

TRANSNATIONAL RESEARCH REPORT



MUSHLINK - Promoting Mushroom Farming in Western Balkan through strengthening linkages between VET providers and the business sector

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Introduction

The MUSHLINK project, funded under the Erasmus+ Capacity Building in the Field of Vocational Education and Training (CB-VET), aims to promote mushroom farming as a sustainable agricultural alternative in the Western Balkans. The initiative is grounded in the belief that strengthening linkages between VET (Vocational Education and Training) providers and the business sector can unlock new economic opportunities, especially in rural communities where traditional agriculture is under increasing pressure from climate change, urban migration, and declining profitability.

This transnational research report serves as a foundational resource for the project's capacity-building and training components. It identifies and analyses the systemic gaps and opportunities that exist in mushroom farming across five Western Balkan countries: Serbia, Albania, Kosovo, Montenegro, and Greece. The report explores national contexts in terms of agricultural practices, the availability of bio-resources, regulatory frameworks, and the status of VET systems. It aims to highlight both the potential for mushroom farming as a circular bio-economy solution and the barriers that VET institutions and small-scale producers face in adopting this model.

Through a combination of desk and field research, including focus groups with representatives from the public sector, business actors, and VET institutions, the report presents an evidence-based overview of the current landscape. It outlines the extent to which mushroom cultivation is integrated (or absent) from agricultural development policies, educational curricula, and business ecosystems, and proposes how VET systems can evolve to meet the skill demands of this emerging sector.

The findings of this report will directly inform the development of a tailored Training Format, a Capacity-Building Framework (CBF) for Work-Based Learning (WBL), and a digital learning platform. These resources will help VET providers, rural entrepreneurs, and policy stakeholders co-develop scalable mushroom farming practices aligned with green and digital transition goals. Ultimately, the research aims to support the creation of a resilient, inclusive, and environmentally sustainable farming model rooted in local bio-resources and labor.

Desk research methodology

The desk research component of the MUSHLINK Transnational Research Report was designed to provide a comprehensive understanding of the mushroom farming landscape and the VET-business ecosystem across the five project countries: Serbia, Albania, Greece, Montenegro, and Kosovo. The methodology was structured to support the project's broader objective of aligning VET training with real market needs and local development opportunities in the mushroom sector.

The research combined secondary data sources—such as government publications, policy reports, academic articles, and industry data—with contextual analysis relevant to each country's agricultural practices, bio-based input availability, regulatory environment, and vocational training infrastructure.

A key feature of this desk research was the mapping of both **national and local-level areas** that will be targeted for the implementation of piloting activities in each partner country. These mapped areas were selected based on criteria such as:

- Rural and peri-urban demographic profiles
- Presence of agricultural activity and bio-waste streams suitable for mushroom substrate production
- Existing or potential VET infrastructure
- Entrepreneurial interest and market proximity for mushroom products

By focusing on these strategically identified areas, the project ensures that subsequent activities—including field research, training programs, and Bio-Lab setups—are contextually grounded and responsive to local realities. The comparative approach will also facilitate cross-country learning, helping partners to adapt best practices and intervene on common challenges in the agriculture sector.

The findings from this desk phase serve as a baseline for the project's action-oriented deliverables, including training design, work-based learning schemes, and the digital content development that follows in later stages of implementation.

Agriculture sector: general overview

Serbia

1.1 Employment in agriculture (% of workforce)

Basic labor market indicators in the RS point to positive, if not extremely progressive trends: on the one hand, increased activity and employment rates, on the other, lower unemployment and inactivity rates. The total number of employed persons in 2019 was 2.2 million. Rural areas have generally had higher levels of activity and employment than cities. In urban regions, the share of low-skilled workers (without or with primary education) is 6.8%, whereas in rural areas, it rises to 30.5%. Agriculture's employment rate is permanently dropping, yet it remains a prominent job sector. Agriculture employed **452,700 people** in 2019, accounting for **15.6%** of the population over the age of 15 (13.4% of the working-age population). In the RS, agriculture, forestry, and fishing account for 11.5% of total employment.

The general and specific rights of formally employed persons in the agricultural sector and the food system of the RS are regulated by the Labour Law, Law on Pension and Disability Insurance and other relevant national legislation, while the rights of seasonal workers in the agriculture, forestry and fishery sector are regulated by the Law on Simplified Work Engagement on Seasonal Jobs in Certain Activities and enable seasonal workers to exercise their labour rights. Employees are also entitled to workplace safety and health, which is governed by the Safety and Health at Work Law and the Law on Ratification of the Convention relating to Safety and Health in Agriculture - Convention 18414 - with a focus on the following worker categories: young people, women, and temporary and seasonal workers.

1.2 Number of registered & informal farmers

According to the Farm Structure Survey (FSS) statistics from 2018, there were **564,541 agricultural holdings (AHs)**, with family AHs accounting for 99.7% of the total. According to the 2018 FSS statistics, a sizable proportion of farms (42.8%) are owned by people over the age of 65. The majority of farm managers in the RS (54%) have earned their experience solely via practice, 38% have completed high school in a non-agricultural sector, and only 3% have secondary education in agriculture. In 2018, 7% of farm managers took agriculture classes. Farm managers receive very little agricultural education, whether formal or informal.

1.3 Farm size distribution (e.g. % of farms <2 ha)

The number of AHs is falling in all regions, while the average AH size has increased from 5.4 ha (2012 Census of Agriculture) to 6.2 ha (FSS 2018). In comparison to the 2012 Census of Agriculture, the FSS 2018 findings show a modest rise in the area of the UAA (from 3,437.4 ha to 3,475.9 ha). The AHs of up to 5 ha are dominating (71.7% of the overall number of AHs), however they only account for 23.2% of the total UAA, demonstrating a strong duality of AH structure.

| Land resources | Ref. unit | Total | <1 ha | 1≤ha<2 | 2≤ha<5 | 5≤ha<10 | 10≤ha<50 | 50≤ha<100 | ha≥100 |
|------------------------------|-----------|---------|---------|---------|---------|---------|----------|-----------|---------|
| Agricultural holdings | No. | 564,541 | 111,876 | 110,893 | 182,253 | 96,262 | 58,010 | 3,825 | 1,422 |
| | % | 100.0 | 19.8 | 19.6 | 32.3 | 17.1 | 10.2 | 0.7 | 0.3 |
| Utilised agricultural area | ha (000) | 3,475.9 | 58.7 | 159.9 | 589.2 | 665.2 | 1,045.7 | 256.2 | 701.0 |
| | % | 100.0 | 1.7 | 4.6 | 17.0 | 19.1 | 30.1 | 7.4 | 20.2 |
| Average farm size | ha | 6.2 | 0.6 | 1.4 | 3.2 | 6.9 | 53.4 | 67.0 | 493.0 |
| Unutilised agricultural land | ha (000) | 290.0 | 20.8 | 22.1 | 36.0 | 18.6 | 10.1 | 8.4 | 174.0 |
| Wooded area | ha (000) | 972.3 | 102.7 | 145.9 | 254.3 | 188.9 | 118.9 | 58.6 | 103.0 |
| Other land | ha (000) | 440.6 | 18.0 | 13.7 | 28.8 | 32.6 | 27.1 | 32.0 | 288.4 |
| Total agricultural land | ha (000) | 5,178.7 | 200.2 | 341.6 | 908.3 | 905.4 | 1,201.7 | 355.1 | 1,266.5 |

Source: SORS

1.4 Farm typologies (arable, livestock, mixed)

Serbia produces a variety of agricultural products, primarily grains, fruits, and vegetables, which account for a sizable portion of its GDP and exports. Serbia is one of the world's top five producers of raspberries (127,011 tons in 2018) and plums (430,199 tons). It also produces a substantial amount of maize (6,158,120 tons, ranked 32nd in the world) and wheat (2,095,400 tons, ranked 35th). The production of sugar beet (2,299,770 tons) and sunflower seeds (454,282 tons) satisfy domestic demand for sugar and vegetable oil while also allowing for the export of around 180,000 tons of sugar to the EU.

Fruit farms cover 182,922 hectares of arable land in Serbia (as of 2018).

Grain farms cover around 1,702,829 hectares of arable land in Serbia (as of 2018), making 66.22% of total used arable land.

Not including grains, there are various agriculture cultivars being planted on over 869,000 hectares of arable land in Serbia. Among vegetable, watermelon and strawberry plants, 34,190 hectares that are grown outdoors are produced for use in fresh state, 12,083 hectares are grown outdoors for industrial processing and 3,843 hectares are grown in greenhouses.

As of 2018, the share of **livestock** in agricultural production of Serbia stood at 32.6%, with total livestock valued at 1.460 billion euros and annual production value of livestock products being around 450 million euros. In the total structure of production value of livestock, pigs comprise the most (66.2%), followed by cattle (31.0%), poultry (14.4%) and sheep and goats with 8.4%. As of 2018, there are 23 million chickens, 3.3 million pigs, 1.8 million sheep, 881,000 cattle, 218,000 goats and 15,000 horses. Also, there is an estimated 914,000 beehives, 31,800 rabbits, 4,800 donkeys and small numbers of buffaloes and ostriches.

1.5 Youth & women participation in farming

| Rate | The Republic of Serbia | | | Male | | Female | | Gender gap | |
|-------------------|------------------------|-------|-------|-------|-------|--------|-------|------------|-------|
| | Total | Urban | Other | Urban | Other | Urban | Other | Urban | Other |
| Activity rate | 68.1 | 67.8 | 68.7 | 73.2 | 77.4 | 62.6 | 59.2 | 10.6 | 18.2 |
| Employment rate | 60.7 | 59.8 | 62.1 | 64.7 | 70.7 | 55.1 | 52.9 | 9.6 | 17.8 |
| Unemployment rate | 10.9 | 11.8 | 9.5 | 11.7 | 8.7 | 12.0 | 10.7 | -0.3 | -2.0 |
| Inactivity rate | 31.9 | 32.2 | 31.3 | 26.8 | 22.6 | 37.4 | 40.8 | -10.6 | -18.2 |

Source: SORS

RS has significant gender and age disparities, especially when activity and employment rates are taken into account among the rural population. Rural women had significantly lower activity and employment rates than men. Young women are in the worse position since they have the lowest rates of activity and employment, as well as significantly higher rates of unemployment and inactivity. The agricultural workforce comprised 1,150,653 individuals, a 14% decrease from 2018, with 77.2% men and 22.8% women household heads. The average age of the head of a family of an agricultural household is 60 years, and every 11th household head is younger than 40 years.

Only 115.549 holdings had been registered with the women as an owner and 390.774 on man. Those “ladies holdings” in 95% are active in the rural tourism activities. It is obvious, that except in rare cases when life circumstances influence farm ownership, most often the owners of the farms are men. It is the consequence of traditionalism, conservatism.

| | Members of Ag. holdings and permanent employees | | | Members of family ag. holdings | | |
|--------------------|---|---------|---------|--------------------------------|---------|---------|
| | Total | F | M | Total | F | M |
| Republic of Serbia | 1,157,319 | 489,342 | 667,977 | 1,134,245 | 483,633 | 650,612 |

Source: <https://popispoljoprivrede.stat.gov.rs/sr-Cyrl/tabele/>

Massive initiatives towards encouraging women's participation in the agricultural sector led by different organizations and governments did not result in serious progress. Unfortunately, this is not the consequence of the lack of energy or desire to be involved in the agriculture sector, nor mistake of traditional education. This situation is the outcome of the absence of the real strategy of agriculture development, and vision where agriculture sector in RS is going.

Greece

1.1 Employment in agriculture (% of workforce)

In 2023, about **11.5%** of the Greek workforce was employed in agriculture. This figure represents around **400,000 people**, accounting for 10% of total employment in all sectors. In 2025, agriculture is projected to continue declining as a percentage of total employment in Greece, although it still accounted for over 10% of total employment in 2020. The agricultural sector is experiencing challenges like aging populations in rural areas, unemployment for young people, and natural constraints affecting farming. Greece is

actively seeking to fill seasonal agricultural labor needs, with agreements in place with countries like Albania, Bangladesh, and Egypt.

1.2 Number of registered & informal farmers

In Greece, there are approximately **700,000 registered farms**. While precise figures for informal farmers are harder to obtain, estimates suggest a significant level of informality in the agricultural sector, impacting the total number of individuals involved in farming activities.

1.3 Farm size distribution (e.g. % of farms <2 ha)

In Greece, the vast majority of farms are small, with an average size of **around 7 hectares**. More than 70% of farms are less than 5 hectares. Greece also has a high percentage of family farms, which are generally smaller in size compared to non-family farms. Farms are primarily located in the plains of Thessalia, Macedonia, and Thrace, which are suitable for large-scale cultivation. Eastern Greece, including the Attica peninsula, also has fertile farmland. Many farms, particularly in regions like Macedonia and Thrace, offer agrotourism and workshops, and some are found on islands like Kefalonia and Icaria, known for their winemaking farms.

1.4 Farm typologies (arable, livestock, mixed)

Currently, Greek agriculture like other countries of the European Union is heavily subsidized by the Common Agricultural Policy (CAP). Certain deductions of subsidies are planned within the next decade. Greek farming is diverse, with a strong focus on olive oil production and wine, but also encompassing a wide variety of crops and livestock. Crops include olives, grapes, citrus fruits, cereals, and vegetables. Livestock products are also produced, and fisheries play a significant role in the Greek agricultural sector. The average utilised area of Greek agricultural units in 2020 was just over 5.3 hectares (53 acres), less than 1/3 of the corresponding average area in the EU-27 (17.1 hectares).

The very small average size of farms does not allow the exploitation of the increasing economies of scale resulting from rising fixed costs (increasing physical capital intensity in international agricultural production). This is the first of the negative facts in the Greek agriculture.

Greece produced in 2018:

- 1.2 million tons of maize;
- 1 million tons of olive (5th largest producer in the world, behind Spain, Italy, Morocco and Turkey);
- 1 million tons of wheat;
- 968 thousand tons of peach (3rd largest producer in the world, behind China and Italy);
- 933 thousand tons of grape (19th largest producer in the world);
- 913 thousand tons of orange (17th largest producer in the world);
- 837 thousand tons of cotton;
- 835 thousand tons of tomatoes;
- 630 thousand tons of watermelon;
- 465 thousand tons of potato;
- 353 thousand tons of sugar beet;
- 344 thousand tons of barley;
- 285 thousand tons of apple;
- 265 thousand tons of kiwi (5th largest producer in the world, behind China, Italy, New Zealand and Iran);

1.5 Youth & women participation in farming

In Greece, both youth and women participate in farming, with specific policies and programs aimed at encouraging their involvement. Greece's CAP Strategic Plan allocates significant funding to young farmers, along with support for education, advisory services, and business planning. Additionally, the Ministry provides assistance to young women who wish to become established as farmers, recognizing the potential for empowerment through land acquisition and asset management.

Women represent around 46.34% of all farmers in Greece, cultivating approximately **36%** of the total declared agricultural land. But this is only the official data

In 2020, almost 65% of farm owners were at least 55 years old, with the majority (37.1%) being at least 65 years old. Young farmers (> 30yo) represents only the **32%** of the farmers. This fact is one of the major problems in the agricultural sectors in Greece.

Albania

1.1 Employment in agriculture (% of workforce)

In the past ten years, Albania has seen an economic increase exceeding 3%, which fell to 2.2% in 2019. The year 2019 reflected a downward trend due to a significant drop in rainfall, which resulted in a reduction in hydroelectric power output (WB, 2019). Throughout this time period, economic growth from a production standpoint was bolstered by the growth of the service sector, while the construction and industry sectors experienced fluctuations. From the viewpoint of aggregate demand, economic growth was primarily driven by the rise in private consumption.

The agricultural sector has seen a steady growth over the past few years, reaching 2.5 billion EUR in 2019. The sector's share of the overall gross value added (GVA) of the economy has remained stable at 20%, while its share of employment has dropped by 10 percentage points over the past decade. Factors such as migration and rising labor productivity have led to a decrease in the number of people employed in agriculture. Labor productivity within the agricultural sector has been on a consistent upward trend, amounting to 5,515 EUR per full-time worker in agriculture in 2019. Even with the rise in GVA per worker in recent years, Albania maintains the lowest GVA per full-time worker in comparison to other Western Balkan countries (FAO, WB, and ILO, 2019).

Agriculture in Albania employs 47.8% of the total of active population and about 24.31% of the land is used for agricultural purposes.

Livestock farming plays a crucial role in generating income for the majority of farms in rural Albania, with 86% engaged in this activity. Livestock contributes 52% to the Agricultural GDP, highlighting its significance for the country's economic and social development. Cattle represent the largest portion of livestock, accounting for 46.7% of the total number of livestock heads. Small ruminants make up 30.3%, pigs 6.3%, poultry 9.3%, and equidae 7.4% of the total livestock heads per cattle unit. However, there is an overall declining trend for both small ruminants and cattle.

Furthermore, according to INSTAT data, 57% of farmers engage in economic activities like as mixed farming and vegetable gardening. Crop production in Albania primarily consists of forage and cereals, which account for 36% and 25% of the cultivated land, respectively. The rise in fruit tree production is

predominantly due to the expansion of orchards, citrus fruits, grapes, and olives. This increase in output is facilitated by a steady growth in the area under cultivation and enhanced yield rates.

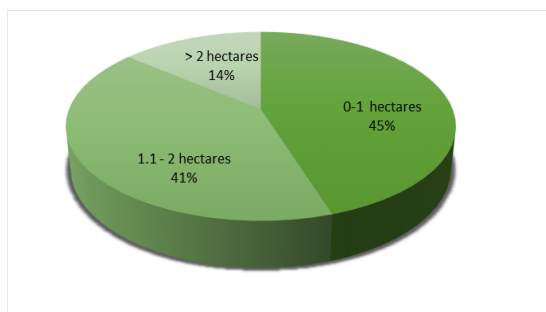
Agro-processing employs around 11,300 people in formal jobs and many more informally, especially during high seasons in agriculture and as part of informal businesses. 65% of these jobs are filled with young people under 30, while 70% of them are young women. Most of youth working in agro-processing are unskilled, manual workers, employed along the processing line – grading, handling or packing products. The sector has been selected for the important weight it carries in the Albanian economy. This amounts to 24.4% of the total agriculture turnover or 5% of the total Albanian GDP. Additionally, agro-processing trends are promising as is the potential for growth and job creation. The sector turnover has almost doubled, while employment has increased by close to 20%, supported by a growing domestic demand for processed products.

1.2 Number of registered & informal farmers

According to the International Labour Organization (ILO), informal employment in Albania accounts for 56.7% of total employment as recorded by INSTAT's Labor Force Survey in 2019. Agriculture accounts for **63.9% of all informal workers**. More thorough data indicate that men are more likely to work informally. 59% of all working men work informally, compared to 54% of women. Until 2019, Albania had the greatest level of employment in the Western Balkans, accounting for 53.8% of the able-bodied workforce, although the World Bank has concluded that employment growth may have been influenced by the labor market's increased formalization.

In the past year Albania has seen an increase in the number of farmers with NIPT numbers. According to data from the Institute of Statistics in Business Registers, the country would have **96,440 farmers** with Taxable Person Identification Numbers (NIPT) in 2023. On an annual basis, the number of farmers with NIPT has increased by 14.3 percent. Meanwhile, 11.2% of respondents identified as female farmers or managers. Lushnja has the most formalized farmers, with 10,000 253 registered, accounting for 10.6% of all active farmers with NIPT. Divjaka comes in second after Lushnja, with 5,187 registered farmers, followed by Berat, with 4,800. Durrës and Kukës have the fewest farmers with NIPT numbers (2,342 and 1,483, respectively). The NIPT equipment has expanded due to rising consumer demand, but a series of subsidy schemes are in place to support farmers as well as encourage new investments in the sector for which the NIPT number is necessary.

1.3 Farm size distribution (e.g. % of farms <2 ha)

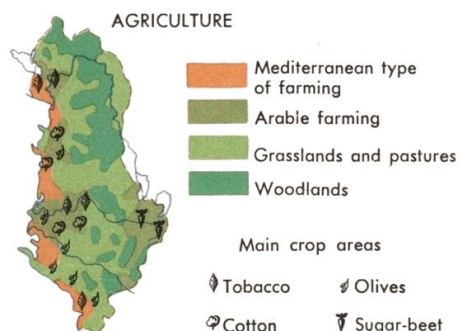


Albanian agriculture is dominated by a large number of very small and fragmented farms. Around 45% of total farms are micro-farms (0-1 ha), 41% of farms have a size of 1.1-2 ha and only 14% of farms have an area of more than 2 ha. In average, ***farm size is around 1.2 ha*** in Albania, which is close to micro-size and has a significant impact on productivity and competitiveness of farmers in the region.

A high percentage of agricultural farms fail to meet national and EU standards due to limited financial resources to improve facilities or technologies, as well as a lack of awareness or knowledge about these

standards. Lack of enforcement of legislation is still weak, which reduces the incentive to invest in meeting these standards. The main source of financing for agricultural farms is their own sales and funds, while bank borrowing is still underdeveloped due to high loan percentages and lack of attractive microfinance facilities.

1.4 Farm typologies (arable, livestock, mixed)



The farm typologies identified are:

(1) Poly-culture, mainly for the market: This group is characterized by the highest proportion of sales (64 % of the total production value) as well as no clear specialization in one type of agricultural production. The farming mix is dominated by crops (77 % of total production). The distribution among cropping activities favors fruit tree production, but other crops such as arable crops (31 %) and vegetables (nearly 20 %) also make an important contribution.

(2) Arable crops: In this group, arable crop production is dominant (nearly 90 % of total crop production). The farms in this group use only 3.8 AWU/million Albanian lek of agricultural production, which is the lowest amount of labor used among all the types identified.

(3) Fruit trees: In fruit trees, we have included all types of fruit trees (pome fruits, stone fruits, nuts, sub-tropical fruits, citrus, olives and vines) The farms in this group have a clear specialization in fruit tree production (77 % of crop production) and are market oriented (64 % of the production is sold).

(4) Livestock: This group of farms is characterised by lower sales (one-third of total production) but a significant proportion of livestock activity. It seems that this strategy is the result of limited arable land (on average less than 1 ha/farm) and reduced potential for employment in non-agricultural sectors.

1.5 Youth & women participation in farming

Youth engagement in agriculture is relatively low. Many young people, especially in rural areas, are discouraged from seeking off-farm jobs and are predominantly involved in agriculture as unpaid family workers. Albania has the **second-youngest population** in Europe, but rural youth unemployment is 27.9%, far higher than the EU average (WG4-REAWG). In 2018, Albania had 500,192 young persons under the age of 15 and 396,188 elderly adults 65 and older. The proportion of employees aged 15 and up is 52.1%. According to an examination of employment by economic activity, services and agriculture employ the most people (42.9% and 37.4%, respectively), while industry employs only 19.7%.

Women account for 40.1% of the agricultural labor force, compared to 28.7% for men. Agriculture is the primary source of employment for rural women (UN WOMEN, 2024). According to an analysis of job structure and employee activity status, 23.5% of women are family workers, whereas male family workers account for only 13.2%. The sector is also notable for a high proportion of unpaid employment by women. In informal employment, women account for twice as many family workers as men (54% versus 28%).¹⁸ Women who work informally, particularly family workers, are excluded from maternity leave and have limited access to social security and insurance schemes.

Montenegro

1.1 Employment in agriculture (% of workforce)

Montenegro's economy is heavily reliant on agriculture. The agriculture sector is significant since it accounts for a large portion of total GDP. In 2020, the agricultural, forestry, and fisheries sector accounted for 7.6% of GDP, up 1.2% from 2019. The COVID 19 viral pandemic, which curtailed activity in many businesses (tourist, trade, etc.), contributed to the increase in the agriculture, forestry, and fisheries sector shares. Thanks to the EU export number, an increasing number of Montenegrin businesses are introducing their products to the EU market.

According to the Statistical Office of Montenegro data (Labour Force Survey) for 2020, Montenegro's total labor force is made up of 267,200 of the active population. From this figure, 219,400 people were employed, while 47,800 were unemployed. Unemployment affects the most people aged 15 to 24, accounting for 36%. According to FSS 2016 data on employment in 43,791 family agricultural holdings, **99,236 people** work in them. That is **22.1%** of the overall employed population.

1.2 Number of registered & informal farmers

According to the preliminary results of the Census of Agriculture in 2024, the total number of agricultural holdings in Montenegro is **26 711**. By the beginning of 2021, about **13,900 agricultural farms** have been entered in the Register of Agricultural Holdings, which have the opportunity to apply for the support of the Ministry of Agriculture, Forestry and Water Management through measures to support the Agrobudget. The rest of the existing agricultural farms that are not in the Register of Agricultural Holdings, are farms not using the national subsidies and producing for their own consumption.

1.3 Farm size distribution (e.g. % of farms <2 ha)

In accordance with the FSS 2016 data, agricultural holdings possess 255,845.8 ha of total utilised agricultural land, i.e. average agricultural holding possesses **5.84 ha** of agricultural land.

Table 1: Agricultural holdings by utilised agricultural land, economic size, and labour force

| | Number of holdings | Utilised agricultural land ha | Average area of agricultural utilised land per holding (ha) | Labour force on agricultural holdings |
|-----------------------|---------------------------|--------------------------------------|--|--|
| Agricultural holdings | 43,791 | 255,845.8 | 5.84 | 99,236 |

Source: FSS - Farm structure survey 2016 (Statistical Office of Montenegro)

Structure of agricultural land is unfavourable in terms of the size of agricultural holdings compared to the size of farm holdings in Member States and countries in the region. Comparing the data from the Survey on the Structure of Agricultural Holdings (Statistical Office of Montenegro), the average area of used agricultural land per farm in Montenegro is 5.84 ha. However, it should be taken into account that 58% of agricultural holdings own up to 2 ha of land, which means that the used agricultural land is very fragmented, which additionally negatively affects the full utilization.

1.4 Farm typologies (arable, livestock, mixed)

Over 60% of agricultural land in the country is used for grazing of relatively small holdings of livestock and this figure rises to over 85% if one takes into account meadows where grazing occurs. The next largest category of land use is fields and garden, which utilizes about 9% of the agricultural land with vegetable gardens and field crops, including fodder for domestic livestock. About 40% of this category (arable land) is devoted to fodder crops, 18% consists of vegetable gardens, and only 11% is devoted to growing cereals, such as wheat, barley, oats and maize. Finally, orchards and vineyards, located largely in the southern part of the country running from Podgorica to the sea, constitute about 3% of the total agricultural land. This area is partially irrigated and target for expansion over the coming decades, primarily for export. It includes table and wine grape production, and other fruit crops (10).

Montenegro can be divided into 5 areas according to the specific characteristics and conditions for the development of agriculture:

- The coastal region (9.8% of total agricultural land area) of fertile agricultural land, suitable for fruit and vegetable production and for breeding of small ruminants, and abundant with honey-bearing, aromatic and medicinal herbs and wild fruits.
- The Zeta-Bjelopavlíci region (15.3% of total agricultural land area) is the lowland region up to 200 m above sea level, suitable for various types of production (farming, fruits-vineyards, livestock).
- The karst region (14.3% of total agricultural land area) lies at elevations of up to 700-800 m. The arable land is scarce and is mainly located in the karst fields, karst funnel-shaped depressions and small valleys, whereas arid areas dominate. The most important agricultural sectors are livestock breeding (especially goats and sheep, and then the cattle) and beekeeping.
- The northern-mountainous region (35% of total agricultural land area) is characterized by numerous plateaus and highland; it is suitable for growing cereals, potatoes and brassicas, as well as for the development of livestock breeding due to large areas of meadows and pastures.
- The Polimsko-Ibar region (25% of total agricultural land area). Fertile land and abundance of springs and running water make this region important for all three branches of agriculture: farming with vegetable growing, fruit growing and animal husbandry.

The most important crops are vegetables and fruits, while commercial production of farm crops (cereals, maize, sugar beet, oilseeds) is almost not represented. Livestock breeding is the most significant branch of agriculture, with a share of more than 60% in total new value (9).

1.5 Youth & women participation in farming

RCTP projects (Cluster development and rural transformation projects) made a significant contribution to addressing gender needs and achieving Gender equality and women's empowerment (GEWE), addressing all three gender policy objectives: (1) economic empowerment to enable both rural women and men to participate in and benefit from profitable economic activities; (2) both women and men have equal voice and influence in rural institutions and organizations, including decision making processes at household, community or local level; (3) more equitable balance in workloads and in the sharing of economic and social benefits between women and men.

Women accounted for a substantial number of beneficiaries. As for the matching grant scheme under component 1, the project disaggregated data on women and youth participation for each value chain cluster. Overall, women represent 20% of the matching grant (MG) beneficiaries and 18% of those who

have received trainings (below the targets of 30%). Out of the 196 women-headed households who received a MG, the greatest allocation was recorded in the milk value chain (74%). This is true also for the young women-headed households (out of the 42 young women-headed households who received a MG, 55% of the allocation was recorded in the milk value chain). In the Register of agricultural farms in Montenegro, out of 16,803 farmers in 2021, there are **1683** women, somewhat above **14 %** of women in agriculture.

Youth represent **19%** of the matching grant beneficiaries and 31% of those who have received trainings (above the targets of 30%). RCTP has also encouraged youth to register as the head of agricultural households. As a result, newly registered households headed by youth represent 47% of the total number of young people benefiting from matching grants (79 out of 168).

Kosovo

1.1 Employment in agriculture (% of workforce)

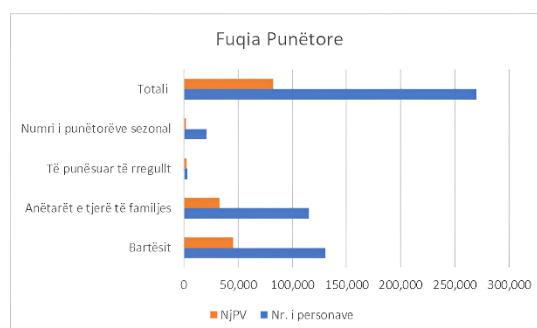
Agriculture is a vital sector in Kosovo, employing around **18.7%** of the workforce and contributing approximately 6.6% to the national GDP, according to the Kosovo Agency of Statistics (KAS) and the Ministry of Agriculture, Forestry and Rural Development (MAFRD). Through the Survey of Agricultural Economies (2019), data have been collected about employment in agriculture depending on their engagement in production, full-time, part-time or occasional. Agricultural work during 2019 expressed in APU (Annual Work Unit), (1 APU is equal to 1,800 hours of work per year). The total number of agriculture employees reaches **270,181 individuals**.

| Labor Force | | Number of persons | AWU |
|--|------------------------------|-------------------|-----------|
| Family members working in the agricultural economy | Bearers | 130,333 | 45,589 |
| | Other family members | 115,265 | 32,688.72 |
| Other employees (non-family) | Regular employees | 3,553 | 2,614.11 |
| | Number of seasonal employees | 21,030 | 1,765.59 |
| Total | | 270,181 | 82,657 |

Source: Agricultural Economics Survey 2019 KAS

1.2 Number of registered & informal farmers

In 2023, the total number of registered farmers in Kosovo was **130,775**. While 362,700 individuals are estimated to be involved in agriculture in some way, only 130,775 are officially registered as agricultural farmers. Although agriculture has the potential to create jobs, most of the agricultural work in households is performed by the labor force of family members, according to the table on the right it can be observed that the largest part of the NjPV consists of the bearers with 55.2% and other members of the family, which constitutes 39.5%, while other groups have a low participation



1.3 Farm size distribution (e.g. % of farms <2 ha)

In Kosovo, the majority of farms are small, with most being **less than 5 hectares in size**. Specifically, 91% of farms are smaller than 5 hectares, though they represent 46% of the total arable land. About 70% of Kosovo's 105,000 farms manage less than 2 hectares, and around 65% of the total arable land is managed by smallholders. Only 0.4% of farms cultivate an area equal to or larger than the EU-27 average of 20 hectares.

| Farm size (ha) | Number of farms | Farms by size category, as a percentage of the total | Arable land by category in hectares | Arable land by size category, as a percentage of the total |
|------------------------|-----------------|--|-------------------------------------|--|
| 0 - 0.5 | 31,290 | 69.00% | 6,453 | 46.00% |
| 0.5 - 1.00 | 17,560 | | 11,999 | |
| 1.00 - 2.00 | 22,560 | | 29,055 | |
| 2.00 - 5.00 | 23,383 | | 23,00 | |
| 5.00 - 10.00 | 7,063 | 8% | 64,819 | 35.00% |
| 10.00 - 20.00 | 1,429 | | 16,800 | |
| 20.00 - 30.00 | 240 | | 5,255 | |
| 30.00 - Më shumë se 30 | 198 | | 13,393 | |
| Total | 103,723 | 100% | 186,389 | 100% |
| Total | 103,723 | 100% | 186,389 | 100% |

Source: Green Raport 2022

Despite the unfavorable structure of farms, the utilized area of agricultural land is constantly increasing. According to the latest data of the Survey of Agricultural Economies. In 2017, the total utilized area of agricultural land was 416,072 ha, while in 2018, a slight increase was observed, continuing with growth in 2019, where the area had reached 420,141 ha. The increase in agricultural land use continued in 2020, in 2021 the area of agricultural land used reached 420,327 ha, which shows a change of 0.3% compared to 2020.

1.4 Farm typologies (arable, livestock, mixed)

In Kosovo, agricultural land is primarily used for cereal grains, vegetables, fruits, and vineyards. The majority of farms are small, with a significant portion focused on subsistence or local consumption. Livestock farming, including dairy and poultry, is also prevalent. The largest area of farming land is occupied by meadows and pastures (including common land) which constitutes 51.79% of the total utilized area of agricultural land. After meadows and pastures, the largest area is the category of arable land-felds, with a share of 44.8%, which represents the area of 188,365 ha, which includes the area of vegetables in the open Feld (first crop) and greenhouses (first crop).

| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Change '20/'19 in % | Share in % 2020 |
|--|----------------|----------------|----------------|----------------|----------------|----------------|---------------------|-----------------|
| Arable land - fields | 187,223 | 186,954 | 188,359 | 188,365 | 188,372 | 183,375 | 0.0 | 44.8 |
| - Out of which, with vegetables in the open field (first crop) | 7,864 | 8,033 | 7,818 | 8,319 | 8,435 | 8,491 | 1.4 | - |
| - Out of which, with vegetables in greenhouses (first crop) | 457 | 467 | 468 | 518 | 547 | 562 | 5.5 | - |
| Garden | 994 | 1,199 | 1,003 | 1,122 | 1,133 | 1,089 | 1.0 | 0.3 |
| Orchard plantations | 5,493 | 6,247 | 7,687 | 9,244 | 10,029 | 10,144 | 8.5 | 2.4 |
| Vineyard plantations | 3,112 | 3,199 | 3,272 | 3,367 | 3,437 | 3,471 | 2.1 | 0.8 |
| Nursery | 196 | 159 | 109 | 111 | 137 | 140 | 23.1 | 0.0 |
| Meadows and pastures (including common land) | 218,808 | 218,314 | 218,152 | 217,932 | 217,102 | 217,107 | -0.4 | 51.7 |
| Total utilized area of agricultural land | 415,826 | 416,072 | 418,582 | 420,141 | 420,210 | 420,327 | 0.03 | 100 |

Source: Green Report for 2022

1.5 Youth & women participation in farming

In 2019, approximately 15.5% of the population, or 270,181 people, were involved in agriculture, with women constituting **49%** of the agricultural workforce. Despite their substantial presence, gender and social inequalities persist within the sector. Women face significant wage disparities, earning 20% less in the private sector and 8% less in the public sector compared to their male counterparts. Moreover, women-led agricultural enterprises receive significantly fewer subsidies compared to those owned by men. As an example, out of the 70,270 farmers supported by the Ministry of Agriculture, Forestry, and Rural Development (MAFRD), only 5% are women. These disparities highlight the need for targeted interventions to promote gender equality and address the barriers faced by women in accessing resources and support within the agriculture sector.

The findings indicate that child labour is present in the agricultural sector, with approximately 40 per cent of households engaging adolescents between the ages of 13 and 17 in agricultural work. Child labour involving children aged 5 to 12 years old is present in 10 per cent of households. Adolescent boys are more likely to work longer hours than girls, and older children are more involved in hazardous tasks. The prevalence of child labour varies across different regions, with Ferizaj having the highest engagement of adolescents in agricultural work (88 per cent). Gjilan, Ferizaj and Prishtinë are the top three regions with the highest percentage of households engaging children aged 5 to 12 years old in agricultural work. Common patterns of work performed by children in the agricultural sector include cultivating plant crops (94 per cent), raising and caring for livestock (47 percent), and handling or applying pesticides (16 percent). The primary causes of child labour in the agricultural sector are related to family dynamics and the willingness of children to contribute. Families in economic deprivation are more likely to engage their children in potentially dangerous agricultural tasks.

VET in agriculture sector

Serbia

2.1 National policies and strategies

The **Strategy for the Development of Education in Serbia by 2030**, which was endorsed by the Serbian government in June 2021, is a more comprehensive plan that covers adult education, teacher education, and other pertinent facets of the educational system in addition to all educational levels from ISCED 0 to ISCED 8. Serbia's "Strategy for the Development of Education by 2030" emphasizes enhancing the quality and relevance of vocational education and training (VET), including in agriculture. This strategy focuses on developing and improving qualification standards and educational programs, strengthening Sector Skills Councils, and aligning education with labor market demands.

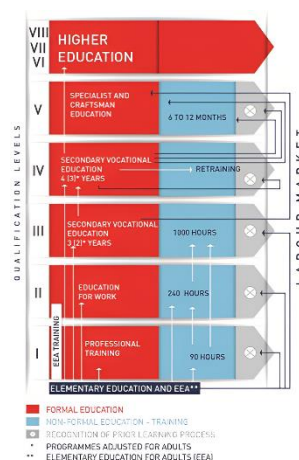
Some significant subjects that were not covered by the previous strategic framework have been defined in the strategy. Additionally, a new strategy has redefined the accomplishment of certain specific objectives that were initiated during the preceding time. Another step toward aligning education policies with those pertaining to science, technical, and technology advancement in contemporary society is the Strategy for the Development of Education in Serbia by 2030. Additionally, this approach tends to align educational rules with international efforts and agreements (such as those from the EU, UN, Council of Europe, etc.).

The document outlines two overarching goals: one pertaining to pre-university education and the other to higher education. The first one pertains to the stronger educational function of all educational institutions, the improved quality of teaching and learning, and the equity and accessibility of pre-university education. The second one focuses on enhancing higher education's equity, relevance, quality, and accessibility.

2.2 National qualification frameworks (NQF)

In Serbia, agriculture qualifications range from high school and professional school degrees to Bachelor's, Master's, and PhD degrees. The majority of agricultural producers in Serbia hold a higher education/BA degree, with a significant portion also possessing Master's and PhD degrees. The National Qualifications Framework of Serbia (NQFS) defines four qualification types: general, vocational, academic, and vocational-higher education.

The NQF Law mentions credits in terms of ECTS points for HE programmes only. The descriptions of the qualifications in the NQFS database <http://noks.mpn.gov.rs/en/> give volume of qualifications in years for qualifications at levels 1 – 5 (in years or in hours) and in ECTS points for qualifications at levels 6-8 e.g. level 6.1 180 ECTS, level 6.2 240 ECTS.



2.3 Institutional framework

With 256 certified agriculture advisers, the **RS's Agriculture consultancy Service (AAS)** is a network of 34 agricultural consultancy services. Of these, 22 AASs in Central Serbia—three privately operated and 19 public—have 188 licensed agriculture advisers. The Institute for Science Application in Agriculture, which has been designated for a five-year period as an institution for professional training, monitoring, and

evaluation of the effects of AASs' activities, assists MAFWM in implementing the control and coordination of these services. Twelve AASs and 88 certified agriculture consultants service the AP Vojvodina area. As the authorized organization for advisors' professional training in AP Vojvodina, the PSAWMF oversees and coordinates these services with help from AAS Novi Sad. The Law on Advisory Services, the actual mid-term program, and the annual programs for the development of AASs in agriculture are all followed by MAFWM and PSAWMF.

2.4 Agricultural vocational schools & training centers

Vocational education in the sector is traditionally very well-developed. In Serbia exist 22 secondary agricultural schools. Curriculum in the ag. schools last 4 years. It is fully orientated towards praxis and theory of the relevant agricultural activities. Majority of the schools have own experimental fields, and what is very important, often obtain own income thanks of the different products produced on the own experimental farm.

Unfortunately, in the curriculum of the schools, mushrooms cultivation is not included. It is very important to be emphasized that mushroom cultivation, in the educational program must be included as a tool which can be used in the realisation of the farm circularity. In RS, only two Faculties for agriculture exist. Mushroom cultivation is mentioned as a side branch with very old and conservative information.

The need for the improvement of professional competence, awareness and knowledge transfer in the field of agriculture and rural development is increasing year by year, and the current situation is that 49% of AH managers (including AH holders) gained vocational education through work in agriculture, 3% through agriculture secondary school, 1% have completed agricultural faculty and 0.24% have attended informal vocational trainings – courses. In the RS, formal education (secondary education, faculty, postgraduate, and PhD studies) as well as informal education and vocational trainings organized by educational and research institutions, advisory services, consulting firms, project units, and the media are the main ways that knowledge is transferred in the fields of agriculture and rural development.

Greece

2.1 National policies and strategies

The 2022-24 Greek strategic plan for VET, LLL and youth aims to address system weaknesses, with focus on quality assurance, VET inclusiveness and responsiveness to the digital and green transitions and connections with the labour market. It sets targets to reinforce apprenticeships and internship schemes (respectively, up to 25000 new apprentices and 35000 new internships annually) by 2025 and beyond. In addition, around 200 occupational profiles shall be created or updated, and certified, by EOPPEP in 2024. The plan is in line with VET priorities agreed at European level and the national implementation plan (NIP) commitments by 2025. These include the creation of a digital platform for VET for institutions and learners, digitalisation of EOPPEP services, modernisation of laboratory infrastructure in initial VET (117 laboratory centres). The NIP also foresees expansion of the network of model PEPAL and thematic IEK and the upgrading of the teaching staff, including in adult education and training.

2.2 National qualification frameworks (NQF)

The EQF also covers the agricultural sector, incorporating qualifications acquired through vocational education and training. In particular, graduates of Vocational High Schools (EPAL) receive a high school diploma and a certificate of specialization at level 4 of the NQF. In addition, Vocational Training Institutes

(VTIs) offer programmes leading to level 5 qualifications, which are related to specialized agricultural skills. Institute of Educational Policy.

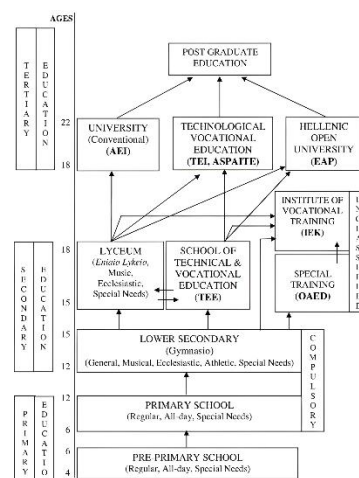
Level 3 (EQF Level 3): Corresponds to Upper Secondary VET (EPAL) programs with agricultural specializations (e.g., crop production, animal husbandry). Graduates gain practical and theoretical skills to perform agricultural tasks under supervision.

Level 4 (EQF Level 4): Refers to more advanced vocational qualifications (e.g., final year of EPAL or initial post-secondary VET studies). Learners can carry out more independent work in agricultural production and apply more complex techniques.

Level 5 (EQF Level 5): Corresponds to post-secondary vocational education and training, such as studies in the Schools of Advanced Vocational Training (SAEKs) or IEKs (Institutes of Vocational Training). Graduates at this level can plan, supervise, and improve agricultural activities, including sustainable farming practices, management of resources, and use of modern technologies.

2.3 Institutional framework

The government approves the national education policy designed by the education ministry. Social partners including trade unions and employer organisations participate in the working group on developing legislation, with an advisory role, in particular through proposals on VET training and its implementation. Public and private VET providers are monitored and evaluated by: the General Secretariat of lifelong learning, the directorates of secondary or professional education of the education ministry or organisations supervised by the education ministry (i.e., National Organisation for the Certification of Qualifications and Vocational Guidance (EOPPEP), universities). Law 4763/2020 reforms VET governance and promotes the joint strategic planning of VET with the aim of avoiding overlaps, better address labour market needs and support autonomy at VET provider level. According to Law 4763/2020, the



General Secretariat for VET and LLL of the education ministry, is responsible for designing, implementing, coordinating and monitoring policies in the relevant fields. It is also the supervisory body for the implementation and monitoring of VET and LLL programmes. In addition, the law has set up governance bodies (including social partners and VET stakeholders) at national and regional level to support VET governance. Nationally, the main advisory body is the Central VET Council (KSEEK). It includes representatives from the education ministry and other relevant ministries, employer and employee associations, and chambers. It has a 3-year term and is responsible for monitoring labour market developments, adjusting VET programmes to labour market needs, and reorganising the spatial distribution of VET sectors and specialities in order to fine-tune the VET offer. In each region, a council linking VET with the local labour market (SSPAE) has been established (including labour market representatives and local authorities), aiming to align VET programmes with local labour market needs and support the work of the Central VET Council by submitting proposals for the VET sectors and specialities that should be offered at regional level. In addition, a Central Scientific Committee (KEE) has been formed to support the General Secretariat and the Central VET Council. The mission of this

committee is to carry out scientific research and provide evidence-based advice aiming to improve the quality and efficiency of VET and LLL programmes.

2.4 Agricultural vocational schools & training centers

Greece has various educational institutions offering vocational education and training in the agricultural sector:

- Vocational Lyceums (EPAL).
- Institutes of Vocational Training (IEK).
- Vocational Training Centers (VTCs): They offer training programmes for adults in various areas of agriculture, contributing to upgrading the skills of the workforce.

In addition, the Agricultural University of Athens provides higher education and supports professional development through the Liaison Office, which connects students and graduates with the labour market in the agricultural sector.

Despite the existence of these structures, agricultural education in Greece faces challenges, such as the need to renew curricula and to strengthen the link with modern labour market requirements. The continuous upgrading of the EQF and the strengthening of the institutional framework are essential for the effective development of the agricultural sector.

Albania

2.1 National policies and strategies

Albania has made efforts in recent years to reform its agricultural and rural development policies and align them with the European Union's Common Agricultural Policy. The vision of agricultural policy is based on the priorities of the Inter-sectorial Strategy for Agriculture and Rural Development (ISARD) 2014-2020, the National Strategy for Development and Integration (NSDI-II) 2015-2020, the National Programme for European Integration (NPEI) 2019-2021, the GoA Program 2017-2020, and the Ministry of Agriculture and Rural Development (MARD) priorities.

The **Strategy for Agriculture, Rural Development, and Fisheries for the period 2021-2027 (SARDF 2021-2027)**, adopted by the Government of the Republic of Albania by the end of the year 2021, reflects the continuity of the country's priorities for development of agriculture, rural areas, and fishery sector, and to provide support to the agricultural sector to achieve a sufficient level of competitiveness to cope with the challenges of the open and changeable market, as well as to boost the development of rural areas.

In order to address the identified needs of the agriculture sector, national agricultural policy interventions in the upcoming strategic period 2021-2027 within the SARDF defines the following overall objectives:

General Objective 1: Reinforcing a sustainable and competitive agri-food sector

General Objective 2: Strengthening environmental protection and climate actions

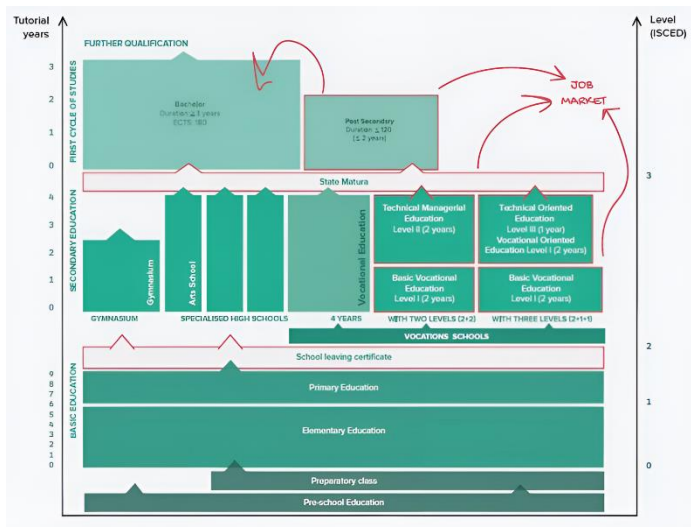
General Objective 3: Strengthening the socio-economic fabric of rural areas

The achievement of the VET strategic objectives will be achieved through targeted agricultural policy interventions in nine specific areas that are presented as specific objectives. The specific objectives in the successive text, have the connection between them and mushroom farming.

- Specific Objective 1: Increasing the viability and resilience of farms;
- Specific Objective 2: Enhancing competitiveness and market orientation;
- Specific Objective 3: Improving the response of societal demands for safe, nutritious and sustainable food, as well as for animal welfare;
- Specific Objective 4: Contributing to climate change mitigation and adaptation, as well as sustainable energy;
- Specific Objective 7: Strengthening rural employment and business development, including sustainable forestry;
- Specific Objective 8: Strengthening social capital formation for inclusive local development initiatives;

2.2 National qualification frameworks (NQF)

Albanian VET system consists of two major pillars: Initial VET and Vocational Training, Continuing VET. Initial programmes in the public VET schools have a duration of four years. Agriculture training curricula have a 2+1+1 structure, with two years of fundamental vocational training, one year of specialization, and one year of consolidation. After passing the final test, students are awarded a certificate as a Technician or Middle Manager, equivalent to level 4 of the AQF, as well as a Vocational State Matura Diploma, which allows them to pursue postsecondary education. In addition to these certificates, students receive a Semi-Qualified Worker Vocational Certificate (AQF level 2) after completing and passing the basic vocational education examination (year 2), and a Qualified Worker Certificate (AQF level 3) after successfully completing the specialization phase (year 3). These credentials are required to advance to the next level of training (AQF level 4 and 5) while also providing direct access to the labor market.



2.3 Institutional framework

The Agricultural and Rural Development Agency (ARDA)

established by Law 9817 of 2007, is a public legal entity under the Ministry of Agricultural and Rural Development. The Agency is responsible for administering the agricultural and rural development funds provided by the state, the 2KR project, the EU, and other donors or international organizations.

Agricultural Technology Transfer Centers (ATTCs)

were created by Decision of the Council of Ministers No. 515, dated 19.07.2006 "On the restructuring of Scientific Research Institutes under the Ministry of Agriculture, Food and Consumer Protection". ATTCs main tasks include the identification, testing, adaptation and introduction into agricultural practices of new methods and materials (inputs) for the country.

Regional Agricultural Extension Agencies (RAAEs) assigned according to the Decision of Council of Ministers (DCM), are key factors in the development of a competitive and sustainable agricultural sector, working in long-term partnership with beneficiaries. RAAEs main role is to organize and develop professional training of farmers in the field of agriculture and rural development.

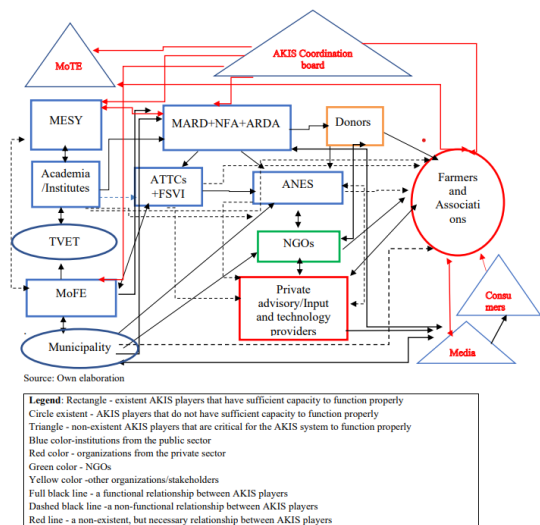
The Agricultural Knowledge and Innovation System (AKIS) is based on a centralized role of MARD depended institutions, namely Agriculture National Extension Service (ANES) in being transferring information from Agricultural technology Transfer Centers (ATTCs), Food Security and Veterinary Institute (FSVI) and National Food Authority and Academia (Agricultural University of Tirana and Faculty of Agriculture of University Fan Noli in Korca) to farmers. Moreover, ANES is also signaling information to other depended institutions of MARD such as Agriculture and Rural Development Agency (ARDA). The schemes revealed no direct linkage between ANES and private service providers. In reality these ties although not formally created are frequently visible in the organization of training and field demonstrations.

2.4 Agricultural vocational schools & training centers

The system of **vocational agricultural education** includes 12 secondary schools which cover the following areas: agriculture; agritourism, veterinary, food technology, crop and livestock farming, forestry.

University education in agricultural sciences is offered by the Agricultural University of Tirana (AUT) and the Faculty of Agriculture of Korça. UBT is the only university specializing in the provision of undergraduate and postgraduate studies, research, training and extension in the field of agriculture and food processing.

MARD manages national **agricultural extension service** covering territory of the whole country. The service enables the provision of information, advice and training to farmers and agro-business. In total, this service has 264 employees at central and local level. At the county level, the extension service is part of 4 RAEA (Regional Agricultural Extension Agencies), in each of them are employed 7 specialists in different fields such as vegetables, orchards, livestock, plant protection, agrarian economists. The rest of the extension staff is in the Agricultural Information Centers (120 of them) at the local level which



maintain direct links with the farming community. 5 Agricultural Technology Transfer Centers (ATTC) are responsible for conducting applied research in various fields of agriculture. ATTCs support MARD in formulating strategies and drafting national schemes, transferring technologies to agricultural and agro-processing businesses, supplying certified planting material for some of the seeds and seedlings, etc. The total number of employees in QTTB is 280. The Public Advisory Service (Extension) and ATTCs forward information to approximately 20% of farmers and agribusinesses each year. Each year, more than 8,000 farmers are assisted by extension service (RAEA) staff to implement and benefit from national support schemes.

Montenegro

2.1 National policies and strategies

Currently, the Montenegrin VET Strategy 2020-2024 is in place, accompanied by the approved Action Plan for 2024 (adopted in Aug 2024). The Action Plan defines measures and activities for implementing operational goals: 1) Vocational education that enables skills, competences and qualifications for employability, lifelong learning, inclusiveness, personal development and active citizenship of individuals; 2) Vocational education that is relevant for the individual, the labour market and society, and which is accessible and innovative; 3) Comprehensive, quality and effective vocational education, with management and funding that encourages excellence and efficiency. In addition, the Action Plan defines deadlines for implementation, indicators of results and performance, means for the implementation of activities, sources of financing and competent institutions for implementing individual activities for the year 2024. The VET Strategy aligns with the priorities of the EU's Copenhagen Declaration on VET and the skill needs of the economic sectors identified in the Montenegrin Smart Specialisation Strategy (2021-2024; see EC, 2021b).

The Centre for Vocational Education (VET Centre) is in charge of implementing the Strategy for Adult Education of Montenegro 2015-2025 and the related annual plans, and is an active member of EPALE. An important task of the VET Centre includes the accreditation of institutions. Courses will be mainly offered via the Public Employment Services. Montenegro's Entrepreneurial Lifelong Learning Strategy 2020-2024 is a follow-up to the 2015-2019 strategy.

2.2 National qualification frameworks (NQF)

In Montenegro, agricultural qualifications within the Montenegrin Qualifications Framework (MQF) are primarily categorized under Levels II to V, depending on the complexity of the occupation and the depth of skills and knowledge required. The MQF is aligned with the European Qualifications Framework (EQF), facilitating comparability and recognition across Europe.

- **Level II (EQF Level 2):** Basic vocational qualifications suitable for entry-level positions in agriculture, such as general farm workers.
- **Level III (EQF Level 3):** Intermediate qualifications for roles like assistant agricultural technicians, requiring more specialized skills and knowledge.
- **Level IV (EQF Level 4):** Advanced vocational qualifications for positions such as agricultural technicians, encompassing comprehensive understanding and the ability to manage specific agricultural operations.

- **Level V (EQF Level 5):** Higher vocational qualifications that may include supervisory roles or specialized areas within agriculture, often requiring the ability to manage complex tasks and coordinate teams.

2.3 Institutional framework

The Ministry of Education, Science and Innovation (MESI) is responsible for overseeing all levels of education in Montenegro, including IVET and CVET, focusing on planning, implementing, and improving educational policies, with support from various institutions and professional bodies that also contribute to the governance and management of the Montenegrin VET system. The Centre for Vocational Education (VET Centre) plays a key role in developing vocational education and training, ensuring quality assurance in both vocational and adult education, and managing the creation of qualification standards, IVET and CVET programmes, advisory support, and research for young people and adults. The Bureau for Educational Services (BES) defines and ensures quality in preuniversity education, while the Examination Centre conducts external assessments of knowledge at the end of secondary education and is also responsible for training external examiners for vocational qualification procedures. The National Education Council (NEC) provides advisory support on programmes, standards, and overall education quality at all pre-university levels, including IVET and CVET, with standing working bodies that include committees for general, vocational, and adult education. The Qualification Council (QC) works to improve the qualifications system, including their approval and classification within the National Qualifications Framework (NQF), and has established 15 sectorial commissions.

2.4 Agricultural vocational schools & training centers

The National Advisory Service has clear structure and it is functioning in two divisions: Advisory service for plant production and Advisory service for animal production. Both operate through the regional centres (Bar, Podgorica, Nikšić, Berane, Bijelo Polje and Pljevlja). Until 2018, it had functioned within the **Biotechnical Faculty**. Since 2018, after formal change, the services have been functioning as departments of the Ministry of Agriculture and Rural Development. This change made weaker the relationship between advisors and faculty scientific staff. The Advisory services are specialized for performing advisory activities in agriculture and rural development. However, the employees of the Advisory service are more and more involved in the pure administrative tasks and duties related to the implementation of the direct payments and rural development support to the family farms. Hence, the original professional and advisory roles of both divisions of the National Advisory Service are diminishing by time.

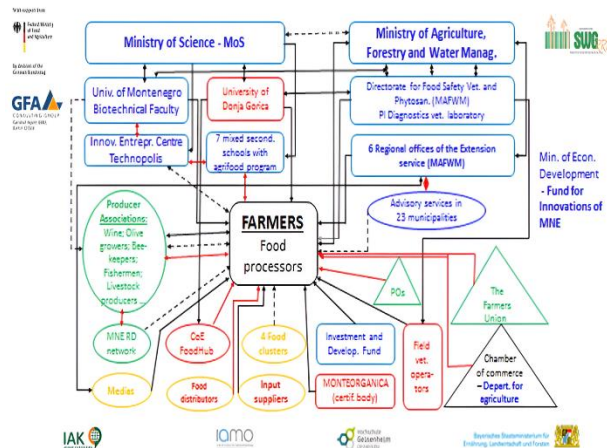


Figure 1: The AKIS Map in Montenegro

There is an independent body - **Monteorganica**, doo, an accredited certification body for control and certification in organic production. As it was presented on the AKIS Map, there are **seven secondary schools with agrifood programs**: Nikšić, Berane, Bijelo Polje, Pljevlja, Mojkovac, Bar and Andrijevica. Majority of them have educational programs for agricultural and veterinary technicians.

Kosovo

2.1 National policies and strategies

The development of a skillful labor force is primarily the responsibility of the government through the education system. Therefore, the government has integrated a VET system in the upper-secondary level of education. The MEST, acting in conjunction with the Ministry of Labor and Social Welfare (MLSW), provide VET to young people with the aim of equipping students with the necessary competencies and skills to be more competitive and position themselves in the labor market. **Kosovo Education Strategic Plan 2022–2026 (KESP)** as the key document for the development of the education sector in Kosovo, outlines the VET sector as one of the seven areas of planning along with the main challenges to be addressed for improving the sector. The document acknowledges the flaws of the sector and focuses on system improvements through enhancing the relevance of school programs to labor market needs, developing of VET specific core curriculum aligned to the Kosovo Curriculum Framework (KCF), and providing high quality work experience and professional practice to VET students.

2.2 National qualification frameworks (NQF)

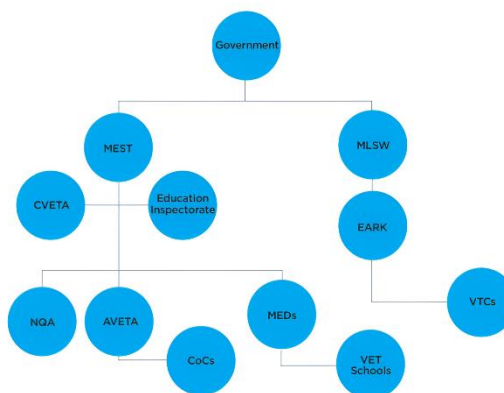
VET qualifications must be based on the requirements of KCF, the VET core curriculum, and National Qualifications Framework. The VET system covers several levels of the education to support the needs of young people in their continuous professional development and employment. Various partners are involved in this process to provide young professionals who pursue vocational professions a smoother transition to the labor market. Formally, chambers of commerce, teachers' union, and different ministries should be involved in the process of planning, development, and implementation of VET policies. This suggests that VET sector is very complex and therefore it requires clarification and division of tasks and responsibilities among key stakeholders in order to have a system that is well managed and effective.

Agricultural education programs are primarily situated within the vocational education and training (VET) system, aligning with **NQF Levels 3 to 5.**

- **Level 3:** Corresponds to upper secondary vocational education, typically covering grades 10–11. Students at this level acquire foundational knowledge and practical skills in agriculture, preparing them for entry-level positions or further education.
- **Level 4:** Represents the final year of upper secondary education (grade 12), where students deepen their specialization in agricultural studies. Completion of this level often leads to a diploma qualifying graduates for employment or progression to post-secondary education.
- **Level 5:** Denotes post-secondary non-tertiary education, such as specialized vocational programs lasting one to two years. At this level, students attain advanced competencies in agriculture, equipping them for supervisory roles or specialized technical positions

2.3 Institutional framework

The VET sector in Kosovo is managed by the Government through ministries and agencies that operate under ministerial supervision. The **MEST** is responsible for the overall policy making and legislation, including VET education, higher education, and life-long learning. Even though VET law recognizes the responsibilities of other ministries and agencies in managing and providing VET education, the main responsibilities fall under the MEST in collaboration with **MLSW**. Following the recommendations of the EU supported functional review of MEST, the Government of Kosovo ratified a new regulation for internal restructuring of MEST, which allowed the establishment of a separate department for VET with **three divisions**: Division for School Infrastructure, Curricula and Labour Market Analyses, Division for VET Standards and Quality Assurance, and Division for Lifelong Learning.



2.4 Agricultural vocational schools & training centers

Although Kosovo has a well-developed system of agricultural secondary vocational schools and university education, opportunities for vocational training of persons engaged in agriculture (for managers and workers) and lifelong learning are limited, especially for the rural population. Lack of innovative agricultural production systems in Kosovo, and low farm productivity and profitability are problems that will be addressed through this measure.

Institutions that provide training:

Department of Extension and Technical Services, MAFRD

DETS Role Manage and coordinate the provision of extension service and training based on the work program for MIAC advisors.

Municipal Information and Advising Centers (MIACs):

Each MIAC is staffed with at least one agricultural advisor to meet farmers' requirements. MIACs are being used to provide consultation, advice and training to farmers and members of the rural community.

Private training providers

Private extension services for agriculture and rural development include: private advisors, input suppliers, NGOs, veterinary stations, farmers' associations, agro-processors, etc. Private providers provide services to farmers directly and indirectly.

Faculty of Agriculture - University of Prishtina (UP)

The links between teaching, research and extension services are essential. The Faculty of Agriculture plays an important role in the education of advisors. This institution should also consider including extension knowledge in its curriculum.

Connection of Extension with Agricultural Research Institutes

In Kosovo, links between farmers, advisors and researchers are poorly developed and need to be strengthened. The Department of Extension and Technical Services within the MAFRD/DETS has created a database that contains the register of information for agricultural advisors and who are available at any time to respond to the requests of farmers with advice and trainings for agriculture and rural development. Advisors are categorized according to the specialized services they provide.

Mushroom farming: Regulatory & business environment

Serbia

3.1 Mushroom classification laws (e.g., novel food classification)

Political constraints, the lack of a comprehensive and cohesive agricultural development strategy, and the failure to implement even well-formulated strategic objectives have all slowed the sector's development, despite the presence of objectively achievable growth potential. Nonetheless, the legislative and institutional framework controlling agricultural activity is generally well-structured and closely aligned with EU laws.

In contrast, the mushroom growing sector is particularly susceptible in the Republic of Serbia. It continues to receive little attention from policymakers and strategic planners. Mushroom cultivation, in particular, is not handled as a distinct agricultural sub-sector, but rather as an administrative and legal subset of the broader framework for vegetable production, ignoring its distinctive biological, economic, and operational characteristics.

Food safety [law](#) covers a most relevant aspect of the quality of vegetable food. In Article 15 it is described that:

“Any legal person or entrepreneur that is entered in the Register of Economic Operators and the Central Register of Facilities (hereinafter referred to as: the Central Register) kept by the Ministry may engage in the production and circulation of food and feed. The legal person and entrepreneur referred to in paragraph 1 of this Article shall be entered in the Register of Economic Operators in accordance with the law governing the registration of economic operators. Natural person that is entered in the Central Register may also engage in the production of food and feed intended for circulation in accordance with regulations governing veterinary matters or plant protection.

The Central Register shall include data on the following: 1) approved facilities, and 2) registered facilities the food and feed production and circulation facilities shall be approved or registered, in accordance with special regulations”.

This article often creates confusion among mushroom farmers and bureaucracy in RS. The mushroom growing unit is a farm, and can be considered as a farm and, fortunately, the local bureaucracy in charge started to understand.

3.2 Licensing for mushroom farming

Mushrooms as a final product, are under the jurisdiction of the Phytosanitary inspection which has the spectrum of obligation but also is authorised for supervision of all aspects of the mushroom production and delivery. (<http://www.dnrl.minpolj.gov.rs/download/dokumenta/food.pdf>), article 76.

Mushrooms as a primary agricultural product does not belong in the list of the products where HACCP standard is necessary. It is primary agricultural product and this praxis is the same in entire Europe.

As a primary agricultural product, mushrooms may be certified based on the Global Gap standard which in fact is good agriculture praxis applicable for all agriculture products which can be positively estimated after food safety testing.

Very specific influence on mushroom cultivation as an agricultural branch has wild types of mushrooms, its collection and export. Formally, this forest fruit (where forest mushrooms belong) collecting is regulated but in reality, it is an extremely harmful activity on the margins of the legal activity. Its negative influence on biodiversity, ecology, and finally on the marginalized population (who are most often primary collectors of forest fruit), is an extremely big problem in the entire Balkan.

Such praxis must be stopped. Educational activities realized under the frame of the Mush Link project has to be also orientated towards increasing the awareness of biodiversity maintaining importance.

3.3 Registration & taxation protocols

Registration of the farm/agricultural holdings is not obligatory for the farmers in any sector. However, certain benefits for mainstream productions can be obtained only if the farm is registered. At least, registration farm – farm-agricultural holding, has the status of a legal entity with a bank account which only can be used in the trade business

Registration is the administrative process. Besides that, this process cannot be estimated as complicated, but for the mushroom producer can be, as the elementary condition for the farm registration is the proof of agricultural land ownership. Mushroom producers do not need to have land so this may be the specific obstacle in the registration process.

Registration is possible by using the web platform <https://erpg.eagrar.gov.rs/>

Mushroom growing production is one of the rare agricultural activity which may be realized in urban areas and registration may face and additional obstacles. Often small mushroom farms are situated in the urban areas where local authorities are not capable to realize registration and obtain certain benefits, if those exist, for the farmers, due to the objective and subjective reasons.

3.4 Sanitary/hygiene regulations (HACCP, DDD)

Serbia has food hygiene regulations that apply to mushroom cultivation, including sanitation and hygiene practices. Mushroom cultivation is subject to the **Food Safety Law**. This law mandates that food business operators ensure compliance with prescribed hygiene requirements at all stages of food production, processing, and distribution. While there are no mushroom-specific sanitary regulations, general guidelines for hygiene in mushroom farms are available from industry sources. These include practices such as daily use of clean clothing, sanitization of footwear, and changing gloves between different cultivation areas.

3.5 Lab testing requirements for food safety

Serbia has laboratory testing requirements for mushroom cultivation, particularly in the context of plant health and food safety. These tests are crucial for ensuring the quality and safety of mushrooms produced for consumption and trade, both domestically and internationally. RS's plant health legislation, including the Law on Plant Health and the Rulebook on phyto-sanitary control, mandates that regional phyto-sanitary laboratories conduct routine tests and that specialized laboratories at Faculties and Institutes are used for full identification and confirmation of harmful organisms. This framework aims to prevent and control the spread of diseases and pests that can affect mushroom cultivation.

Greece

3.1 Mushroom classification laws (e.g., novel food classification)

In Greece, mushrooms are classified as food, primarily regulated by the EU's General Food Law (GFL) and specific regulations on novel foods.

Besides novel food and novel food ingredients falling under the specific stipulations of EU Regulation 2283/2015, "normal food enriched with nutrients such as vitamins, minerals, amino acids etc.", which is the most common method of producing functional food, has to undergo pre-marketing authorization (approval) by the Supreme Chemical Council, pursuant to Art 5 par. 1 of the Food Code. The same approval requirement is stipulated also by article 3 par. 11 of the Food Code that refers to any permissible "fortification of normal food and drinks with vitamins".

The approval of Supreme Chemical Council is required even for fortified food legally produced and/or marketed in another EU member state, as well as for food enriched only with those vitamins and minerals listed in Annexes I and II of the EU Regulation 1925/2006. Due to the fact that specific maximum limits for the addition of vitamins and minerals to normal food have not been uniformly stipulated on Community level yet, the Supreme Chemical Council continues to enjoy substantial discretion in valuating and defining such limits. Moreover, Art. 3 par. 11 of the Food Code stipulates additionally that, should an amount of each added vitamin lead under normal conditions of daily consumption to exceeding 50% of RDA, without been over the corresponding therapeutic dosage, the consensual opinion of ΕΟΦ is required before marketing the product concerned.

The country also has specific legislation for wild edible mushrooms, focusing on their management, collection, and certification. The legal framework is currently being developed by the Ministry of Environment. While there isn't a specific law yet, the framework aims to address collection practices, provide training, and ensure the authenticity of Greek mushrooms, preventing imported mushrooms from being falsely labeled as Greek. This initiative focuses on establishing standards for quality and safety, with a potential future for official certification.

3.2 Licensing for mushroom farming

AUTHORISATION, REGULATION AND LEGALFRAMEWORK FOR MUSHROOMS CULTIVATION BUSINESS IN GREECE / (For cultivation on substrate within a greenhouse or semi-enclosed unit):

1. Legal form - Establishing a business

The first step is the creation of a legal person (individual, LLC, LLC, ICE, etc.) through:

- Registration in the G.E.M.I General Register of Businesses
- Registration of a company with the Tax Office
- Registration with Greek Agricultural Organization & the National Social Security Institution / special department for farmers (as a farming is the main occupation)

2. Declaration of Agricultural Land / Installation

If someone have privately owned or rented land:

Declaration in the OMS (Integrated Subsidy Management System) declaration

Land Register - Declaration of land use

If it is a greenhouse: Installation plans and declaration of structural adequacy (by an engineer)

3. Environmental Classification and Permit

Mushroom cultivation falls under the provisions of Law 4014/2011 and is included in the:
Category B (Simple notification) or
Category A2 (Preliminary Environmental Assessment) - if the installation includes a substrate processing plant or large-scale cultivation
Competent Authority: Region or Decentralised Administration
(depending on the size and environmental impact)

4. Operating Permit - Declaration of Start of Agricultural Activity

The process is now digitized through the gov.gr platform - agricultural activities category.

Key documents:

Declaration of the type of production (e.g. *Pleurotus ostreatus*)

Pleurotus (e.g. *Pleurotus* spp. - *Pleurotus* (e.g. *Pleurotus* spp.) - Purity of the crop (e.g. *Pleurotus* spp.)

Certificates of structural & electromechanical engineering studies

Proof of land title (or lease)

5. Declaration of a plant-based food production facility

To sell at markets, Ho.Re.Ca, or pack your products, you need:

Registration with the Hellenic Food Safety Authority (or the Regional Department of Rural Development) This step is optional for small units and mandatory for standardization/ B2B sales.

6. Sanitary & Phytosanitary Regulations, for production in a greenhouse:

Regulations for substrates - site cleanliness (DDD)

Regulations for storage areas, draughts, ventilation, traceability

Substrate certificates/analysis - for bio culture or innovative materials (coffee, wood shavings, etc.)

7. Specific for Organic Farming (optional only for those who need or will a certification)

OMS declaration with reference to "organic transition"

Certification by an approved body (e.g. DIO, PHYSIOLOGIKI, IRIS)

Keeping crop diaries, checking for prohibited substances

3.3 Registration & taxation protocols

Farms in Greece are subject to tax obligations and require registration with the competent authorities. Mushrooms farming follow the general rules for agricultural businesses. Farmers' registration and taxation are governed by a combination of national and EU laws. Farmers must register with the Greek tax authorities and the Register of Farmers and Agricultural Holdings, fulfilling obligations related to tax payments, social security, and the use of cash registers for business transactions. They are also subject to VAT and income tax, with potential deductions for certain expenses.

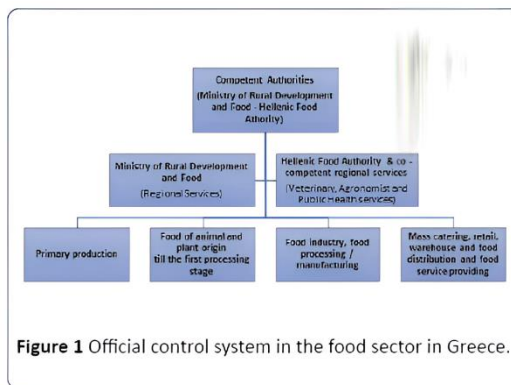
The procedure concerns the granting of a producer vendor's license to conduct open-air itinerant trade.

*A producer vendor is defined as a producer registered in the Register of Farmers and Farm Holdings, pursuant to Law 3874/2010 (Government Gazette, Series I, No 151) who is active in the open-air trade of agricultural products exclusively of their own production for sale, and who has been granted a business operating license by the competent authority. *Itinerant trade is the pursuit of an open-air commercial activity by a vendor moving between locations by any type of motor vehicle, trailer, or other means of transport. *Vendors do not maintain a specified location where their business activity is conducted, but are constantly in transit unless engaged in a transaction. According to the latest published census of the ELSTAT (Hellenic Statistical Authority), such vendors operate in municipal communities with permanent populations of up to five thousand (5 000) inhabitants. Licenses for the respective itinerant commercial

activity are granted by the Regional Authorities, subsequent to issuance of a public notice calling for submission of applications. They are intended for the licensing of natural persons who must be registered in the Register of Farmers and Agricultural Holdings pursuant to Law 3874/2010 (Government Gazette, Series I, No 151) as farmers by profession.

3.4 Sanitary/hygiene regulations (HACCP, DDD)

HACCP principles are incorporated in national legislation aligned with EU Regulation 852/2004 on the hygiene of foodstuffs and related directives. Farms involved in integrated pest management, organic farming, and greenhouse production often implement HACCP-based food safety management systems to monitor critical points such as water quality, pesticide use, handling, and storage. Many Greek farms (mushroom farms included) aiming for export markets or supplying large retailers adopt HACCP certification or related standards (e.g., GLOBALG.A.P., ISO 22000) to demonstrate food safety and traceability.



3.5 Lab testing requirements for food safety

In Greece, laboratory testing for mushroom safety involves several key areas, including microbial analysis, heavy metal detection, and mycotoxin testing. Official controls are implemented at various stages of production, processing, and distribution, with physical checks and sampling for laboratory analysis. These tests ensure compliance with food laws and standards.

Key Testing Services include:

- Moisture and Physical Analysis: Determines grain quality and storage feasibility.
- Pesticide and Chemical Residue Testing: Detects pesticides, heavy metals, and mycotoxins.
- Microbial Safety Testing: Identifies harmful bacteria and fungi affecting food safety.
- Nutritional Profiling: Measures protein, fiber, carbohydrate, and mineral content.
- Regulatory Compliance Testing: Ensures food grains meet FSSAI, FDA, EFSA, and Codex standards.
- Custom R&D Solutions: Helps food manufacturers improve product quality and ensure food safety.

Albania

3.1 Mushroom classification laws (e.g., novel food classification)

Edible mushrooms are categorized according to the amended law-2008-01-28-9863-ON-FOOD CHAPTER VII, Article 27.

“1. Food and food ingredients consisting of microorganisms, fungi, algae or isolated from them are classified as novel food category.

2. The following categories of novel foods shall be considered, in addition to those specified in point 1 of this article: a) made entirely or partially from new raw materials; b) with a changed basic composition; c) produced using a production technology that differs from the previous ones.

3. The categories of novel foods specified in points 1 and 2 of this article must not: a) harm human health; b) mislead the consumer; c) differ from the foods and food ingredients they are intended to replace to such an extent that their normal consumption would constitute a nutritional disadvantage for the consumer.”

3.2 Licensing for mushroom farming

Mushroom cultivation in Albania falls under the broader agricultural sector. According to Law No. 7659 on Seeds and Seedlings, individuals or entities involved in the reproduction and multiplication of vegetative planting material must obtain a license. This law ensures that planting materials meet quality and phyto-sanitary standards, which would encompass mushroom spawn and related materials.

3.3 Registration & taxation protocols

According to the General Directorate of Taxes, farmers (including mushroom farmers) is an agricultural producer, self-employed, who develops the activity with his own labour force and with the tools at his disposal, in the activity of agricultural, forestry and fishing production. Farmers who sell their products to entrepreneurs (traders) are obliged to register and be provided with a NIPT certificate.

Registration

The application and provision with the NIPT certificate is made by the farmer himself, at the Regional Tax Directorate of the jurisdiction according to the division of the administrative organization.

Documentation for registration:

- Application for registration according to the relevant form, completed and signed by the applicant
- Original identification document (ID card)/or a notarized copy of this document, which is attached to the application for registration.
- Original certificate issued by the Regional Directorate of Agriculture, Rural Development and Water Administration, based on which the farmer's agricultural production activity is confirmed.

Mandatory data:

- Residence address, contacts of the person;
- Place of exercise of the activity, agricultural production;
- Field of agricultural production activity, where if the farmer carries out several agricultural production activities, then several are cited starting from the one that carries the main weight;
- Specimen of the signature (firm) of the individual farmer.
- The documents accompanying the application must be submitted in original or certified copies, and must not contain corrections or deletions

Changes in registration

The farmer is obliged to declare to the Regional Tax Directorate, where he is provided with the NIPT certificate, changes in the registered data such as: identification data, the place of exercise of agricultural production activity, due to the alienation of agricultural land or any other change in the data declared at the time of registration.

Deregistration

The farmer is deregistered voluntarily through the application for deregistration. The application is made according to the relevant form, submitting at the same time the NIPT certificate to the Regional Tax Directorate in which this certificate was issued.

Obligations to pay

Farmers registered using the protocol given above, have no tax liability and consequently no obligation to pay.

3.4 Sanitary/hygiene regulations (HACCP, DDD)

Albania's food safety legislation mandates the implementation of HACCP systems across food production and processing facilities. Instruction No. 20, dated 25.11.2010, outlines procedures for implementing Good Hygiene Practices (GHP), Good Manufacturing Practices (GMP), and HACCP protocols in food establishments. These measures aim to identify and control potential hazards in food production, ensuring consumer safety. The National Food Authority (NFA) oversees the enforcement of these standards through inspections and audits.

While specific references to DDD (Disinfection, Disinfestation, and Deratization) measures are not explicitly detailed in the available sources, Albania has established hygiene requirements for farms and food processing facilities. Instruction No. 21, dated 25.11.2010, sets specific hygiene requirements and official controls for products origin, including the production, processing, storage, and transport of such products.

3.5 Lab testing requirements for food safety

According to the amended law-2008-01-28-9863-ON-FOOD:

CHAPTER XI, Article 38 on food safety protocols include one or more of the following activities: a) inspection; b) sampling and analysis; c) control of the label and official documentation; d) review of traceability documentation; d) review of the self-control system. Official control is carried out in accordance with the rules provided for in Law No. 10 433, dated 16.6.2011 "On inspection in the Republic of Albania", except when expressly provided for in this Law. The fees for taking samples, performing analyses, official control at the BIP and for providing the document certifying food safety are approved by instruction of the Minister. In the case of bilateral or multilateral international agreements, the provisions of the agreements apply, and under conditions of reciprocity, fees may not be applied. Except in cases regulated by special laws, the types and permissible norms regarding pesticide and veterinary drug residues in food, the use and purity of food additives, materials in contact with food, food contaminants, enzymes, baby foods, digestive extracts, foods for use with certain nutritional values, quick-frozen foods, ionizing radiation, mineral waters, cleaning substances, as well as any substance intended to become part of food or to be in contact with it, the essential requirements that specific food products must meet,

specific labelling rules for specific foods, as well as food-borne diseases, hygiene rules, the internal market control system, specific rules for food products of animal origin, TRACES system certification are approved by instructions of the minister responsible for food.

CHAPTER XI, Article 41 states the official control of food has the following objects:

“1. The location, conditions and state of the establishment, the production layout, the offices, the environment, the means of transport used in the food business, in particular the conditions set out in Articles 19 and 20 of this Law.

2. Inspection of the health status of personnel and the hygiene of facilities that are in direct contact with food.

3. Raw materials, water, ingredients, additives, technological additives and other substances used for the preparation and production of food.

4. Semi-finished foods.

5. Ready-made foods.

6. Cleaning, cleaning and maintenance substances used in production processes.

7. Processes used for the production or processing of food.

8. The method of packaging, packaging materials and those in contact with food.

9. Labelling and accompanying documents of food.

10. Determination of origin, protected geographical indications and the indication "Traditional food product".

11. Technological processes applied in the production and preparation of foods.

12. Food additives, materials in contact with food, food contaminants, as well as cleaning substances are determined by instruction of the minister responsible for food.”

CHAPTER XII, Article 44 on Authorized control laboratories:

“1. Laboratory analyses of samples, according to Articles 17 and 40 of this Law, taken for the performance of official food control, shall be carried out in laboratories authorized by the Minister responsible for food.

2. The food and feed control inspector shall send the samples taken to an authorized control laboratory for the performance of official control.

3. The fee for the analyses performed, for foods produced in the Republic of Albania, shall be covered by the institution responsible for the official control of food and feed. When the food does not meet the mandatory requirements, based on this Law, as well as/or the information specified on the label, the fees shall be paid by the food business operator, which produces and/or places the food on the market.

4. The list of authorized control laboratories, which determines the type of laboratory and the analyses that they are authorized to perform, shall be approved by order of the Minister responsible for food and published in the Official handbook once a year.”

Montenegro

3.1 Mushroom classification laws (e.g., novel food classification)

In Montenegro, the Law on Nature Protection and the Law on Organic Agriculture are relevant to edible mushrooms. The Law on Nature Protection covers the general protection of wild species, including

mushrooms, while the Law on Organic Agriculture regulates the production and processing of mushrooms grown organically, ensuring they meet specific standards.

Article 10 of the document states:

“Methods of organic plant production lay down: the selection of species and varieties of plants, crop rotation, soil cultivation, fertilization means and methods, the system of soil fertility maintenance, the methods for control of plant diseases, pests and weeds as well as methods for collecting of forest fruit and medicinal herbs and mushroom growing. Methods of organic livestock production define: selection of species and races of animals, breeding methods, nutrition and health protection of animals as well as procedures for animals procured from other farms. Animals in terms of the indent 2 of this Article include: horses, cattle, pigs, sheep, goats, poultry, bees and aquaculture animals. Products from hunting of wild animals and fishing products are not considered products of organic agriculture. Methods of organic plant production and methods of organic livestock production stated under the indents 1 and 2 of this Article shall be laid down in detail by a regulation issued by the competent organ.”

3.2 Licensing for mushroom farming

Before selling mushrooms, growers must obtain the necessary licenses and permits. These may include:

- **Business Licenses:** Required to operate any commercial entity.
- **Agricultural Permits:** Specific to farming activities, including mushroom cultivation.
- **Food Safety Certifications:** Ensures that the mushrooms meet health and safety standards.

Based on these categories, the Montenegro farms can apply for the necessary business permits which will enable them to operate. Additionally, these companies must also obtain import/export licenses, considering some products are brought into the country.

3.3 Registration & taxation protocols

In Montenegro, farmers’ registration and taxation follow specific protocols for both individuals and businesses. Registration for VAT is required when an annual turnover exceeds €30,000, while income from independent activities is taxed at varying rates based on income levels. Farmers are also subject to social insurance contributions, and there are specific regulations regarding agricultural holdings and the register of agricultural producers.

3.4 Sanitary/hygiene regulations (HACCP, DDD)

In Montenegro, farmer hygiene and sanitation regulations primarily focus on food safety, plant health, and water/sanitation access. The legal framework includes the Law on Food Safety, the Law on Plant Health Protection, and relevant regulations concerning water and sanitation, ensuring food safety and preventing the spread of plant diseases.

The Law on Food Safety mandates that food businesses ensure their products are safe, healthy, and have adequate nutritional value. This includes preventing food contamination, ensuring proper handling and storage, and adhering to Hazard Analysis and Critical Control Points (HACCP) standards.

The Law on Plant Health Protection focuses on preventing the introduction and spread of pests and diseases in plants, including monitoring and control measures. This also includes regulations on seed quality, planting material, and plant protection products.

3.5 Lab testing requirements for food safety

Administration for Food safety, and Phytosanitary affairs is functioning as a unit of the Ministry. It consists of two sectors: Food safety sector - responsible for coordination and monitoring food safety policy; and Sector for Phytosanitary affairs performs tasks pertaining to the laws in the field of plant health protection, seed and planting materials. There is one national laboratory (National Reference Phytosanitary Laboratory as a unit of the Biotechnical Faculty), supervised by the Administration. By doing so, the Administration closely collaborate with many stakeholders: the universities, private veterinary service, input suppliers etc.

Farmers shall pay the compensation for:

- 1) laboratory analysis and testing of official samples of plants, plant products and other regulated articles, which are conducted at the request of the competent inspector with the purpose of determining the health status of plants, in the event when the result of the analysis or testing is unfavorable for such legal or natural person, unless the law provides otherwise;
- 2) phytosanitary inspection of plants, plant products and regulated articles related to the movement within the Republic;
- 3) phytosanitary inspection of plants, plant products and regulated articles which are being imported;
- 4) phytosanitary inspection of plants, plant products and regulated articles which are being exported;
- 5) implementation of the systematic monitoring of the titleholders of plants.

Kosovo

3.1 Mushroom classification laws (e.g., novel food classification)

In general terms, Kosovo's **Law on Food (No. 03/L-016)** regulates all stages of food production, processing, storage, and distribution for human consumption. Additionally, the **Law on Plant Protection (No. 02/L-95)** addresses the protection of plants and plant products from harmful organisms. These laws may indirectly impact the handling and safety standards of edible mushrooms.

In specific terms, **LAW ON ORGANIC FARMING (No. 02/L-122)** under ANNEX I PRINCIPLES OF ORGANIC PRODUCTION AT FARM LEVEL A/Plant and plant products:

“5.For production of mushrooms, substrates may be used, if they are composed only of the following components: 5.1.farmyard manure and animal excrements (including the products referred to in indents 1 to 4 of Annex II, (a)either from holdings producing according to the organic production method; (b)or satisfying the requirements referred to in Annex II, Part A, 5.2.products of agricultural origin, other than those covered under point 5.1 (e.g. straw),from holdings producing according to organic production method; 5.3.peat not chemically treated; 5.4.wood,not treated with chemical products after felling; 5.5.mineral products of Annex II, Part A to water and soil.”

3.2 Licensing for mushroom farming

Mushroom farming is classified under agricultural activities. While there isn't a specific license exclusively for mushroom cultivation, farmers must adhere to general agricultural regulations. This includes registering their agricultural activities with the relevant municipal authorities and complying with national agricultural standards.

For those interested in organic mushroom cultivation, Kosovo has established a legal framework for organic farming. The **Law No. 02/L-122 on Organic Farming** outlines the requirements for organic production, including certification processes. Farmers must obtain certification from recognized bodies such as ALBINSPECT, which operates in Kosovo. This certification ensures that the farming practices meet international organic standards, facilitating access to both domestic and international markets.

If the mushroom farming operation includes processing activities, compliance with food safety regulations is mandatory. The **Law on Food** (No. 03/L-016) governs food safety standards in Kosovo. Processing facilities must adhere to hygiene standards, proper labeling, and quality control measures. Implementing international certifications such as ISO 9001 (Quality Management), ISO 14001 (Environmental Management), and OHSAS 18001 (Occupational Health and Safety) can enhance credibility and marketability.

3.3 Registration & taxation protocols

National Farmer Registry (NFR): Registration is mandatory for farmers seeking to apply for direct payments, subsidies, or rural development funds. Upon registration, each farmer is assigned a unique Farm Identification Number (**NIF**), ensuring accurate identification and preventing duplicate applications. In addition, farmers are encouraged to register with their local municipal Department of Agriculture. This registration is often a prerequisite for obtaining a fiscal number from the Tax Administration of Kosovo (TAK).

Tax Obligations: Registered farmers are subject to income tax based on their earnings from agricultural activities. Payments made to farmers may be subject to a 1% withholding tax, depending on the nature of the transaction. Farmers with an annual turnover exceeding €30,000 are required to register for VAT. Those below this threshold may opt for voluntary registration.

3.4 Sanitary/hygiene regulations (HACCP, DDD)

In Kosovo, farmers are subject to a range of sanitary and hygiene regulations, primarily to ensure food safety and prevent the spread of diseases in animals and plants. The Kosovo Food and Veterinary Agency (KVFA) plays a key role in implementing these regulations, which are largely aligned with EU standards. These regulations cover areas like food safety, and plant protection. While not obligatory, primary producers, including farmers, are encouraged to adopt HACCP principles. Implementing such systems can enhance food safety practices on farms and may provide a competitive advantage in markets that prioritize certified food safety measures.

3.5 Lab testing requirements for food safety

Farmers engaged in the production of food items such as edible mushrooms must comply with food safety regulations overseen by the Food and Veterinary Agency (FVA). This includes mandatory laboratory testing for:

- Microbiological Contaminants: Detection of pathogens like *Salmonella*, *Listeria*, and *E. coli*.
- Chemical Residues: Monitoring for pesticide residues, heavy metals, and other harmful substances.
- Mycotoxins: Assessment of toxins produced by fungi, which can contaminate crops and feed.

Mapped areas: Geographic & demographic profile

Serbia

4.1 Land use and cover (urban, agricultural, forested)



In the Belgrade area, land use is predominantly agricultural, followed by forested and semi-natural areas, with a significant portion also being urban and artificial. A study of the Belgrade-Novı Sad highway corridor revealed that agricultural land comprised 77.9% of the land cover in 2018, while artificial surfaces accounted for 13.0%. Forests and semi-natural areas made up 6.4%. The city of Belgrade itself has a substantial amount of green space, with forests covering 7.2% and public green spaces (parks, etc.) occupying 1.8% of the total urban area.

4.2 Population of target area (consumers)

The estimated population of Belgrade in 2023 is around 1.408 million.

4.3 Urban vs rural population ratio (strategic planning for sector development)

Within this population, approximately 1,383,875 individuals reside in urban areas, while 297,530 live in rural areas. This results in an urban-to-rural population ratio of roughly 82.3% urban to 17.7% rural. This makes integrated waste management of urban streams as a strategic priority for mushroom cultivation.

4.4 Number of farm households (potential producers)

In 2023, Belgrade had 508,365 registered agricultural households, according to the preliminary results of the Agriculture Census.

Greece

4.1 Land use and cover (urban, agricultural, forested)



North Kynouria is a municipality in Arcadia Prefecture, Peloponnese region, Greece. Its land area is 577 km², its population about 10,000. The Municipality of North Kynouria is an area of outstanding natural beauty that combines mountain and sea, history and culture, traditions and heritage architecture. Mount Paronias, a physically dominating landmark of the region, has a relatively mild climate, with fewer days of snow cover. About 86% of its area consists of forests – mostly black pine, cephalonian firs, oaks, maples and chestnut trees- and grasslands, while the rest is cultivated land. The protected forest of *Juniperus drupaceae*- a species of the cedar family is the only one of its kind in Europe. Paronias range is also home to 113 rare plants, including 16 locally endemic ones, as well as one of the few remaining populations of jackals in the country. Astros is its capital and has 5.000 inhabitants.

4.2 Population of target area (consumers)

North Kynouria population is **9,483** (2021 census). The seat of the municipality is in Astros.

4.3 Urban vs rural population ratio (strategic planning for sector development)

Around two-thirds (**68%**) of the population live in urban or semi-urban settlements (larger villages and towns). About one-third (**32%**) live in smaller, rural, or remote villages. As such mushroom farming can be seen as a business model to support the revitalization and economic development of primarily rural areas.

4.4 Number of farm households (potential producers)

North Kynouria municipality estimates approx. **2,100 to 2,450 farm** households.

Albania

4.1 Land use and cover (urban, agricultural, forested)



Baldushk village is located 20km from Tirana, in its Southwest. The entire area is along valley, with medium-sized hills and valleys. This area borders several other administrative units, Tirana and Elbasan. It is also among the Administrative Units with the largest area in Central Albania. The total area is 8505 hectares.

4.2 Population of target area (consumers)

The total population of Baldushk is 5329 inhabitants, distributed throughout the valley but also in its hills. Baldushk administrative unit covers 14 villages listed below

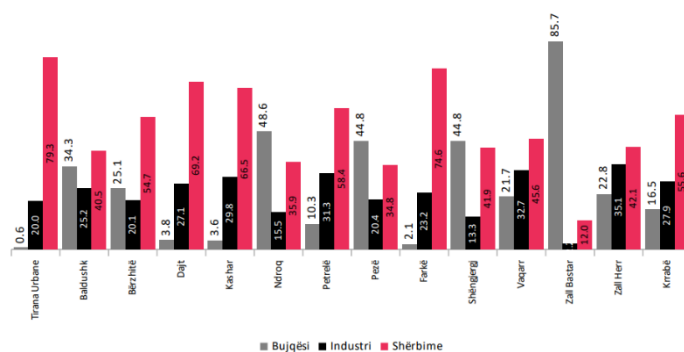
| | | | |
|---------------------|------------|-----------------|------------|
| <i>Mumajes</i> | <i>354</i> | <i>Koçaj</i> | <i>319</i> |
| <i>Fushas</i> | <i>699</i> | <i>Veski</i> | <i>428</i> |
| <i>Balshaban</i> | <i>394</i> | <i>Kakunjë</i> | <i>412</i> |
| <i>Baldushk</i> | <i>456</i> | <i>Parret</i> | <i>206</i> |
| <i>Shpat/Rrovë</i> | <i>338</i> | <i>Shënkoll</i> | <i>165</i> |
| <i>Isufmuçaj</i> | <i>438</i> | <i>Shpat</i> | <i>183</i> |
| <i>Mustafakoçaj</i> | <i>461</i> | <i>Vrap</i> | <i>414</i> |

4.3 Urban vs rural population ratio (strategic planning for sector development)

Baldushk administrative unit in remains a fully rural area with no urban population. However, the proximity with the capital Tirana opens opportunities to strategically plan mushroom farming and reach a bigger domestic market.

4.4 Number of farm households (potential producers)

According to INSTAT, Census 2018 - Employment by economic sector, Baldushk administrative unit workforce employment is **34.3% in agriculture**, 25.2% in industry related fields and 40.5% in services. **180 farmers** are registered with NIPT codes. However the total number of active farmers (including informal ones) in presumed to be **approx. 900**.



Montenegro

4.1 Land use and cover (urban, agricultural, forested)



Bar is a town and seaport in Coastal region of Montenegro. It is the capital of the Bar Municipality and a center for tourism. According to the 2023 census, the town itself had 15,868 inhabitants, while the total population of Bar Municipality was 46,171. Bar is located 50km from Podgorica, the capital of Montenegro. To the east is the largest lake in South Europe, Lake Skadar. To the west, across the sea, is Italy. This area borders several other administrative units, Ulcinj, Podgorica and Budva. The total area is 598 km². The area is a mix of valley and mountains, with Mediterranean

climate. The coastal part of Bar supports maquis shrubland with oak, holm oak, laurel, myrtle, Spanish broom, oleander, hawthorn, sloe, thorn, butcher's broom and asparagus. To the north and the mountains, there are oak and beech forests. Citrus fruits including tangerine, orange and lemon grow in the Bar area as do pomegranates, olives, grapevines and figs.

4.2 Population of target area (consumers)

The Bar Municipality in Montenegro had a population of **46,171 inhabitants** as of the preliminary 2023 census data. The town of Bar itself, the municipality's center, had 17,649 inhabitants in 2011, according to the previous census. The municipality is located on the Adriatic coast in southeastern Montenegro.

4.3 Urban vs rural population ratio (strategic planning for sector development)

As of 2024, the urban-to-rural population ratio in Bar Municipality, Montenegro, is approximately **69% urban to 31% rural**. There are 83 settlements and villages with different population number. Bar, Stari Bar, Sutomore, and Virpazar are classified as urban.

4.4 Number of farm households (potential producers)

According to the preliminary results of the 2024 Census of Agriculture, Bar Municipality in Montenegro has **1,135 registered agricultural holdings**. This figure represents approximately 4.25% of the total 26,711 agricultural holdings across Montenegro.

Kosovo

4.1 Land use and cover (urban, agricultural, forested)



The municipality of Peja is located in north-western Kosovo. To the south, the municipality borders Deçan and Gjakova, to the east, Klina and Istog, and to the north and west, neighboring Montenegro. The municipality comprises 79 villages and the city of Peja. It covers an area of 603 km². Together with the municipalities of Istog and Klina, the municipality forms the Peja District. Peja Municipality in Kosovo is primarily characterized by forests and agricultural land. While forests cover a significant portion of the municipality, particularly in the southwestern regions, agricultural land also plays a crucial role in the area's landscape.

4.2 Population of target area (consumers)

The Peja municipality in Kosovo had an estimated population of 82,745 inhabitants in 2024. The municipality covers an area of 602 square kilometers and includes the city of Peja and 95 villages. The region of Peja from the 2024 population census reaches the figures of close to 175 thousand inhabitants: The municipality of Peja had a population of 96,450, of which 87,975 (91.21%) were Albanians, 3,786 (3.93%) were Bosniaks, 2,700 were Balkan Egyptians, 993 were Roma, 332 were Serbs, 189 were Gorans, 143 were Ashkali and 59 were Turks.

4.3 Urban vs rural population ratio (strategic planning for sector development)

In Peja municipality, the population distribution leans towards rural areas. While a significant portion lives in the urban area, the majority resides in the rural parts of the municipality. Specifically, about **38.3% of the population lives in urban areas, while 61.7% lives in rural areas.**

4.4 Number of farm households (potential producers)

The number of formal farmers (registered as farmers) is **285** but in total there are over **2796 farmers** as agriculture is often perceived as an informal activity.

Mapped areas: Mushroom farming inputs

Serbia

5.1 Lignocellulosic waste availability (e.g straw, corn cobs, coffee grounds, olive cake, sawdust)

In Belgrade, lignocellulosic waste like straw, corn cobs, coffee grounds, olive cake, and sawdust is readily available, primarily from agricultural and food processing industries. Belgrade generates a considerable amount of food waste, with estimates suggesting around 205,000 tons annually, or 134.6 kilograms per capita. These residues are abundant and can be utilized for various mushroom applications.

5.2 Spent substrate sources (brew grain, animal manure, etc.)

While a precise number is difficult to obtain, Belgrade is known for its vibrant coffee culture and numerous cafes. Tripadvisor lists 270 restaurants and cafes in Belgrade, according to their website. This includes a variety of establishments, from traditional Serbian coffee shops to modern cafes.

Belgrade has a diverse and growing craft beer scene with numerous breweries and taprooms. While there isn't a precise number of brewing facilities, it's safe to say there are "tens of microbreweries" and many places to enjoy beer. A few notable examples include Dogma Brewery, Gvint Brewery and Taproom, and Pivara.

About 8.6 million m³ of fresh liquid manure and about 20.4 million tons of fresh solid manure are generated in Serbia. Belgrade area has a significant amount of animal manure is generated, primarily from livestock farming, with liquid and solid forms being the dominant types.

5.3 Existing mushroom production & consumption data

While specific production and consumption data for Belgrade is limited in the provided search results, Serbia does have a notable mushroom industry, particularly with a focus on wild mushroom trade and a company like Ekofungi implementing a circular economy approach.

[Krishikosh](#) also notes that 70% of mushroom growers in Serbia use oyster mushroom spawn. Additionally, a study showed that button mushroom is a popular choice for consumers.

[ScienceDirect.com](#) cites an example of a small-scale organic farm near Belgrade, which is part of a larger research study on mushroom production systems.

[Nature Conservation](#) notes that Serbia has become a source country for the export of wild mushrooms, but more research is needed to accurately understand the extent of their wild mushroom trade.

5.4 Use of mushroom substrates in circular economy

Belgrade has ongoing bio waste recycling initiatives, focusing on both local composting and more centralized treatment plants. Belgrade encourages home and local composting to address food waste. The "Circular Communities in Serbia" initiative encourages the processing of organic waste into electrical and thermal energy.

Greece

5.1 Lignocellulosic waste availability (e.g straw, corn cobs, coffee grounds, olive cake, sawdust)

Olive cultivation is a cornerstone of North Kynouria's agriculture. The municipality is home to several olive cooperatives, such as the Agricultural Olive Cooperative in Doliana, which produce high-quality extra virgin olive oil. These cooperatives play a vital role in the local economy and are integral to the region's agricultural identity.

Arcadia, including North Kynouria, has a history of cultivating cereals like **wheat and barley**. Traditional wheat landraces, such as "Asprositario" and "Zoulitsa," are still cultivated in the region, reflecting the area's rich agricultural heritage.

While specific data on coffee consumption in the North Kynouria municipality is not readily available, it's likely to be within the general coffee consumption patterns of Greece. Greece is a significant coffee-consuming nation, with approximately 40,000 tons of coffee consumed annually. About 60% of this consumption occurs at home, while 40% is outside the home, in shops, restaurants, or cafes.

5.2 Spent substrate sources (brew grain, animal manure, etc.)

In North Kynouria, villages such as Doliana, Ano Doliana, and Kastanitsa are known for traditional livestock farming practices, particularly **sheep and goat herding**. These areas are characterized by their mountainous landscapes, which are suitable for grazing. The production of dairy products, including cheeses made from sheep and goat milk, plays a vital role in the local economy and cuisine.

However, specific data on the number of livestock or households engaged in livestock farming within North Kynouria is not available in the provided sources.

5.3 Existing mushroom production & consumption data

There are no relevant data to reference. On the national level, In 2021, Greece's mushroom production was 0.7 thousand metric tons, and imports were significantly higher at 17.53 thousand metric tons, according to IndustryARC. While Greece's domestic mushroom production is relatively small, the per capita consumption is lower than in other EU countries, averaging around 1000 grams per year. The majority of mushroom supply in Greece is met through imports.

5.4 Use of mushroom substrates in circular economy

North Kynouria municipality is implementing various biowaste recycling practices to meet national and EU waste management goals. These practices include separate collection systems, composting, and energy recovery from biowaste. The municipality is also focusing on public awareness and infrastructure development to improve biowaste management.

Albania

5.1 Lignocellulosic waste availability (e.g straw, corn cobs, coffee grounds, olive cake, sawdust)

Baldushk agricultural land area is 2291 hectares with poly-cultural crops listed as follows: corn, lucerne, wheat, vegetables, olive groves, vineyards, orchards. Also in recent years farmers have invested in agricultural greenhouses. Organic waste coming from farms in area is composed of corn cobs, straw, brew spent grain, olive branches is increasing significantly from year to year, vegetables waste etc. According to estimations with straw-to-grain ratio for wheat ~ 1.2 (assuming an average value), in Tirana municipality should produce approx. **25,776 tons of straw each year** which can be used to mushroom cultivation.

Baldushk administrative unit has approx. **25 thousand roots of olive groves**. The cultivar is Tirana's black olive. The biological remediation of olive oil mill wastes with fungi has been studied for neutralizing the heavy pollutant effects and/or for converting these wastes into new value-added products. Olive press-cakes mainly comes from multiphase decanters that generate around 55% of the total weight of the olive and is composed of the pulp and skin, without including the stones. Baldushk area could produce **approximately 250–300 metric tons** of olive press-cake per year, serving as substrate for oyster mushrooms.

5.2 Spent substrate sources (brew grain, animal manure, etc.)

Albania has approx. 26,600 coffee bars among which **8,300 are located in Tirana municipality**. When it comes to their personal coffee-drinking habits, Albanians drink between 300-375 cups of coffee a year (2.5kg per capita). Recently, coffee waste has been widely considered for cultivating different *Pleurotus* genus, utilising the large amount of waste produced by coffee manufacturers. As SCGs are composed of a high percentage of cellulose (12.40%), hemicellulose (39.10%), and lignin (23.90%), they could be potentially used as a supplementary substrate for the cultivation of *Pleurotus* species. Baldushk is also known for raising poultry (turkeys), the tradition of the area. This area raises **30-50 thousand turkeys** each year to supply mainly the capital city.

5.3 Existing mushroom production & consumption data

Currently, there is no publicly available, city-specific data on mushroom production and consumption in Tirana. National statistics for Albania indicate that mushroom production has remained steady at approximately 100 tons annually since 1996, placing the country among the lowest producers globally. Given Tirana's urban environment and limited agricultural land, it's likely that the city contributes minimally to this national production figure.

On the consumption side, Albania's reliance on mushroom imports has been increasing. In 2023, the country imported approximately 908,589 kg of fresh or chilled mushrooms, primarily from Poland and Greece. While specific consumption data for Tirana is unavailable, as the capital and largest city, it's reasonable to infer that a significant portion of these imports is consumed there.

5.4 Use of mushroom substrates in circular economy

Some recycling initiatives can be found through Sida (Swedish International Development Cooperation Agency) project "Circular economy through composting of organic waste in Baldushk" aiming at promoting **composting of organic waste** in Baldushk municipality unit, Tirana, in order to reduce the amount of organic waste that is burned on the fields, thrown in rivers and lakes, and to reduce the amount

of methane gas that would be produced if such waste would go to the Sharra landfill. Small-scale composting is generally unknown in Albania, and at its best, it is not done using the right method. The implementation of this project will help in promoting circular economy through the production of compost which can be sold or exchanged, and will help Albania in the implementation of the EU directives on waste, as well as implementation of the Strategy on Integrated Waste Management of Albania. The project served as a pilot model that can be replicated in other rural or semi-rural areas of Albania, and which gets Albania closer to the EU accession as a candidate country.

Montenegro

5.1 Lignocellulosic waste availability (e.g straw, corn cobs, coffee grounds, olive cake, sawdust)

The area around Bar, Montenegro, boasts over **100,000 olive trees**. Many of these trees are over a thousand years old, and some are considered among the oldest of their species in the world.

Species like *Castanea sativa* (chestnut), *Corylus colurna* (Turkish hazelnut), *Juglans regia* (walnut), *Malus sylvestris* (wild apple), *Prunus avium* (wild cherry), and *Pyrus* species (wild pears) are native to Montenegrin forests, according to ResearchGate.

In 2020, Bar, Montenegro had 16.1 kha (kilometers of hectares) of natural forest, covering 28% of its land area. This means there were **16,100 hectares of forest**. The city has also experienced deforestation, losing 22 hectares of natural forest in one year, which is equivalent to 8.37 kt (kilotonnes) of CO₂ emissions.

5.2 Spent substrate sources (brew grain, animal manure, etc.)

Bar's livestock sector includes cattle, sheep, goats, pigs, and poultry. The number of sheep in Bar decreased is estimated 4,119, and cattle numbers around 2,217.

It's difficult to pinpoint the exact amount of beer consumed in Bar, Montenegro, without specific data for that city. However, per capita beer consumption in Montenegro as a whole has been reported at around **75 liters per person**. In 2021, it was reported to be 64.4 liters per capita. This numbers show high levels of brewer's spent grain in the city.

5.3 Existing mushroom production & consumption data

Montenegro's mushroom market, including truffles, has seen a relatively flat consumption trend, with the revenue declining in 2018 compared to the previous year, according to IndexBox. The market value reached its peak in 2015 but experienced a decline from 2016 to 2018, as reported by IndexBox. Popular edible mushrooms in the Lovćen basin include the **Parasol mushroom, Penny Bun, champignon, chanterelle, and honey fungus**, says www.montenegro.travel. However, experienced individuals are recommended to collect these, according to www.montenegro.travel.

5.4 Use of mushroom substrates in circular economy

Circular bioeconomy practices are being implemented in Bar, Montenegro. The Chamber of Economy of Montenegro has established a **Circular Economy HUB** to facilitate circular initiatives and share knowledge. Montenegro is also actively engaged in the EU's LIFE programme for environmental and climate action, further supporting circular bioeconomy efforts.

Kosovo

5.1 Lignocellulosic waste availability (e.g straw, corn cobs, coffee grounds, olive cake, sawdust)

According to classification of crops, it may be said that wheats cover the largest area (approximate), with this structure:

| | | | |
|---------------|-----------------|-----------|----------------|
| Corn | 5300 ha | or | 25.28 % |
| Wheat | 1550 ha | or | 7.39 % |
| Barley | 120 ha. | or | 0.6 % |
| Oat | 150 ha. | or | 0.7 % |
| Rye | 70 ha. | or | 0.3 % |
| Total: | 7190 ha. | or | 34.29 % |

Meanwhile, industrial cultures are decreasing further, or not cultivated at all (tobacco, beet, sunflower, soy) etc. Vegetables in the municipality of Peja cover a considerable area of around 4300 ha or 20.5%. Groves used to cover around 1470 ha or 7 % of the total arable land area, while today, fruit plantations are calculated at only 5 % of the former plantation areas.

5.2 Spent substrate sources (brew grain, animal manure, etc.)

The Peja municipality in Kosovo has a significant livestock sector, with a focus on dairy farming, particularly cows and sheep. There are approximately **9,000 head of cattle, nearly 6,000 sheep, and 850 goats in the municipality.**

5.3 Existing mushroom production & consumption data

Kosovo's mushroom industry encompasses both cultivated varieties, such as Champignon and Shiitake, and wild mushrooms. Fungo LLC, based in Kamenica, stands out as a pioneer in this sector, operating 23 collection hubs across the country and offering fresh, frozen, and dried mushrooms. The company has significantly contributed to raising awareness about mushroom consumption among the Kosovar population. While specific data on domestic mushroom consumption in Kosovo is limited, the establishment and growth of companies like Fungo LLC suggest an increasing local demand. These enterprises have played a role in promoting mushroom consumption within the country.

5.4 Use of mushroom substrates in circular economy

Efforts to implement circular bioeconomy practices in Peja municipality. A project called "Circular Economy for Green Transition" (CE4GT) is being implemented by People in Need (PIN) in collaboration with Let's Do It Peja (LDIP). This project, funded by the European Union and the Czech Republic's Ministry of Foreign Affairs, aims to reform and revolutionize Kosovo's approach to waste, particularly focusing on composting waste.

Mapped areas: Infrastructure & support system

Serbia

6.1 Proximity of markets, urban centers

Belgrade offers a diverse range of markets, many of which are located within or near the urban center. Popular markets include Kalenić Pijaca, Zeleni Venac Market, and Zemun Market. Additionally, the city boasts a number of shopping malls and urban areas like Knez Mihailova Street, a pedestrian shopping zone.

6.2 Presence of food suppliers (supermarkets, markets)

Belgrade offers a mix of modern supermarkets and traditional markets for food shopping. Supermarkets like Maxi, Tempo, and Shop&Go are popular, while markets like Kalenić Pijaca and Zemunska Pijaca offer a more local and vibrant experience, [according to Tripadvisor](#).

6.3 HoReCa sector demand for mushrooms

The HoReCa (Hotel, Restaurant, Catering) sector in Belgrade likely sees a substantial demand for mushrooms, particularly for their culinary versatility and growing health-conscious consumer preferences. While specific demand figures for Belgrade are not readily available, the broader market trends suggest a positive outlook for mushroom consumption in the HoReCa sector.

6.4 Access to agricultural extension services

In Belgrade, access to agricultural extension services primarily occurs through the public agricultural extension services (PAES) and specialized organizations, many of which utilize ICT. PAES, coordinated by the Institute for Application of Science in Agriculture (IASA), offers a range of services, including training, information on new technologies, and assistance with various aspects of agricultural production. Specialized organizations often focus on specific areas like subsidies, market information, or market research, using methods like SMS and email.

6.5 Waste collection & recycling systems relevant to mushroom substrates

Belgrade is working to improve its bio-waste collection and recycling systems, with a focus on innovative solutions and initiatives to reduce landfill waste and promote circular economy principles. The city is exploring various methods for managing bio-waste, including home composting, anaerobic digestion, and thermal treatment, aiming to transform it into fertilizer and/or green energy.

The city's Public Utility Company "Gradska čistoća" is responsible for waste management services in the ten inner city municipalities, using different types of collection bins and routes depending on the urban structure.

Greece

6.1 Proximity of markets, urban centers

| From Astros to: | Approx. Distance | Direction |
|-----------------|------------------|------------------------------|
| Paralio Astros | 4 km | East |
| Agios Petros | 18 km | Southwest |
| Kato Doliana | 17 km | Northwest |
| Ano Doliana | 22 km | Northwest (via Kato Doliana) |
| Xiropigado | 10 km | North |

6.2 Presence of food suppliers (supermarkets, markets)

The area is characterized by the presence of large supermarket chains such as Sklavenitis, AB Vassilopoulos, Lidl, Masoutis and My Market. These chains offer opportunities for the distribution of fresh mushrooms to consumers. In addition, local farmers' markets are an important sales channel for small producers. The main problem in the Greek retail trade is that the position of the supermarkets is so dominant that they are driving prices down to the point of being a problem for producers.

6.3 HoReCa sector demand for mushrooms

Local eateries and tavernas often incorporate these foraged mushrooms into traditional dishes, reflecting the integration of mushrooms into the regional cuisine. This practice not only showcases the area's natural bounty but also caters to the growing interest in authentic and locally sourced foods among visitors.

6.4 Access to agricultural extension services

Agricultural extension services are mainly provided through the Associations of Cooperatives, which employ agronomists to support farmers. However, the provision of these services may be limited and focused mainly on the supply of inputs. On the other hand mushrooms cultivation is so limited and marginalized that prevents even the access to these limited services.

6.5 Waste collection & recycling systems relevant to mushroom substrates

The area has developed guidelines for the separate collection and recovery of municipal solid waste, aiming at recycling and material recovery. These systems are very young so far, although they could be supportive in the future for the recycling of agro-industrial waste such as mushroom substrates.

Albania

6.1 Proximity of markets, urban centers

Baldushk lies in what is considered the **rural-urban fringe** of Tirana. It is agriculturally oriented but increasingly influenced by urban development dynamics. The distance is 13–17 km southwest of Tirana's city center (Skanderbeg Square). By car, it typically takes 25 to 40 minutes, depending on traffic and the specific route taken.

6.2 Presence of food suppliers (supermarkets, markets)

There are 17 small grocery stores in the area.

6.3 HoReCa sector demand for mushrooms

Baldushk administrative unit has 5 restaurants and 2 pizzerias that have mushrooms on their menus. Overall, Tirana municipality has 6,183 hotels and restaurants; 8,300 bars and cafes and approx. 30,810 commercial companies in total. While no data can be found on the utilization of cultivated mushrooms, they are a common ingredient in various cuisines, including Albanian and Italian, both of which are prevalent in Tirana. Several notable establishments highlight mushroom dishes:

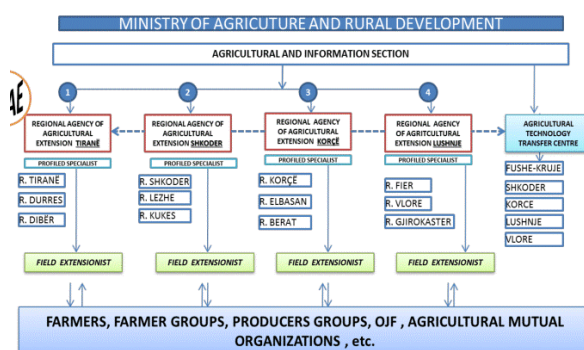
Tartuf Shop Restaurant: Specializes in truffle-based dishes, offering items like pasta with truffle mushrooms and chicken with truffle sauce.

Oh, Lola!: Features Italian-inspired dishes, including spaghetti with pecorino cheese, freshly ground black pepper, cep mushrooms, and fresh truffle.

Ulliri Restaurant: Offers dishes such as chicken fillet with cream of mushrooms and mashed potatoes.

6.4 Access to agricultural extension services

The farm advisory system is Tirana Agency of Agricultural Extension (RAAE), consists of about 260 agronomist and livestock specialist. The extensionists are working in district and village level, as well in 120 Agricultural Information Centres. Baldushk receives consultancy and guidance services from Tirana RAAE.



6.5 Waste collection & recycling systems relevant to mushroom substrates

In 2017 Tirana Municipality procured with a limited fund of 13 million euros, cleaning services for three areas of the capital. Baldushk administrative unit was a beneficiary under Tirana 3 area, with a limit fund of 494 million lek divided over three years. The contracting authority has previously foreseen all waste collection points for the placement of 950 containers divided into 479 PGM (waste collection points) with a volume of 1.7 m³, within the contracted area. The service operator must perform the full service foreseen in the methodology, 796 container emptying's/day, for the urban area 110 emptying's 3 times/week (156 days per year) for the rural area (Vaqarr, Ndroq, Pezë). **44 emptying's 2 times/week (104 days per year) for the rural area (Baldushk)**. No separated collection are noted and recycling of bio-waste remains on farm-level as composting when available.

Montenegro

6.1 Proximity of markets, urban centers

Bar is approximately:

- 27 km (17 miles) north of Podgorica, the capital of Montenegro
- 40 km (25 miles) from Tivat and 60 km (37 miles) from Kotor
- 31 km (19 miles) from Ulcinj
- 19 km (12 miles) from the Albanian border

The town is well-connected by road and rail, with the Belgrade–Bar railway offering scenic views of the Montenegrin countryside. Bar also has ferry services to Italy, enhancing its connectivity.

6.2 Presence of food suppliers (supermarkets, markets)

There are 4 super markets, a farmer market and a dozen of small grocery stores in the area.

6.3 HoReCa sector demand for mushrooms

There are 15+ restaurants and 20+ pizzerias that have mushrooms on their menus. Mushrooms are an integral part of the diet in Montenegro.

6.4 Access to agricultural extension services

In Bar, Montenegro, agricultural extension services are provided by the Ministry of Agriculture and Rural Development (MARD) through the Biotechnical Faculty and regional centers. The Plant Production Extension Service (PPES) and Livestock Selection Service (LSS) are key components, offering expert advice, training, and information to farmers. These services are funded by the Ministry and play a crucial role in supporting agricultural development.

6.5 Waste collection & recycling systems relevant to mushroom substrates

In 2024 the municipality of Bar signed a contract with Eko Fund and provided new communal equipment worth 45,000 euros. The wet fraction, which includes organic waste such as food scraps, fruit, vegetables, as well as hygiene waste, has its own separate containers but still the whole municipality area is not covered with adequate containers for recycling purposes. Most organic waste is burned or left aside as worthless. Only a few families carry out traditional composting.

Kosovo

6.1 Proximity of markets, urban centers

Peja (city center): Peja itself is a major urban area, the third-largest city in Kosovo.

Gjakova (approx. 40 km southeast): A medium-sized city, about 45–50 minutes by car.

Istog (approx. 20 km northeast): A smaller town, around 25 minutes away.

Deçan (approx. 20 km south): Another small town, 20–25 minutes away.

Pristina (capital city, approx. 85 km east): Around 1.5–2 hours by car via R101/M9.

6.2 Presence of food suppliers (supermarkets, markets)

There are *6 super markets, 7 markets*.

6.3 HoReCa sector demand for mushrooms

Mushrooms are a common ingredient in traditional local dishes, including:

- Mushroom stews (e.g., gulaš with mushrooms)
- Stuffed mushrooms
- Mushroom sauces served with meats or pastas

Wild mushrooms collected locally (like porcini) are prized for their flavor and often used seasonally in menus. Cultivated mushrooms like Champignon (button mushrooms) are used year-round.

6.4 Access to agricultural extension services

The main providers are: University of Haxhi zeka, Faculty of Agribusiness. Technology of Plant protection, Food Technology, Agro environment and agro ecology.

6.5 Waste collection & recycling systems relevant to mushroom substrates

In Peja municipality, there is no official system for separate waste collection. While there is a regional waste management company, Ambienti, responsible for collection, the focus is on door-to-door and common collection points, rather than separate collection at the source. Informal waste pickers play a significant role in collecting recyclables, but there's no official system or data on this. The municipality is working on a circular economy strategy and has drafted policy documents related to recycling, but a waste separation system is not yet in place.

Comparative analysis table

| Key Performance Indicators (KPIs) | Serbia | Greece | Albania | Montenegro | Kosovo |
|--|--|--|---|--|---|
| 1. Agriculture sector: general overview | | | | | |
| 1.1 Employment in agriculture (% of workforce) | 15.6%; 452,700 workers | 11.5%; 400,000 workers | 47.8%; 588,637 workers | 22.1%; 99,236 workers | 18.7%; 270,181 workers |
| 1.2 Number of registered & informal farmers | 564,541 Ahs | 700,000 farms | 96,440 farmers | 26 711 Ahs | 130,775 farmers |
| 1.3 Farm size distribution (e.g. % of farms <2 ha) | 6.2 ha | approx. 7 ha | approx. 1.2 ha | 5.84 ha | less than 5 ha |
| 1.4 Farm typologies (arable, livestock, mixed) | Fruit; grain; non-grains; livestock | Poly-culture; arable; fruits; livestock | Poly-culture; arable; fruits; livestock | Poly-culture; arable; fruits; livestock | Poly-culture; arable; fruits; livestock |
| 1.5 Youth & women participation in farming | 22.8% women; low youth engagement | 46.34% women; 32% young farmers | 40% of employed women; Youth engagement is low. | 14 % women; 19% youth | 49% women; 10 youth |
| 2. VET in agriculture sector | | | | | |
| 2.1 National policies and strategies | Strategy for the development of education and upbringing in the Republic of Serbia until 2030 (2021-2023) | 2022-24 Greek strategic plan for VET; CAP Strategic Plan | SARDF 2021-2027 | VET Strategy 2020-2024 | Kosovo Education Strategic Plan 2022–2026 (KESP) |
| 2.2 National qualification frameworks (NQF) | 1 – 5 (in years or in hours) and in ECTS points for qualifications at levels 6-8 e.g. level 6.1 180 ECTS, level 6.2 240 ECTS | NQF level 3-5 | AQF level 2 to 5 not specific to mushroom cultivators | MQF II to V | NQF Levels 3 to 5 |
| 2.3 Institutional framework | AAS | EOPPEP; KSEEK; SSPAE; KEE | AKIS; RAAE; ATTC; ARDA | MESI; BES; NEC | MEST; MLSW |
| 2.4 Agricultural vocational schools & training centers | 22 VET schools | EPAL; IEK; VTCs | 4 RAEA; AUT; 14 VETs | 7 VET schools; Monteorganica | DETS; MIACs; UP |
| 3. Mushroom farming: Regulatory & business environment | | | | | |
| 3.1 Mushroom classification laws (e.g., novel food classification) | Food Safety Law, Article 15 | General Food Law (GFL); Regulation 2283/2015; Regulation 1925/2006 | law-2008-01-28-9863-ON-FOOD CHAPTER VII, Article 27 | Law on Nature Protection; Law on Organic Agriculture | Law on Food (No. 03/L-016); LAW ON ORGANIC FARMING (No. 02/L-122) |
| 3.2 Licensing for mushroom farming | Global Gap | For cultivation on substrate within a greenhouse or semi-enclosed unit | Law No. 7659 on Seeds and Seedlings | Food safety certifications | ISO 9001; ISO 14001; OHSAS 18001 |
| 3.3 Registration & taxation protocols | eAgrar | Register of Farmers and Agricultural Holdings | NIPT certificate | Register of Agricultural Holdings | National Farmer Registry (NFR) |
| 3.4 Sanitary/hygiene regulations (HACCP, DDD) | Good Ag. Praxis | GLOBALG.A.P., ISO 22000 | Instruction No. 20, dated 25.11.2010 | HACCP standards | KVFA |
| 3.5 Lab testing requirements for food safety | Regular for agricultural sector | Microbial analysis, heavy metal detection, and mycotoxin testing | CHAPTER XI, Article 38; CHAPTER XI, Article 41; CHAPTER XII, Article 44 | Phytosanitary tests | FVA |

| | | | | | | |
|--|--|--|--|--|--|---|
| Local context analysis | 4. Mapped areas: Geographic & demographic profile | | | | | |
| | 4.1 Land use and cover (urban, agricultural, forested) | agricultural; forested; semi-natural | agricultural; forested; semi-natural | agricultural | semi-urban; forested | forest; agricultural |
| | 4.2 Population of target area (consumers) | 1.408 million | 9,483 | 5329 in situ; 535,702 in Tirana municipality | 46,171 | 82,745 |
| | 4.3 Urban vs rural population ratio (strategic planning for sector development) | 82.3% urban; 17.7% rural | 68% urban; 32% rural | 100% rural in situ; 65.4% urban-34.6% in Tirana | 69% urban to 31% rural | 38.3% urban; 61.7% rural |
| | 4.4 Number of farm households (potential producers) | 508,365 | approx. 2,100 - 2,450 | 180 | 1,135 | 285 |
| | 5. Mapped areas: Mushroom farming inputs | | | | | |
| | 5.1 Lignocellulosic waste availability (e.g straw, corn cobs, coffee grounds, olive cake, sawdust) | 205,000 tons annually | olive trees; wheat and barley; coffee shops | 250–300 metric tons | 100,000 olive trees; 16,100 hectares of forest | corn; wheat; barley; oat |
| | 5.2 Spent substrate sources (brew grain, animal manure, etc.) | 270 restaurants; breweries; fresh solid manure | livestock (sheep and goat) | poultry (chickens & turkeys); 8,300 bars in Tirana | livestock (cattle, sheep, goats, pigs, and poultry); Brewers spent grain (capita 75 liters per person) | 9,000 head of cattle, nearly 6,000 sheep, and 850 goats in the municipality |
| | 5.3 Existing mushroom production & consumption data | limited; 70% of mushroom growers use oyster | 17.53 thousand metric tons import | limited national data: 908,589 kg imports; 100 ton production | limited; Parasol mushroom, Penny Bun, champignon, chanterelle, and honey fungus | Fungo LLC |
| | 5.4 Use of mushroom substrates in circular economy | local composting; treatment plants | Separate collection systems, composting, and energy recovery from biowaste | limited: NGO initiatives | Circular Economy HUB | CE4GT project |
| | 6. Mapped areas: Infrastructure & support systems | | | | | |
| | 6.1 Proximity of markets, urban centers | Kalenić Pijaca, Zelenci Venac Market, and Zemun Market | 4-22 km distance with surroundings | 20 km from Tirana | well-connected; short distances and good infrastructure | 20-86 km with surroundings |
| | 6.2 Presence of food suppliers (supermarkets, markets) | Maxi, Tempo, and Shop&Go | Sklavenitis, AB Vassilopoulos, Lidl, Masoutis and My Market | 17 small grocery stores | 4 super markets, a farmer market and a dozen of small grocery stores | 6 super markets, 7 markets |
| | 6.3 HoReCa sector demand for mushrooms | substantial demand | Local eateries and tavernas | 5 restaurants and 2 pizzerias insitu; 6,183 hotels and restaurants in Tirana | 15+ restaurants and 20+ pizzerias | traditional local dishes (restaurants) |
| 6.4 Access to agricultural extension services | PAES; IASA | Associations of Cooperatives | Tirana RAAE | PPES | University of Haxhizeka, Faculty of Agribusiness. Technology of Plant protection, Food Technology, Agro environment and agro ecology | |
| 6.5 Waste collection & recycling systems relevant to mushroom substrates | Gradska čistoća | Separate collection and recovery | no separated collection | Eko Fund; separated collection | Ambienti | |

Conclusion

Researchers from partner organizations conducted an internal evaluation of the agriculture and the preliminary mushroom sector at the national level. The evaluation was based on the criteria below:

| Comparative analysis between partners | |
|--|--------|
| Well established/high levels | Red |
| Existing/medium level | Orange |
| Non-existing/low level | Yellow |

Based on data analyzed, the common cross-country needs for mushroom sector development require:

Integration into VET and Adult Training

- Lack of structured training programs in mushroom cultivation across all countries.
- Limited teacher/trainer experience in mushroom-specific practices.

Value Chain Development

- Fragmented or underdeveloped supply chains from production to market.
- Minimal integration with processing, packaging, and distribution sectors.

Awareness and Knowledge Gaps

- Limited understanding of mushroom farming potential among farmers and rural youth.
- Insufficient public and institutional recognition of mushrooms as a high-value crop.

Access to Infrastructure and Technology

- Inadequate infrastructure for controlled environment growing (humidity, temperature).
- Poor post-harvest handling (cold storage, drying units, transport).

Policy and Institutional Support

- Weak or absent national strategies specifically targeting mushroom production.
- Lack of financial incentives or startup support schemes.

Market Development and HoReCa Linkages

- Underserved demand in local restaurants, hotels, and catering services.
- Lack of branding and market promotion for locally cultivated mushrooms.

Field research methodology

The field research phase of the MUSHLINK project was designed to complement the desk-based findings by gathering direct input from stakeholders across three key cohorts relevant to the development of a viable mushroom farming sector in the Western Balkans. These cohorts included:

1. **The Business Sector** – small and medium enterprises (SMEs), agribusinesses, and start-ups operating or exploring opportunities in mushroom cultivation or supply chains.
2. **The VET Sector** – vocational education institutions, trainers, instructors, and extension service providers involved in agricultural training.
3. **The Public Sector** – representatives from ministries, municipalities, and public institutions involved in agriculture, rural development, education, and labor policies.

Detailed information of the questionnaires template have been inserted under [Annexure I](#).

To capture a diverse range of insights and challenges, the research team conducted structured focus group discussions and key informant interviews across all five project countries (Serbia, Albania, Greece, Montenegro, and Kosovo). Participants were selected based on their role in or influence over mushroom farming development and vocational skills provision in their local contexts.

The primary data collection tool was a series of **semi-open-ended questionnaires**, tailored to each cohort. These questionnaires were designed for needs assessment, enabling participants to reflect on their current experiences, identify barriers to progress, and propose opportunities for collaboration between VET systems and the mushroom farming industry. The semi-structured format allowed for both quantitative aggregation of key issues and qualitative elaboration of locally grounded insights.

The focus of the field research was twofold:

- **Strengthening the enabling environment** for mushroom farming by identifying gaps in policy, regulation, technical support, and infrastructure.
- **Enhancing employment potential** in the mushroom sector by aligning vocational training with the specific competencies, resources, and entrepreneurial pathways needed for industry uptake.

The data will support the formation of multi-stakeholder networks and public-private partnerships as part of the project's broader mission to stimulate rural employment and promote circular agriculture practices.

Focus group: public sector

Serbia

Total respondents: 6 public institutions

Institutional & Regulatory Framework

- **Type of institution:**
 - Municipality: 67%
 - Ministry: 33%

Most participants represent local government. This indicates municipalities are key entry points for local policy and implementation.
 - **Policies supporting mushroom farming:**
 - No: 100%

None of the institutions currently have policies targeting mushroom farming. This shows a clear policy gap in the circular economy space.
 - **Legal frameworks on biowaste:**
 - Not sure: 100%

All respondents were unsure if relevant legal frameworks exist. This reflects a lack of awareness or legal clarity on biowaste use in agriculture.
-

Technical & Financial Support Mechanisms

- **Technical assistance or knowledge transfer:**
 - No: 100%

No institutions offer technical support. There is a need for capacity-building programs to support stakeholders on mushroom farming and recycling.
 - **Financial incentives:**
 - No: 100%

No financial mechanisms like grants or tax benefits are available. This limits business engagement and sustainable investment.
 - **Main barriers:**
 - Lack of funding, regulatory gaps, and low awareness: 100%

All institutions cited these three barriers. The findings indicate a systemic absence of structured support.
-

Strategic & Policy Considerations

- **Viability of mushroom farming:**
 - Yes: 100%

All institutions see mushroom farming as a valuable opportunity for sustainable development and job creation.
- **Partnerships to support the sector:**

- Not sure: 100%
Institutions were unsure which partnerships would help. This points to limited knowledge on collaborative models in the green economy.
 - **Improving institutional role:**
 - More funding, regulation, training, awareness: 100%
All respondents agreed these measures are needed. This shows alignment on the tools required for change, despite the current lack of action.
 - **Openness to collaboration:**
 - Yes: 100%
Every institution is open to joining a multi-stakeholder initiative. This presents a strong foundation for building a joint program.
-

Conclusion

All public institutions surveyed lack current policies, legal clarity, and support mechanisms for mushroom farming. However, they unanimously recognize its value and are open to future collaboration. This creates a strong base for targeted policy design, stakeholder training, and strategic partnerships. The findings point to an opportunity to develop local circular economy initiatives from the ground up, starting with municipal engagement and regional support programs.

Greece

17 civil servants or elected members of local or regional authorities were reached and we finally interviewed a number of 7 participants in the in the conducted focus group. 2 of the focus groups were implemented remotely and one more was implemented face to face. The participants answered the questionnaires and a more open discussion followed. The interviews which were later transcribed and analyzed into this summary.

Q1: 3 participants were from local authorities, 2 from regional authorities, 1 from the National Agricultural Organization, 1 from a local development agency (one of the 54 existing all around state). These institutions cover all kind of functions and services such as local development planning, licensing regulations & provision, agricultural services and funding programs..

Q2: Circular economy practices as well as support to mushroom farming are not practiced by most of the institutions. Only one of the respondents (the regional Department of the Ministry of F6 sustainable organic agriculture) includes mushroom farming. 6 out of 7 respondents acknowledged that their institutions do not have specific policies or programs targeting mushroom production or circular economy practices involving fungi.

Q3: 5 out of the 7 participants (72,3%) have no knowledge about biowaste regulations. Only two of them (28,57%) have extended knowledge about the existing legal framework.

Q4: Knowledge transfer and/or technical support is a matter of interest for the 57,15% of the participants. The level varies: from funding and counselling provision to license and information regarding regulations, know how transfer and implementation of mushrooms processing. The remaining 42.85% admit that there not any special initiatives focused on mushrooms as a commercial business undertaking and production.

Q5: From the answers we count that the existing allocated funding is used to finance farming infrastructures (generally covered greenhouses/indoor cultivations or mushroom substrate preparation methods) and/or to mushroom products as food processing undertakings. Programs are derived either from national funding programs and/or other national resources or from various EU funding programs. 3 participants representing the 42.85% admit stated that their institutions have not participated in any founding initiative.

Q6: Regulatory constraints, lack of a national strategic policy supporting the overall development of the fungi sector, sector overall awareness, a loud absence of education and specialized production trainings were highlighted as the most important barriers. Need for greater institutional support, provision of funding opportunities for starting fungi as a business and low market visibility for the sector are mentioned by the 28,57 %.

Q7: 7/7 of participants (100%) mentioned that mushroom farming could be a viable business opportunity promoting at the same environmental sustainability and linked directly to environmental impact. They also highlighted that they could affect positively the local economic and social development by increasing job positions and contribute significantly to the local economic growth.

Q8: 7/7 of participants (100%) answered positively for the development of synergies and cooperation as the pivotal fact, so crucial for the development of the sector. 42,85% of respondents suggested public-private partnerships would be a key factor for the mushroom farming development. The same percentage on the other hand firmly believed that cooperation between academia/research and agro businesses could increase positively the farming potential.

Q9: 57,14 % of the participants have the opinion that extended training and awareness campaigns are key factors fostering mushroom farming and circular economy initiatives. More funding, improved and more clear regulations, business support exchanges, transfer of know-how are mentioned by the 42,86% of the participants.

Q10: Noteworthy is that all participants (100%) expressed their positive opinion to develop initiatives to promote mushroom farming that includes bio waste recycling and expressed interest in participating and collaborative with any related organization.

Albania

Institutional & Regulatory Framework

A total of 10 individuals participated in the conducted focus group. The focus group was implemented through remote interviews which were later transcribed and analyzed into this summary.

Q1: 80% of respondents were representatives from municipal-level institutions in Tirana and its surrounding local administrative units. The other 20% were from the Agency for Agricultural and Rural Development (ARDA). These institutions cover functions such as local planning, agriculture services, and funding programs, with ARDA operating under the Ministry of Agriculture and Rural Development.

Q2: Circular roadmaps to include or support mushroom farming are not present. Only 10% of respondents mentioned an initiative loosely connected to sustainable agriculture that could support mushroom farming. 60% of respondents acknowledged that their institutions do not have specific policies or programs targeting mushroom production or circular economy practices involving fungi. 30% of respondents were unsure whether such policies exist at the national level, signaling a knowledge gap.

Q3: Knowledge about biowaste regulations was intermediate. 30% of respondents mentioned the National Strategy on Waste Management but were unclear whether it explicitly allows or encourages agricultural reuse of organic waste for activities like mushroom cultivation. 60% of respondents were sure, mentioning the Local Integrated Waste Management plans with concrete actions for awareness campaigns or initiatives that turn biowaste through circular practices such as composting. The remaining 10% stated no relevant legal framework exists or were unsure.

Technical & Financial Support Mechanisms

Q4: Knowledge transfer and technical support varies significantly depending on the institution profile, capacity, and donor involvement. 40% of respondents collaborate with NGOs or businesses on pilot projects involving biowaste reuse. 40% of respondents support knowledge transfer for local farming (not mushroom specific) or green entrepreneurship, especially through local economic development programs or donor-funded projects. The remaining 20% mention no institutionalized or mushroom-specific initiative.

Q5: Financial incentives are available for businesses investing in sustainable mushroom farming but the low awareness level limits inclusion. According to 80% of respondents mushroom farmers can potentially access funding from several national, EU, and international sources such as IPARD III (Instrument for Pre-Accession Assistance in Rural Development); co-financing from Albanian Investment Development Agency (AIDA); grants from SME Support Schemes for innovation, green technologies, and business infrastructure; or EU funds often implemented via GIZ, or regional cooperation platforms (e.g., ReSPA, RCC). The remaining 20% were not sure about the general access to national or EU-funded rural development programs, but they lacked details or examples of how these were used for fungi-related businesses.

Q6: Low awareness was highlighted as the primary challenge to greater institutional support (40%), followed by limited funding (30%) and unclear regulations (10%). Officials admitted that mushroom farming is not yet viewed as a priority and that staff lack the expertise (10%) to assess or promote it. In some cases, bureaucracy and missing legal clarity further hindered their ability to act (10%).

Strategic & Policy Considerations

Q7: All participants (100%) viewed mushroom farming as a viable opportunity to promote environmental sustainability and local economic growth. They emphasized its potential for job creation, especially among youth, and its synergy with rural circular economy goals due to limited land requirements and abundance of biowaste to reuse.

Q8: 30% of respondents suggested public-private partnerships would be key to driving mushroom farming forward. The majority (70%) emphasized the need for international cooperation—especially with EU-

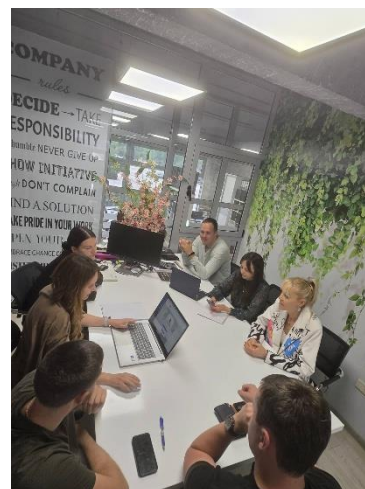
backed projects—and collaborations with research institutions and universities to bring expertise and innovation to local levels.

Q9: All participants (100%) expressed the need for increased training and awareness campaigns targeted at both officials and the public. 40% of respondents pointed to the need for clearer regulations, while others called for dedicated funds and pilot projects to test the sector’s feasibility before broader investment.

Q10: The majority (80%) expressed interest in participating in collaborative initiatives to promote mushroom farming and biowaste recycling. The remaining 20% suggested this would depend on clear goals, defined institutional roles, and availability of external support (financial or technical).

Montenegro

A focus group, as a research method used to gather feedback, opinions, and insights from a small, diverse group of people about mushroom potential in Bar, was organized for public sector. It was a structured but flexible discussion format guided by a moderator who asked open-ended questions. The focus group lasted 60 minutes. Although it’s a qualitative research method, meaning the focus is on depth of insight rather than statistical analysis, we provided below the percentage of participants’ responses.



Topic: Strategic & Policy Considerations for Mushroom Farming Development

Date: 14/05/2025

Moderator: Anita Radulovic

Participants: 6 individuals from public institutions

- 3 from local municipality
- 2 from public companies
- 1 environmental agency

Q1: 50% of the respondents represent local municipality, 33% represent public companies based in Bar while 17% represent environmental agency.

Q2: None of the institutions involved had policies to support mushroom farming, just agriculture in general through different programs.

Q3: Yes, Montenegro has established legal frameworks that regulate the use of biowaste for agricultural purposes, including mushroom farming. These frameworks aim to ensure environmental protection, public health, and the promotion of sustainable agricultural practices. The focus group assessment defined: Law on Waste Management; Regulation on Conditions for Processing Biowaste; Law on Organic Production; Law on Agriculture and Rural Development; and Law on Plant Health Protection.

Q4: 67% of respondents provide technical assistance to farmers in general. For example, in 2025 the Municipality of Bar allocated €150,000 for agricultural development through six support categories including Field and Vegetable production (compatible to the mushroom growing). The municipality covers 50% of eligible costs per investment. The "Youth in Agribusiness" program targets unemployed individuals under 30 registered with the Bar Employment Bureau. Approved projects receive grants covering 100% of eligible costs, up to €10,000 per project. The municipality regularly issues public calls for various agricultural support programs. These calls are open until September 15, 2025, or until funds are exhausted.

Q5: Only as a part of farming in general (please see above). Not specifically for mushroom.

Q6: The respondents agree that low awareness is the main barrier as well as general lack of interest in agriculture in coastal municipalities such as Bar (where tourism is the main economy sector).

Q7: All respondents agree that mushroom farming would be a great link between agriculture and tourism because there is a huge demand for mushroom in Bar and many restaurants & hotels, potential buyers. Also the latest trends in nutrition promote intake of fresh vegetables.

Q8: According to the respondents involved Public-Private Partnerships (PPP) should be promoted more. They see as an example Plantadjun, an urban garden from Bar, which obtained financing from the Ministry of Science and Municipality of Bar and later became self-sufficient financially, participating at EU calls. The respondents consider PPP as a good tool to boost good ideas.

"Municipality and private businesses can develop community mushroom farms on municipality owned land for people in need".

*They also agree that Cross-border collaborations can facilitate knowledge exchange, access to funding, and adoption of best practices. There is a potential for **job creation**- empowering women, youth, or marginalized groups through micro-farming cooperatives, but also to partner with schools or community centers to teach sustainable cultivation.*

Q9: 50% of the respondents believe that more funding is needed to implement tailor made mushroom farming initiatives. 35% of respondents consider a mix of training programs and awareness raising as crucial for development of the sector because funds are there but people are still not convinced in the financial potential of the mushroom farming. 15% of the respondents believe there should be some regulatory adjustments/ tax reliefs for an innovative initiative in Montenegro, such as mushroom farming.

Q10: All participants agree that they would be willing to participate in such initiative.

Kosovo

This focus group analyzed responses from **11 public institutions**—including ministries and municipalities—on their current role, readiness, and perspectives regarding mushroom cultivation and its integration into circular economy practices. The findings shed light on institutional awareness, existing policies, technical and financial support, and barriers that hinder growth in this promising sector.

Q1: The survey included representatives from both ministries and municipalities. A majority (8 out of 11) were from municipalities, while 3 were from ministries. This distribution reflects the importance of both local and national governance in supporting agricultural innovation.

Q2: Only one institution reported having a specific policy or program that supports mushroom cultivation within the circular economy. Most institutions (8 out of 11) indicated that no such policies exist, and 2 respondents were unsure. This highlights a significant policy gap and a lack of formal institutional frameworks to promote the sector.

Q3: Responses were mixed regarding legal frameworks regulating biological waste usage in agriculture. Four institutions acknowledged the existence of such frameworks, citing laws like the Law of Forests in Kosovo, while others stated that no such regulations exist or were unsure. This inconsistency indicates either a lack of harmonized regulations or limited awareness among institutions.

Q4: Half of the institutions reported providing technical support or knowledge transfer, particularly through agricultural experts. The remaining half indicated no such support exists. This suggests that technical capacity is available in some areas but not systematically offered across the country.

Q5: Only three respondents mentioned financial support mechanisms, including municipal grants and subsidies. The majority (8 out of 11) confirmed that no financial incentives such as grants, subsidies, or tax reliefs are currently available for sustainable mushroom cultivation. This lack of funding is a significant barrier to sector development.

Q6: A recurring theme in the responses was the lack of funding, cited by nearly all institutions. Other barriers included regulatory constraints, low awareness of the sector's potential, and absence of clear government priorities or programs. These factors collectively hinder greater public sector engagement in mushroom-related initiatives.

Q7: All institutions recognized mushroom cultivation as a viable and sustainable approach to economic development. Respondents emphasized its profitability, contribution to local economic growth, and potential to reduce import dependency. This positive perception indicates a fertile ground for future public-private collaboration.

Q8: Public institutions identified several types of strategic partnerships that could advance mushroom cultivation: Public-private cooperation, International collaborations, Research partnerships, and National and international donor engagement. Many respondents advocated for structured partnerships with existing businesses and foreign experts, as well as policy frameworks that protect domestic producers.

Q9: When asked how they could improve their role, institutions frequently suggested: Increased funding, Regulatory reforms, Awareness campaigns, and Capacity-building through training and technical programs. This response indicates a readiness to act—pending proper resourcing and coordination.

Q10: Most institutions (9 out of 11) expressed openness to participating in multi-stakeholder efforts promoting mushroom cultivation and organic waste recycling. Only one institution was not willing to join, and one remained uncertain. This reflects strong institutional willingness to collaborate for systemic impact.

Focus group: business sector

Serbia

Focus Group Composition

- **Participants:** 12 attendees
-

1. Type of Business or Organization Represented

- **Farmer:** 50%
- **Agribusiness:** 25%
- **Entrepreneur:** 17%
- **Trader:** 8%

Context: Most participants are directly involved in agriculture, with some exploring value-added services like processing or trading. Entrepreneurs express interest in diversifying into mushrooms due to perceived low land requirements.

2. Familiarity with Mushroom Farming

- **Not familiar:** 0%
- **Somewhat familiar:** 33%
- **Very familiar:** 25%
- **Already involved:** 42%

Context: A majority are either experienced or actively involved. Those “somewhat familiar” are typically early-stage explorers or those transitioning from other crops.

3. Current Engagement in Mushroom Farming

- **Yes:** 42%
- **No:** 17%
- **Planning to start:** 25%
- **Interested but unsure:** 16%

Context: A notable share is operational, and interest is strong. Some hesitate due to uncertainty about returns and technical requirements.

4. Willingness to Use Biowaste for Cultivation

- **Yes:** 67%
- **Maybe:** 25%
- **No:** 8%

Context: The majority see biowaste as a viable and sustainable input. "Maybe" responses stem from concerns over quality and contamination. One participant rejected the idea, citing strict product quality standards in their niche market.

5. Biowaste Types Considered Suitable

- **Crop residues:** 75%
- **Coffee grounds:** 42%
- **Brewer's waste:** 33%

- **Food waste:** 17%
- **Other:** 8% (wood chips)

Context: Crop residues (e.g., straw, corn husks) are most accessible and known. Urban farmers find coffee grounds attractive. Brewer's waste is considered by those near breweries.

6. Barriers to Using Biowaste

- **Regulatory issues:** 33%
- **Costs:** 25%
- **Availability of waste:** 17%
- **Lack of technology:** 17%
- **Other:** 8% (quality control concerns)

Context: Regulations on biowaste handling are a major concern. Others face collection and logistics issues. Cost concerns are mostly tied to pre-processing biowaste.

7. Perception of Profitability and Sustainability

- **Yes:** 75%
- **No:** 8%
- **Uncertain:** 17%

Context: Most participants view mushroom farming as a sustainable and profitable alternative, especially with low land use. The skeptics worry about market access and perishability.

8. Interest in Business Partnerships

- **Yes:** 67%
- **Maybe:** 25%
- **No:** 8%

Preferred partnerships:

- Waste suppliers (farmers, food processors)
- Distributors and wholesalers
- Tech partners for substrate processing

Context: Collaborations are seen as critical to securing inputs and accessing markets.

9. Desired Support or Incentives

- **Funding:** 58%
- **Training:** 42%
- **Technical assistance:** 33%
- **Market access:** 33%
- **Other:** 8% (policy advocacy)

Context: Access to finance and knowledge are top priorities. Technical guidance is especially important for newcomers.

10. How Financial Institutions Can Help

- **Loans:** 42%
- **Grants:** 33%
- **Investment funds:** 17%

- **Business advisory:** 8%

Context: Participants emphasize the need for soft loans or grants to reduce startup risk. Some advocate for specialized green finance instruments.

Greece

A total of 14 business people participated in the 5 conducted focus group. The 3 focus group was implemented remotely and the 2 in person. We addressed out invitation to 25 businesses of the sector of mushrooms farming but also to suppliers and machinery production practitioners as well as to HO.RE.CA business people. Mandatory to mention here that a significant number (8) of existing mushrooms farms nationally ended their function recently mainly due to increased energy cost.

Q1: Most of the participants (71,42%) were farmers from different regions, while the 14,28% are from HORECA sector proceeding products based on collected mushrooms and the rese 14,28% are suppliers to mushrooms farmers. Half of the mushroom farmers have additional activities related to mushrooms farming such as substrate selling or even production and food processing.

Q2: Most of the participants (9285%) expressed that somewhat they are familiar with the mushrooms cultivation. Only the 28,57% are in some related business more than 8 years. Most of the lower familiarity level mentioned that they faced lack of information and education or training opportunities.

Q3: 42,85% of the participants reported that mushroom production is their main source of income while the same percentage are not fully **engaged** in mushroom farming. 2 of them (14,28%) are ready to end their activity (one due to retirement, one due financial problems). From them who are not fully engaged mentioned that they mostly experiment to cultivate mushrooms but they faced or still are facing technical obstacle and need more information, training and networking.

Q4: In this question participants are divided almost equally,

- 5 of them, representing the 35,71% are negative as they believe regulations and stability do not work. 2 of them because they collect and not cultivate mushrooms
- 28,57 are positive to use or already use biowaste as a substrate for mushroom cultivation and the
- 35,71% stand in between expressing doubts mainly due to food safety regulations and lack of know-how

Q5: Most of the participants (57,14%) showed **crop residues as the most appropriate biological waste**. **Closely (50%)** believe that coffee **grounds** could be a substrate due for mushrooms. Lower score for **general food waste or stems**.

Q6: Participants highlighted several important barriers that prevent them to use bio waste for mushroom cultivation. **Regulatory issues**, availability of waste, acquisition/logistics cost, lack of knowledge, **lack of appropriate technology and machinery are the principal findings in what constitutes the barriers in present situation on the national level**.

Q7: Most of the participants (64,28%) are positive to mushroom cultivation and expressed the opinion that this can be a sustainable business opportunity. A percentage of 28,57% still are skeptical and fearful. Their doubts derive mainly due to: to start a mushrooms farm is a large and expensive investment, the

national economic environment is not stable, the consumers' attitudes towards the use of mushrooms (in our country), the non-friendly authorities are the reasons of their apprehension and fear.

Q8: The vast majority of the participants (85, 71%) expressed a real intention to create and to/or to participate in active networks and partnerships related to mushroom farming and bio waste recycling. Many expressed the opinion that partnerships are the only way to **develop a sustainable future. Sharing experiences and knowledge, receiving specialized services and know-how, expanding sales networks are some of the interesting topics.**

Q9: Participants expressed their pressing needs for support and asked for Funding/Financing, Technical assistance as well as preparedness to access to the Market.

The highest need seems to be the Funding/Financing (71,42 %), then Market Access (50 %), Technical Assistance (28,57 %). Last but not least, Training and Networking follow with 14, 28 %.

Q10: Commercial Banks & their financial instruments seem to play an important role for the mushroom farming and circular economy initiatives. 57,14 % ask for Loans or Grants from the Banks. On the other hand 28,57 % expressed a restrain about the role of the banks and their willingness to cooperate with the farmers and in favor of the farmers.

Albania

A total of 10 individuals participated in the conducted focus group. The focus group was implemented in Baldushk village as the strategic mapped area for the local activities of the project.

Business Engagement & Market Perspective

Q1: All participants (100%) were farmers of Baldushk village that have been selected due to the compatibility of their residue biomass with mushroom farming practices. These farmers own family businesses of at least 2 hectares that target domestic markets. The age group was between 40-50 years old. Gender inclusion was also considered with 3 female farmers participating in the focus group.

Q2: The familiarity level of participants was low. 50% of respondents were not aware of the business opportunity primarily due to traditional farming background of the mapped area and little exposure or knowledge of mushroom cultivation or considered as technical and unrelated to their current practices. The other half were somewhat familiar to the topic. Main sources of information were media, social networks and acquaintances and knew about the potential applications of such business model. However they lacked information or practical experience to consider it seriously.

Q3: All participants reported that they do not currently engage in mushroom farming. 20% considered or even tried it briefly, but encountered challenges such as lack of knowledge, technical difficulties, or poor market demand, which led them to abandon the idea. 40% mentioned that their current farming activities require their full attention, leaving little time or resources to diversify into mushrooms. The remaining 40% expressed interest in the future but felt they need more support, training, or access to inputs before starting.

Mushroom Farming & Biowaste Recycling

Q4: All participants (100%) expressed willingness to use agricultural or food industry waste as a substrate for mushroom cultivation. Many saw it as a cost-effective and sustainable way to repurpose waste that would otherwise be discarded. Others viewed it as an opportunity to add value to by-products from their own farms or local industries, creating a new income stream. A few mentioned that using waste materials could make mushroom farming more accessible and affordable, especially for small-scale farmers.

Q5: Participants identified a variety of biowaste types they believe could be effectively used for mushroom cultivation. The most commonly mentioned were crop residues (60%) such as straw, corn stalks, and wheat chaff, seen as abundant and readily available on their farms. Several also pointed to coffee grounds (20%) as a promising substrate due to their nutrient content, especially where small cafés or shops are nearby. Farmers also considered general food waste (20%), including vegetable scraps and discarded produce from markets, as a potential resource if properly managed.

Q6: Participants identified several key barriers to using biowaste for mushroom cultivation. 30% of farmers pointed mentioned regulatory issues, expressing concerns about unclear or restrictive rules around collecting, transporting, and using biowaste materials safely and legally. The majority (50%) highlighted a lack of appropriate technology and know-how as the biggest obstacle, noting that without access to proper equipment, training, and technical support, it's difficult to process biowaste effectively for mushroom farming. Additionally, 20% of farmers raised concerns about the marketability of mushrooms grown on biowaste, fearing that even if they successfully cultivate mushrooms, there might be limited demand or buyers reluctant to purchase products perceived as "waste-grown."

Business Model & Investment Perspective

Q7: All participants (100%) agreed that mushroom farming can be a profitable and sustainable business model. 50% highlighted the low competition in the local market, making it an attractive niche opportunity. Several noted that mushroom farming aligns well with sustainable agriculture principles, especially when using waste substrates, which can also help attract funding or grants for green initiatives. Others pointed to the growing demand for mushrooms and mushroom products both locally and in wider markets, driven by increasing consumer interest in healthy and alternative foods.

Q8: All participants (100%) expressed strong interest in forming business partnerships related to mushroom farming and biowaste recycling. Many saw partnerships as a way to share resources and knowledge, particularly in areas where they lack expertise, such as biowaste processing or controlled environment farming. Several farmers were open to collaborating with technology providers, researchers, or training centers to improve cultivation methods and ensure quality control. Others were interested in partnering with local food industries or markets to secure a steady supply of biowaste or ensure a stable sales channel for their mushrooms. A few also mentioned the potential for cooperative models where small farmers could join forces to reduce costs and improve access to funding or equipment.

Q9: Farmers identified several types of support that would encourage them to invest in mushroom farming. Among the multiple choices they provided 80% pointed to financing as the most critical factor, noting that access to grants or low-interest loans would help them cover initial setup costs and reduce financial risk. 70% emphasized the importance of training, especially hands-on learning to build skills and

confidence in mushroom cultivation. 10% saw value in technical assistance, particularly expert guidance during the early stages. 50% highlighted the need for better market access, expressing concern about where and how to sell their produce.

Q10: Farmers saw a strong role for banks and financial institutions in supporting mushroom farming and circular economy initiatives. 90% favored grants choice, emphasizing the need for non-repayable funding to lower the risk for small or start-up mushroom growers. 50% mentioned investment funds as a useful mechanism to scale up operations or support cooperative ventures. 30% of respondents highlighted the usefulness of accessible loans, provided they came with favorable terms. 30% pointed to the importance of business advisory services, suggesting that financial institutions could offer guidance on business planning, risk assessment, and access to markets.

Montenegro

A focus group, as a research method used to gather feedback, opinions, and insights from a small, diverse group of people about mushroom potential in Bar, was organized for SME sector. It was a structured but flexible discussion format guided by a moderator who asked open-ended questions. The focus group lasted 60 minutes. Although it's a qualitative research method, meaning the focus is on depth of insight rather than statistical analysis, we provided below the percentage of participants' responses.



Topic: Business Engagement & Market Perspective in Mushroom Production

Date: 05/05/2025

Moderator: Darko Pekic

Participants: 14 individuals from farming, agribusiness, investment, and supply chain backgrounds

- 4 from agribusiness
- 3 from farming
- 2 consulting business
- 2 supply chain business
- 2 restaurant owners
- 1 innovation startup

Q1: 29% agribusinesses, 21% farming, 14% consulting business, 14% supply chain business, 14% 8% restaurant owners, 8% innovation startup.

Q2: 43% of respondents are somewhat familiar, 29% are very familiar, 21% are not familiar while 7% are already involved in mushroom farming.

Most of the respondents have limited knowledge on the business opportunity. Only one of them had previous experience with mushroom farming as he is a farmer himself.

"I've heard a bit about mushroom farming, but I wouldn't say I'm very familiar with it as a business. I know it's gaining popularity because it doesn't need a lot of land and can be done indoors, but I've never tried it

myself. Most of my experience is with livestock, so mushrooms feel like a different world to me. I'd be open to learning more, especially if it's profitable and doesn't require a huge upfront investment."

Q3: *71 % of respondents are interested but unsure as they are not fully aware of the requirements and benefits, 7% (1 respondent) have already started production while 22% do not plan to start mushroom production as they are engaged in other fields.*

Q4: *22% were not eligible to respond because they said before that they would not start mushroom production any time soon. 78% said they would gladly use agricultural or food industry waste.*

The main listed benefits are:

- *Support circular economy*
- *Reduce input costs*
- *Transform waste into value-added products*
- *Reduce landfill use and pollution as Bar's landfill Mozura has been facing a huge pressure already*

Q5: *57% of respondents listed food waste as the main source of biowaste for mushroom farming as huge quantities of food are thrown every day. 43% of respondents, mainly farmers, listed crop residues. The benefits of coffee waste was not recognized by our respondents although coffee consumption is very high in Montenegro.*

Q6: *Most of the respondents do not see any of the given option as relevant. Their main conclusion is that the lack of knowledge on mushroom farming is the main barrier.*

"While mushroom growing uses waste substrates, there's a point where spent substrate becomes a burden if not properly handled or reused."

Q7: *All respondents agreed that mushroom farming would be a profitable business and that new technology plays an important part in its development.*

"Consumers are actively seeking plant-based protein sources, and mushrooms offer that umami flavor profile without heavy processing."

"From logistics, freshness is a major constraint. Mushrooms spoil fast, so cold chain integrity is critical—many producers can't afford that infrastructure yet."

Q8: *22% of respondents were not eligible to answer to this question due to the fact that they previously confirmed the lack of interest in mushroom farming. 78% of respondents agreed that business partnerships with reliable investors would give a push to their initiatives. Most of them saw partnerships as financial contribution to the development of business and splitting the profit later.*

"We're seeing more inquiries from impact investors. They like mushrooms because the startup costs are relatively low, and there's a short turnaround time on yields."

Q9: *50% of the respondents listed funding opportunities as the main trigger for them to start mushroom farming, 30% expressed the desire to get tailor made training and continuous support from extension services while 20% need a cluster that will help them to focus on production and not worry about sales.*

"More tailored financing instruments—standard loans don't work well for crops with quick cycles like mushrooms.

Training and extension services for new growers.

Stronger linkages between growers and value-added producers.”

Q10: *All respondents agree that so far banks and financial institutions were not proactive to understand the potential of this sector.*

“Its needed to draft new grants for agro-innovation where mushrooms are explicitly listed. They are not even on the radar now”.

Kosovo

Mushroom cultivation is an emerging and innovative agribusiness opportunity with high potential in terms of sustainability, profitability, and contribution to the circular economy. To explore the role of the business sector in this field, a structured questionnaire was conducted with **ten representatives** from diverse business backgrounds, including farmers, agribusiness operators, and entrepreneurs. This focus group report presents a detailed analysis of their perspectives, awareness levels, and readiness to engage in mushroom cultivation and related circular economy practices.

Q1: The participants in this survey represent a broad spectrum of the business sector:

- 4 are active farmers
- 2 are engaged in agribusiness
- 1 represents American berry cultivation
- 2 are involved in walnut cultivation and processing
- 2 are already active in mushroom cultivation

Q2:

- 7 out of 10 respondents are somewhat informed about mushroom cultivation.
- 2 are already involved in mushroom cultivation.
- 1 is planning to start a mushroom-related business, while another is interested but unsure.

Q3: Business assessment of involved participants identified:

- 2 out of 10 respondents are active in mushroom farming
- 2 out of 10 respondents are planning to start for farm diversification
- 6 out of 10 respondents are interested but unsure of the feasibility and the profit it can bring

Q4: All ten respondents expressed willingness to use organic waste as a substrate for mushroom cultivation. This unanimous interest demonstrates the business sector's openness to circular economy practices and waste valorization.

Q5: The types of waste identified as suitable for mushroom cultivation include:

- Crop residues (mentioned by all)
- Food waste (mentioned by 3 participants)
- Coffee grounds and brewery waste (mentioned by 1 respondent)

Q6: The main challenges reported include:

- Lack of technology (6 mentions)
- Regulatory issues (4 mentions)
- Cost (4 mentions)
- Availability of waste (3 mentions)

Q7: All respondents agreed that mushroom cultivation is both sustainable and profitable. This consensus reflects a shared belief in the long-term viability and economic return of investing in this field.

Q8: 100% of respondents expressed interest in business partnerships related to mushroom cultivation and organic waste recycling. Types of partnerships were not specified, but the uniform response suggests a strong willingness to collaborate across the value chain.

Q9: The most requested forms of support include:

- Training (9 mentions)
- Financing (7 mentions)
- Technical assistance (4 mentions)
- Market access (3 mentions)

Q10: Respondents suggested several ways banks and financial institutions could facilitate growth:

- Loans (mentioned by 8 participants)
- Grants (5 mentions)
- Investment funds (5 mentions)
- Business advisory services (2 mentions)

Focus group: VET sector

Serbia

Total respondents: 12 from agricultural education and training institutions

General Information

- **Roles in the VET sector:**

- 66.6% teachers
- 16.6% scientists
- 16.6% extension services advisers

The majority are teachers, suggesting strong engagement at the school level.

- **Types of institutions:**

- 66.6% schools (primary or gymnasium)
- 16.6% universities or scientific institutes
- 16.6% extension services

This reflects a diverse educational background but with a strong presence at the basic education level.

- **Experience in agricultural education:**

- 100% more than 10 years

All respondents are highly experienced, indicating strong potential for upskilling and curriculum development.

Mushroom Farming in Curricula

- **Current inclusion of mushroom farming:**

- 83.26% No
- 16.6% Yes

Very few institutions include mushroom farming, showing a major curriculum gap.

- **Course level for existing programs:**

- Higher education only: postgraduate, PhD, or university-level modules

Existing teaching is advanced and limited to academic institutions. No presence at vocational or secondary level.

- **Depth of teaching:**

- Only at a basic or scientific-theoretical level

There is no hands-on or intermediate instruction. No practical skill development is reported.

- **Topics covered (where present):**

- Responses were not quantified, but mainly theoretical: mushroom types and research focus

There is limited coverage of practical topics like cultivation techniques or market opportunities.

- **Reasons for exclusion from curricula:**

- 80% lack of resources
- 20% low perceived demand

Lack of investment and awareness are key barriers to introducing mushroom farming in VET.

Future Perspectives

- **Support for curriculum integration:**

- 100% Yes

All respondents believe mushroom farming should be taught more widely. This is a strong endorsement from the education sector.

- **Support needed:**

- 83.26% selected all options (teacher training, materials, practical facilities, partnerships)
- 16.66% excluded teacher training

Most institutions need comprehensive support. Only a few did not see teacher training as essential.

Conclusion

The education sector has experienced staff but lacks resources and practical programs on mushroom farming. Curriculum content, where it exists, is limited to research-level theory. However, there is strong consensus that mushroom farming should be more integrated into VET. Stakeholders are ready for change but need support across infrastructure, training, and partnerships.

Greece

For this part of the field research we addressed invitations to 20 VET professionals from different levels and specializations. Teachers, counsellors, facilitators, trainers, training organizers from Vocational Schools, Vocational Institutes, Adult Education Centers, Vocational Training Centers and Universities are the main people interviewed. We finally conducted only 3 focus groups with 7 participants. All the other were not able to express any opinion on our special topic.

General Information

Q1: 5 Participants are Adult trainers or teachers at educational centers, 3 are counsellors (agronomists or foresters) providing tailor made services to farmers and one is professor at University level responsible for the sector of Mycology.

Q2: The participants represent

- Public education at secondary (2 or 22,22 %) level and one at University level.
- 44,44 % are private counsellors providing support to farmers or candidate farmers
- 22,22% are working in private Vocational or Training Centers

Q3: The majority of participants (77,77%) have over 10 years of experience in education. Only 2 (22,22%) have experience between 2 and 5 years. .

Mushroom Farming in Curricula

Q4-5 Most of the participants (88,88%) confirmed that their institutions do not currently include mushroom farming in their training programs or their curricula stands on the very basic theoretical framework regarding the fungi kingdom. At the university level the education is only provided to students and at theoretical level.

This above mentioned fact highlights a clear gap in training provision and points to the need for training content to be addressed firstly to trainers and counsellor and then to farmers so they will be able to run successfully business initiatives on the sector.

Q6: The main topics covered (in the few answers we get) are:

- Substrate preparation, Pest and disease management, other organic ways to improve the substrate (55,55%)
- Main cultivation techniques (33,33)
- Mushrooms species (22,22%)

Q7: The main reasons for the fact that mushroom farming is not covered or is covered at the very introductory level are

- Lack of related expertise 66,66%
- Absence of modern educational material and train the trainers programs 33,33
- Lack of perceived demand 22,22%
- Not a Strategic Policy plan to support and include mushroom farming on the Ministry Level as a central direction from the Government for rural development

Future Perspectives

Q8: All participants expressed their belief that including somehow mushroom farming into agricultural education could develop the sector. The derived explanations were very clear and firm that mushroom farming as a local business is indeed an opportunity for local development and job creation in rural areas.

Q9: Participants agreed that a holistic train the trainers program is needed. Supporting training material (manuals, online books, videos etc). On the other hand they mentioned that field practice, experimentation and “hands-on” training are also very important and promote real implementation on the farms.

Q10: Finally, networking and bridging the knowledge from academics, trainers, farmers, and HORECA sector is a great opportunity for successful implementation and the most important factor to increase the visibility and viability the sector needs. Last but not least this will definitely secure the circulation of the knowledge among the various stakeholders and secure successful implementation on a business level.

Albania

A total of 10 individuals participated in the focus group which was organized in collaboration with “Charles Telford Erickson” VET school. The partnership was established based on the school’s expertise in agricultural education and its previous collaboration with ETMI on local pilot activities through the Erasmus+ Capacity Building in Youth project BECBA. The project promoted mushroom farming as one of its sustainable waste management solutions in the circular bioeconomy field. This synergy will aim to bridge VET sector linkage with farmers requiring consultancy and career guidance to enter the mushroom industry.

General Information

Q1: All participants (100%) cover the VET teacher role in the agriculture field. Their professional qualification in agriculture is equal to EQF Level 2 and EQF Level 4, classified based on the National Qualifications Framework (KSHK – Korniza Shqiptare e Kualifikimeve), which aligns with the European Qualifications Framework (EQF).

Q2: All participating respondents are full-time employed at “Charles Telford Erickson” VET school. The school has over 145 students and 45 partner businesses to cooperate with for the apprenticeship of students.

Q3: The majority of participants (60%) had between 6 and 10 years of experience in agricultural education, reflecting a solid foundation in teaching and curriculum delivery within the sector. 20% of educators had 2 to 5 years of experience, indicating a growing familiarity with the field, while the remaining 20% were relatively new, with less than 2 years of involvement. Overall, the group combined seasoned professionals with newer entrants, offering both depth of experience and fresh perspectives for adapting curricula to emerging topics like mushroom farming.

Mushroom Farming in Curricula

Q4: All participants (100%) confirmed that their institutions do not currently include mushroom farming in their agricultural training programs. This highlights a clear gap in training content and points to the need for updating agricultural education to reflect emerging opportunities in sustainable and circular farming practices.

Q5: N/A

Q6: 50% of the educators reported that mushroom farming is covered at a basic introductory level, while the other half described it as being taught at an intermediate level. Although there is no dedicated or specialized curriculum for mushroom farming, participants noted that the topic is often addressed through cross-references in broader subjects such as plant production, soil science, or sustainable agriculture. These indirect mentions provide some exposure, but participants agreed that a more structured and practical approach is needed to properly prepare students for opportunities in this field.

Q7: Educators reported that substrate preparation and market opportunities are the most frequently covered topics, each mentioned by 60% of participants. Substrate preparation is usually integrated into broader lessons on soil and growing media, while market aspects are discussed in relation to entrepreneurship and agricultural business planning. 40% of educators noted that pest and disease

management is also addressed, mostly in general plant health modules, with some applicable content for fungi. Only 10% reported coverage of sustainability aspects, highlighting a significant gap in teaching how mushroom farming can support circular and eco-friendly practices. While certain components are touched upon, the training remains fragmented and lacks a comprehensive focus on mushroom cultivation.

Q8: The most common reason cited for the absence of mushroom farming in the curriculum was a lack of in-house expertise, with 50% of respondents noting that their institutions do not currently have trained staff capable of delivering specialized content on mushroom cultivation. 40% of participants pointed to a low perceived demand, suggesting that mushroom farming is still viewed as a niche topic and not a priority within mainstream agricultural training. 10% identified other barriers, specifically the absence of a clear business orientation toward mushroom farming and a lack of partnerships between the VET sector and the mushroom industry, which limits opportunities for practical exposure and curriculum development. Overall, the responses highlight both internal capacity gaps and external structural challenges.

Future Perspectives

Q9: The majority of educators (70%) believed that mushroom farming should be more widely integrated into agricultural education, citing its potential for income generation, alignment with sustainable practices, and relevance to circular economy principles. They felt that including it could equip students with innovative skills and open new entrepreneurial paths. 30% of participants were not sure, expressing interest but also concern about practical constraints like limited capacity, unclear job prospects, and lack of teaching materials. 10% of educator responded no, arguing that the current focus should remain on traditional crop and livestock farming, which they felt were more aligned with local labor market needs. Overall, there was strong support, tempered by concerns over feasibility and relevance.

Q10: Educators agreed that teacher training is essential, with 60% of participants noting that instructors need updated knowledge and skills in mushroom cultivation to effectively teach the subject. An equal percentage stressed the importance of educational materials, such as textbooks, manuals, and lesson plans specifically tailored to mushroom farming. 40% highlighted the lack of practical facilities, pointing out that hands-on training environments—like small-scale mushroom labs or grow rooms—are necessary for meaningful learning. 60% also emphasized the need for stronger partnerships with the mushroom industry, which could provide expertise, real-world insights, and opportunities for student internships. Overall, participants viewed a combination of pedagogical, infrastructural, and collaborative support as crucial for successfully integrating mushroom farming into VET education.

Montenegro

A focus group, as a research method used to gather feedback, opinions, and insights from a small, diverse group of people about mushroom potential in Bar, was organized for VET sector. It was a structured but flexible discussion format guided by a moderator who asked open-ended questions. The focus group lasted 60 minutes. Although it's a qualitative research method, meaning the focus is on depth of insight rather than statistical analysis, we provided below the percentage of participants' responses.



Topic: Mushroom Farming in Curricula

Date: 30/04/2025

Moderator: Darko Pekic

Participants:

- 11 individuals from public and private VET schools
- 7 from public VET schools
- 4 from private VET schools

Q1: 64% of respondents are teachers while 36% are trainers.

Q2: 64% of respondents work in public vocational schools while 36% work at private training centers.

Q3: 55% of respondents have been involved in training for more than 10 years, 27% of them work as educators for 6-10 years while 18% have less than 2 years of experience.

Q4: 64% of the respondents confirmed that their institutions included mushroom farming practices in their curricula but only as a part of a larger curricula (for example vegetables). The respondents coming from private sector explained that their funding was project based and they would love to include mushroom farming education in their classrooms but so far they have not had any real initiative.

Q5: Mushroom farming is partially integrated into various vocational education and training (VET) programs in Montenegro, offering both theoretical knowledge and practical skills but as mushroom growing is a relatively new practice in Montenegro the curricula in public schools do not fully recognize it. The teachers and trainers agree that there needs to be a specialized training course for beginners but also theoretical background needs to be obtained in public schools.

Q6: 64% of respondents consider it as a basic introduction while 36% of respondents do not include it at all.

Q7: 36% of respondents were not eligible to reply on this question as they do not include mushroom farming in their curricula. Others stated that mushrooms were a part of a bigger curricula and just basic information was provided to students such as types of mushrooms, pest and disease management, sustainability aspects and importance of mushrooms in nutrition.

Q8: The respondents (36%) who did not have mushroom farming in their curricula explained that the main reason was the low perceived demand as it's a relatively new practice in a country that sees tourism as its main economy sector. But they believe it will change soon because there is a clear link between tourism and agriculture.

Q9: All respondents believe that mushroom production deserves more attention and integration into agricultural education.

Q10: To better integrate mushroom farming into Vocational Education and Training (VET) curricula, several forms of support would be needed.

Some of the findings are listed below:

- Partner with mushroom producers, cooperatives, and agribusinesses for internships, mentorships, and job placements.

- Provide tools and materials for students to begin cultivation.
- Establish mushroom growing units on VET campuses for hands-on learning (demonstration)
- Provide manuals, videos, and case studies
- Create systems to track learning outcomes and business success among graduates.

Kosovo

The mushroom industry is gaining increasing importance within the agricultural sector due to its nutritional, economic, and environmental value. As the demand for sustainable food systems grows, mushroom cultivation offers a promising avenue for innovation, employment, and income generation. Given this potential, the integration of mushroom cultivation into vocational education and training (VET) systems is crucial to equip future professionals with the necessary competencies. This focus group report presents a detailed narrative analysis based on responses from **ten professionals** actively involved in agricultural VET institutions, including both universities and professional secondary schools.

Q1: The questionnaire involved ten participants:

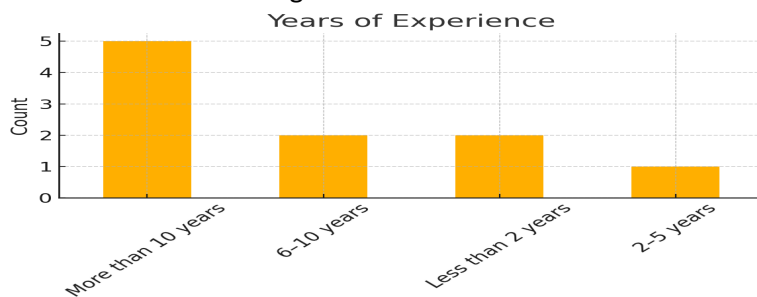
- 4 university professors
- 6 professional secondary school teachers

These participants represent a balanced cross-section of agricultural training providers. Their combined perspectives provide a comprehensive understanding of the current status and future potential of mushroom cultivation in professional education.

Q2 and Q3: The respondents reported varying levels of experience:

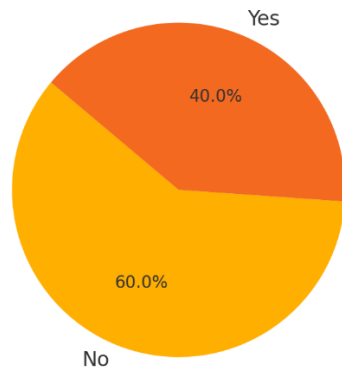
- 5 have over 10 years of experience
- 2 have 6–10 years of experience
- 1 has 2–5 years of experience
- 2 have less than 2 years of experience

This distribution highlights a strong presence of experienced educators who can critically assess the evolution and needs of agricultural curricula.



Q4: Only four institutions currently include mushroom cultivation in their programs. All four are university-level institutions where the topic is generally integrated into broader subjects such as general botany or cultivation technology. The remaining six institutions, all professional secondary schools, do not yet offer any training on mushroom cultivation. This disparity suggests a significant gap in technical education related to mushroom farming at the secondary level.

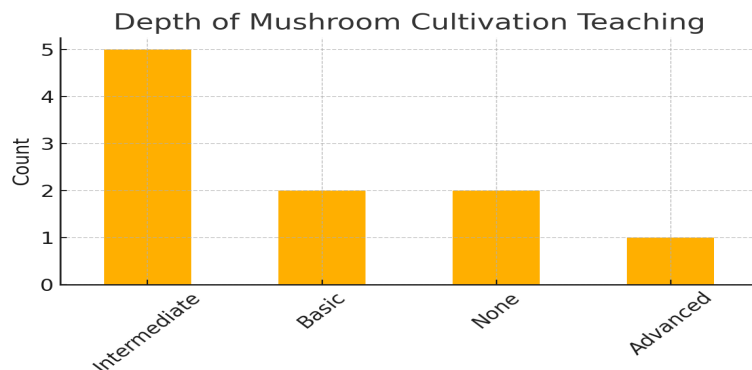
Mushroom Cultivation Included in Curriculum



Q5: Among the institutions offering mushroom-related content:

- One provides advanced specialization
- Four offer intermediate-level training
- Two provide only a basic introduction
- Three do not include it at all

This inconsistency reveals a lack of standardization in curriculum depth, ranging from superficial exposure to comprehensive technical training. The advanced institution provides an example of best practice, yet such depth is rare.



Q6: The curriculum content in the institutions that include mushroom cultivation covers:

- Mushroom species identification
- Substrate preparation techniques
- Cultivation methodologies
- Post-harvest handling
- Market analysis and opportunities
- Sustainability considerations

However, not all institutions cover all these topics, with some limiting the scope to only cultivation techniques or post-harvest practices. This fragmentation reduces the effectiveness of training and limits students' readiness for real-world application.

Q7: Institutions that do not include mushroom cultivation identified several barriers:

- Lack of qualified teaching staff
- Inadequate resources and infrastructure
- Absence of curriculum integration

These challenges reflect systemic constraints and institutional unpreparedness, particularly in vocational schools. Most cited the absence of expertise as a key limiting factor, underscoring the need for teacher capacity building.

Q8: Despite the current limitations, all ten respondents agreed that mushroom cultivation should be more widely integrated into agricultural education. This unanimous support reflects a shared recognition of the sector's potential to enhance food security, diversify income sources, and contribute to green agriculture.

Q9: Respondents emphasized the following areas of support required to effectively integrate mushroom cultivation into VET curricula:

- Targeted teacher training and upskilling
- Development of tailored educational materials
- Access to practical facilities (e.g., labs, farms)
- Industry partnerships for experiential learning

The absence of any one of these elements can hinder successful curriculum development. A multi-pronged strategy is needed, incorporating pedagogical, infrastructural, and collaborative approaches.

Q10: The collected responses suggest a dual reality: on one hand, there is an awareness and recognition of the value that mushroom cultivation education holds; on the other hand, there is a practical and institutional lag in implementing it. This discrepancy highlights a classic implementation gap where strategic intent is not yet matched by operational capability.

University-level institutions show more initiative and capacity to incorporate specialized agricultural topics, while secondary vocational schools are constrained by limited human and physical resources. Moreover, the lack of harmonized curriculum content across institutions results in uneven learning outcomes, making it difficult to establish national competencies or qualifications in mushroom farming.

From a systemic perspective, the integration of mushroom cultivation into VET curricula should not only aim at skill acquisition but also align with broader goals such as innovation, sustainability, and rural development. Addressing this need requires a coordinated policy framework involving ministries of education and agriculture, funding agencies, and private sector stakeholders.

Comparative analysis: public sector

1. Institutional Awareness and Policy Gaps

- **No country has a national strategy specifically for mushroom farming.**
 - Most public institutions—especially municipalities—have **no existing policies** or programs supporting mushrooms as part of the CE.
 - **Legal clarity on biowaste use is generally lacking**, with many respondents unsure if frameworks exist.
-

2. Technical & Financial Support Deficiencies

- Institutions across all countries **do not provide technical support** specific to mushroom farming.
 - **Financial incentives** (grants, tax reliefs, startup subsidies) for mushroom producers are **absent or unclear** in nearly every country.
 - A systemic lack of **institutionalized support mechanisms** hinders sector growth.
-

3. Perception of Sector Potential

- **All countries recognize the viability** of mushroom farming for sustainable development, job creation, and rural revitalization.
 - **Public-private partnerships** are widely seen as essential, yet underutilized.
 - Officials expressed strong **openness to future collaboration** and participation in multi-stakeholder initiatives.
-

4. Common Barriers Identified

- **Funding shortages** and **low awareness** dominate as primary barriers.
 - **Lack of trained personnel, regulatory limitations, and inadequate infrastructure** were repeatedly cited.
 - **Limited market visibility** for mushrooms and a **low institutional understanding** of the fungi sector further compound the issue.
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5. Country-Specific Highlights

- **Greece:** Weak institutional awareness; some knowledge about biowaste law exists. All agree mushrooms are viable and support multi-stakeholder cooperation.
- **Albania:** Municipal and national agencies show some engagement in circular waste management but lack targeted policies for mushrooms.
- **Serbia:** No support mechanisms or legal clarity; all institutions are willing to collaborate in future initiatives.
- **Montenegro:** Has biowaste legislation and support programs, but no mushroom-specific strategies. Sees strong synergy between tourism and agriculture.
- **Kosovo:** Partial technical capacity and strong support for mushroom viability. Seeks structured partnerships and clearer policy frameworks.

Comparative analysis: business sector

1. Familiarity and Engagement

- Most participants are **somewhat familiar** with mushroom farming; a smaller share are **already involved or planning to start**.
 - Experience varies widely: from curious farmers to agribusinesses with active cultivation.
 - **Limited exposure** and lack of practical knowledge are key barriers in Albania and Montenegro.
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2. Perceptions of Mushroom Farming

- Seen as a **viable and sustainable business** by nearly all groups.
 - Benefits recognized:
 - Low land use
 - Short production cycles
 - Circular economy alignment (using agricultural/food waste as substrate)
 - Skepticism still exists in some groups due to:
 - High startup costs
 - Market access uncertainty
 - Weak policy support.
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3. Biowaste as Substrate

- High willingness to use **biowaste** (crop residues, coffee grounds, brewer's waste).
 - Commonly cited **challenges**:
 - Lack of clear regulations on waste reuse
 - Technology and equipment gaps
 - Transportation and logistics costs
 - Food safety concerns for consumers.
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4. Support Needs Identified

- Businesses emphasized the importance of **grants, low-interest loans, and startup subsidies**.
 - Desire for **tailored training** and **continuous mentorship**, especially hands-on learning.
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5. Partnerships and Collaboration

- Strong interest in forming **public-private partnerships** and **horizontal cooperation** (e.g., cooperatives).

- Businesses favor collaboration with:
 - **Waste suppliers**
 - **Technology providers**
 - **Distributors and HoReCa buyers**
 - Emphasis on **shared services, resource pooling, and knowledge exchange.**
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6. Role of Financial Institutions

- Participants see a critical role for banks in:
 - Providing **soft loans and grants**
 - Supporting **investment funds**
 - Offering **business advisory services**
- However, there is a **lack of trust** or belief in the financial sector's willingness to serve agri-innovators

Comparative analysis: VET sector

1. Current Curriculum Coverage

- **Mushroom farming is largely absent** or marginally included in VET curricula.
 - Where it is present, it appears only **as part of general plant production or biology courses**, not as a dedicated subject.
 - **University-level institutions** (especially in Kosovo and Serbia) cover mushrooms in theory-heavy modules, while **secondary vocational schools lack practical integration**.
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2. Key Barriers Identified

- **Lack of teacher expertise:** 50–66% of educators stated they do not have the knowledge to teach mushroom cultivation.
 - **Absence of modern educational materials:** 33% cited outdated or missing textbooks, manuals, and digital content.
 - **Low perceived demand:** In several countries (Albania, Montenegro), mushroom farming is not prioritized because it's seen as niche or emerging.
 - **Inadequate infrastructure:** Many schools lack facilities like grow rooms or labs to deliver practical training.
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3. Educational Content (Where Present)

- **Frequently covered topics:** Substrate preparation, pest and disease management, species identification, and market planning.
 - **Rarely covered:** Sustainability, bioeconomy linkages, or circular economy practices.
 - **Most training remains theoretical**, with little opportunity for hands-on learning.
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4. Educators' Perspectives

- **Strong consensus (70–100%)** that mushroom farming should be integrated into agricultural education.
 - They recognize its potential for:
 - **Rural entrepreneurship**
 - **Circular economy education**
 - **Youth employment opportunities**
 - Emphasis on connecting **education with real-world farming and market practices**.
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5. Support Needs for VET Integration

VET professionals recommend:

- **Train-the-trainer programs** on mushroom farming.
- **Development of structured curricula** with lesson plans, case studies, videos, and manuals.

- **Setup of demonstration farms or mushroom labs** at VET campuses.
- **Partnerships** with mushroom producers for internships and industry exposure.
- **Harmonization of curricula** across education levels to establish national competencies.

Annexure I – focus group questionnaires

Public sector template

Institutional & Regulatory Framework

1. What type of public institution do you represent? (*Municipality, Regional government, Ministry, Environmental agency, Other – please specify*)
2. Does your institution have policies or programs that specifically support mushroom farming as part of the circular economy? (*Yes/No/Not sure – please elaborate if applicable*)
3. Are there existing legal frameworks regulating the use of biowaste for agricultural purposes, including mushroom farming? (*Yes/No/Not sure – please specify any key regulations if known*)

Technical & Financial Support Mechanisms

4. Does your institution provide technical assistance or knowledge transfer for businesses or farmers interested in mushroom farming and biowaste recycling? (*Yes/No – please specify what kind of support, if applicable*)
5. Are there financial incentives (grants, subsidies, tax benefits) available for businesses investing in sustainable mushroom farming? (*Yes/No/Not sure – please specify if applicable*)
6. What are the main barriers preventing greater institutional support for mushroom farming and biowaste recycling? (*Lack of funding, Regulatory constraints, Low awareness, Other – please specify*)

Strategic & Policy Considerations

7. Do you see mushroom farming as a viable strategy to promote local economic development and environmental sustainability? (*Yes/No – please elaborate why or why not*)
8. What kind of partnerships (public-private, international cooperation, research collaborations) could help advance mushroom farming as a green business model? (*Open-ended response*)
9. How could your institution improve its role in fostering mushroom farming and circular economy initiatives? (*More funding, Regulatory adjustments, Awareness campaigns, Training programs, Other – please specify*)
10. Would your institution be open to participating in a multi-stakeholder initiative to promote mushroom farming and biowaste recycling? (*Yes/No/Maybe – please specify conditions if applicable*)

Business sector template

Business Engagement & Market Perspective

1. What type of business or organization do you represent? (*Farmer, Agribusiness, Entrepreneur, Trader, HoReCa, Bank/Investor, Other – please specify*)
2. How familiar are you with mushroom farming as a business opportunity? (*Not familiar, Somewhat familiar, Very familiar, Already involved in mushroom farming*)
3. Does your business currently engage in mushroom farming? (*Yes, No, Planning to start, Interested but unsure*)

Mushroom Farming & Biowaste Recycling

4. Would you consider using agricultural or food industry waste as a substrate for mushroom cultivation? (*Yes/No/Maybe – please explain why*)
5. What types of biowaste do you think could be effectively used for mushroom farming? (*Crop residues, Coffee grounds, Brewer's waste, Food waste, Other – please specify*)
6. What are the main barriers to using biowaste for mushroom farming? (*Regulatory issues, Costs, Availability of waste, Lack of technology, Other – please specify*)

Business Model & Investment Perspective

7. Do you see mushroom farming as a profitable and sustainable business model? (*Yes/No – please explain why*)
8. Would you be interested in business partnerships related to mushroom farming and biowaste recycling? (*Yes/No/Maybe – please specify what kind of partnerships*)
9. What kind of support or incentives would encourage you to invest in mushroom farming? (*Funding, Training, Technical assistance, Market access, Other – please specify*)
10. From your perspective, how can banks and financial institutions support the development of mushroom farming and circular economy practices? (*Loans, Grants, Investment funds, Business advisory, Other – please specify*)

VET sector template

General Information

1. What is your role in the VET sector? (*Teacher, Trainer, Educator, Other – please specify*)
2. What type of agricultural training institution do you work in? (*Vocational school, Technical institute, Training center, University, Other – please specify*)
3. How long have you been involved in agricultural education and training? (*Less than 2 years, 2-5 years, 6-10 years, More than 10 years*)

Mushroom Farming in Curricula

4. Does your institution currently include mushroom farming practices in its agricultural training programs? (*Yes/No*)
5. If yes, in which courses or modules is mushroom farming covered? (*Open-ended*)
6. How in-depth is the teaching of mushroom farming? (*Basic introduction, Intermediate level, Advanced specialization, Not included at all*)
7. What are the main topics covered in mushroom farming education at your institution? (*Select all that apply: Types of mushrooms, Cultivation techniques, Substrate preparation, Pest and disease management, Post-harvest handling, Market opportunities, Sustainability aspects, Other – please specify*)
8. If mushroom farming is not included in your institution's curriculum, what are the main reasons? (*Lack of resources, Lack of expertise, Low perceived demand, Other – please specify*)

Future Perspectives

9. Do you believe that mushroom farming should be more widely integrated into agricultural education? (*Yes/No/Not sure – please explain*)
10. What support would be needed to better integrate mushroom farming into VET curricula? (*Teacher training, Educational materials, Practical facilities, Industry partnerships, Other – please specify*)