ANALYSIS OF GERMAN DUAL VOCATIONAL TRAINING AND REVIEW OF CURRENT ECOLOGICAL AND ECONOMIC STANDARDS

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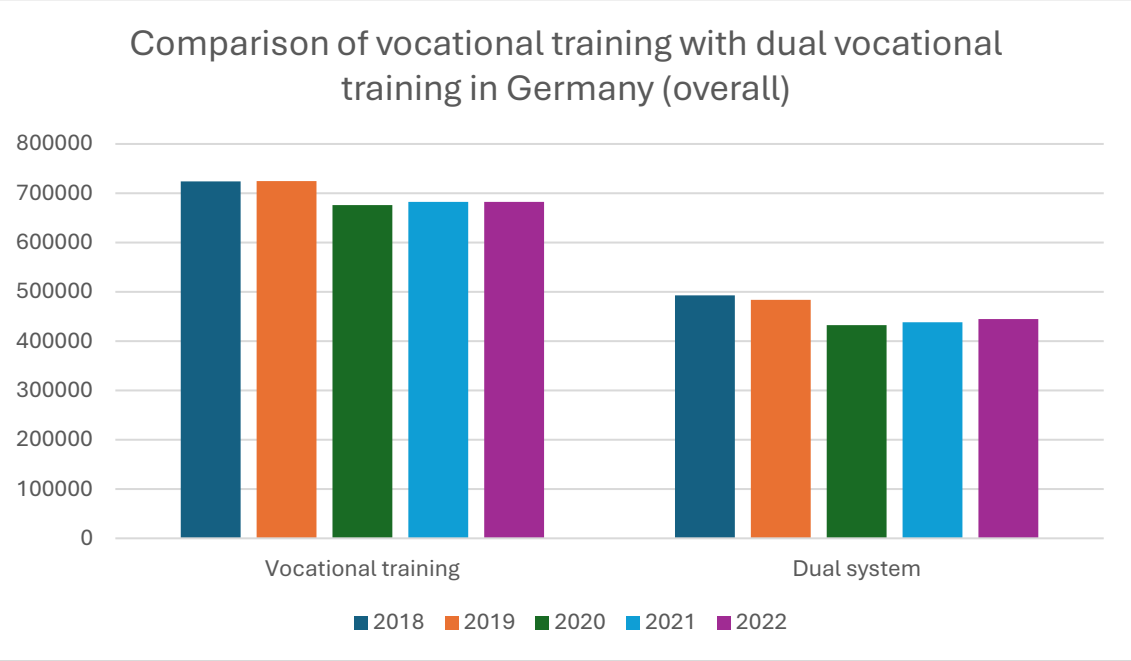
1. Introduction



Graph 1: Comparison of vocational training with dual vocational training [1]

German dual vocational training is characterised by its history and enjoys an excellent international reputation. This can also be seen in the number of trainees starting dual vocational training (Graph 1). In dual vocational training, the "training on the job" model comes into play, with trainees learning practical skills in their company and the theoretical basics at a vocational school. The trainees can learn from the experienced trainers and acquire this knowledge by working in the company and learning at the vocational school. Due to the constant change, the trainees can always be taken by the hand by the company and the trainers in order to acquire this new information.[2] The dual system of vocational training is praised as an essential pillar for meeting the demand for skilled labour, which is also seen as the basis for the high-quality training of apprentices. According to the prevailing experts, this type of training is associated with the comparatively low youth unemployment rate in Germany.

There are no official requirements to start a dual vocational training programme in a company. Most apprentices have a secondary school leaving certificate or even a university entrance qualification.[3] Another advantage is that apprentices receive an apprentice's

[1] Federal Ministry of Education and Research (2022) "Bildungsbericht 2022", https://www.bmbf.de/SharedDocs/Downloads/de/2022/berufsbildungsbericht-2022.pdf?__blob=publicationFile&v=1, pp. 41 (retrieved: 08.03.2024)
[2] Federal Agency for Civic Education (2016) "Entstehung und Merkmale des dualen Ausbildungssystems", https://www.bpb.de/themen/bildung/dossier-bildung/228394/entstehung-und-merkmale-des-dualen-ausbildungssystems/ (retrieved: 08.03.2024)
[3] CULTURE MINISTER CONFERENCE (no date) "Vocational training in the dual system - an internationally recognised model", https://www.kmk.org/themen/berufliche-schulen/duale-berufsausbildung.html (retrieved: 08.03.2024)

salary at the start of the apprenticeship contract and have a relatively high degree of variety due to the companies and school-based training. By training in sales, the apprentice can prove himself directly and make a successful transition into the company. Thanks to the dual training system, further training can take place after the apprenticeship, which can come directly from the company or be offered externally. Dual vocational training is currently in competition with university studies. Dual training is currently being promoted and further integrated into higher education.[4]

An additional effect of the performance is that the physical work that is carried out in the company has a better learning effect on the apprentices. All senses should be utilised in order to better retain the information imparted.[5]

Demographic change means that dual vocational training has a special role to play. Due to the resulting shortage of skilled labour, other groups of people are moving further into the spotlight. These include immigrants and people with disabilities, who are coming to the fore as a result of the tightening situation. Increasing digitalisation and automation of processes are omnipresent. This rapid change must be absorbed by companies.

The agricultural sector is of particular importance here. This sector is not only affected by demographic change and the rapid restructuring of current technologies, but must also cover other aspects in its development. These include economic, social, ecological and animal welfare aspects, which must lay their foundations in various areas of the value chain.

Recently, intense social disputes have arisen from various aspects of agriculture. These include the ongoing farmers' protests and the "Friday for future" demonstrations, which have caused quite a stir. Many perspectives are derived from agriculture and nutrition that do not allow an objective view of the topic. There are also aspects of hygiene, morality, politics and law, as well as cultural, religious and societal expectations. There is a complex structure that does not allow for an objective optimal state. As a result, goals must be defined and indicators found that make progress measurable. Due to the complexity, the transformation process is seen as a task for society as a whole.

The number of trainees has been falling or stagnating since the coronavirus pandemic. This is also linked to the attractiveness of the profession and the increasing number of young people who prefer to study.

The associated investments, through digitalisation and automation, as well as stricter regulation, represent a sectoral peculiarity. Furthermore, companies are competing with other sectors for young talent and land, which is essential for agriculture.

In today's globalised and increasingly sustainable world, ecological and economic standards in vocational training are of crucial importance. Ecological standards refer to measures and practices that promote environmental protection, sustainability and the responsible use of natural resources. Economic standards, on the other hand, focus on the

[4] Federal Agency for Civic Education (2016) "Die duale Ausbildung - ein Zukunftsmodell?", https://www.bpb.de/themen/bildung/dossier-bildung/229611/die-duale-ausbildung-ein-zukunftsmodell/ (retrieved: 08.03.2024)
[5] MAX-PLANCK-GESELLSCHAFT (2016) "Learning with all the senses", https://www.mpg.de/8930937/vokabel-lernen-gesten (retrieved: 08.03.2024)

efficiency, profitability and competitiveness of training programs and the the resulting economic benefits for companies and societies. In this analysis, we will examine the integration of these standards into Germany's dual vocational training system.

2. General information about the labour market

Labour and training markets are the foundation of any economy and are crucial for developing skilled workers and strengthening competitiveness internationally. This report takes a look at the labour and training markets in Germany, Lithuania, Finland, Norway and Italy to shed light on their structures, trends and challenges.

Dual vocational training plays an important role in many of these countries, as it provides an effective method of preparing workers for the demands of the labour market. By combining theoretical instruction in vocational schools and practical training in companies, dual training enables trainees to acquire relevant skills and knowledge that are crucial for their future profession.

In addition to dual training, however, it is also important to look at the general trends and developments in the labour and training markets of these countries. These include employment rates, unemployment, skills shortages, training systems and the integration of workers into the labour market.

By analysing these aspects, we can gain a comprehensive understanding of the dynamics of the labour and training markets in Germany, Lithuania, Finland, Norway and Italy and identify potential areas for policy action and economic and social development.

2.1. Germany[6]

2.1.1 Current situation on the German labour and education market

Germany has a stable economic situation as the largest economy in the EU and the fourth largest in the world. Known for its leading companies in various sectors such as the automotive, chemical and electrical industries, the focus of employment opportunities is largely on small and medium-sized enterprises (SMEs).

In March 2023, 45.72 million people were in employment, an increase of 1.0% compared to the previous year. This increase was recorded in almost all federal states, with Hamburg recording the strongest growth. However, there were also slight declines in some federal states such as Thuringia and Saxony-Anhalt.

The unemployment rate in April 2023 is 5.7% based on the total civilian labour force, with East Germany continuing to have higher unemployment rates than West Germany, although the difference has narrowed in recent years. Ukrainian refugee migration is also having an impact, with around 1.175 million nationals from Ukraine registered in Germany.

There are currently 773,000 registered jobs, which corresponds to a decline of 9% compared to the previous year. Germany also attracts many cross-border commuters from other countries, particularly Poland and France.

2.1.2 Expected development on the German labour and education market

The demand for well-trained specialists remains high, particularly in professions such as doctors, nurses, engineers, scientists, IT specialists and other STEM professions. There is

[6] https://eures.europa.eu/living-and-working/labour-market-information/labour-market-information-germany_de

also demand for educators, drivers, chefs and professions in the food industry and agriculture.

There are good opportunities for foreign skilled workers, especially if they are trained in one of the sought-after professions. There are recognition procedures for foreign qualifications to facilitate access to the German labour market.

Dual training also remains an important option for those who want to work in less sought-after professions. Here, a job is directly linked to a training contract, which offers financial support during training.

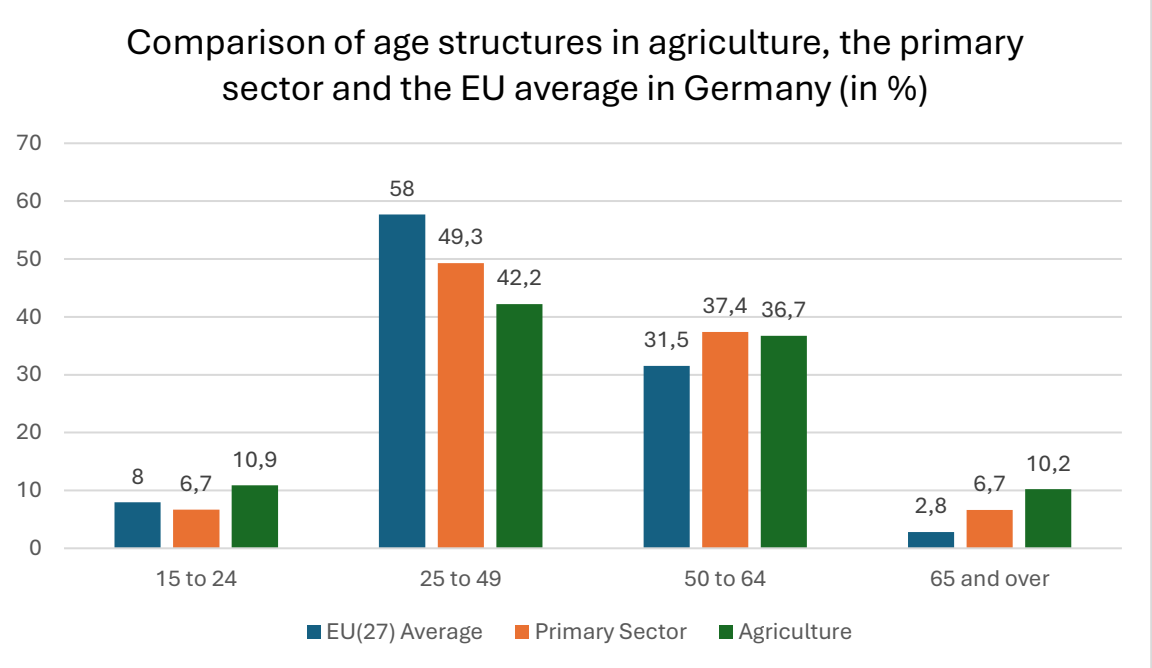
2.1.2 Challenges and opportunities for the German labour and education market

Challenges on the German labour market continue to include the imbalance between supply and demand in certain occupational fields. While there is an oversupply of qualified unemployed people in some areas, there is a shortage of skilled labour in others.

The integration of refugees, particularly from Ukraine, presents a further challenge, but also opens up opportunities for the labour market, particularly in professions with an acute shortage of skilled workers.

Dual vocational training remains an important part of the German education system, but also offers room for improvement, particularly with regard to the recognition of foreign qualifications and the integration of digitalisation and new technologies.

Overall, the German labour and education market offers a wide range of opportunities for well-trained specialists, both from Germany and abroad. However, continuous adaptation to changing requirements and conditions remains crucial in order to ensure long-term success and competitiveness.



Graph 2 [Source: Eurostat "*Employment by sex, age and detailed economic activity (from 2008 onwards, NACE Rev. 2 two digit level) - 1 000*", (retrieved: 12.03.2024)]

The basis for the following data is the number of people in employment in the EU, which relates to the individual countries. In the following charts, the age structures in the EU are represented by blue lines (EU (27) average), while the age structure of the primary sector is illustrated by orange lines (primary sector). These two values are to be regarded as constant and represent the average values for the EU. The age structure of the labour force in the agricultural sector (agriculture) is determined individually for each country.

The EU average tends to show a higher age structure among 25- to 49-year-olds and correspondingly lower values among 50- to 65-year-olds. This trend is particularly evident among those aged 65 or older, where the age structure in agriculture exceeds the average values. This indicates a demographic change and below-average numbers of young people in this sector.

2.2. Italia[7]

2.2.1 Current situation on the Italian labour and education market

The Italian labour market is characterised by regional heterogeneity, with northern Italian regions showing strong industrialisation, while agricultural and tourism activities dominate in the south. The most important sectors in terms of their share of GDP in 2022 are services, manufacturing, construction and agriculture. Temporary contracts and full-time employment are common, with upper secondary education being the most sought-after qualification.

The Italian population has fallen continuously in recent years and reached a historic low in January 2023. This demographic crisis is particularly evident in the south of Italy, especially in the regions of Molise, Basilicata and Calabria.

Despite a slight slowdown in the last quarter of 2022, Italy's GDP recorded growth of +2.8% in 2022. Further growth of 1.9% is expected for 2023, with GDP already above the European average in the first quarter of 2023. The positive GDP trend is being supported by consumption, a recovery in investment and tourism flows. The unemployment rate has fallen slightly, while youth unemployment remains high.

The latest forecasts for the period 2023-2027 show a significant employment requirement of around 3.8 million jobs. The service sector will absorb the largest share, followed by industry and agriculture. The construction industry, tourism, advanced services and the education and culture sector in particular are expected to see a large number of new hires, which will be supported by the recovery and resilience plan.

2.2.2 Expected development on the Italian labour and education market

In the coming years, investments from the national recovery and resilience plan will play a decisive role. The ecological and digital transformation will increase the demand for "green" jobs, particularly in areas such as renewable energy, sustainable mobility and the circular economy. The need for skilled labour in the IT and telecommunications sector will also increase.

The national recovery and resilience plan envisages that a significant proportion of investment will be channelled into the ecological and digital transition. Jobs in the green economy and the IT sector will be particularly in demand. New industries could develop and a wide range of green and digital products and services are expected.

Certain professions are expected to be in particularly high demand over the next five years, including doctors, engineers, healthcare technicians, software developers and environmental technicians. The demand for university graduates will be particularly high in areas such as medicine, economics, statistics and the STEM subjects.

2.2.3 Challenges and opportunities for the Italian labour and education market

Regional differences characterise the labour market, with the south struggling with high unemployment. The planned measures of the national recovery and resilience plan aim to reduce these regional differences and strengthen the south.

[7] https://eures.europa.eu/living-and-working/labour-market-information/labour-market-information-italy_de

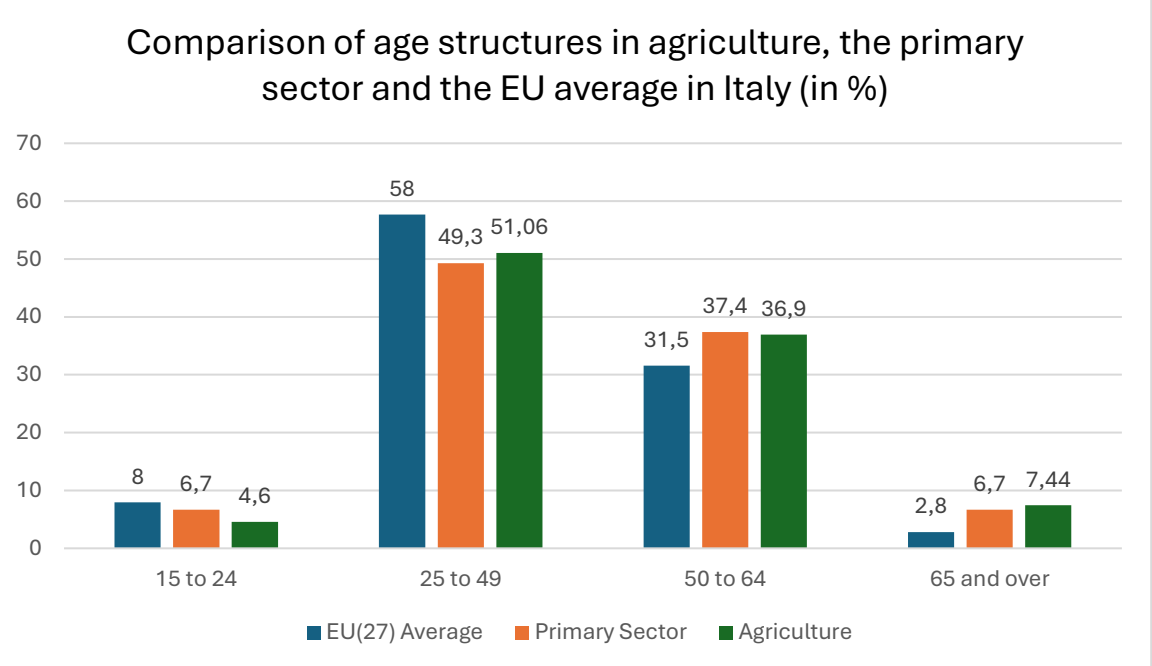
There is still a large employment gap between men and women. Female unemployment is particularly high in the south of Italy. Measures to promote gender equality could improve the situation.

There is a discrepancy between the supply of training and the demand for certain qualifications. In the areas of transport, construction, fashion and mechatronics in particular, supply is unable to meet demand. Investment in education is needed to close these gaps.

Despite the demand for labour, many companies are having difficulty finding suitable employees, especially highly qualified specialists. This mainly affects technical and highly specialised professions as well as skilled workers.

The demand for immigrant labour is high, particularly in areas such as business support services, transport and logistics and construction. Integration and support for immigrant workers could improve the labour market situation.

Overall, Italy faces both challenges and opportunities. Through targeted investment, gender equality measures, education reforms and support for migrant workers, the country could strengthen its labour and education market and ensure sustainable economic development.



Graph 3 [Source: Eurostat "*Employment by sex, age and detailed economic activity (from 2008 onwards, NACE Rev. 2 two digit level) - 1 000*", (retrieved: 12.03.2024)]

2.3 Finland [8]

2.3.1 Current situation on the Finnish labour and education market

Finland, with a population of around 5.5 million people, faces various challenges and opportunities in the labour market. Demographic trends are characterised by an increasing number of people entering retirement and a rise in the number of immigrants, while at the same time more and more people want to work longer.

In 2022, just over 2.6 million people were employed in Finland. The highest employment figures were recorded in the service sector, with trade, transport, hotels and restaurants, education and health and social work being the most labour-intensive sectors. It is expected that the proportion of jobs in the service sector will continue to increase.

Large companies such as Posti Group Oy and ISS palvelut Oy offer numerous jobs in the postal and courier services and property and office services sectors respectively. In addition, the public sector, particularly the City of Helsinki, is one of the country's largest employers and offers employment opportunities in education, social services, health, transport and maintenance.

2.3.2 Expected development in the Finnish labour and education market

In the coming years, Finland will continue to face challenges such as the lack of labour availability. This problem is often caused by insufficient qualifications, a lack of work experience or a lack of specific expertise among jobseekers.

It is predicted that the demand for labour in areas such as healthcare and social services, construction, the service sector and retail will continue to rise. In particular, nurses and healthcare professionals, care assistants, early childhood educators, software and application developers and sales staff in call centres and customer service centres will be in high demand.

2.3.3 Challenges and opportunities for the Finnish labour and education market

The biggest challenge in the Finnish labour market is the mismatch between the needs of employers and the qualifications of job seekers. This requires increased co-operation between educational institutions, the government and industry to ensure that the workforce has the necessary skills and knowledge.

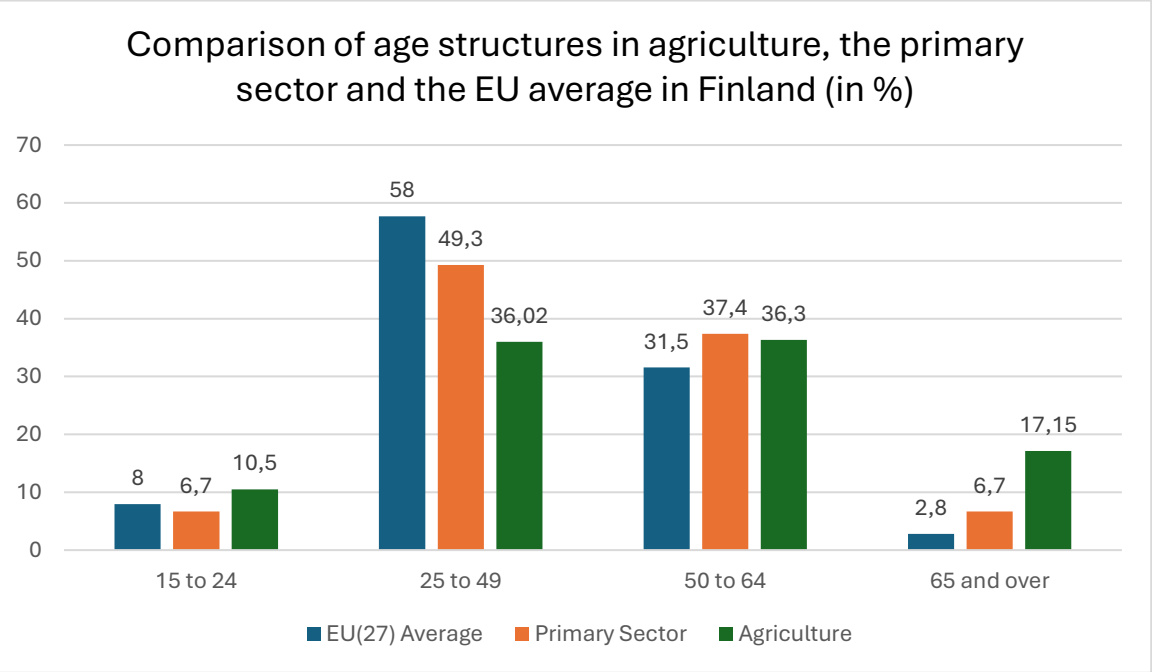
At the same time, there are opportunities for those who are willing to develop their skills and adapt to the changing demands of the labour market. Vocational training and retraining programmes can help to improve the employability of workers and meet the needs of employers.

Promoting innovation and supporting growth industries such as healthcare, construction and the service sector can also help to create new jobs and promote economic growth in Finland.

Overall, Finland faces the challenge of closing the skills gap in the labour market in order to strengthen the economy's competitiveness and secure long-term growth. Through targeted measures to develop skilled workers and promote innovation, Finland can take advantage

[8] https://eures.europa.eu/living-and-working/labour-market-information/labour-market-information-finland_de

of the opportunities presented by the changing labour market and build a dynamic and sustainable economy.



Graph 4 [Source: Eurostat "*Employment by sex, age and detailed economic activity (from 2008 onwards, NACE Rev. 2 two digit level) - 1 000*", (retrieved: 12.03.2024)]

2.4 Lithuania [9]

2.4.1 Current situation on the Lithuanian labour and education market

Lithuania had a population of 2,860,002 at the beginning of 2023, while the unemployment rate was 9.0% as at 1 April this year. Compared to the previous year, the unemployment rate fell by 6.2%, which indicates a robust labour market situation. It is particularly encouraging that unemployment fell in most of the country's municipalities, indicating broad-based economic stability.

Despite the economic slowdown and ongoing geopolitical uncertainty, the labour market remains resilient and active. However, it is becoming apparent that some jobseekers may struggle to find suitable employment opportunities as companies slow down their expansion plans and competition for vacancies increases.

In 2022, a total of 274,000 vacancies were reported, with the majority in the transport and storage and manufacturing sectors. It should be noted that three quarters of the jobs reported were in skilled occupations, with the country's major cities being the main centres of employment opportunities.

2.4.2 Expected development on the Lithuanian labour and education market

Digitalisation and technological progress have had a significant impact on the demand for certain professions in Lithuania. In particular, the demand for IT specialists is expected to continue to rise as companies increasingly rely on digital solutions. In addition, sectors such as financial and insurance services as well as information and communication are expected to record significant employment growth.

The shortage of skilled labour remains a particular challenge in certain sectors such as healthcare, IT and construction. This shortage could worsen in the coming years, as the older population is increasingly reliant on healthcare services and digitalisation requires additional technical skills.

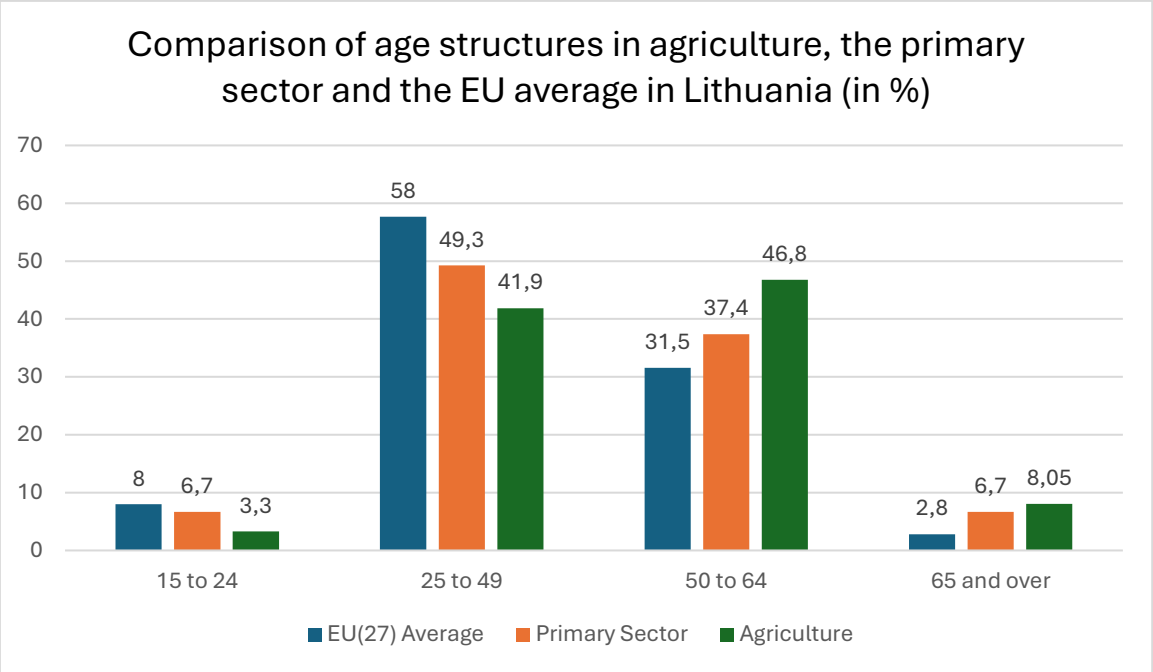
To meet these challenges, Lithuania is focusing on various measures, including the promotion of education and training as well as the integration of foreigners into the labour market. Targeted programmes and initiatives are being implemented to close the skills gap and improve employment opportunities for all population groups.

2.4.3 Challenges and opportunities for the Lithuanian labour and education market

Despite the positive developments, Lithuania continues to face challenges, particularly in terms of skills shortages and adapting to rapidly changing labour demands. It is crucial that the education system remains flexible and responsive to the needs of the labour market to ensure a highly skilled and adaptable workforce.

At the same time, however, there are also opportunities for growth and innovation, particularly in emerging sectors such as the digital economy and services. Through targeted investment in education and professional development, Lithuania can strengthen its competitiveness and secure a sustainable economic future.

[9] https://eures.europa.eu/living-and-working/labour-market-information/labour-market-information-lithuania_de



Graph 5 [Source: Eurostat "Employment by sex, age and detailed economic activity (from 2008 onwards, NACE Rev. 2 two digit level) - 1 000", (retrieved: 12.03.2024)]

2.5. Norwegen[10]

2.5.1 Current situation on the Norwegian labour and education market

The current situation on the Norwegian labour market is a mixture of success and challenge. With an unemployment rate of just 1.8% in March 2023, a figure not seen since the financial crisis of 2008, one might get the impression that Norway is bursting with labour. But the reality is more complex.

Although unemployment is low, there is a significant shortage of skilled labour, particularly in industries such as healthcare, education, retail and technology. Companies are struggling to fill vacancies and many are complaining of a lack of applicants with the required skills. This mismatch between supply and demand for certain skills has intensified competition for labour and increased the requirements for applicants.

Another aspect that makes the situation complex is the discrepancy between the qualifications required and those available. Job seekers, even those with work experience, may not have the specific skills that employers require. This mismatch between supply and demand is one of the biggest challenges facing the labour market.

2.5.2 Expected development in the Norwegian labour and education market

Looking ahead, demand for labour is expected to continue to rise, particularly in sectors benefiting from the green transition, such as battery factories and renewable energy. While the introduction of the Inflation Reduction Act (IRA) in the US has caused some companies to rethink their hiring plans, the overall trend towards more green jobs is expected to continue.

At the same time, the challenges on the labour market are expected to remain. The shortage of skills to meet demand will continue to increase and companies will have difficulty finding qualified labour. The rapid change in job requirements and technologies requires employees and employers alike to be adaptable and committed to lifelong learning.

In addition, economic uncertainties such as higher interest rates and inflation could lead to a slight increase in unemployment by slowing down expansion and hiring in many companies. Despite these potential challenges, the Norwegian labour market is expected to remain robust, driven by a solid economy and the pursuit of innovation and sustainability.

2.5.3 Challenges and opportunities for the Norwegian labour and education market

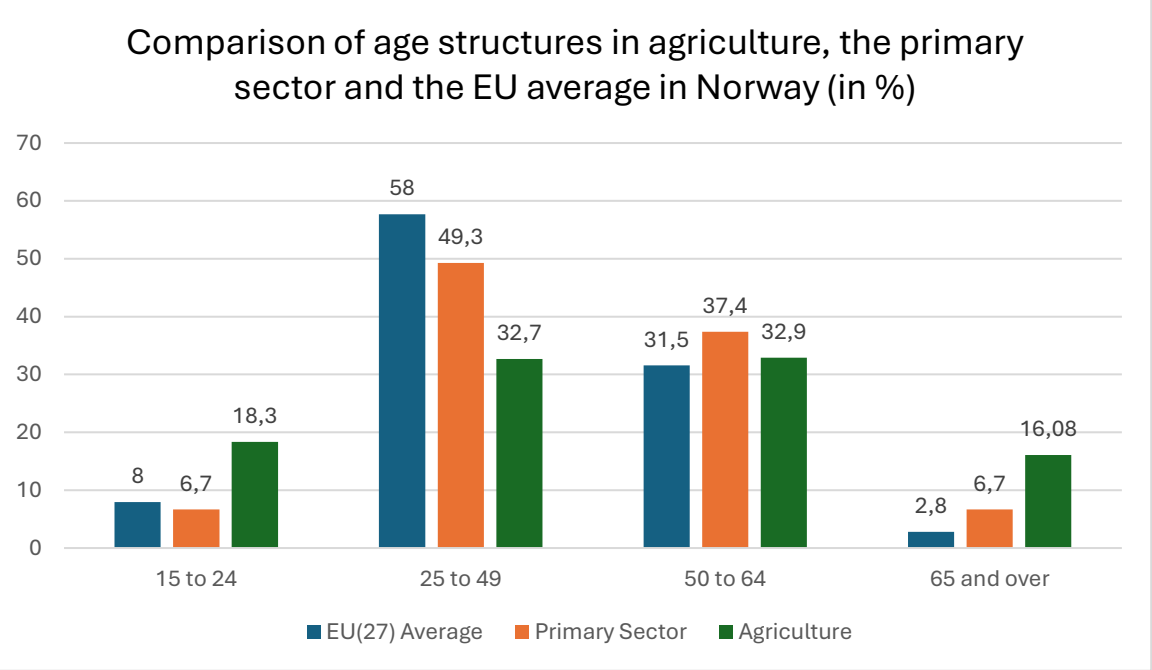
The biggest challenge for the Norwegian labour market is undoubtedly the mismatch between the skills required and the skills available. This requires increased cooperation between educational institutions, government and companies to ensure that the education and training of the labour force meets current and future requirements.

At the same time, this challenge also harbours opportunities. By making training systems more flexible and adaptable and promoting lifelong learning, workers can respond better to the changing demands of the labour market. Companies that invest in the education and training of their employees can gain a competitive advantage and at the same time contribute to strengthening the economy.

[10] https://eures.europa.eu/living-and-working/labour-market-information/labour-market-information-norway_de

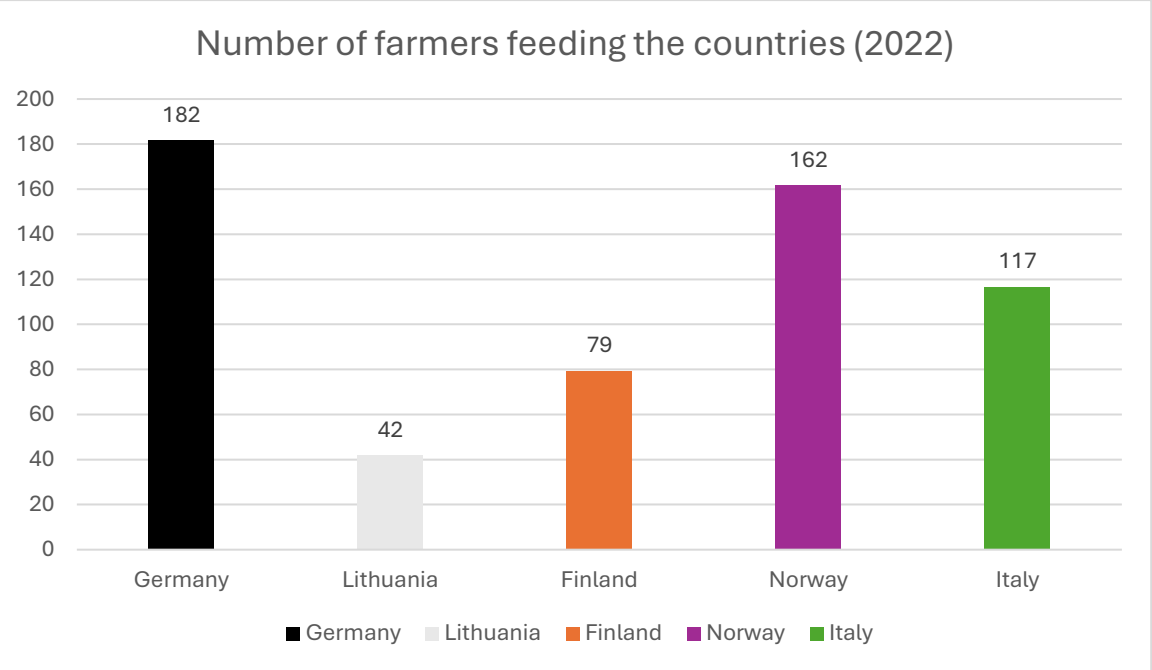
The green transition also offers opportunities for growth and innovation. By promoting sustainable technologies and working practices, new jobs can be created and a positive environmental impact can be achieved at the same time. Companies that adapt to these changes at an early stage can benefit from a growing market and consolidate their position as industry leaders.

Overall, the Norwegian labour market faces complex challenges, but also great opportunities. By taking a proactive and collaborative approach, the government, businesses and educational institutions can work together to help future-proof the labour market and promote long-term growth and prosperity for all.



Graph 6 [Source: Eurostat "*Employment by sex, age and detailed economic activity (from 2008 onwards, NACE Rev. 2 two digit level) - 1 000*", (retrieved: 12.03.2024)]

2.6 Number of farmers feeding the countries



Graph 7 [Source: Eurostat "*Employment by sex, age and detailed economic activity (from 2008 onwards, NACE Rev. 2 two digit level) - 1 000*", (retrieved: 13.03.2024)]

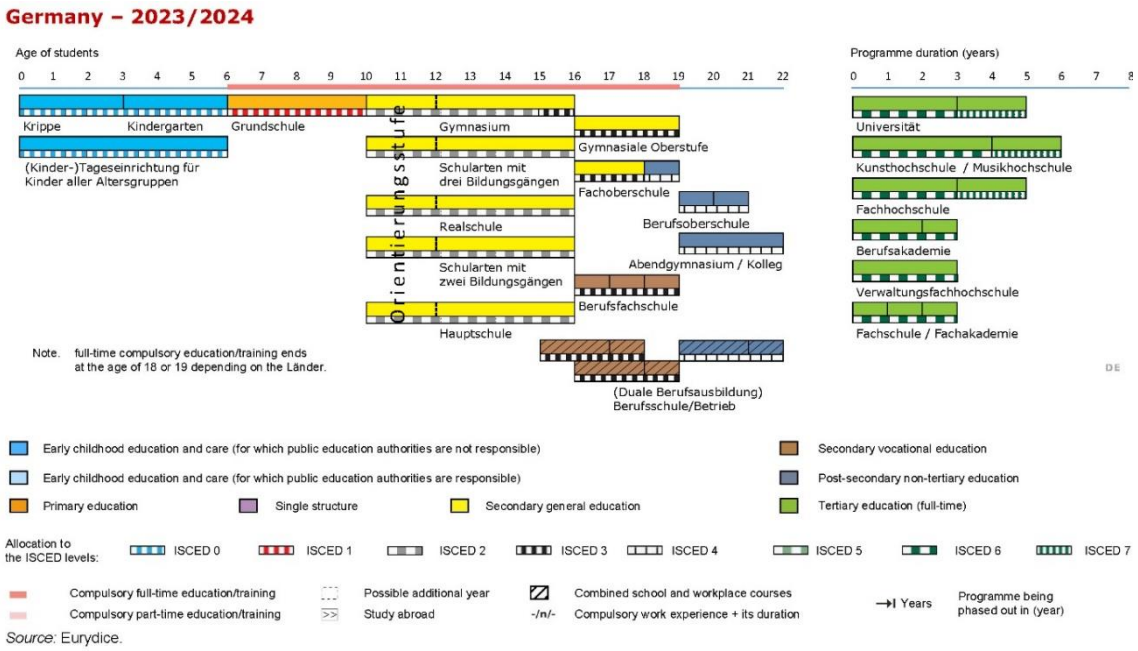
Graph 6 illustrates how many inhabitants a farmer would have to feed if all food were produced regionally. The degree of self-sufficiency plays a decisive role here, indicating the extent to which a country can cover its own food requirements from its own production. A self-sufficiency rate of over 100% indicates that the country produces more than it consumes, while a value below 100% means that additional food has to be imported.

Although the available data does not provide a complete picture of the degree of self-sufficiency of all countries, the degree of self-sufficiency in Germany is 86%. This means that Germany has to import around 14% of its food from abroad to meet the needs of its population. This figure illustrates the dependence on external sources and the need for international trade to ensure balanced food security.[11]

[11] https://www.landwirtschaft.de/landwirtschaft-verstehen/wie-funktioniert-landwirtschaft-heute/markt-und-handel/der-selbstversorgungsgrad-wie-ist-es-um-die-versorgung-mit-lebensmitteln-in-deutschland-bestellt#:~:text=A%20imposing%20figure%20and%20yet,in%20this%20country%20only%202081%20per cent.

3. vocational education and training (VET) systems

3.1 Structure of the national education system in Germany



Source: Eurydice.

3.1.1 Early childhood education and care

In Germany, children are entitled to a place in a daycare centre when they reach the age of one. Furthermore, there is an entitlement to kindergarten when the child is 3 years old, and this entitlement applies until the child starts school. The age range for this is 0 to 6 years. Early childhood education and care is not part of the state school system and fees are charged depending on the federal state. Some programmes are in place to relieve the burden on parents. These programmes come from federal funds. Some day care centres are free of charge.[12] The admission of a child is barrier-free, but there is no free choice of location.[13] A concept for early childhood learning must be presented in the centres and provides for the strengthening of basic skills. No fixed lessons or assessments are planned. The focus is on the individual's personal development.[14] In addition to the crèche and kindergarten, there are individual facilities for early childhood education such as pre-school classes, school kindergartens and facilities for people with disabilities who require special attention.[15] The level of education is categorised as ISCED0.

3.1.2 Primary school education

Attending primary education is necessary to fulfil compulsory schooling. Attendance is compulsory from the age of 6. An application can be made to enrol the child in school earlier if this is advantageous. Compulsory school attendance begins when the child starts school.

[12] https://eurydice.eacea.ec.europa.eu/national-education-systems/germany/access
[13] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/organisation-fruehkindlicher-bildung-betreuung-und-erziehung
[14] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/leitlinien-der-fruehkindlichen-bildung-betreuung-und-erziehung
[15] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/andere-organisationsmodelle-und-alternative-strukturen-der

As a rule, children are between the ages of 6 and 10 and are only taught by a small number of teachers. In exceptional cases, they are aged 6 to 12. There is a 5 to 6 day week, which varies from case to case, but the number of hours remains the same. All-day care by the institutions is highly valued and cooperation with extracurricular organisations is currently being expanded to support further education and sports activities.[16] The main subjects taught are German, maths and general studies. This is followed by English as a foreign language and physical education. There are predetermined educational plans with specific objectives that are mandatory for all federal states. The EU educational goals have an influence here, which were specified by ET2030 and the previous ET2020, among others.[17] A performance assessment is carried out, which is shared with the parents. Performance is recorded in writing. After completing primary school, students can move on to the next school programme.[18]

3.1.3 Secondary and post-secondary non-tertiary education

This is followed by **lower secondary education,** which ends with year 9 or 10 (15 to 16 years). The lower secondary level is divided into three categories: school types with one, two or three educational programmes. The first school-leaving certificate can be obtained in year 9 and the intermediate school-leaving certificate and the intermediate school-leaving certificate with a qualification for the Gymnasiale Oberstufe in year 10. Entitlement to the Gymnasiale Oberstufe can be achieved through an extended school period or through various courses. Most schools in Germany are comprehensive schools, which offer all qualifications. The other school types are aimed at specific educational pathways. In principle, there is no legal entitlement to admission to a particular school. The desired educational pathway and the desired school must be specified. After lessons, pupils have the opportunity to take part in after-school programmes. These strengthen physical fitness or further educate the pupils. These are offered internally or externally by various organisations.[19] For all educational pathways at the various types of school, there is a specification of the hours to be completed in order to complete an educational pathway. Part of the training is basic skills and further learning of English as a foreign language. The area of maths, science and technology education (MINT - mathematics, information technology, natural sciences and technology) is currently being strengthened.[20] The basis for the assessment and passing of the educational pathway are the achievements, which are recorded in a final certificate. The examination forms can be written or oral. The certificates represent the authorisation for the next educational pathway and the completion of the educational pathway marks the end of compulsory schooling.[21]

[16] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/aufbau-des-primarbereichs
[17] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/lehren-und-lernen-im-primarbereich
[18] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/leistungsbeurteilung-im-primarbereich
[19] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/aufbau-der-allgemeinbildenden-sekundarstufe-i
[20] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/lehren-und-lernen-der-allgemeinbildenden-sekundarstufe-i
[21] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/leistungsbeurteilung-der-allgemeinbildenden-sekundarstufe-i

Secondary level I is followed by secondary level II. This is divided into the general upper secondary level and the vocational upper secondary level. The upper secondary level generally lasts 2 to 3 years and entitles students to enter a tertiary education programme. During this time, the courses can be taken individually in order to pursue one's own strengths and interests.[22] Of particular importance is the specialisation in German, foreign languages and mathematics. This is supplemented by artistic, social science, scientific and technical subjects, sport and religious education, which build on the skills acquired in lower secondary level.[23] At the end of upper secondary level, pupils have to take 4 to 5 examinations. At the end, the pupil receives a certificate of achievement.[24]

Vocational upper secondary education comprises various educational institutions, including full-time vocational schools and vocational training in the dual system. Full-time vocational schools, such as Berufsfachschulen, Fachoberschulen, vocational Gymnasien and Berufsoberschulen, offer a variety of educational programmes that prepare students either for the acquisition of basic vocational qualifications or for the acquisition of a higher education entrance qualification. These schools have different entry requirements, such as a secondary school leaving certificate.

In the dual system, training takes place in companies and vocational schools. Around half of young people start their training in a recognised training occupation that is regulated by the Vocational Training Act or the Crafts Code. The aim of the training is to impart the vocational skills and knowledge required to practise a qualified occupation.

The structure and organisation of educational institutions vary depending on the type of school and training system. In full-time vocational schools, teaching takes place in specialised classes, while training in the dual system takes place both in the company and at the vocational school. Qualifications are awarded according to the educational programmes and training regulations. These can be vocational qualifications, entrance qualifications for universities of applied sciences or university entrance qualifications. The qualifications are recognised by the federal states and by chamber examinations.[25]

In vocational education and training in the dual system, teaching at vocational schools is divided into inter-occupational and occupation-related subjects. The framework curricula for vocational education are developed jointly by the federal states and are based on the training regulations. Digitalisation is playing an increasingly important role in vocational education and training, which is why the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder has issued recommendations on the use of digitalised teaching and learning formats.[26]

[22] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/aufbau-der-allgemeinbildenden-sekundarstufe-ii
[23] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/lehren-und-lernen-der-allgemeinbildenden-sekundarstufe-ii
[24] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/leistungsbeurteilung-der-allgemeinbildenden-sekundarstufe-ii
[25] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/aufbau-der-beruflichen-sekundarstufe-ii
[26] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/lehren-und-lernen-der-beruflichen-sekundarstufe-ii

3.1.4 Higher education

As of 2023, there are a total of 422 state and state-recognised higher education institutions in the Federal Republic of Germany. These include universities and equivalent higher education institutions, colleges of art and music as well as universities of applied sciences. Universities and equivalent institutions of higher education have the right to recognise teaching qualifications. They are heavily involved in scientific research and the training of young academics. Colleges of art and music offer degree programmes in the visual, creative and performing arts. Universities of Applied Sciences concentrate on application-oriented teaching and research with integrated practical semesters and the professional experience of experienced professors. In addition, there are vocational academies that offer dual training programmes and technical colleges that provide further vocational training and advanced training.[27] The degree programmes are based on a tiered system. There is a first-cycle programme (Bachelor) and a second-cycle programme (Master). A third-cycle (PhD) programme can then be taken up. The previous stages (first and second cycle) must be completed before starting a doctorate.[28]

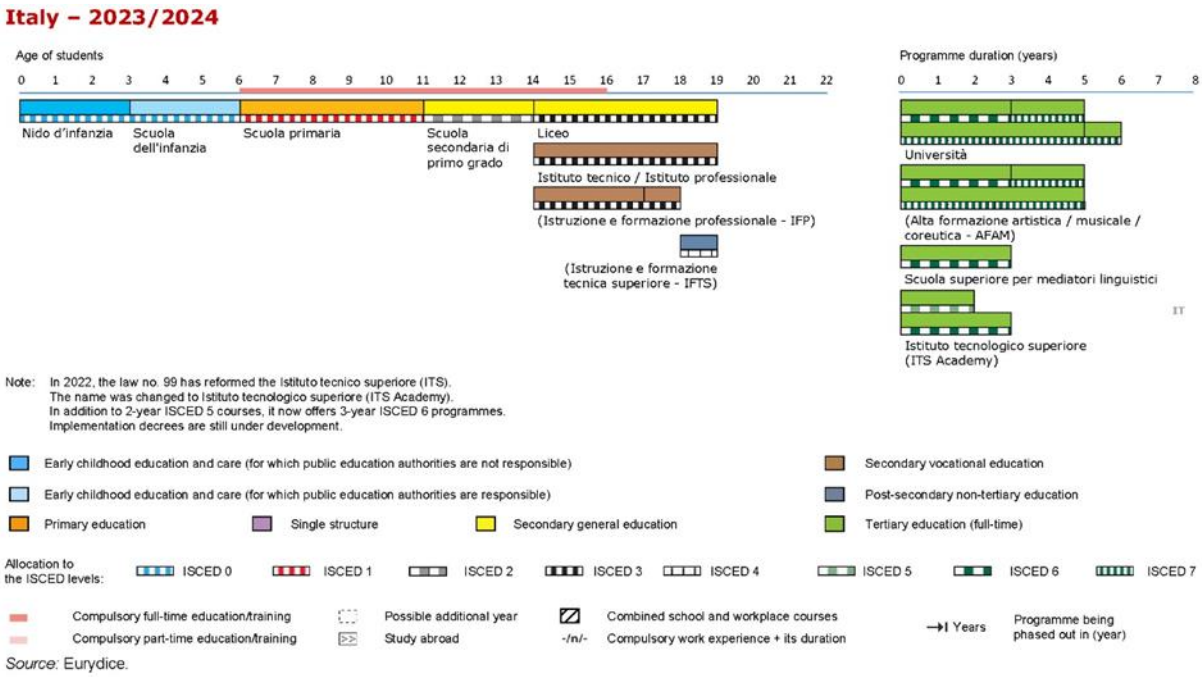
The first and second-cycle programmes can also be taken on a dual basis. In this case, the theoretical content of the programme is combined with training, work and practice. The advantage is that students have a high practical relevance and this also goes down well with potential employers. The exchange takes place between the university of applied sciences/university and the respective companies.[29]

3.1.5 Adult education and training

Adult education and training has a special status due to democratic development. The responsibility of private and public organisations is secured through various continuing education laws. New vocational qualifications and skills are in prospect here. Catching up on school-leaving qualifications is provided by evening schools, which also strengthens the education of immigrants.[30]

[27] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/arten-von-hochschuleinrichtungen
[28] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/third-cycle-phd-programmes
[29] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/bachelor
[30] https://eurydice.eacea.ec.europa.eu/de/national-education-systems/germany/wichtigste-anbieter

3.2 Structure of the national education system in Italy



3.2.1 Early childhood education and care

Early childhood education is organised in an integrated system that extends over 6 years. Early childhood care is divided into two parts. The first part is the "pedagogical services for childhood/kindergarten" and the second part is preschool. Both parts are designed for 3 years each, although entry to pre-school can only take place at the age of 4 or 5.[31] There is no compulsory attendance and admission to kindergarten is associated with costs. Pre-school attendance, on the other hand, is free of charge and is provided and maintained by the local municipalities. There is no guarantee of a place at the pre-school.[32] The kindergarten is subject to pedagogical guidelines for the integrated system, which are divided into 6 points and cover essential points. The aim of the kindergarten is to teach basic skills. [33]

3.2.2 Primary school education

Primary school education is compulsory and lasts 5 years. Together with compulsory lower secondary education, this forms the first educational cycle, but they are separate educational levels. Compulsory education lasts 10 years and begins with the start of primary school. The objectives of primary school are set out in the national guidelines, which include learning objectives, compulsory subjects and timetables.[34] The only requirement is age and all children have a right to education, which includes immigrants. In primary education, the class teacher principle applies and the children generally only have one teacher for the entire time. Lessons can be based on a 5 or 6 day week and the

[31] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/organisation-centre-based-ecec
[32] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/early-childhood-education-and-care
[33] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/educational-guidelines
[34] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/primary-education

organisation of the daily schedule is subject to autonomy.[35] Assessment is numerical and formative at the end of the school year. Primary school education does not include a final examination and qualifies pupils to attend compulsory lower secondary level.[36]

3.2.3 Secondary and post-secondary non-tertiary education

Secondary education consists of two compulsory education levels: The lower secondary level and the upper secondary level for general education and vocational training (second education cycle). Lower secondary level lasts 3 years and is usually attended between the ages of 11 and 14.[37] Schools often offer lower secondary level and pre-school together and are offered by private and public organisations. Final examinations are scheduled at the end of an educational cycle and therefore take place at the end of both lower and upper secondary level.[38] The aim is to enable the acquisition of basic competences and skills, which must be taught in a minimum number of hours. The final examination and participation in a minimum number of hours. The lower secondary level certificate enables students to enter the second education cycle.[39]

The upper secondary level generally lasts 5 years. This is divided into upper secondary level general education and upper secondary level vocational education and training courses (IFP), which are organised at regional level and last 3 to 4 years.

General upper secondary education is offered by six types of general education schools: Art (liceo artisto), classical studies (liceo classico), natural sciences (liceo scientifico), languages (liceo linguistico), music and dance (liceo musicale e coreutico), humanities (liceo delle scienze umane). Successful completion of upper secondary level enables access to higher education. [40]

Vocational upper secondary education is provided in the form of school-based training and is offered by both public and private providers. There is a choice of 11 school-based training programmes. An IFP certificate can be obtained if three years of training have been completed after the first two years of compulsory upper secondary education.

The three or four-year vocational training courses (IFP) are organised regionally. You can also attend university if you have completed a four-year training programme and attended a one-year integration course. The IFP courses comprise a total of between 2,900 and 3,600 teaching hours over a period of three years. Of this, around 35-45% is spent on cultural skills, 45-50% on technical and vocational skills and the remainder on internships and integrated activities. The courses at upper secondary vocational education institutions

[35] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/organisation-primary-education
[36] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/assessment-primary-education
[37] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/secondary-and-post-secondary-non-tertiary-education
[38] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/organisation-general-lower-secondary-education
[39] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/assessment-general-lower-secondary-education
[40] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/organisation-general-upper-secondary-education

consist of 15-30% integrated activities in the technical-vocational part of the timetable.[41] Vocational upper secondary education offers various branches of study at universities of applied sciences and vocational schools, including business and technology. Curricula follow national guidelines and include specific knowledge and key competences. Internships and counselling activities are part of the learning process and aim to improve students' career opportunities.[42]

Assessment in upper secondary vocational education follows clear guidelines to assess learning progress, overall performance and behaviour. Teachers' meetings determine the methods and final examinations consist of written, practical and oral tests. Special regulations apply to pupils with disabilities. Communication of results is transparent between the school, pupils and their families.[43]

Two types of courses are offered at the post-secondary level: IFTS courses, which lead to specialised technical certificates, and regional vocational courses. IFTS courses have national standards and last 2 semesters, while regional courses are offered by decentralised agencies. IFTS courses are available nationwide and require a secondary level II qualification or professional experience, while regional courses are open to secondary school leavers. Teaching methods vary in both courses, and both end with certification exams. IFTS courses provide access to public competitions and university courses, while regional courses lead to a regional qualification certificate.[44]

3.2.4 Higher education

Post-secondary education includes universities, AFAM institutes and ITS. Universities award degrees in accordance with the Bologna Process. AFAM institutes offer fine arts, music and dance. ITS offer short study programmes and have recently been reformed. All institutions are autonomous and have their own structures.[45]

Bachelor's university degree programmes usually last three years and lead to a "Laurea" degree. These degree programmes are structured in areas such as health, natural sciences, social sciences and classics. Single-cycle degree programmes such as medicine, pharmacy and law take longer (usually six years) and lead directly to a second cycle degree. Admission usually requires a secondary school leaving certificate. Graduates can continue their studies and have access to the labour market. Certification is obtained through graduation and the final examination.[46]

[41] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/organisation-vocational-upper-secondary-education
[42] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/teaching-and-learning-vocational-upper-secondary-education
[43] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/assessment-vocational-upper-secondary-education
[44] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/teaching-and-learning-post-secondary-non-tertiary-education
[45] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/types-higher-education-institu https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/bachelortions
[46]

Second-cycle programmes usually last two years. Second-cycle programmes receive a Laurea Magistrale upon completion, while Afam graduates receive a second-cycle academic diploma. Admission requires a first cycle degree.

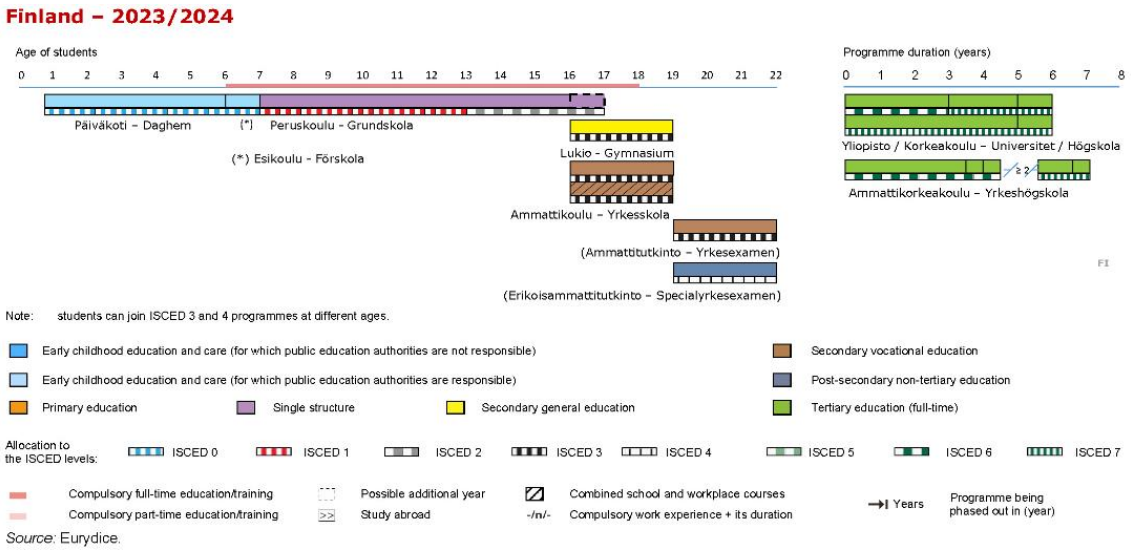
Universities and Afam institutes offer third-cycle programmes aimed at highly qualified research. Access requires a second cycle degree and the passing of a public competition. The programmes last at least three years and lead to a doctorate (PhD) at universities or a scientific research diploma at Afam institutes.[47]

3.2.5 Adult education and training

In Italy, "adult education" refers to activities aimed at cultural enrichment, re-skilling and professional mobility. There has been an adult education system since 1997, which was reformed in 2007 and implemented until 2015/2016. The system was organised in local permanent centres and through evening classes. After the reform, the term "adult education" was replaced by "school-based education for adults", which focuses on educational activities for skills acquisition. Provincial centres for adult education (CPIAs) were established to replace CTPs and evening classes. CPIAs offer courses for people aged 16 and over, including initial training, completion of compulsory education and language courses for immigrants. The courses are flexible and allow for personalised study pathways as well as distance learning. The system is funded and overseen by the Ministry of Education and Merit. In the 2016/2017 school year, 108,539 adults were enrolled and the number of courses and participants increased overall.[48]

[47] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/third-cycle-phd-programmes
[48] https://eurydice.eacea.ec.europa.eu/national-education-systems/italy/adult-education-and-training

3.3 Structure of the national education system in Finland



Source: Eurydice.

3.3.1 Early childhood education and care

Early childhood education and care (ECEC) is an integral part of the education system. In Finland, all children are entitled to state-funded early childhood education and care, which usually begins at 9 or 10 months. The children are usually between the ages of one and seven. Most children are placed in a public municipal early education centre. The proportion of private institutions is low and a fee is charged depending on income.

One year of pre-school education is compulsory, which takes place one year before comprehensive school (single-structure primary and lower secondary education). This is offered free of charge and is part of the education system. A national curriculum is the basis for the curriculum. [49]

The municipalities are responsible for ensuring that pre-school education takes place in one of Finland's official languages, such as Finnish, Swedish or Sámi. Other languages may be offered, as preschool is intended to protect different cultural and linguistic identities.[50] The preschool does not award grades, but prepares a pedagogical document based on the child. The basis of the competences taught is laid down in the Basic Education Act, which is defined as a goal-oriented education, upbringing and care unit with a pedagogical focus. Completion of primary school paves the way for the comprehensive school. Great emphasis is placed on continuous learning, so that early childhood care and pre-school education as well as the transition to comprehensive school form a single unit.[51]

3.3.2 Single-section primary and lower secondary level

Due to demographic change, the number of schools in Finland has fallen by 46% since 2000 to 2021, but accessibility is ensured by free transport. Compulsory schooling begins at the age of 6 and continues until the age of 18. Reaching the age of 7 is the only prerequisite for starting education.

[49] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/early-childhood-education-and-care
[50] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/access
[51] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/educational-guidelines

The Finnish schools are designed as comprehensive schools covering primary and lower secondary education. The comprehensive schools cover years 1 to 9 and are taught by a class teacher in the first 6 years and predominantly by specialised staff and a tutor teacher in years 7 to 9, who is assigned responsibility for the class.

The Swedish language is a recognised main language in Finland, as Finland belonged to Sweden for a long time. An estimated 5%-6% of the Finnish population speak Swedish. It should be noted that primary and secondary education should be organised separately for both language groups. [52]

A core learning plan is drawn up by the Finnish National Agency, which contains the objectives and content of the learning material as well as principles of pupil assessment, special needs education, minimum number of lessons and approaches to learning methods. This also applies to upper secondary level. The education providers draw up their own curricula on the basis of the core curriculum. The curriculum for primary schools includes core subjects such as languages, natural sciences, social sciences, maths, arts and crafts, health and lifestyle as well as orientation subjects. From Year 7 onwards, further optional subjects are added and an introductory phase to vocational life is also included. The electives can vary depending on the school and community.[53]

Students are assessed by means of an objective assessment of behaviour and numerical grades. The assessment of behaviour has no influence on the numerical grades and is listed separately, which should serve as active feedback for the student and the parents. These assessments are carried out continuously until the student reaches the final year. At the end of the comprehensive school, a final assessment is carried out, which serves as a basis for further educational pathways.

3.3.3 Upper secondary and post-secondary education Non-tertiary education

After completing comprehensive school, pupils are entitled to attend upper secondary general education and upper secondary vocational education. Further attendance is compulsory after the reform of 1 August 2021, as compulsory schooling continues until the age of 18 or ends at the end of upper secondary level. Completion of upper secondary general and vocational education qualifies students to study at university. In 2023, just under 52% opted for upper secondary general education and just under 40% for upper secondary vocational education. [54]

The general upper secondary level is based on learning content that does not follow a fixed structure. Compulsory and optional subjects are offered. It takes 2 to 4 years to complete upper secondary education, but the average is 3 years. Achievement is measured in credits and 150 credits are required to graduate. General secondary education is also offered to

[52] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/organisation-single-structure-education
[53] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/teaching-and-learning-single-structure-education
[54] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/upper-secondary-and-post-secondary-non-tertiary-education

adults and they are served in separate schools. They only need 88 credits to graduate. In 2022, adults made up around 6% of the total number.[55]

The distribution of teaching hours in upper secondary general education for young people includes compulsory studies and national electives. Compulsory studies include mother tongue and literature, a language, B1 language, B2 and B3 languages, mathematics, environmental and natural sciences, humanities and social sciences, religion or ethics, health education, arts and sports, guidance counselling and thematic studies. All students learn at least two languages, and Finnish or Swedish is compulsory as an additional national language.[56]

The final assessment is based on the national core curriculum, which is regularly presented to students and parents. At the end of general upper secondary school, so-called matriculation examinations are carried out, which can influence the final grades. The final certificate enables pupils to go on to study at university.[57]

Vocational upper secondary education is most frequently offered by vocational training institutions, accounting for just under 85%. In Finland, a personal skills development plan is created for each apprentice, which is developed together with teachers, career counsellors and possibly representatives from the world of work. This plan recognises skills already acquired and identifies the competences needed and the ways to acquire them in different learning environments. This individualised approach is a unique feature of the Finnish education system.[58]

In Finland, great emphasis is placed on individualised teaching methods, a combination of theory and practice and the development of key competences in order to provide students with a comprehensive vocational education.[59]

Student assessment is based on a competence assessment plan that sets out detailed guidelines and procedures for competence assessment. Assessment is based on demonstrated competence, focussing on broad areas of competence that meet the demands of working life. Certification takes place after completion of all mandatory and optional learning units in accordance with national qualification requirements and other regulations. A qualification certificate is awarded by the training provider once all units have been completed to an acceptable standard.[60]

[55] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/organisation-general-upper-secondary-education
[56] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/teaching-and-learning-general-upper-secondary-education
[57] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/assessment-general-upper-secondary-education
[58] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/organisation-vocational-upper-secondary-education-and-training
[59] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/teaching-and-learning-vocational-upper-secondary-education-and
[60] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/assessment-vocational-upper-secondary-education-and-training

3.3.4 Higher education

The Finnish system is organised in cycles and comprises universities and universities of applied sciences. They offer bachelor's, master's and doctoral degree programmes. Universities of Applied Sciences offer practice-orientated higher education for professional expert tasks and carry out applied research and development activities that promote industrial, economic and regional development. They offer professionally oriented Bachelor's and Master's degree programmes. Higher education institutions have autonomy in administration, education and research, while performance negotiations with the Ministry of Education and Culture define subject-specific educational responsibilities and quantitative targets.[61]

Study programmes are divided into 12 educational areas, including education, arts and culture, engineering and health. Students are continuously assessed through written and oral examinations and final theses. Graduates can receive a certificate, a degree certificate, a diploma supplement and a certificate of achievement. The Bachelor's programme lasts 3 years and 180 ECTS credits are required.[62]

A Master's degree programme can be obtained at universities and universities of applied sciences. A special feature is that the Master's degree programme can only be taken up after passing the Bachelor's degree and gaining at least 2 years of professional experience. The duration of the Master's programme is usually 2 years. A corresponding document is issued at the end of the programme.[63]

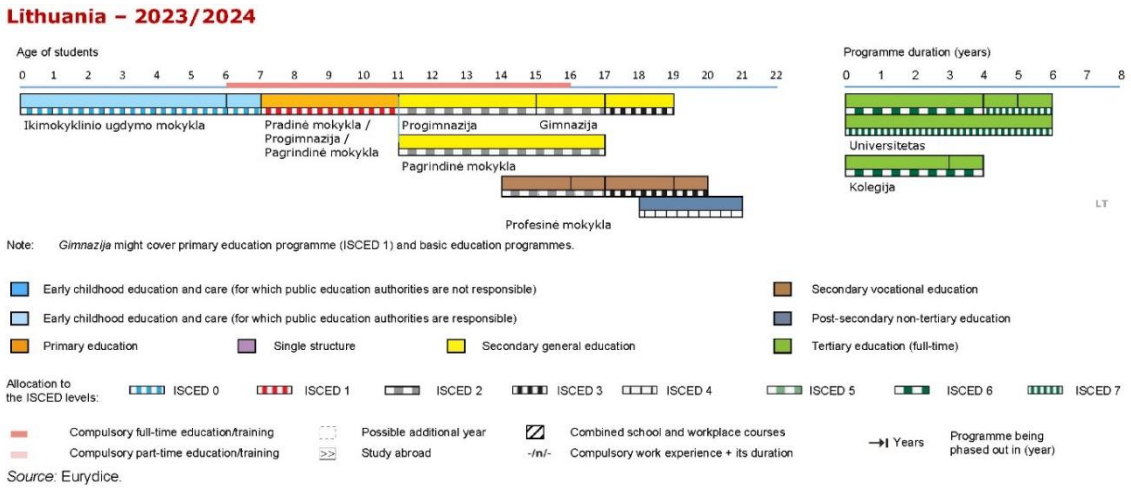
3.3.5 Adult education and training

The responsibilities of adult education in Finland include ensuring labour availability, creating educational opportunities, strengthening social cohesion and equality. The aim is to provide learning opportunities for adults in various fields of education, including vocational training and general education. In Finland, adult education has a long history and has been influenced by societal changes such as labour demands and economic structure. Participation in adult education is around 29 per cent of the population aged 25 to 64. The main providers of adult education are vocational schools, universities, folk high schools and summer universities.

The adult education institutions offer various programmes, including general education, vocational training, literacy and language courses for immigrants and entrepreneurship training. The validation of non-formal and informal learning processes takes place in various areas of education, with a focus on vocational training.[64]

[61] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/higher-education
[62] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/bachelor
[63] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/second-cycle-programmes
[64] https://eurydice.eacea.ec.europa.eu/national-education-systems/finland/developments-and-current-policy-priorities

3.4 Structure of the national education system in Lithuania



Source: Eurydice.

3.4.1 Early childhood education and care

Early childhood education and care is divided into two parts. The first is pre-school education, which is not compulsory and there is no legal entitlement or guarantee of a place in pre-school. Nevertheless, the municipalities do their best to organise a place for the children. Pre-school education can be compulsory if the children live in a socially deprived area or in other critical situations such as a disability. This education is free of charge. Compulsory schooling (second part) begins at the age of 6, but education can be started as early as the age of 5 on request. In this case, attendance at pre-school is compulsory for 1 year.[65] The non-compulsory pre-school education is based on recommendations and criteria that freelance teachers or an ECEC environment can use to design a curriculum that is tailored to the children. Pedagogical guidelines are to be implemented. The development here relates to general skills development.[66]

3.4.2 Primary school education

Compulsory schooling begins at the age of 6 or 7 and ends at the age of 15 or 16. Secondary school can be attended once the previous one has been completed. As a rule, compulsory primary education begins at the age of 7 and lasts 4 years. A special feature is that there are dormitories at the schools and yellow buses to transport the pupils to their respective schools. Classes are mainly taught by one teacher. Additional teachers can be brought in if the teachers have missing qualifications such as additional language skills, knowledge of history, etc. [67]

Each school develops its own curriculum, which is based on a main national curriculum. This sets out how the curriculum is implemented, organised and how students are assessed. The educational pathway sets out a prescribed number of hours that must be completed in order to graduate. The primary subjects are: Moral education, languages (first

[65] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/access
[66] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/educational-guidelines?etrans=de
[67] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/organisation-primary-education?etrans=de

foreign language: English, German or French), social education, maths, science and technology education, art education and physical and health education. [68]

The current curriculum for primary education emphasises holistic assessment that helps students to learn and grow successfully. It includes formative, self-referenced and summative assessments that recognise individual pupil progress and promote a positive learning environment. The National Pupils' Achievement Testing (NMPP) complements these assessments and serves as a standardised measure of learning outcomes, looking at pupil performance holistically.[69]

3.4.3 Secondary and post-secondary non-tertiary education

Further education is divided into 3 levels. Lower secondary education, upper secondary education and vocational education and training (VET).

Lower secondary level (ISCED 2) is the second formal level of education. This is divided into two stages. The first part comprises a four-year education phase and the second lasts two years. In total, this education phase lasts 6 years. The second part can include subjects from a vocational training programme, which can be credited to the training afterwards. The institutions offering lower secondary education include pre-gymnasium (Pre-gymnasium), lower secondary education schools ( ) and grammar schools. VET schools can also provide lower secondary education together with a VET programme. [70]

The pre-gymnasium covers grades 5 to 8, but can also offer primary education from grades 1 to 4. Pedagogical systems such as Waldorf, Montessori or Suzuki, which are also offered in other lower secondary schools, can be used here. The lower secondary education school covers grades 5 to 8 in the first part and grades 9 to 10 in the second part. It can also offer a comprehensive educational programme for grades 1 to 10. A school-multi-functional center covers primary and lower secondary education as well as early childhood education. The grammar school is aimed at students aged 15 to 18. The high school offers programs to serve lower secondary and upper secondary education. The vocational education and training (VET) institution can also offer lower secondary level and award a qualification.[71] There is a predetermined number of studies that must be completed in order to obtain a qualification in the educational pathway. The modules are based on a national plan and a corresponding curriculum is developed by a working group of the respective education provider. The curriculum for lower secondary education includes moral education, languages, maths, science, social sciences, the arts, technology, physical education and cognitive cultural activity. There are prescribed hours for each area that must be

[68] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/teaching-and-learning-primary-education?etrans=de
[69] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/assessment-primary-education?etrans=de
[70] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/secondary-and-post-secondary-non-tertiary-education
[71] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/organisation-general-lower-secondary-education

completed.[72] Assessment takes place at the end of the school year in the form of points and the issuing of a certificate.[73]

Secondary level II (ISCED 3) lasts 2 years. This consists of compulsory and optional general education subjects as well as subjects from vocational education and training programs. The providers are grammar schools and vocational schools, which take the form of an apprenticeship.[74] Students who have completed lower secondary level can attend upper secondary level at a grammar school. Four-year grammar schools accept pupils who have successfully completed at least eight years of lower secondary school or a preliminary grammar school. Two-year grammar schools, on the other hand, accept pupils who have completed ten years of lower secondary school.[75] The curriculum is organized by the schools themselves, but they must adhere to the national requirements. The pupil has to complete a certain number of lessons and modules. Some of the modules can be taken individually and may include vocational modules.[76] In Lithuanian schools, assessment is carried out using formative, diagnostic and summative methods. Summative assessment at the end of the school year takes the form of grades and examinations. Completion of upper secondary level requires passing the Matura examinations and/or a Matura thesis, with digital certificates being issued since May 2023.[77]

Vocational education and training (ISCED 3) is offered by vocational schools, freelance teachers or other vocational training providers who are legally authorized to do so. The training lasts one, one and a half or two years. Vocational training can be started at the age of 14 and has a formal character in the initial training programme. The further training programmes have formal and non-formal elements.[78] The prerequisite for starting a vocational training programme is proof of successful completion of lower secondary education if the student is under the age of 16. If this is not the case, then the applicant must apply for the VET programme and the lower secondary education offered by vocational schools in Lithuania. The vocational schools are homogeneous. The duration of the training programme is 2 years. If the lower secondary level is also attended, the time is extended to 3 years. The lower secondary level is organised in the same way as the normal formal education.[79] The training programme requires predetermined hours, which must be attended in order to graduate. The assessment of performance must be related to the performance targets. The school can decide on the methods and tools for assessing

[72] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/teaching-and-learning-general-lower-secondary-education
[73] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/assessment-general-lower-secondary-education
[74] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/secondary-and-post-secondary-non-tertiary-education
[75] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/organisation-general-upper-secondary-education
[76] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/teaching-and-learning-general-upper-secondary-education
[77] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/assessment-general-upper-secondary-education
[78] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/secondary-and-post-secondary-non-tertiary-education
[79] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/organisation-vocational-lower-secondary-education

performance and progress. These are recorded in a leaving certificate. Two certificates are issued for prior attendance at lower secondary level and completion of vocational school. [80]

Persons who have already completed lower secondary level can apply for an apprenticeship with attendance at upper secondary level. In this case, proof of having passed lower secondary level is sufficient. The school has the right to check suitability by means of a recruitment test. The final year comprises 60-70% vocational subjects and is interlinked with continuous or intermittent practice. Lithuanian schools use different assessment methods such as grades and portfolios, with a possible switch to a ten-point system. Teachers assess student performance, while schools and the Ministry of Education oversee quality assurance and certification. Students who have completed upper secondary school can shorten the duration of their education to one year.[81]

3.4.4 Higher education

There are two types of study programmes: University and college study programmes. The higher education system is divided into 4 study cycles.

1. short cycle - the acquisition of a level 5 qualification framework qualification;
2. the first cycle - Professional Bachelor and Bachelor level;
3. he second cycle - Master's level;
4. the third cycle - doctoral level.

Short-term study programmes are assigned to educational level V. It is currently not clearly defined which degree programmes are to be offered as short courses. The short-term study programme should be 90 to 120 credits and be similar to an apprenticeship programme. To be eligible for admission, students must have completed upper secondary education with at least 3 years of work experience or training in connection with vocational training. The study programme must correspond to the previous career.

A bachelor's degree programme requires an upper secondary school leaving certificate. First-cycle programmes can comprise between 180 and 240 ECTS credits, depending on the type of university and its direction, and require a combination of theoretical teaching, practical experience and final theses. Admission is through an admissions competition and employability is promoted through practical experience and career counselling during the course of study. Students are assessed through examinations and assessments, and on completion they receive a diploma and a Diploma Supplement documenting their qualifications.[82]

Master's degree programmes prepare students for scientific or artistic activities and award a Master's degree. Admission after Bachelor's degree. Curricula must correspond to the study objectives and are regularly updated. Theses are based on research or artistic projects. Students have access to libraries and career support. Assessment through

[80] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/assessment-vocational-lower-secondary-education
[81] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/assessment-vocational-upper-secondary-education
[82] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/bachelor

examinations and performance tests. Graduates receive a diploma and a diploma supplement (overview of the content of the training acquired).[83]

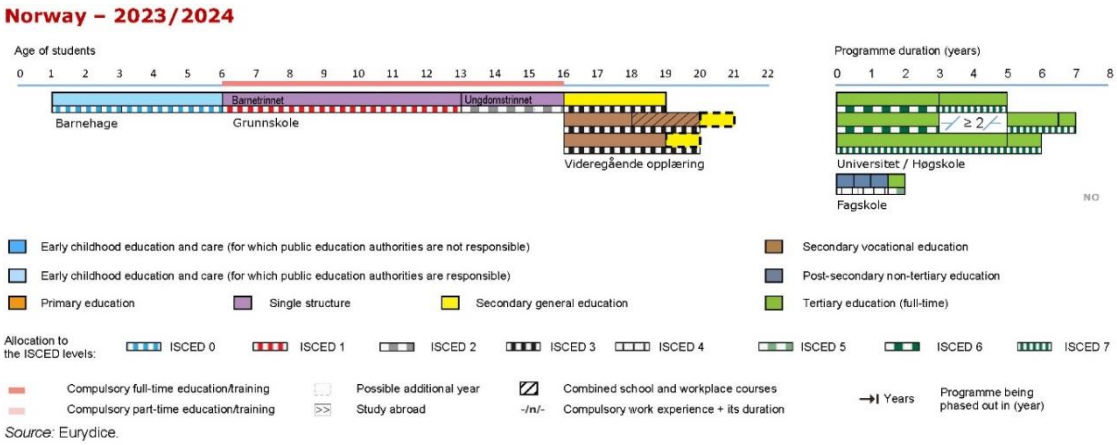
Doctoral programmes in natural sciences and art enable scientists and artists to conduct independent research. The establishment of doctoral programmes is approved by the Ministry of Education. Doctoral students receive a doctoral degree after successfully defending their dissertation. They have access to libraries and career centres. The programme includes basic research, applied projects and artistic activities. Career counselling and youth employment are encouraged. Assessment is in accordance with university regulations and a diploma is awarded on completion.[84]

3.4.5 Adult education and training

Lithuania guarantees all citizens and foreign residents access to education, including primary, secondary and higher education. This includes formal, non-formal and informal education. The state finances primary education, lower and upper secondary education and vocational training. Non-formal education programmes meet individual needs and improve qualifications. Informal learning is based on practical knowledge and can be part of formal education programmes. The importance of lifelong learning is recognised by the state.[85]

[83] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/second-cycle-programmes
[84] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/third-cycle-phd-programmes
[85] https://eurydice.eacea.ec.europa.eu/national-education-systems/lithuania/adult-education-and-training

3.5 Structure of the national education system in Norway



Source: Eurydice.

3.5.1 Early childhood education and care

The main aim is to fulfil the children's need for care and play and thus to shape their holistic development. Early childhood education is not compulsory in Norway, but children are entitled to a subsidised, admission-free kindergarten place from the age of one. Local authorities must ensure allocation. Around 50% of children are placed in private kindergartens, which receive the same amount of public funding as public institutions.[86] Education is not free and a fee must be paid for the kindergarten place. There is a discount for several children and places are free from the third child onwards.[87]

The curriculum for kindergartens lays the foundation for the basic principles, objectives, teaching content, activities and pedagogical approaches. Each kindergarten must draw up an annual activity plan on this basis and includes basic topics and learning content that are to be assigned to the development goals. No formal assessment is provided for, but there is constant consultation with the authorised representatives. Early childhood education ends at the age of 6 and paves the way for the transition to primary school.

3.5.2 Single-section primary and lower secondary level

Primary and lower secondary education in Norway is organised in a comprehensive school system, which is subject to a common legal plan and a national curriculum. It is admission-free and free of charge. Primary level comprises grades 1 - 7 (6 to 12 years of age) and lower secondary level grades 8 - 10 (13 to 16 years of age). Compulsory schooling lasts for 10 years. Some schools cover the entire school period and others only cover primary school or lower secondary level. [88]

The school system is adapted to demographic change and has several small schools in rural and remote regions. In the case of long distances, there is a right to transport and distance learning if the school is unable to teach a subject. Extracurricular care and activities must be provided by the municipalities, as well as free homework help for grades 1 to 4. [89]

[86] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/early-childhood-education-and-care
[87] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/access
[88] Single-structure primary and lower secondary education
[89] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/organisation-single-structure-education

The national curriculum covers primary, lower secondary, general upper secondary and vocational upper secondary education. It contains around 500 subject syllabuses, such as core subjects, which regulate the distribution of periods and subjects across the whole range. The 5 main skills taught are: oral and written expression, reading, maths and the use of digital tools. [90]

The basis for the assessment of pupils are the competence objectives in the subject curriculum. In grades 1 - 7, pupils receive a written assessment and, from grade 8 onwards, pupils receive an additional numerical assessment. The end of lower secondary level is introduced with nationwide examinations in selected subjects which, together with the overall performance, lead to a final certificate. After graduation, there is an entitlement to a 3-year upper secondary education programme.[91]

3.5.3 Upper secondary and post-secondary education at tertiary level

The general and vocational upper secondary levels have a common core curriculum and are often offered at the same schools. General upper secondary education lasts three years and qualifies students for university studies upon completion. Vocational upper secondary level lasts four years and includes two years of theory followed by two years of work experience in a company.[92]

The general upper secondary level is intended to prepare students for university entrance, while the vocational upper secondary level focuses on practice-orientated vocational training. The core subjects that cover both areas are: Norwegian, maths, English and science. In general and upper secondary vocational education, core curriculum options must be chosen in addition to the core subjects, which in upper secondary vocational education are specific to the subject curricula of the programme. The programmes are divided into different areas, including agriculture, construction, healthcare and information technology, which represent relevant training in collaboration with social partners.[93]

Both areas of education, upper secondary general education and upper secondary vocational education, receive continuous feedback and numerical assessments every six months. This feedback relates to the daily learning process and includes both formative and final assessments. The final assessment is carried out by evaluating the grades achieved in written, oral or practical examinations. It should be noted that upper secondary vocational education is categorised as ISCED 5 and upper secondary general education as ISCED 4. Examinations are taken at the end of both educational levels, which qualify students for university entrance.[94]

3.5.4 Higher education

The degree programmes are divided into three cycles. The first is the Bachelor's degree. The duration of study is generally three years for Bachelor's degree programmes and five years

[90] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/teaching-and-learning-single-structure-education
[91] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/assessment-single-structure-education
[92] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/upper-secondary-education-and-post-secondary-tertiary-education
[93] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/teaching-and-learning-0
[94] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/assessment-0

for integrated Master's degree programmes in teacher training. Admission requirements include successful completion of upper secondary education and specific subject requirements. The curriculum varies according to subject and institution. Assessment is by examination at the end of the programme and degrees are certified in accordance with the Universities and Colleges Act.[95]

Another form of study is "short-cycle higher education", which means that these are short study programmes aimed at specific vocational training. In contrast to traditional university degree programmes, they are shorter and focus on providing students with professional skills quickly. The admission requirement is an upper secondary school leaving certificate or a vocational qualification.[96]

The subsequent Master's programme usually takes 2 years. The admission requirement is a Bachelor's degree. Experience-based programmes require an additional two years of professional experience. Curricula are autonomous, some are subject to national regulations. Assessment is by examination and project work. Graduates receive a diploma and a diploma supplement. [97]

Doctoral programmes are offered by various higher education institutions and generally last three years. The admission requirement is a completed Master's degree, if you can do a doctorate in this subject. The programme is approved by a selected committee.[98]

3.5.5 Adult education and training

The adult education system in Norway is well established and includes adult education centres, study associations and distance learning. In recent years, the importance of lifelong learning has been further emphasised, resulting in a legal right to basic and continuing education for adults and free education for immigrants. Since 2006, employers have been able to apply for funding for the training of employees with low basic skills via the SkillsPlus programme. The programme has also been supporting NGOs since 2015.[99]

Norwegian adult education covers various areas such as lower and upper secondary education, vocational schools, post-secondary education, higher education and programmes for basic skills in working life (SkillsPlus). The municipalities offer Norwegian and social studies classes for immigrants. There are also formal and informal learning programmes offered by study associations, folk high schools and distance learning institutions. Prison inmates have access to education and there are programmes to support the transition to the labour market. Adult education centres, study associations and private distance learning institutions offer a variety of courses for adults, from leisure activities to university level.[100]

[95] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/bachelor
[96] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/short-cycle-higher-education
[97] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/second-cycle-programmes
[98] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/third-cycle-phd-programmes
[99] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/adult-education-and-training
[100] https://eurydice.eacea.ec.europa.eu/national-education-systems/norway/main-types-provision

4.2. 4. 12 ZKL guidelines[101]

4.1 Introduction

The vision for the future of German agriculture is characterised by a comprehensive approach based on ecological, economic and social sustainability. This mission statement, developed by representatives of the Federation of German Rural Youth and the Youth in the German Federation for the Environment and Nature Conservation, strives for an agricultural and food system that takes equal account of the needs of society, the environment and animals.

The farming profession is seen as a key player whose work contributes significantly to food security and the protection of the environment, nature and animals. Emphasis is placed on farmers acting as independent entrepreneurs and assuming both ecological and economic responsibility. The diversity of farms is emphasised and the aim is to give young farmers preferential access to resources such as land.

With regard to the environment, nature and climate, the aim is to achieve sustainable land use that contributes to the health of people and animals and to maintaining the quality of water, soil and air. This includes measures such as regenerative agriculture, the promotion of biodiversity and the expansion of climate-friendly production methods. Digitalisation also plays a role by using it to enable more efficient and environmentally friendly ways of working.

Fairness and transparency characterise the economic conditions in agriculture, both in the market and in cooperation along the value chain. Regionality is promoted in order to support short transport routes and regional cycles. Consumers are encouraged to find out about the origin and production methods of their food and to consume more regional and sustainable products.

Training and career entry into agricultural professions are promoted, with training and further education programmes geared towards current and future challenges. Political and institutional cooperation offers planning security and supports farmers in the provision of social services.

Global impacts are also taken into account by striving for fair trade and fair labour conditions for smallholder farmers worldwide. Overall, this vision strives for an inclusive and sustainable agriculture that meets the needs of society as well as environmental and social challenges.

The twelve guidelines for the transformation process in the area of agriculture and food in Germany were formulated to enable a rapid and holistic economic and ecological reorganisation of the entire system. This transformation should take place in harmony with global environmental limits and strengthen the ecological compatibility and resilience of agricultural production. In addition, the aim is to promote the diversity of farm types, production methods, agricultural structures and landscapes.

[101] https://www.bmel.de/DE/themen/landwirtschaft/zukunftskommission-landwirtschaft.html

4.3. Guidelines

Guideline 1:

The transformation of agriculture should improve ecological compatibility, promote the diversity of farm types and landscapes and create a framework for predictable future prospects. It should also prevent production from being relocated to regions with lower standards.

Guideline 2:

Agricultural producers should be motivated to achieve positive effects on the climate, environment, biodiversity, animal welfare and health. Policymakers must ensure that this is also economically attractive.

Guideline 3:

Food should be produced and marketed in an economically, ecologically and socially sustainable way. Prices should reflect the actual production costs and encourage consumers to adopt more sustainable behaviour.

Guideline 4:

The social costs of the current agricultural and food system must be taken into account. A transformation towards sustainability can bring economic savings in the long term.

Guideline 5:

The transformation takes time, but must not be at the expense of future generations. It must therefore begin immediately and take place in clearly defined steps with monitoring and, if necessary, readjustment.

Guideline 6:

All political instruments must be aligned with the sustainability goals.

Guideline 7:

An effective agricultural and environmental policy requires better coordination and integration at horizontal and vertical level as well as dynamic further development of the legal framework.

Guideline 8:

Public funding for agriculture should be used specifically for the provision of public goods.

Guideline 9:

Policy measures should be based on target achievement rather than input indicators.

Guideline 10:

The diversity of regional conditions in agriculture must be taken into account and regional cooperation should be promoted.

Guideline 11:

New policy measures should be tested in pilot projects and scientifically evaluated.

Guideline 12:

Discussion processes should be promoted in order to overcome polarisation in the agri-environmental debate and find common solutions.

5. The dual German vocational training system in particular

5.1 Framework curriculum for the training occupation of farmer in Germany

A framework curriculum is a curriculum for vocational training. It describes the desired competences as well as the teaching content to be taught in vocational education and training, as well as learning areas, learning objectives, learning content and time benchmarks. This is followed by the training framework plan, which covers and defines further aspects with the training regulations. As young trainees have different prior knowledge, the framework curriculum must be flexible. The framework curriculum is structured according to learning fields and can be adapted to the needs of the company or the federal state. The individual federal states are responsible for adapting their own curricula.[102]

The dual vocational training programme in agriculture usually lasts 3 years. The basis of the training is the framework curriculum, which applies nationwide. The training company and the vocational school are independent places of learning, but work as equal partners and have a joint educational mission. The vocational school builds on the general competences acquired in the previous education, as well as vocational expertise. This is intended to prepare students for later situations in everyday working life, as well as for helping to shape social and ecological responsibility.

The following information is taken from the framework curriculum, which is available on the website of the Conference of Ministers of Culture.[103]

In this context, vocational schools act as mediators of work-related learning content for vocational training, vocational practice and impart knowledge about possible further vocational training measures. The framework curriculum provides for the dovetailing of school-based and practical training.

The framework curriculum is aimed at education and training for vocational and non-vocational situations. These are set out in **objectives:**

- Receiving sound vocational training that enables trainees to adapt to constantly changing requirements and take on new tasks. They are given the opportunity to expand their scope for decision-making and action and to push the boundaries of the workplace.
- Networking the skills and knowledge acquired so that trainees can get off to a good start in the world of work.
- Learning additional, non-professional skills in order to increase the ability to act and make judgements in non-professional areas.
- Personal development should be used to recognise the possibilities and limitations of work and vocational training. This strengthens the understanding of the tasks and gives self-confidence.
- It should enable students to recognise operational, legal, economic, ecological, social and political contexts.

[102] https://de.wikipedia.org/wiki/Rahmenlehrplan
[103] https://www.kmk.org/themen/berufliche-schulen/duale-berufsausbildung/downloadbereich-rahmenlehrplaene.html?tx_fedownloads_pi3%5Bcontroller%5D=Downloads

- Becoming aware of the tensions in the professional field and dealing with these tensions. The aim is to learn how to achieve a balance for the environment.

The training programme is normally divided into training years. This provides for basic training, which takes place in the first year, and specific specialised training, which in this case takes place in the second and third year of training. Sometimes these specialised training courses are planned together for similar professions.

Objectives and content are defined on the basis of the training regulations and in the framework curriculum and also regulate the final qualification. These are taught in the dual system in vocational training and by the vocational school. This is also the prerequisite for further training programmes.

An agreement must be reached between the company and the vocational school in order to be able to adhere to the technical and time frame. Farmer training is assigned to the agricultural sector and the primary sector.

The curriculum has certain broad objectives that are important for all trainees. These objectives should then be linked to specific goals for their profession.

A trainee should:

- The trainee should know and observe the principles and measures of accident prevention and occupational safety to avoid damage to health and to prevent occupational illnesses.
- The trainee should be able to explain why it is important to design workplaces in such a way that they are both people-friendly and ergonomic, and understand how this can be realised.
- The trainee should understand the environmental impact of his/her professional activity and be able to describe measures to avoid or reduce this impact.
- The trainee should understand the principles and measures for using energy efficiently at work.

Training as a farmer teaches skills in both plant and animal husbandry that are required for this profession. These include:

- The trainee should be able to competently carry out the activities of a farmer in various agricultural businesses and service sectors.
- The trainee should be able to adjust and adapt to new professional requirements independently and flexibly.
- to participate in vocational training and further education programmes

The aim of the framework curriculum for vocational school in the agricultural profession is to offer comprehensive basic vocational training that focuses on both general and specific agricultural skills. The training should promote the trainees' ability to act and at the same time address the requirements of business management and the ecology of the profession. Scientific, economic, technical and mathematical content is integrated.

The training is divided into basic and specialised training, whereby the structure and content are similar. In regions with a basic vocational training year, certain content from the

specialised level can be brought forward to the basic level in order to convey the holistic context and in-depth specialist knowledge.

The subject matter for the economics and social studies examination is based on the guidelines for teaching economics and social studies at vocational schools.

New technologies and project-based learning can be used in order to adequately take into account the variety of production methods and branches of business. The time allocation of teaching content in the agricultural sector is flexible and depends on regional needs and the organisation of teaching.

The recommended time guidelines for the various learning areas serve as a guide for curriculum design in the federal states. The production processes and branches of plant and animal production listed as examples in the framework curriculum are intended to serve as a guiding function and can be supplemented if necessary. The focus on action competence aims to support trainees in solving specific professional problems, starting at the basic level and deepening at the specialised level.

5.2 Basic level (1st year of training)

In the first year of training in agriculture, basic knowledge and skills are taught that are of central importance for prospective farmers. The focus is on the areas of plant cultivation and animal husbandry, which are each covered in different modules.

Plant cultivation focuses on topics such as soil cultivation, sowing, fertilisation, crop care and marketing. The trainees learn to take into account the operational conditions as well as natural and economic site conditions and to justify land management ecologically. They acquire knowledge of soil cultivation equipment, sowing and planting equipment and the selection and application of fertilisers. The importance of material cycles, ecological balance and species and landscape protection is also covered.

In the area of animal husbandry, content such as feeding, breeding, keeping and caring for farm animals is taught. Trainees learn how to optimise the performance of livestock and meet the needs of animals while taking into account their natural behaviour. Topics such as feed quality, breeding methods, disease prevention and legal regulations on animal husbandry are also part of the curriculum.

From a critical point of view, it is noticeable that ecological, economic and social aspects are only given limited consideration in many subject areas. For example, the area of ecology is only dealt with for 10 hours compared to other topics such as soil cultivation or feeding, which each comprise 30 to 40 hours. This could lead to important issues of sustainability, resource conservation and animal welfare being neglected. A more balanced weighting of these aspects would be desirable in order to give prospective farmers a holistic perspective on agriculture and better prepare them for the challenges of the future.

5.3 Specialist level (2nd and 3rd year of training)

In the second and third year of the agricultural training programme, future farmers are given an in-depth understanding of various aspects of plant production and animal husbandry. In the area of plants, specific production methods and farm branches such as cereal cultivation, root crops and grassland management are covered. Trainees learn about the

site-specific requirements, operational interrelationships and ecological aspects of these areas.

In cereal cultivation, tillage measures, sowing and fertilisation techniques and crop care methods are taught. The sales opportunities and profitability of cereals also play a role. Similar content is covered in root crop cultivation, with a focus on beet and potatoes. The sales opportunities and profitability of root crops are also examined.

In the area of grassland, trainees learn to assess grassland areas, carry out suitable sowing and maintenance measures and recognise sales opportunities. However, despite this comprehensive training, it is noticeable that ecological aspects are only given limited consideration. A more balanced weighting of these aspects would be desirable in order to give prospective farmers a holistic perspective on agriculture.

In the area of animal husbandry, production methods and farm branches such as cattle farming and pig farming are covered. Trainees learn about farm organisation, breeding and feeding techniques as well as marketing strategies. Here, too, it is noticeable that ecological aspects are only given limited consideration, which requires a critical examination of the training structure.

In addition, as part of alternative agriculture, prospective farmers are taught to integrate the farm into the ecosystem and to carry out special soil care measures. However, here too there is a limitation in the consideration of ecological aspects.

Overall, the second and third year of training offers an in-depth insight into the various aspects of agriculture. However, a more balanced emphasis on ecological aspects is desirable in order to give the prospective farmers a holistic perspective on agriculture and better prepare them for the challenges of the future.

Ecological, social and economic components are only given limited consideration in many subject areas, as are new technologies. A more comprehensive inclusion of technical and ecological content could make a long-term contribution to the restructuring of operational services and expand the knowledge of today's specialists to make them the leaders of tomorrow. Alternative agriculture is increasingly addressing the topic of ecological sustainability, but a closer integration of this content would be commendable.

5.4 Strengths and weaknesses

The dual vocational training system for farmers in Germany has a number of strengths and weaknesses that offer a multifaceted insight into the training landscape. On the one hand, the focus is on practical orientation, which is ensured by the close integration of company-based training and school-based teaching. This structure enables trainees not only to acquire theoretical knowledge, but also to test and deepen their practical skills directly in the work environment. The framework curriculum plays a decisive role here, as it offers the flexibility to respond to individual prior knowledge and the needs of the companies or federal states.

Another advantage of the dual system is its holistic approach to education. The curriculum emphasises not only job-related skills, but also the development of skills in non-occupational areas. Ecological, social and economic aspects are given equal

consideration in order to provide the prospective farmers with a comprehensive perspective on their future work.

However, the system is not without its weaknesses. A clear imbalance can be seen in the weighting of the various subject areas. While ecological, economic and social aspects are often only dealt with to a limited extent, other topics dominate. The integration of new technologies and alternative agricultural models also falls short of the potential. A more balanced weighting and a stronger emphasis on linking theory and practice could help to optimise training and better prepare trainees for the demands of the future.

Overall, the dual vocational training system for farmers in Germany offers a solid foundation for a versatile training programme. The combination of theoretical knowledge and practical experience gives trainees the skills they need to successfully establish themselves in the world of work. Nevertheless, there is potential for further development in order to better meet the challenges of the changing agricultural landscape.

6. New technologies in agriculture

The clash and accumulation of problems has been recognised and, in addition to promoting vocational training, there is another way that can complement the first. The use of new technology to counteract the prevailing problems. These can help farmers to increase crop yields, reduce the use of chemicals, minimise operating costs and compensate for labour shortages. These technologies are currently being developed and have a growing market. There is great potential in terms of sustainability, productivity, labour savings and labour savings. Animal welfare can also be improved. The focus is on data management systems that optimise soil cultivation and harvesting methods. Important areas of digitalisation in agriculture include sensor technology, robotics, automation, artificial intelligence and big data. The use of digital technologies makes it possible to collect, process and systematically analyse large amounts of data. The use of artificial intelligence in particular helps to conserve resources, simplify complex work processes and promote sustainability in agriculture.

Agriculture is often already digital, but will be further digitalised in the near future. Digital applications are already helping with fertilisation, crop protection and animal husbandry, for example. Agricultural machinery is equipped with intelligent technologies and can, for example, be part of automated work processes on farms or fields. It is clear that the IT sector will take over further activities in the future.

The growing demand for high-quality food and sustainable agricultural production mean that innovative digital methods are playing an increasingly important role in plant production and animal husbandry. Modern agricultural technology with integrated electronics and automation enables efficient and resource-saving working methods. More than 80 per cent of farms already use digital solutions.

In crop farming, satellite data is used for the precise control of tractors and implements, which enables the needs-based application of inputs. In livestock farming, automatic milking systems (AMS) and other automated components are increasingly being used to improve animal health and welfare. Sensors record various data such as movement, feeding behaviour and animal activity in order to detect and treat diseases at an early stage.

The profitability of digital technology depends on the relationship between investment and operating costs as well as the savings or higher yields achieved. The use of AMS, for example, leads to an average seven per cent higher milk yield and thus contributes to the profitability and sustainability of farms. Nevertheless, digitalisation also harbours risks. The compatibility of machines from different manufacturers is a challenge, as are issues of data sovereignty and security. Illegal hacker attacks or technical faults can jeopardise operational safety. The continuous development of technology can overburden farmers and intensify social conflicts between generations. In addition, the demands on labour could increase and lead to an acceleration of structural change in agriculture.[104]

6.1 Drones

The use of drones in agriculture offers farmers a wide range of possibilities. They make it possible to assess the height and biomass of plants, detect the presence of weeds in the field and measure the water saturation of the soil from a distance. In addition, drones can be used for hazardous tasks such as applying insecticides without exposing people to direct risks from chemicals.

Although drones can provide high-precision information, satellites are still the preferred technology for monitoring and mapping large areas of land. Nevertheless, drones offer a flexible and efficient way to accurately monitor and manage certain agricultural tasks on small to medium-sized areas.

6.2 Data from satellites

With the help of modern satellite images, farmers can obtain a wealth of information. They can assess the health of the plants, determine the proportion of wilted plants and calculate the amount of vegetation in the fields. In addition, satellites allow farmers to use the Normalised Difference RedEdge (NDRE) and the Modified Soil-Adjusted Vegetation Index (MSAVI). These indices help to remotely determine the nitrogen content of the soil and analyse the effects of soil quality on early plant growth.

6.3 Software for precision agriculture

Today, farmers can use mobile and web-based applications to create detailed maps of their fields, store information about past farming practices and generate reports. This software also enables farmers to use GPS or GNSS navigation in conjunction with automated guidance technology to improve the precision of agricultural machinery and optimise sowing, harvesting and fertiliser application procedures.

FieldBee is one of the leading companies in the field of precision agriculture. These web and mobile applications are available in both free and paid versions. In addition, farmers can purchase automatic guidance systems, RTK-GNSS receivers and base stations to achieve centimetre accuracy for all field operations.

Thanks to an autonomous tractor with GPS, the route during harvesting could be optimised and fuel could be saved ("precision farming").

[104] https://www.bmel.de/DE/themen/digitalisierung/digitalisierung-landwirtschaft.html

6.4 Intelligent greenhouses / vertical farming

The idea of vertical farming and indoor farming is no longer a vision, but a reality. Examples such as Europe's largest vertical farm in Denmark or the world's largest in Dubai show that this innovative form of agriculture is already being successfully realised. By growing fruit and vegetables on several levels on top of each other in relatively small areas, vertical farms enable year-round production regardless of external weather conditions.

In these farms, plant growth is optimised with the help of LED lamps, precise climate control and a computer-controlled circulation system for water and nutrients. As a result, impressive yields can be achieved while only a fraction of the space is required compared to conventional farming.

In addition to large commercial farms, there are also smaller solutions such as those from Infarm, whose vertical farms are installed in supermarkets. These enable local and self-sufficient production of fresh vegetables directly on site. There are even fully automated mini farms for domestic use that create ideal conditions for growing leafy vegetables.

The advantages of vertical farming are manifold: it offers solutions for ensuring food security for a growing world population, significantly reduces water consumption, minimises the use of pesticides and fertilisers and shortens transport routes. As a result, it makes an important contribution to sustainability and environmental protection.

However, the high production costs and high electricity consumption are still challenges that vertical farming has to face. In addition, there are still reservations on the part of consumers regarding the use of high-tech in food production and the lack of microorganisms from the soil.

Despite these challenges, vertical farming is a promising alternative, especially in climatically disadvantaged areas, and could make a significant contribution to sustainable food production in the future.[105]

[105] https://www.landwirtschaft.de/landwirtschaft-erleben/landwirtschaft-hautnah/in-der-stadt/vertical-farming-landwirtschaft-in-der-senkrechten

7. Conclusion

The key to improving the quality of training in the agricultural sector lies in strengthening cooperation between the various educational stakeholders. Close links between schools, training companies, chambers and other relevant partners are crucial to ensure that training meets the requirements of the labour market and provides learners with the necessary skills and knowledge.

Cooperation between schools and training companies makes it possible to develop practical training content and ensure that learners can acquire the necessary skills directly in the workplace. Through regular communication and joint planning, schools and companies can ensure that the training meets the current requirements of the agricultural sector and is tailored to the needs of the learners.

The chambers also play an important role in ensuring the quality of training in the agricultural sector. They can act as an intermediary between schools, companies and government bodies and ensure that training meets the applicable standards and guidelines. By organising training courses, workshops and other events, the chambers can help to raise awareness of the importance of high-quality training and promote cooperation between the various stakeholders.

Regularly adapting training systems to changing environmental standards and technological innovations is crucial for the sustainability of the agricultural sector. In view of the increasing digitalisation of agriculture, it is essential that trainees are familiarised with the latest technologies in order to meet the challenges of modern agriculture.

In particular, the integration of innovative technologies such as drones, satellite data and precision farming software plays a key role. Drones offer a wide range of possibilities, from monitoring plant health to applying chemicals, which can increase efficiency and minimise environmental impact. Satellite data allows farmers to obtain precise information about their fields and adjust management accordingly, while precision farming software enables detailed planning and implementation of agricultural practices.

Furthermore, intelligent greenhouses and vertical farming are becoming increasingly important. These innovative approaches to food production enable year-round production regardless of external weather conditions while minimising land consumption and the use of resources. By using LED lamps, precise climate control and automated irrigation systems, impressive crop yields can be achieved while reducing water consumption and the use of pesticides.

In order to meet the demands of modern agriculture, it is therefore essential that training systems are flexible enough to continuously adapt to new technologies. Through close cooperation between schools, training companies, chambers and other relevant stakeholders, trainees can be optimally prepared for the challenges of the future while ensuring the sustainability and efficiency of agriculture.

The need for continuous training and development for teachers to ensure that they have up-to-date knowledge and skills is undeniable. Only through an ongoing commitment to their own professional development can teachers meet the increasing demands of the education system. It is therefore crucial that education authorities and institutions offer

teachers the opportunity to participate in regular training, workshops and professional development programmes.

These training programmes should not only focus on subject-specific skills, but also include pedagogical approaches, new teaching methods and the use of digital technologies. In addition, teachers should be encouraged to engage with current developments in education and integrate innovative practices into their teaching.

By keeping up to date, teachers can not only maximise the learning success of their students, but also create a dynamic learning environment that responds to the needs of an ever-changing society. Ultimately, the continuous professional development of teaching staff plays a key role in improving the overall quality of education and providing students with the best possible conditions for their personal and professional development.

The promotion of international co-operation and exchange of experience is key to the continuous improvement of the education system. By sharing experiences and best practices with other countries, new perspectives can be opened up and innovative approaches identified. This transnational dialogue enables education stakeholders to learn from the successes and challenges of other countries and to adapt and improve their own education system accordingly.

Through increased international co-operation, education authorities, schools, teachers and researchers can learn from each other, adopt best practices and develop joint solutions to global education challenges. This not only promotes cultural exchange and understanding between different countries, but also helps to improve the quality and effectiveness of education on a global scale.

Ultimately, collaboration at an international level offers the opportunity to enrich education for all stakeholders and create a diverse, inclusive and future-orientated learning environment.

The analyses of labour markets show the diversity of challenges and opportunities in the labour and education markets in various European countries, including Germany, Italy, Finland, Lithuania and Norway. Given demographic changes and the shifting economic landscape, it is essential that training systems are flexible and adaptable to respond to changing labour needs in different sectors.

In Germany, the labour market faces the challenge of meeting the demand for skilled workers in key areas such as healthcare, education and the service sector. Investment in education and training as well as the promotion of innovation and entrepreneurship are crucial to strengthening the German labour market and preparing it for future challenges.

Similarly, Italy is also faced with the need to meet the demand for labour in high-growth sectors such as the service sector and industry. Targeted investment in education and training as well as the promotion of innovation and digital transformation will play a key role in this.

In Finland, the service sector is expected to continue to grow, resulting in increased demand for labour in areas such as healthcare and social services, construction and trade. In order to meet the demand for skilled labour, jobseekers must have the necessary qualifications and skills, which requires improved education and training.

Lithuania also faces the challenge of meeting the demand for skilled labour in certain areas such as healthcare and the IT sector. These challenges can be overcome through targeted investment in education and training and the integration of foreigners into the labour market.

In Norway, agriculture is an important sector of the economy, but it is confronted with the use of technology and demographic changes. Financial incentives, education and training programmes and the promotion of sustainable agricultural practices can strengthen the agricultural sector and attract skilled workers.

Overall, close cooperation between government, educational institutions and businesses is crucial in order to adapt training systems to the needs of the labour market and build a dynamic and competitive workforce. By investing in education and training, promoting innovation and digital transformation and creating sustainable jobs, European countries can successfully meet current and future challenges.

May this comprehensive look at Europe's labour and education markets help us collectively seize the opportunities that lie ahead to shape a prosperous future in which education and employment equally contribute to strengthening and enriching our societies.