension Services to Improve Primary Agricultural Production (DESIPAP)". This project initiated institutional capacity-building in the field of agricultural extension in collaboration with the Government. The philosophy and architecture of the Slovak advisory system stemmed from the experiences of EU countries, particularly of Great Britain, the Netherlands, and Austria. In 1998, the public extension system was established. Within this system, 22 extension service centers have been created. Out of these, ten centers were placed next to research institutions, 10 next to regional seats of the Slovak Food and Agricultural Chamber, and two were placed in private companies. From the very beginning, the Agroinstitut (a public institution operating lifelong education in the food and agricultural sector) was responsible for the education and certification of advisors. Despite this positive initiative developed by the Government and the EU, the activities of the above-mentioned centers have never

been fully developed. Due to financial problems and overall supply constraints, these centers were continuously compelled to interrupt their activities. It is important to note here that the extension activities undertaken during this period are now positively evaluated. This refers to the preparation of Slovak farmers on EU accession, to the successful utilization of SAPARD funds, to the transition from a centrally planned to a market-oriented economy, and the development of the rural economy and organic farming. However, up to the time of accession to the EU, this system was never developed in its real terms.

Agricultural knowledge and innovation system has become more important following the accession of the Slovak Republic to the European Union. This is connected to the requirement to meet the conditions for Cross-Compliance. According to Council (EU) regulation number 1782/2003, the agricultural extension system must focus its activities on the minimum requirements defined in the legal norms of production (Statutory Management Requirements – SMRs) regarding the maintenance of land in good agricultural and ecological conditions. Since this is linked to the direct payments system, this fact led to the new, however still not completed, architecture of the advisory system in 2007. It is characteristic that so far no single institute exists to deal with the structure and organizational management of agricultural extension or innovation centers. Such an institute would be in a position to ensure the revival of the agricultural extension system, its modernization, and its comprehensive institutional reconstruction in an effective way, with the aim that such a system would then fulfill all the functions which are expected from modern extension in the field of transmission of new knowledge, innovation and technologies into agricultural practices and to rural areas.

Apart from the forestry educational system (forestry colleges, forestry vocational school, and forestry university) the history of forestry knowledge and innovation system is practically linked to the Institute for the Education and Training of Forestry and Water Management Workers (IETFWMW), which was established in 1978 as a specific unit of the Ministry of Forestry and Water Management of Slovakia. The institute was solely responsible for the preparation of youth for manual occupations through ensuring the educational process at forestry vocational schools. The institute also focused on lifelong learning aimed at increasing and maintaining the qualification of forestry and water management staff in public institutions. Additionally, by organizing specialized training courses

this institute educated experts and advisors for educating and training forestry and water management staff. Furthermore, the institute has elaborated conceptual methodological documents for the management activities of the Ministry of Forestry and Water Management in the area of education and training in the field of basic and further education of workers, provided necessary study materials, and controlled the implementation of educational programs. In the nineties of the last century, the institute was separated from the Ministry and became an individual institution. During this period, it provided lifelong courses, training of managerial staff, professional courses for state administration staff, for rest workers requalification courses, IT and language courses, forestry consultancy for non-state forest owners and managers, and short-term courses aimed at public relation and forestry pedagogy. In 2006, when National Forest Centre was established in Zvolen, the institute became an organizational unit of the Centre as the Institute for Forest Consulting and Education (NFC – IFCE). As a professional educational institution, it ensures further expert education in the field of forestry. By approving Act no. 280/2017 on the provision of support and subsidies in agriculture and rural development and the amendment of Act no. 292/2014 Coll. on the contribution provided from the European Structural and Investment Funds and on the amendment of certain laws as amended, the legal framework for the development of the agricultural advisory system in Slovakia was amended in 2017. According to Section 22 of this Act, the farm advisory system is a system of advisory services for agriculture and forestry, which ensures the transfer of science and research results into practice to improve the management of agricultural and forestry enterprises while complying with sustainable agricultural and forestry requirements.

4. The agricultural and forestry advisory service(s)

4.1 Overview of all service suppliers

The structure of service suppliers reflects the regulatory and voluntary requirements for agriculture and forest management in Slovakia. The most robust system of advisory, educational, training, and knowledge organizations is linked with the institutions providing legislative and professional advice in the area of agriculture and forest management and management planning, which are represented mainly by the state administration bodies, public research, and educational institutions, agricultural, forestry and veterinary schools and agricultural, forestry and veterinary universities. Due to the legislative requirement for each forest owner and manager to ensure professional forest management in the line with the forest management plans, this public system is complemented by a large group of private persons acting as certified forest managers. Additionally, there is a group of private companies providing advisory services for the forest owners regarding particular forest management issues.

Among the agricultural extension services which are listed as suppliers of advice, educational/training activities, information, technologies, etc. are listed 99 advisors in agriculture and 37 in forestry. The largest group is formatted by research institutions followed by academic institutions/universities and secondary vocational schools. The third group is represented by public organizations under the supervision of MOARD (Agroinstitut, IFEE, etc.). The fourth group is composed of self-governing organizations, such as the National Agricultural and Food Chamber which is playing within the Slovak conditions a meaningful role. Furthermore, this group also includes Individual Farmers Association, Agricultural Entrepreneurs Association, Slovak Food Chamber, Youth Farmers Association, Cooperative and business Organizations Union. The fifth group is comprised of suppliers of agricultural services, such as providers of feeds and feeding components, chemical fertilizers, herbicides, insecticides and other chemicals, agricultural machinery, and technologies, IT services suppliers, etc. The sixth group is composed of individual advisors, private extension organizations, including NGOs and NPOs. The important role of extension services´ suppliers is fulfilling the Association of organic product producers entitled EKOTREND, EKOPOLIS, and NATURALIS.

The information processed in this section is partly based on a questionnaire survey, which was conducted in September and October 2020 in Slovakia. The survey involved 13 advisory organizations and 9 freelance advisors. The answers of the respondents are included in the following subchapters.

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

For agricultural extension systems to operate effectively is extremely important to be a timely response to the current and future needs and requirements of farmers. If it is envisaged that agricultural extension should be effective and pose with innovative dimensions, then it is clear that the government will be compelled to pay greater attention to such services. The policymakers of agriculture have to take into consideration the decisive impact of agricultural extension on primary agricultural production through its effective services focused on farmers today's needs ad challenges. In this respect, the important role is played by the public financial support provided to the farmers through the target-oriented agricultural services. Among the best practices are included in various kinds of funding schemes.

Funding schemes depend on the legal status and organizational position of advisory institutions. The main public bodies are involved in financial relations with the budget of the Ministry of Agriculture and Rural Development of the Slovak Republic and with the EU through the Agricultural Paying Agency). Alongside this, there are several allowance organizations (the significant part of their budget is provided from the MOARD and the rest of the finances has to be generated from the organization's own activities). Among this kind of organizations belong the following: Veterinarian Education Institute, National Forest Centre, Research Station of the High Tatras National Park, or public enterprises such as Agroinstitut Nitra and the Forestry State EU Administration Authorities. Regardless of this, there is no extra financial chapter assigned to financial advisory services on a systematic basis. In certain cases, however, there are financial resources allocated for specific activities (e.g. publishing specific training materials). The majority of the provided advisory services are financed on a project basis (e.g. Rural Development Programme, Operational Programmes).

The use of certified advisory services supported by the state (scheme de minimis) is for many agricultural farms and forest owners and managers limited by the maximum financial aid of 200,000 EUR over three fiscal years. One of the strategic objectives of the National Forestry Program, which follows the vision and strategic goals of the EU Forest Action Plan and the FOREST EUROPE initiative, is "Increasing long-term competitiveness of forestry and improving the sustainable use of forest products and services". Under this objective, there is a Priority 13 specified as follows: "To support cooperation of forest owners and to improve education in forestry". This priority reflects the fact that there are a changing forest ownership structure and the increasing share of forest owners with a lack of skills and capacities for sustainable forest management. Fragmentation of private forest holdings may lead to further difficulties and higher costs in forest management, reducing mobilization of wood and undermining the provision of forest services. Therefore, a well-trained and adaptable workforce is necessary.

4.3 Clients and topics and methods

The main groups of clients receiving consultancy and advisory services are (i) farm and forest owners and managers and (ii) certified advisors and forest managers responsible for the compliance of forest managers' management practices with the legislative requirements. Certified agricultural and forest advisors, therefore, act, on one hand, as knowledge receivers and, on the other, as knowledge providers. For the AFKIS diagram, they are considered knowledge providers for agricultural and forest managers, who represent final receivers of knowledge. In this line, the main content of knowledge transfer is as follows:

Agroinstitut Nitra provides:

1. training of agricultural advisers
2. issuing a certificate to advisers authorized to provide advisory services
3. administrating public portal of the register of agricultural advisers
4. provides information concerning the register of agricultural advisers to the Ministry of 5. Agriculture and Rural Development of the Slovak Republic and the Agricultural Paying Agency based on their request and cooperates with the National Forestry Center - Institute of Forestry Consulting and Education Zvolen (IFCE)

National Forest center provides:

1. Compulsory training:
- Certified forest manager
- Forest reproduction material
- Eligibility for the elaboration of forest management plans
2. Other training and education:
- Education in the field of plant protection products
- Determination of the age of selected game species after hunting
- Timber quality classification
- Forest pedagogy
- Advanced seminar of forest pedagogy - Module A (music therapy, applied zoology and documentary photography)
- Postgraduate seminar of forest pedagogy - Module B (creative drama, forest botany, project teaching)
- Advanced seminar of forest pedagogy - Module C (environmental ethics, media communication)
- Forest guide
- Symposium of forest pedagogy
- Forestry minimum
- Learning about the forest
3. Advisory services:
- Advisory and consultancy services for forest owners and managers
- Elaboration and implementation of rural development projects
4. Other forms of knowledge exchange:
- Direct consultancy for forest owners in the area of forest protection (Forestry Protection Service and RS TANAP)
- Issuing publication “NFC Research Results for Forestry Practice”

Agricultural advisors registered in the Central Register of Advisors

Currently are registered 99 agricultural advisors who provide extension services in the following areas:

- Crop production
- Animal production
- Food industry

- Economics
- Plant nutrition and pedology
- Mechanization
- Forestry
- Meadows and pastures

The extension agencies present in Slovakia are usually providing advice and consultancy in the following fields:

1. Cross-compliance
2. EU project design
3. Rural development
4. Organic farming
5. Livestock nutrition
6. Crop nutrition
7. Animal breeding and livestock registry
8. Horticultural production
9. Financial, taxation and accounting consultancy
10. Education, training, skills courses in agriculture, food processing, and rural development
11. Information technology
12. Development of farm and rural tourism
13. Development of human resources
14. Inputs and outputs quality standards
15. Fruit production
16. Quality standards and finalization of products
17. The development of agribusiness activities
18. Formulation of marketing strategies and others.

Small commercial farms are using advice and consultancy in the following fields:

1. Livestock nutrition
2. Crop nutrition
3. Rural development
4. Cross-compliance
5. EU project design
6. Organic farming
7. Animal breeding and livestock registry
8. Financial, taxation and accounting consultancy
9. Fruit production

10. Horticultural production
11. Information technology
12. Development of farm and rural tourism
13. Inputs and outputs quality standards
14. Quality standards and finalization of products
15. The development of agribusiness activities
16. Development of human resources
17. Education, training, skills courses in agriculture, food processing and rural development
18. Formulation of marketing strategies and others.

Medium commercial farms are using advice and consultancy in the following fields:

1. Cross-compliance
2. EU project design
3. Formulation of marketing strategies and others
4. Animal breeding and livestock registry
5. Livestock nutrition
6. Financial, taxation and accounting consultancy
7. Crop nutrition
8. Rural development
9. Organic farming
10. Fruit production
11. Horticultural production
12. Information technology
13. Development of farm and rural tourism
14. Quality standards and finalization of products
15. Inputs and outputs quality standards
16. The development of agribusiness activities
17. Development of human resources
18. Education, training, skills courses in agriculture, food processing and rural development

Large commercial farms are using advice and consultancy in the following fields:

1. EU project design
2. Cross-compliance
3. Quality standards and finalization of products

4. Formulation of marketing strategies and others
5. Biofuel station
6. Animal breeding and livestock registry
7. Crop nutrition
8. Livestock nutrition
9. Financial, taxation and accounting consultancy
10. Organic farming
11. Rural development
12. Fruit production
13. Development of human resources
14. Horticultural production
15. Information technology
16. Inputs and outputs quality standards
17. Development of farm and rural tourism
18. The development of agribusiness activities
19. Education, training, skills courses in agriculture, food processing and rural development

Private forestry advisors registered in the Central Register of Advisors

Currently registered advisors for the forestry sector (37) provide services in the following areas:

- Improving the conservation status of species and habitats of European and national importance and strengthening the original biodiversity in the normal management of forest land, especially in NATURA 2000 sites
- Improving the economic performance of forestry by introducing nature-friendly forest management in Natura 2000 sites
- Possibilities of resolving the settlement of unknown forest landowners within the managed real estate in Natura 2000 sites
- Increasing public awareness of the possibilities and benefits of nature-friendly forest management in Natura 2000 sites
- Improving the management of forests damaged by biological and abiotic pests in Natura 2000 sites
- Improving the economic performance of forestry by optimizing the recovery of raw wood assortments in Natura 2000 sites
- Improving the economic performance of forestry by processing less valuable biomass arising from the extraction and handling of wood on forest and non-forest land in Natura 2000 sites

- Possibilities of using advanced technologies for integrated forest protection in stands in the Natura 2000 sites
- Increasing the efficiency of forest regeneration by using new technological procedures and innovations in the production of planting material and forest regeneration
- Marketing and investment support of decision-making in the conditions of forest management in terms of nature-friendly management of forest stands in Natura 2000 areas
- Development of principles and advice for maintaining the favorable status of aquatic habitats in connection with agricultural and forestry activities
- Nature-friendly forest management and the competitiveness of the forest enterprise.

Based on realized research the most often provided advisory services are plant production, vegetables, fruits, vines, herbs, insects, construction design, livestock production, farm machinery, forest protection, conservation, but also entrepreneurship and farm management, use of digital equipment and decision support systems, agri-environmental stewardship measures and nature conservation. The advisory services were offered by freelance advisors and by the advisory organization. 13 advisory organizations involved in research employed 129 employees out of which are 55 women. Out of 129 advisors, 95 of them have more than 10 years of professional experience in offering advisory services. 30 advisors involved in research have from 3 to 10 years of professional experience and only 4 advisors have less than 3 years experience. Most of them have an engineer or master degree. 4 of them have a Ph.D. degree. 4 advisory organizations have national advisory certificates and 21 employees have national advisory certification and others, such as lead auditor in FSC and PEFC certification. In these organizations are regularly planned staff strategic plans and human resources are dedicated to the back-office activities. These advisory organizations permanently watch new developments and updates in certification standards and react to necessary needs for new training of advisors. The main sources of funding advisory services are from National/Regional government funds (public funds);cost-recovery from farmers (fee for service financing) and EU CAP projects and funds.

Other actors in the private sector provide consultancy and advice according to their professional orientation (forest management and nature protection issues,

marketing, tax and legal advice, support with grant applications, etc.). Forest management planning companies provide information on forest management practices through the elaboration of forest management plans for forest managers and certified forest managers. Forest certification body PEFC Slovakia provides regular training for PEFC certified forest managers about the requirements of the Slovak Forest Certification Scheme. Associations of forest owners organize training and consultancy for their members in the area of revised legislative requirements for forest management. Some ENOs requiring passive forest management in protected areas advise forest owners on possibilities to apply for financial compensations.

4.4 Human resources and methods of service provision

The advisory services and training programs in the field of agriculture, food processing and rural development, are organized by **Agroinštitút Nitra**, which was entrusted by these activities Slovak Ministry of Agriculture and Rural Development. Agroinštitút Nitra provides training of agricultural advisers in the above-mentioned fields issuing a certificate to advisers authorized to deliver advisory services. Furthermore, this institution administrates the public portal of agricultural advisers' register. Also provides information concerned with to register of agricultural advisers to the MOARD and the Agricultural Paying Agency based upon their request. In addition to this, Agroinštitút cooperates with the National Forestry Center - Institute of Forestry Consulting and Education Zvolen (IFCE).

The Institute for Forest Consulting and Education as a consultancy body of the Forest National brings together the leading experts from practice, science and research, universities and secondary/vocational schools, as well as the representatives of state administration bodies.

Training methods used in cooperation with owners, farmers, or agricultural managers are as follows:

1. Workshops,
2. Vocational training,

3. Face-to-face meeting,
4. Field/farm days,
5. Agro portal – web page information about legislation, new projects/program calls, professional information, new varieties of seeds, fertilizers and other chemicals, feeds, animal genetic resources, quantitative measures, information about seminars, conferences training, smart technologies, climate, smart technologies, data-driven agriculture, etc.
6. Phone helpline,
7. Field schools,
8. Helpdesk for individual questions through the website,
9. Publication (leaflets, etc.),
10. Online meetings (Zoom, MS Teams, Skype, etc.)

One of the most important prerequisites of a well-functioning agricultural extension system is that advisors are good professionals; they are competent in communications with their clients and have a positive approach towards them. These two pre-conditions are essential requirements for the establishment of a professional and market-oriented extension system. The concept of an extension system in Slovakia is stemming from the demands based upon the tasks, the direction of the service, and quality of communication. Applied research requires impetus from farmers and other stakeholders to know which fields should be explored. On the other hand, for an extension, it is important to know what kind of information and knowledge are needed for its clients. Alongside this, both consultants and researchers should know that they have to use clear and understandable communication language. The acceptance of the advice provided by the consultant depends, to a great extent, on his/her communication skills. Furthermore, extension services have to take into consideration the fact that different groups of clients would require diverse types of information and agricultural and food technologies.

The research showed up those freelance advisors as well as advisory organizations apply most frequently advisory methods individual face to face advice on the farm/enterprise; individual face to face advice outside the farm/enterprise (e.g. advisory office); individual advice via telephone; individual advice via digital apps (e.g. skype call, WhatsApp chat, telegram). The pandemic COVID – 19 changed methods of providing advisory service to offering individual advice via digital apps

(e.g. skype call, WhatsApp chat, telegram, emails) and group advice via webinars. The advisory services and training programs organized by the Forestry State Administration Authorities and respective research and consultancy bodies (Forest Protection Service Centre and Control of Forest Reproduction Material of the National Forest Centre and RS TANAP) are provided by their staff. Educational programs are implemented in the form of lectures, conferences, seminars, workshops, but also the form of practical training. Teaching processes are taking place in specialized classrooms equipped with teaching aids and audiovisual technology.

4.5 Programming and planning of advisory work

The programming and planning of advisory works are in a great deal depending on the planning period. The most important and frequently used is **planning per annum**. This is initiated by MOARD and has an upward-downward direction alongside the institutional verticals. During this process are allocated financial resources to the individual AFKIS players/suppliers and the concrete tasks are expressed as the purchase order. The research and agricultural public organizations/institutions are upon the budget and task allocation preparing their annual plans with concrete activities, methods, and communication with targeted groups.

Second kind of **Programming and Planning for 7 years time horizon** in connection to CAP for given time horizon 2021-2027, the FAS with a purpose to use advisory services by farmers, or to establish them and last but not least, there is the Concept for Agriculture and Rural Development. This is usually formulated for the period which is matching with the implementation of CAP. The agricultural extension is its organic part.

The monitoring and evaluation of the implementation of the programming process are realized through the so-called „Green report“ which is prepared by MOARD every year following after the implementation period. This report is submitted for approval to the National Council of Slovak Republic.
There are systematic programming and planning of advisory work in the area of compulsory training and education provided by the forestry state administrations and public bodies for certified forest managers and forest owners and managers

in order to meet the legislative requirements for forest management. In particular, the training of certified forest managers is governed by a ministry regulation required regularly.

In case of changes in forestry and forestry-related legislation, there is additional training organized for forest owners by the forestry state administration and public educational and research bodies. Similarly, forest owners associations organize training for their members. In case of any revision of the national sustainable forest management standards, PEFC Slovakia organizes training for the holders of certificates.
Other services provided by private companies and other actors are applied on an ad hoc basis depending mainly on the available funding schemes and grant project calls.

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

The coordinating bodies in the frame of FAS are organizing knowledge sharing activities among all actors, farmers, other stakeholders and advisors. The other function is also to enhance synergies between various instruments such as advice, training, information, extension services and research. Agroinštitút and IFEE at Zvolen, are organizing basic and regular follow up training for each advisor. The best practices are provided to users of agricultural extension services through an internet portal. The list of accredited advisors and certified organizations with contact details is provided on the webpage of Agroinštitút, IFEE and the National Food and Agricultural Chamber, as well as the Forest Chamber.

The main body covering the area of forestry education, training and knowledge transfer is the National Forest Centres (NFC). NFC is a state-owned public-benefit corporation, which is governed by the Ministry of Agriculture and Rural Development of the Slovak Republic and methodically guided by the Ministry Section of Forestry and Wood Processing. The center merges forestry science, research, consulting, education and forestry practice and consists of four institutes professionally oriented on a particular area within forestry - Forest Research Institute (FRI), Institute for Forest Consulting and Education (IFCE), Institute for

Forest Resources and Information (IFRI) and Forest Management Planning Institute (FMPI).
The Forest Research Institute implements the tasks in the field of forestry research and development, especially deals with environmental issues linked to forest ecosystems. It resolves research projects, mostly upon the request from national and international grant agencies and research programs following the initiatives of the project's founders. It is directly taking part in the implementation of the forests health's monitoring, the national inventory of forests and also monitors the state of forest ecosystems and their components. It is providing the operation of the Forest Protection Service Centre and Control of Forest Reproduction Material. The Forest Research Institute carries out the following activities: review, expertise, educational, librarian, editorial, advisory and public relations functions. It assists and ensures the realization of results of research and utilization of current scientific knowledge in the management of forests by state and non-state owners.

The Forest Management Planning Institute resolves tasks regarding the future development of forest management, creation and updating of methods and implementation procedures, creates a concept and methodical procedures of forest management planning; evaluates, assures quality and continues the work of Forest Management Plans; ensures and performs finding of data of complex detection of the state of forests and ensures the process of public procurement for Forest Management Plans.

The Institute for Forest Resources and Information is the administrator of the Information System of Forest Management. It ensures the creation and management of maps with thematic forest management content. It collects and manages information about the state of forests and those required for forest mapping.

The Institute for Forest Consulting and Education is a professional educational institution that delivers continuing expert education in the field of forest management. The target group for the education programs consists of the employees of state and non-state forestry institutions on various levels of supervision. Around 1500 people take part in the educational activities that the Institute for Forest Consulting and Education conducts, mostly employees of forest management. The insurance of quality is the accreditation of the educational courses via the Ministry of Education, Science, Research, and Sport of

the Slovak Republic. There is a range of extra activities aimed at the work with the public and forestry education. Forestry education appears in exhibition activities at various fairs such as AGROKOMPLEX or LIGNUMEXPO, but also in natural science-oriented competitions or competitions related to special events e.g. European Week of Forests or International Day of Forests. Some programs within forestry education are dedicated to special groups – children in healthcare institutions, clients with special needs, seniors in centers of social services.

The role of private advisors and independent consultancy companies is mainly in the elaboration and implementation of forestry development projects (usually financed within the project calls under the Rural Development Programme).

So far, there is no system for monitoring and evaluating the efficiency of individual methods, forms, or measures promoting advisory services regularly. The efficiency of advisory services provided for forest owners is evaluated only for specific grant projects (e.g Rural Development Fund projects).

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5. Summary and conclusions

5.1 Summary and conclusions on sections 1 - 3

The establishment and foundation of agricultural extension advisory services in the Slovak Republic was very diverse concerning its development during the transition period from centrally planned to the market economy, preparation for EU accession, as well as after the post-accession period. From the very outset, scientists, university professors and teachers of the secondary/vocational schools were very eager to start with the establishment of the public and private agricultural advisory services. The significant state support for this activity was launched in 1998 when the first public agricultural and forestry extension systems were introduced. Regardless of this, receivers of advisory services were fully relying on the free of charge services, especially due to their unfavorable financial situation. As this their intention was only partly realized, the interests of clients in advisory services have declined. The driving force for the dynamic revitalization of advisory services was the EU programming period 2007-2013 in the frame of which was posed the fulfillment of the Cross- compliance requirements. As a consequence of this, the advisory system did moderate progress and continuously is improving. Its more significant development was braked by the adverse economic situations of the agricultural holdings. From 1994 up to 2000 all of the Slovak agriculture farms experienced negative economic results. Net profits were only achieved in 2005, the first year after EU accession. This trend continued up to 2008 but later as a result of the impact of the world financial and economic crisis and the extensive floods in 2010 total expenses rose higher than net profits. From 1990, the share of agriculture, forestry and fisheries of the gross domestic product has continuously declined and in 2011 it was recorded to be only 2.69 percent (as a comparison, in 1990 this indicator was 6.60 percent). In 2017 the share of agriculture on GDP dropped even by 1.6% The analogical trend was also noted for food processing, the share of which was 2.67 percent of the national GDP in 1995, while in 2010 it was only 2.00 percent. In the year 2017 this indicator scaled-down to 1.3%.

One of the most important priorities of the Slovak agricultural and forestry system must be to support the innovation processes on the agricultural holdings through the modern technologies, knowledge and information transfer to the farmers, owners, agricultural managers and forest owners. This priority reflects the

changing production and ownership structures and the increasing share of land and forest owners who lack competitiveness and required skills/ capacities for sustainable agricultural and forest management. Fragmentation of private holdings caused mainly by heritage‘s processes may lead in agriculture and forestry to further challenges, such as higher costs, lagging innovation processes and lower ability to compete for both on domestic as well as on the foreign trades. Moreover in the forest, this is reducing the mobilization of wood and undermining the provision of forest services. Therefore, a well-trained, adaptable and younger workforces are necessary. The structure of service suppliers reflects the regulatory and voluntary requirements for agriculture and forest management. The most robust system of advisory, educational, training and knowledge organizations/agencies are linked to the institutions providing legislative and professional advice in the area of agriculture and forest management and their planning, Theses are represented first of all by the state administration bodies, public research and educational institutions, vocational schools and agricultural/forestry universities. An additional group is formed by associations, trade unions, and chambers. There are also several non-profit organizations, such as certification bodies or environmental NGOs and NPOs.

Funding schemes depend on the legal status and organizational position of advisory institutions. The main public bodies involved in financial relations with the budget of the Ministry of Agriculture and Rural Development of the Slovak Republic are either budgetary organizations (Agricultural Paying Agency), allowance organizations (Veterinarian Education Institute, National Forest Centre, Research Station of High Tatras National Park) or publicly owned enterprises (Agroinstitut Nitra). Forestry State Administration Authorities are from an account point of view included under the budget of the Ministry of Agriculture and Rural Development. However, in all cases, there is no extra financial chapter/line directly assigned to financial advisory services on a systematic basis. In specific cases, however, there are financial resources allocated for certain activities (e.g. editing/publishing specific training materials). Most of the provided advisory services are financed on a project basis (e.g. Rural Development Programme, Operational Programmes).

The advisory services and training programs organized by public and private actors are provided with the utilization of leading experts from the fields, science and research, university teachers and teachers of the secondary/vocational schools, as

well as representatives of state administration‘s bodies. Specialized training is provided by registered certified agricultural and forestry advisors. Educational programs are implemented in the form of lectures, conferences, seminars, workshops, farm days, field days, exhibitions, excursions but also in the form of practical training.

The main groups of clients to whom are a consultancy and advisory services provided (i) farm and forest owners and managers and (ii) certified advisors and agricultural/forest managers responsible for compliance of forest managers’ management practices with the legislative and institutional requirements. Certified agricultural and forest advisors, therefore, act, on one hand, as knowledge receivers and, on the other hand, as knowledge providers. According to the AFKIS diagram, they are considered as knowledge providers for agricultural and forest managers, who are the final knowledge receivers.

5.2 Summary and conclusions on sections 4

The advisory system in the Slovak Republic has its number of pros and cons. From institutional, financial, legislation and human resources points of view, the advisory system has all preconditions for sufficient transfer of knowledge into agricultural primary production and to forestry. However, a serious shortcoming is the absence of a systematic approach to monitoring and evaluation of advisory services ‘efficiency. Also, it has to be highlighted that the existing advisory system both in forestry and agriculture has to undergo substantial reform.

The substantial gaps can be summed up in the following points:

- there is no stable and systematic way of financing advisory and consultancy services for farmers, agricultural and forest owners and managers, So, from an entrepreneurial point of view the provision of advisory services is up to date not providing a stable business environment and it is connected with several uncertainties.
- Current system does not allow to support integrated projects aimed at global problem resolution,
- The needs of agricultural and forest owners/managers in the area of advisory and consultancy services are not monitored and on regular basis,

therefore advisory services do not reflect on farmers' and foresters' needs in time and with perspective visions.

- a share of finances from the total budget for agricultural projects allocated to development projects in the sector is only 7-8 %. However, this is the main driving force to the advisors and consultants to do the business in this area,
- the entire system is complicated, due to demanding requirements for certification, furthermore not very clear financial supporting measures, and also many actors play compromising roles in the area of education and training, while on the other side the services with the delivery of progressive technologies and research knowledge transfers are missing,
- in Slovak agricultural and forestry environment is a lack of institutions providing innovative solutions and orientation on innovations (e.g. bioeconomy, robotic technologies, smart climate technologies, etc.). Also has to be highlighted that implementation of new technologies advised by advisory services is limited by the insufficient agricultural holdings financial resources caused by their low efficiency embodied to the low profit and hence to moderate incomes.
- grant projects for farmers, agricultural and forest owners are supported under the “de minimis” scheme, which is financially limited (once the financial limit is used for the project implementation, there are no financial means left for agricultural and forest owners to pay for advisors and consultancy services for other projects,
- Except for legislative and institutional requirements for management, the system of planning other advisory work does not exist,
- there is no well-operating monitoring system implemented measures‘ efficiency of the advisory system,
- the number of passive agricultural and forest owners/farmers who are not interested in any advisory services is increasing. The main reason for this is connected first of all to the low attractiveness, especially of agriculture, due to its low profitability. Therefore, farmers and forest owners strive to minimize their costs as much as is reasonable. Such an approach that compromises the provision of effective advisory services has an adverse effect on the enhancement of agricultural production, and accordingly on the higher incomes.

The identified positive aspects and future trends are as follow:

- the whole sector of advisory services is moderately developing, and its quality is increasing, due to the EU CAP programming activities and to the increasing capacity of advisors to benefit from the various supporting measures.
- advisory and consultancy services are provided for free unless they are related to the design of projects which are going to be submitted for approval to the Agricultural Paying Agency, upon the call in certain programming activities. Also, the advisory agencies are frequently involved in the implementation of the EU projects, if they have been approved,
- the existing structure of state administration and public bodies is satisfying to the advisory work-related to legislative, institutional and professional requirements for agricultural and forest management,
- advisory services in the traditional management topics are well covered by the current institutional capacity,
- in light of the recent challenges related to climate change, it is expected that the advisory serv

ices will be oriented on the area of ecosystem adaptation to changing conditions as well as new legislative requirements,

. furthermore, advisory services have to inhibit agricultural and forestry sectors to implement

agroecological approaches, agroforestry trends, organic farming, precision agriculture, data-driven agriculture, as well as smart agriculture and climate-smart agriculture because of the protection of natural resources.

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8. Appendix

Annex 1 - List of organizations identified in AFKIS

Status	Type	Organization
Public authorities	Slovak National Council	Agricultural and Environmental Committee
	Ministry	- Ministry of Agriculture and Regional Development of the Slovak Republic (MOARD)
	State administration/Inspectorate	- State Veterinary and Food Agency - Slovak Land Administration Fund - State Veterinary and Food Administration - Agricultural Central Controlling and Testing Institution - Agency for Rural Development - Forestry State Administration Authorities - Slovak Forestry and Timber Inspectorate
	National agencies	- Agricultural Payment Agency
Public accreditation, research and education institutes	University/ Research Institutes	- Slovak Agricultural University in Nitra (SUA) - Technical University in Zvolen (TUZVO), Centre for Continuing Education of TUZVO - Slovak Veterinary University - National Agricultural and Food Centre (NAFC) - National Forest Centre (NFC) – Forest Research Institute (FRI) - Research Station of the State Forests of the Tatra National Park (RS TANAP)
	Public accreditation and educational bodies	- Agroinštitút Nitra - National Forest Centre (NFC) – Institute for Forest Consulting and Education (IFCE) - Veterinarian Education Institute
	Agricultural and Forestry Vocational Schools	- Vocational Agricultural Schools (Bratislava, Levice, Trnava, Nitra, Lučenec, Topoľčany, Zvolen, Liptovský Mikuláš, Košice) - Veterinary Vocational Schools (Košice, Trenčín, Trnava, Nitra, Žilina, Kežmarok, Bratislva) - Forestry Colleges (Banská Štiavnica, Liptovský Hrádok, Tvrdošín) - Vocational Forestry Schools (Banská Štiavnica, Bijacovce, Ivanka pri Dunaji, Prešov, Poltár)
Private sector	Upstream industries	- Output Advisory Units Producers, Traders, Intermediators
	Downstream industries	- Inputs Advisory Units - Forest-based industries (solid, panels, pulp and paper)

	Independent consultants and advisory companies	- Private consultants and companies - Certified consultants and companies - Publishing house LESMEDIUM
Owners /Farmers/Managers of Agricultural and Forestry Enterprises NGOs	Associations/Chambers	- Union of Cooperatives and Business Association - Youth Farmers Association - Council of the Non-state Forest Owner Associations (CNFOA) representing the interests of the members: Slovak Union of Diocese Forests, Slovak Association of Municipal Forests, Union of Owners of Private, Community and Municipal Forests of Banská Bystrica Region, Slovak Union of Regional Associations of Non-state Forest Owners -Agricultural and Food Chamber (AFC) -Slovak Forestry Chamber (SFC) -Chamber of Veterinary Doctors Slovak (CVD)
	Trade Unions/NGOs/NPOs	- EKOTREND - EKOPOLIS, - NATURALIS - ENGOs (WWF Slovakia, Prales, Živica) - Association of Forest Sector Employers (AFSE) - Association of Forestry Workers (AFW)
	Forest certification schemes bodies	- ACCTI - EKOTREND - SVFA - PEFC Slovakia