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O1D1 - REPORT ON ENVIRONMENTAL ENGINEERING AND WASTE MANAGEMENT TRAINING AROUND EUROPE

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Executive Summary

Desk research and literature review for reports and roadmaps of waste management and Environmental engineering training under the Project “VR-WAMA - Improve the Efficiency and the Attractiveness of Environmental Engineering and Waste Management Training with Game Based Virtual Reality” (ERASMUS + 2019-1-SK01-KA202-06079) and are licensed under a Creative Commons Attribution-NonCommercial-ShareAlike (CC-BY-NC-SA) 4.0 International License.

Aim of this report is to evaluate current status of “ecoliteracy” in Slovakia, Italy Romania and Greece and to evaluate Europe as a whole as one influential unit on the behavior of European Union countries.

Current situation of Environmental education and training of VET students

CONTENTS

1	EUROPEAN UNION REPORT.....	6
1.1	SOER 2020 – European Environmental Agency.....	7
1.2	European cooperation in VET	7
1.2.1	VET from education system perspective	8
1.2.2	Vocational education and training characterisation	9
1.3	Main core skills required for green jobs, by skill level of occupation.....	10
1.3.1	Green jobs developments	11
1.3.2	Features of VET for green skills.....	12
1.4	Environmental education and Waste management	14
1.4.1	Environmental engineering	14
1.5	Conclusion.....	15
2	Romania.....	16
2.1	Where to find vocational training.....	16
2.1.1	Stages of secondary education.....	16
2.1.2	The initial professional and technical education (iVET) (ISCED 4).....	17
2.1.3	Eternal factors influencing VET	18
2.2	Developing VET qualification.....	18
2.3	Validation of non-formal and informal learning.....	22
2.4	Environmental education history in Romania.....	22
2.5	Conclusion.....	26
3	Italy.....	28
3.1	VET in Italy	28
3.2	Upper secondary level VET programmes include:.....	29
3.2.1	List of qualifications and diplomas in IeFP VET three- and four-years programmes.....	29
3.3	Post-secondary level VET	30
3.4	Post higher education VET	30
3.5	Key features of Italian educational system	31
3.6	Key competencies in VET.....	32

3.7	General opinion on VET in Italy	32
3.8	Advantages and challenges of the VET system.....	33
3.9	Environmental education in Italy	33
3.10	Italian activities on education development.....	36
3.11	Conclusion	38
4	Slovakia.....	39
4.1	Key Features of the Education System	39
4.2	Stages of the Education System.....	39
4.3	Structure of the National Education System	41
4.4	Demand and supply of training places by field of study 2015/16.....	43
4.5	State educational programs since 2013	44
4.6	Environmental education in Slovakia	44
4.7	Performance standards of VET students in Environmental Education	47
4.7.1	Content standards of knowledge VET students	47
4.7.2	Ecology and landscape ecology.....	48
4.7.3	Environmental protection technology	48
4.7.4	Environmental Monitoring.....	48
4.7.5	Buildings in the environment.....	48
4.8	Information and communication technologies	49
4.8.1	Practical training standards in Environmental education	49
4.9	Content standards of knowledge of VET students	49
4.9.1	Abiotic and biotic components	49
4.9.2	Basics of ecology.....	50
4.9.3	Environmental monitoring.....	50
4.9.4	Information Technology.....	50
4.9.5	Practice.....	50
4.10	Conclusion	51
5	Greece.....	53
5.1	VET in Greece	53
5.2	The education system in Greece.....	54
5.3	Vocational and training system in Greece.....	56
5.4	The curriculum lessons at secondary education	58

5.5	Environmental education	59
5.5.1	Environmental Education in general high schools and technical vocational agricultural school – secondary education	59
5.6	Vocational agricultural training – evening training	60
5.7	Coclusion	61
6	Final conclusion.....	63
7	References	64

1 EUROPEAN UNION REPORT

We are facing an urgent challenge in the area of sustainable development that requires immediate solutions. The main problem remain in question for this century, how to achieve a development that strikes a balance between social, economic and environmental factors. Not only we have to do more, but we have to do it differently. In the coming decade, environmental and climate change challenges will have to be faced in a completely different way than in the past 40 years.

The upcoming EU policies will have to build on current responses to environmental and climate challenges and the latest knowledge that brings essentially different routing practices. Sustainable development of the basic systems shape Europe's economy and life in modern society, especially when it comes to modern housing, energy, food and mobility. In recent years, the EU has implemented sustainability in important policy initiatives such as the circular and bio-economy packages, climate and energy policies for 2030 and 2050. We must clearly emphasize the enlargement, acceleration, streamlining and encourage changes in the behavior of citizens that need to be heard and involved. By speeding up and streamlining the momentum of change, a sustainable economy and circular economy clearly and well-qualified and professionally trained employees will hold green jobs in the near future. For this reason, education and nationwide education are the most important, helping to spread change for the better future.

Sustainable development, green economy and green professions in the course of transforming the current economic model towards a green direction needs improved national program of vocational education as its appears a fundamental prerequisite that will prepare the future workforce of green economy. Employers expect that new employees will have more knowledge, more skills, and will be more intrinsically motivated than employees were two decades ago. But we face a lack of motivation and rather random career choices of students because of low career guidance.

1.1 SOER 2020 – European Environmental Agency

In recent years, the EU has integrated sustainable access into important policy initiatives for 2030 to 2050. In 2020 we face and will continue to face environmental challenges. One of the priority goals is to set up a good life within the capabilities of our planet. We need to find ways to transform the most important societal systems by reviewing consumer life patterns. The coming decade will, therefore, be key to determining Europe's direction in the 21st century. The challenges of the green environment are rooted in global development.

Population increase four times since 1950. There have been significant changes to 75% of the terrestrial environment and 40% of the marine environment. The 6th mass extinction of biodiversity is coming. Morbidity and death due to environmental degradation are four times higher than those caused by aids, tuberculosis, and malaria. Exposure to fine particulate matter in the EU causes 400,000 premature deaths per year. Given the high standard of living, we not only affect the quality of the European continent, but also the quality of the countries from which the EU imports.

According to a summary of past trends, the prospects for 2030 to 2050 are largely on the wrong track for greenhouse gas emissions and land use in agriculture and forestry, energy efficiency and renewable energy in terms of resource efficiency. Urbanization in the context of preservation and enhancement of natural capital will also be a problem.

1.2 European cooperation in VET

In the EU, education and training systems are organised and implemented by the Member States. A detailed overview of national education systems is included in the Eurydice website. While the responsibility for education and training systems lies with individual states, the role of the EU is to support and supplement their capacity. The EU therefore supports Member States through policy cooperation (via the “ET 2020” framework) and funding instruments. These include the Erasmus+ programme and the European Structural and Investment Funds. The Education and Training monitor also ensures this support via a comprehensive, yearly evaluation of education and training systems across Europe.

The EU VET policy vision up to 2020 was set in Bruges Communiqué and Riga Conclusions and is firmly embedded in the ET 2020 framework. This has further evolved through the adoption of:

- A number of Council Recommendation (EQF, EQAVET, ECVET, Validation) and Europass Decision,
- The 2016 New Skills Agenda for Europe with the objective to make VET a first choice,
- The proclamation of the European Pillar of Social Rights in 2017,
- More recently, Council Recommendations on Upskilling Pathways, Tracking Graduates and European Framework for Quality and Effective Apprenticeship,

The EU is also helping to build a European Education Area to strengthen educational outcomes and learning mobility, promote common values and facilitate the mutual recognition of diplomas across borders. Education and training are a critical facet of the EU's broader socio-economic agenda. This agenda includes the Europe 2020 strategy and the European Semester for the coordination of Member States' economic policies.

1.2.1 VET from education system perspective

In the second half of the 20th century higher education and vocationalism resulted in increasing of VET at higher levels and there was the emergency of new VET sectors. In the 1190s the economics crises resulted in new vocational programmes addressing youth unemployment and programmes for retraining. An education system perspective would look at the way VET as an institution continues to evolve over time.

The ways in which VET can be conceptualised as an institution with different concepts are:

- VET as a sector;
- VET as a system;
- VET as organisational field;
- VET as a community;
- VET as a culture.

The change in the global statistic and definition and classification of VET changes over years from “being less important” to “being terminal”.

Nowadays there are at least three distinct features of VET, of which the first two are in decline:

- (a) VET as terminal programmes not providing access to higher education;
- (b) VET focused on the middle level of education;
- (c) VET programmes oriented towards technical or occupation-related content.

1.2.2 Vocational education and training characterisation

Vocational Education and Training is one of two key pathways for young people to enter the labour market. On average 50% of young Europeans participate in initial VET. However, the EU average masks significant differences, ranging from participation rates of 73% to less than 15%. At the time when 40% of European employers cannot find people with the right skills to fill their vacancies, 80% of VET graduates find their first long-term job within six months of finishing their studies. Also young people with a vocational qualification earn 25, 1 % more than those with low level of education.

VET plays a key role also in the continuing professional development of adults. The percentage of companies that had provided any type of continuing professional vocational training in the previous year is increasing systematically from 49, 7% 2005 to 60% in 2015.

In the context of planning economic programs to tackle the economic crisis, significant sums of money have been spent exclusively on tackling climate change and moving towards a low-carbon economy through national aid packages. The relevant costs are mainly related to the energy efficiency of building, renewable energy, low carbon vehicles and sustainable mobility. Green restructuring measures have also been promoted by investing in traditional sectors that can meet the demand for low-carbon products, with large investments in the automotive sector. This in turn has led to environmentally well-developed industries, which have created demand for an increasing number of jobs and for their corresponding skills. Climate and environmental change strategies recognise the need for professional skills for environment. So new development model called sustainable development involves extensive change in the way many people work.

According to Skills for greener future (key findings from 26 countries covered by ILO and 6 countries of European Union by CEDEFOP) the green transition could create millions of jobs, but would require major investments in reskilling. The ILO estimates that in working

towards a circular economy a net total of between 7 and 8 million new jobs will be created by 2030. In circular economy scenario will be created nearly 78 million jobs and almost 71 million destroyed.

1.3 Main core skills required for green jobs, by skill level of occupation

Required across the labour force:

- Environmental awareness and protection, willingness and capability to learn about sustainable development,
- Adaptability and transferability skills to enable workers to learn and apply the new technologies and processes required to green their jobs,
- Teamwork skills reflecting the need for organisations to work collectively on tackling their environmental footprint,
- Resilience to see through the changes required,
- Communication and negotiation skills to promote required change to colleagues and customers,
- Entrepreneurial skills to seize the opportunities of low-carbon technologies and environmental mitigation and adaptation,
- Occupational safety and health.

Required in medium – to high-skilled occupations:

- Analytical thinking to interpret and understand the need for change and the measures required,
- Coordination, management and business skills that can encompass holistic and interdisciplinary approaches incorporating economic, social and ecological objectives,
- Innovation skills to identify opportunities and create new strategies to respond to green challenges,
- Marketing skills to promote greener products and services,
- Consulting skills to advice consumers about green solutions and to spread the use of green technologies,
- Networking, IT and language skills to perform in global markets,

- Strategic and leadership skills to enable policy-makers and business executives to set the right incentives and create conditions conducive to clean production.

1.3.1 Green jobs developments

CEDEFOP and the International Labour Organisation (**ILO**) worked together on the Skills for green jobs report, based on country studies. **CEDEFOP** reported on six EU countries (Denmark, Estonia, Spain, France, UK) and European synthesis report based on these countries was also developed.

According to the EU synthesis report we can explore the policy content, the role of stakeholders and vocational educational and training (VET), while identifying good practices on meeting the challenges posed by new green jobs and the greening of existing occupations. Also according to this report we can summarise major changes in green jobs and employment since 2010, regulations and policies supporting green skills and employment and the role played by social partners, green skills anticipation mechanism and relevant provision in VET.

EU claim diverse economic structure, institutional set-up and policy priorities that all affect “green” skills and jobs developments:

- Countries vary in their approach to defining green jobs and green skills;
- There are different interpretations of the concept of green jobs and green skills;
- Methodologies are still under development or national estimates of the size and shape of green employment have only recently been produced.

At the same time, existing categorisation of sectors and occupations in established data sets make is difficult to identify jobs that are especially green.

Growth in green employment and in policy has been not straightforward.

The growth of green employment since 2010 and the policy response associated with it have no necessarily been linear, they are affected by several factors both external and internal to relevant policy fields. Green skills have been more often taken for granted, and they are already woven into fabric of skills policy and reviews of VET programmes and qualifications.

Policies on green skills and green jobs would benefit from greater coherence.

It tends to be formed de facto from policy decisions made in different policy fields. Green skills tend to be dealt with as a part of existing policy-making processes. There is a lack of coordination between relevant sections of government in respect of green skills too.

Anticipation of green skills tends not to be regular and systematic.

There is a tendency for green skills to be dealt with ad hoc. Needs of permanent mechanisms to ensure continuous monitoring of the demand for and supply of green skills.

Skills development regulations and policies in support of green skills and employment Regulations and strategies focused on green skills and employment are more rarity in European Union countries. Instead most of countries have a set of strategies, plans and legislative acts of parliament related to environmental matter and sustainable development. The mix of ad hoc plans and policies typically include policies to protect the environment, encourage biodiversity, improve energy efficiency and reduce reliance on fossil fuels. Most of them are reaching for carbon reduction targets. The main focus of green policies has been climate protection. In the EU countries national policies and strategies typically provide a framework for action at sectoral and regional/local levels.

1.3.2 Features of VET for green skills.

Qualifications and training programmes have been updated since 2010 in response to the growth of green employment. These updates however, were usually not led by established government process or organised by legislation or strategy. Instead there are common processes to identify skills demanded by the labour market that are applied to VET qualification and programmes, they take into account new skills demands from green employment in respect of existing occupations. Training is mainly a question of adding green components to existing qualifications or programmes.

Different countries have different patterns in their greening of VET qualifications and programmes:

- **Spain** has considerable activity to create new VET diplomas and update existing ones with a focus on skills required for green jobs affecting 17 of the 21 relevant diplomas since 2010.

- **Estonia** has also been updating training since 2010 Sectors with close links to the green economy and green skills experiences in 2017 many active changes and updates in occupational qualification standards in architecture, geomatics, construction and real estate sectors, and several updates in the transport sector and several updates in the transport sector. In 2016 were many updates in automation engineering, energy, mining and chemical industry.
- In contrast several studies in **Germany** have confirmed that new VET trades or university programmes are not needed for green transformation of the economy. Instead emphasis is placed on adjusting existing qualifications and programmes.
- **Denmark** otherwise do not provide detail analysis of what changes in the numbers of green jobs might mean for skills supply and this is attributed to factors such as the flexibility of the training system, which make it easy to incorporate new requirements and the fact that Denmark was an early mover in respect of green technologies and took early steps to adjust is training programmes.

Social partners tend to be less involved in higher education than in VET. Private sector and social dialogue are prominent across the process of designing and implementing VET provision. Respect of green skills takes different forms in different countries, but reflecting the general situation.

- **Germany** is placed on consensus, considered highly influential in the development of training programmes. Also the involvement of the private sector in skills training features strongly in VET owing to the dual system.
- **Denmark** has 50 trade committees with representative of employers and trades unions that determine outcomes, methods, standards and duration of each VET programme.
- In **France** are 14 professional advisory committees managed by ministry of Education, play a key role in designing a new programmes and adapting existing ones to labour market's needs, reweaving programmes and proposing the creation of new ones every five years.
- In **UK** government policy has given business a pre-eminent position in skills policy but trades also plays a role. The Greener Jobs Alliance has been formed by the university and College Union and is focused on building trade union

activities in localities and regions and influencing the curriculum schools and higher education.

- The Green employment programme in **Spain** aim to promote environmental transformation and greening by improving worker's skills.

1.4 Environmental education and Waste management

1.4.1 Environmental engineering

Report on Environmental engineer from "Green skills and environmental awareness in vocational education and training" examines trends in employment, skill needs and training provision for a selected group of occupations likely to be affected by the development of a low-carbon and resource-efficient economy and makes policy recommendations.

- Brief description of high skill level (Architects, engineers and related professionals not elsewhere classified): Design and implement programmes and techniques to manage and mitigate environmental risk arising from industrial hazards, using knowledge of health and safety standards and regulatory requirements, modelling of environmental impacts using IT, and communication skills to advise and persuade colleagues and managers of the need to address risks. In average this position occupies 75-90% male (according to Finland, Netherlands, UK, Slovakia and Hungary).
- Summary of recruitment methods by occupation: Universities are an important source of potential recruits because of the qualifications needed to work in this field in most countries. Recruitment methods also depend on the employer's needs. Employers may recruit university graduates but if they wish to recruit more experienced candidates, they are more likely to employ people who are already employed in a similar role in another company. Similarly, if a particular specialism is required, employers may recruit through advertising on specific recruitment websites/agencies or through subject-specific journals.

1.5 Conclusion

The European Union has presented an environmental convention that aims to improve people's quality of life and make Europe climate-neutral, protect our environment and help companies become world leaders in green products and technologies.

Indeed, as many as 79% of Europeans agree that taking action on climate change will bring innovation, and 93% of Europeans have already taken at least one step to contribute to the fight against climate change.

One of the expected steps is the full implementation of current policies to achieve the 2030 goals. At the same time, it will provide global solutions to global challenges. For the next ten years, sustainable development must become a fundamental principle of ambitious and coherent policies and measures across the whole of society.

2 ROMANIA

Romania's education system is centralized, horizontally and vertically. Responsibility of education strategy, policy and delivery are concentrated under THE Ministry of National Education (MNE). There are several specialised bodies providing input to the ministry, but this is not fully independent evaluation. Locally elected authorities play very little role in the design and delivery of education policies. The MNE directly monitors the implementation of national policies at the local level through the County School Inspectorates (CSIs).

The education system is administered at:

- National level – Ministry of National Education (MEN)
- Central level – cooperation with other ministries
- Local level – local institutions.

The Ministry of National Education ensures the relationship with the Parliament, Economic and Social Council and the representatives of the civil society in matters specific to its field of activity. The education represents a national priority.

General mandatory education has 11 grades and includes the primary education, the lower secondary education and the first two years of the upper secondary education for free.

2.1 Where to find vocational training

2.1.1 Stages of secondary education

The national education system includes the following:

- Secondary lower education or gymnasium (ISCED 2):
 - Secondary lower education or gymnasium with national examination and distribution in upper secondary education units,
 - Secondary superior education (ISCED 3):

- high school education, which includes the high school grades with the following pathways: theoretical, aptitude-based (vocational) and technological,
- 3-year professional education. The graduates of the professional education promoting the certification examination of the professional qualification may attend the high school education courses.

2.1.2 The initial professional and technical education (iVET) (ISCED 4)

The tertiary non-university education includes the post-secondary education:

- The professional and technical education :
 - professional education,(2 - 3 years)
 - technical high school education, (RQQF lvl 4)
 - Post-secondary education. (VET postsecondary school -5 years)

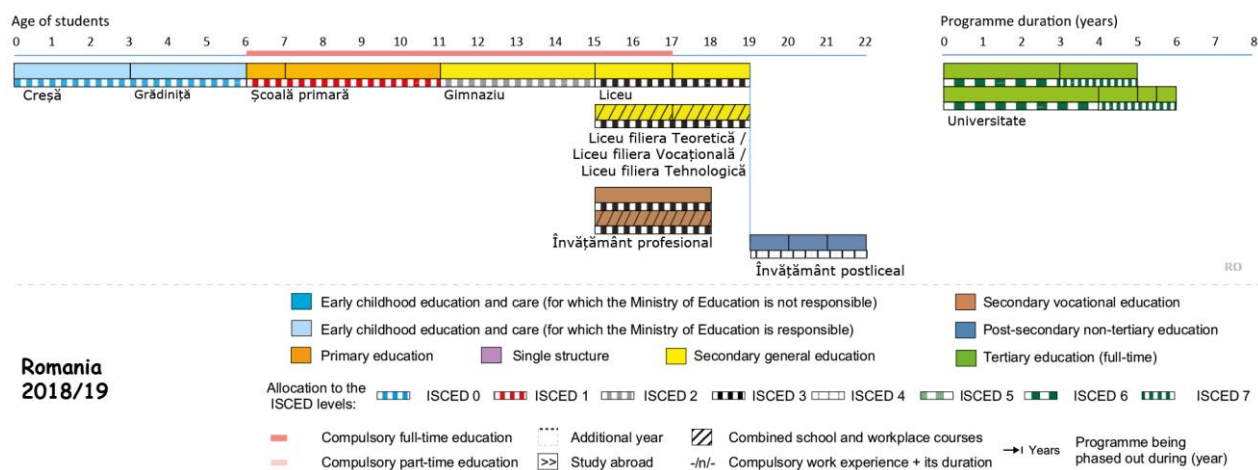


Fig. 1. Structure of the National Education System, source: Eurydice 2018/19

The National Centre for Technical Vocational Education and Training development was created in 1999 and is accountable to the MNE. It develops the quantifications and the national curriculum for initial professional and technical education (iVET) in upper and post-secondary education, according to the National Qualification Framework.

2.1.3 Eternal factors influencing VET

- Demographics: population is ageing, is expected to increase up to 47% in 2060;
- Economy: main sectors are machinery, electrical, transportation, base metals and their production; also services are the main economics sector;
- Education attainment: Romania has the sixth highest share of people with education ISCED- level 3-4, level with low and medium qualification decreased; participation in continuing training increase mostly for females;
- Employment: Since 2016 - the Guarantee plan has put more emphasis on initiatives that combine employment with training of the workforce. The new Youth guarantee implementation plan for 2017-20.

2.2 Developing VET qualification

Initial VET qualification

Training standards describe learning units consisting of learning outcomes and are based on occupational standards. Training standards are developed by representatives of companies from the respective sectors and of VET providers, with the methodological support of the National Centre for Technical and Vocational Education and Training Development, endorsed by National Authority for Qualifications. They are validated by employers and other social partners through sectoral committees. The revision of standards is carried out at least every five years or at the request of economic operators.

Training standards

Training standards play a key role in designing VET curricula, assessing learning outcomes and awarding qualification certificates. To design the training standards and to establish units of learning outcomes in its structure, one or more occupational standards concerned with the qualification need to be analysed as a starting point.

Vocational - national lists of topics for the practical test and evaluation sheets of the themes for the practical test for certification qualifications - Special Education

- MECHANICS *
 - STRUCTURES MANUFACTURER Mont METALICE,

- LACATUS STEEL STRUCTURES AND EQUIPMENT TEHNOLOGIC,
- Locksmith PRESTARI SERVICII
- TINICHIGIU VOPSITOR AUTO
- Confectioner Aluminium and mase plastic

- CONSTRUCTION, INSTALLATION AND PUBLIC WORKS *
 - Carpenters TAMPLAR PARCHETAR
 - INSTALLER plumbing AND GAZE
 - Inlay-Mont PLACAJE
 - ZIDAR-PIETRAR-TENCUITOR
 - ZUGRAV ISPOSAR VOPSITOR TAPETAR

- AGRICULTURE
 - CROPS farmers CAMP
 - Results of learning also - Apply rules of environmental protection.
 - HORTICULTOR
 - AGROTURISM
 - Results of learning also - Apply rules of environmental protection.

- IV.TURISM AND FOOD *
 - BUCATAR
 - COFETAR PATISER
 - WORKER HOTELIER
 - WAITER (waiter) Seller units ALIMENTATIE

- FOOD INDUSTRY *
 - BRUTAR_PATISER_PREP_PROD_FAINOASE
 - PREPARATOR meat and PESTE

- WOOD PROCESSING *
 - TAMPLAR UNIVERSAL

- VII.INDUSTRIE textile and leather *
 - PRODUCT CONFECTIONER TEXTILE
 - CROITOR clothing after COMANDA

- VIII. BEAUTY AND HEALTH human body *
 - BEAUTY AND HEALTH BODY OMENESC

- IX. Printing techniques *
 - The printing OFSET

(* The competences / results of the learning aimed to be achieved (according to the SPP) do not content any Environmental education or waste management competences)

Given the lack of environmental background in the tests, we assume that most of the above-mentioned fields do not contain sufficient information on environmental issues. Since it is important to protect the state of the environment for quality of life, it is necessary that each student at a certain age receives sufficient information about the state of the environment but also about the impact of society on the quality of the environment. Environmental education must be included in every field, but at the same time, it is important to create a field that will train and tutor students who have higher goals in this field.

Romania faces a challenge in raising the quality of education; skills shortage also remains a problem for the country. There is insufficient coherence in the qualification system and a lack of progression opportunities between initial VET, CVET and higher education. Validation of non-formal and informal learning within formal education, needed to support education access and mobility, is not yet possible.

Vocational training standards have been developed since 2003 based on training standards in collaboration with the social partners, validated by sectoral committees, and approved by the Ministry of National Education.

Post-secondary high school technical training

These post-secondary level education has a common goal, to meet the needs of the labour market in the public and private sectors. Courses are planned and organized by the regions and the autonomous provinces on the basis of territorial plans adopted every three years, and they are different in each region.

Higher Technical education and Training courses

Specialization is described according to the demands of the local job market, include a mandatory internship, planned by the regions and managed by at least four training subjects, a school, a VET, a university and a company.

Pathways realise within the Higher Technical Institutes

Courses offering non-academic opportunities at a higher level. The routs form technicians specialised in six technological areas considered strategic for the development of the country. This higher education has to involve following subjects: secondary educational establishment which belongs to a technical association; a training agency accredited by the region for higher education; an enterprices of one of the productive sectors referred to by the higher technical institute; a university department or other body belonging to the scientific and technological research system; a local authority.

POST-VET paths

Student after a training in three or four year and student with completed a second-level secondary school can access vocational courses developed by the regions. These courses are lasing 400 – 600 hours and they are co-financed by the European Social Fund (ESF). Certificate is issued. Courses include also workshops and practical work and they are devided into moduls or units for thematic groups or acquisition of specific skills.

2.3 Validation of non-formal and informal learning

The centres develop their own assessment instruments, based on national occupational standards and/or training standards, to evaluate the candidates. They are responsible for providing validation services following specific requests by beneficiaries/candidates who can acquire full or partial qualifications at EQF levels 1, 2 and 3. Certificates of competences are nationally and internationally recognised. Also, as part of the validation process the centres offer information and counselling to the candidates. Currently, there are 37 fully functioning local assessment centres that can validate prior learning of candidates mainly in services, construction and agriculture.

2.4 Environmental education history in Romania

2.4.1.1 Methods and techniques used in teaching environmental education:

- There is oral communication for pre-schoolers (questions, problem-solving); written communication (textbook and text analysis), visual communication (the language of word, image, and sound) and internal communication based on the internal language.
- Systematic investigation of objective reality for kindergartens and elementary schools. This can be done directly (through systematic review, document study and case study) or indirectly (demonstration, modulation, etc.).
- Basic methods of practical management: outward, real (non-classroom exercises, practical work, and creative activities), imaginary or simultaneous actions such as didactic games and simulation games (for elementary school students).
- Information education for secondary school students: computer instructional courses (interactive lessons offered by AEL-Advanced eLearning); simulations of some processed and natural phenomena in school laboratories or some AEL lessons; use of interactive maps and satellite imagery, etc.

Romania faced a huge challenge from 1990 to 2010 to tackle the environmental problems brought about by the regime change. This change was accompanied by enormous deforestation, which at some point became a serious environmental problem. The answer was several projects and efforts for environmental education across the country.

Although in the period 2010-2013 the public learned about the bad situation and the needs of economic change in the country did not have enough information and instructions on how to proceed. At that time, the first curriculum of environmental education and enlightenment in the country began to develop.

The first step was the emergence of "Prinde radacini" in translation Romania has roots.

It was from Europe that brought the idea to create an educational program that brings ecology to schools. First was the program called "Societatea Carpatina Ardeleanaz district of Satu Mare, Romania" which lasted from 2010 - 2013. This research is part of a project entitled "Developing the institutional structure of environmental education in the border region", which is also part of the cross-border Cooperation Program Hungary - Romania 2007-2013. The project examined air and environment quality with an interesting idea that education is not a form of learning but a tool and key to environmental care.

The second part of the project deals with the applicability of environmental education. The concept of environmental education of this project came up with a proposal for an educational process with five main principles - knowledge, conscience, attitude, competence and participation. At this time, Romanian students did not have formal education in ecology, nor did household patterns and ecology was an optional course. The support was the Green Package, which was to integrate environmental education into all curricula.

At the end of 2008, Satu Mare received a green flag from the World Wide. In 2009, they demonstrated a number of initiatives in the field of environmental education and received international recognition for its efforts.

In 2009 took place VERDIS project, a project that was an initiative of the Associations Eco Tic and MoreGreen and was a campaign of environmental education and awareness of the problem of selective collection and recycling among high school and middle school students in Romania. The project included 20 schools in five cities: Bucharest, Brasov, Cluj, Iasi and Galati. The project proposed these schools a contest focused on the collection of WEEE (waste electrical and electronic equipment), plastic and paper. The program continued with a new challenge: creating a Green notebook of the school for an

environmentally friendly behavior. "Let's Do It, Romania!" is the largest social involvement project in Romania, which aims to empower citizens and authorities regarding proper waste management and environmental enforcement.

In 2010 it held an environmental education campaign carried out among children of the secondary education from Bucharest called "Playing and select" and aimed at awareness of selective collection, as part of the waste stream from collection to recovery.

In 2011 REPORTER Press Group, in partnership with the National Environmental Protection Agency, National Environmental Guard, Environmental Protection Agency from Bucharest and other state institutions launched the project "Eco Attitude = Responsibility, Information, Action" This project was conducted in 14 schools in Bucharest and Ilfov and aimed to educate students in 8th grades to protect the environment.

In 2010 and 2011 thousands of volunteers participated in the "Let's Do It, Romania!" campaign and gathered tons of garbage.

In 2010, the Ministry of Environment launched the EcoWeb, where you can find environmental educational materials for both students and the general public.

In 2013, Romania had three projects and programs to raise awareness of environmental education, such as:

- We play and recycle - this educational ecology program was implemented for preschoolers in thirty-six days in the Satu Mare district between 1 December 2008 and 1 June 2009.
- Schools for an ecological future - this program was implemented by the World Fund for Nature between 5 January and 31 May 2010. This program resulted in a national competition entitled "Schools for a Green Future". This program was addressed to all primary and nursery school pupils from Romania as an information manifesto for preschoolers, kindergartens, students, teachers, parents and local authorities on current environmental issues. The competition was divided into three sections based on the age level of the participants. There were PIPOs for preschool facilities and kindergartens, DOXI for elementary schools and Terra Magazine for secondary schools.

- ECO SCHOOL is an international program aimed at improving the quality of the environment. This program has specific activities that represent an ecological alternative to leisure. The model offers students the opportunity to participate in solving local environmental problems. The program aims to raise the student's level of conscience about environmental problems and sustainable development elements that are realized in the classroom by studying specific actions in school and community.

Green Schools Platform for environmental education and support for sustainable schools in 2009 - 2014. Project was implemented in a context in which public discourse puts rapid economic growth above the protection of natural resources. The project has successfully brought the views of environmental civil society organizations into the Romanian curriculum by promoting an innovative educational approach.

In the academic year 2015 - 2016 - optional **subject Ecological Education** for Green Schools at 41 schools, 47 teachers to secondary school students (75 classes) from Bucharest and 6 other regions in Romania. The educational recipe has been developed on the basis of experiential learning techniques, developing all the necessary educational materials: Student's Handbook, Green Textbook (collection of outdoor and practical activities), Teacher's Handbook and Course Outline. These materials were piloted with over 5000 students, teachers who received help from the project team during their development. "Green initiative's" efforts to support teachers seek to help teachers change the education system so that concepts such as sustainable development gain ground among students and change their behavior. Agreements were signed with 5 district school inspectorates and 12 local NGOs. "Green initiative " also participated in the consultation process initiated by the Ministry of Civil Consultation and Dialogue and the Ministry of Education. A process has started with the Ministry of the Environment, which will eventually enable the introduction of environmental education into the national school curriculum.

The online platform -[http: //www.scoliverzi.ro/](http://www.scoliverzi.ro/) - allowed the association to reach a national reach, with nearly 500 teachers from 40 counties enrolled in the platform and thus had access to educational materials. The project team promoted best practices and

highlighted the work of teachers through short films that had a major impact and made a significant contribution to the sustainability of the project.

According to the results of Environmental education and education for sustainable development in Romania 2019. Romanian preschool and primary school teachers, as well as Geography teachers are interested in environmental engineering and sustainable development. Geography teachers are usually more knowledgeable about the environment and SD than the remaining respondents, but are less involved in environmental engineering and sustainable development activities. The most efficient activities are non-formal ones, held outdoors (hikes, walks, camps, and expeditions), trips and visits to different places, reforestation and forest cleaning campaigns. In order to attain proper environmental engineering and sustainable development, respondents organized hikes and trips in nature for pre-schoolers and pupils, followed by documentary films, cleaning and waste collection, visits in different areas. Pre-schoolers were also involved in systematic observations in the wild. Geography teachers also organized other activities for their pupils involving: educational projects, satellite imagery, educational software, Google Earth, exhibitions, poster design, trips, reforestations and cleaning campaigns, and competitions. Realizing that the deficient environmental engineering and sustainable development of Romanian children and citizens may cause problems at local, regional or national levels, the participants proposed several solutions for the improvement of children's, pupils' and citizens' environmental engineering and sustainable development.

2.5 Conclusion

“Environmentalism in Romania is not always about ecology, the science that deals with studying habitat. Environmentalism became, in secret, almost a political movement. Romanian environmentalism has no longer any real impact in Romanian society. What Romanian State does to protect the environment? It adopts laws, laws that anyone does not respect, laws that are used by certain groups of interest. Is this ecology? Massive deforestation of the Romania forests, does it mean protecting the environment? In Romania, ecologists are still considered dreamers while the West has turned ecology into

a creed, a duty of balance and harmony of nature”: FUNARU Michaela, NICOLAE Carmen-Magda.

3 ITALY

3.1 VET in Italy

General education system in Italy is governed by ministries of education and labour. VET programmes and apprenticeship programmes are run by regions and autonomous provinces. Systematic overview of the educational system can be seen in the graph below.

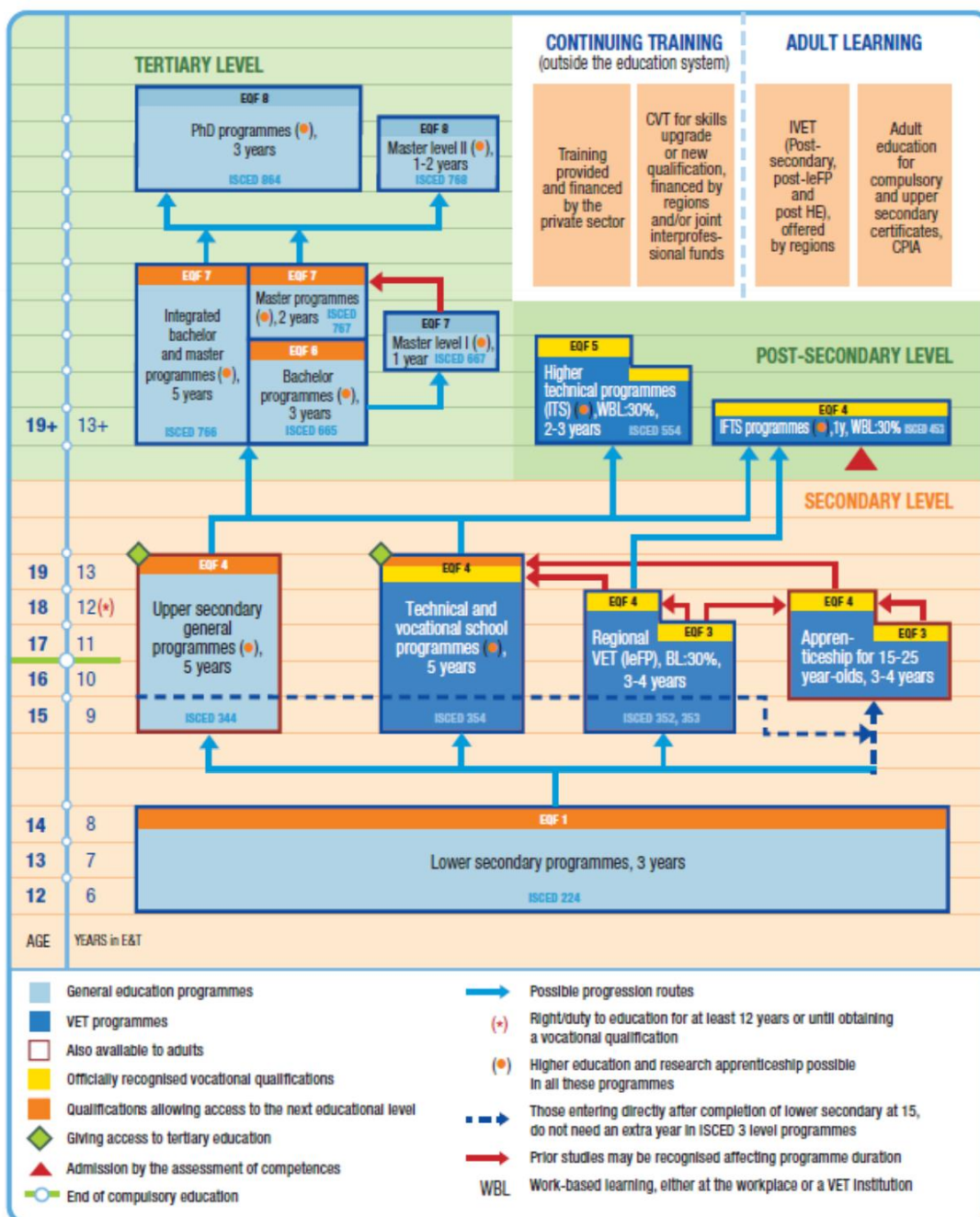


Fig. 2. VET in the education and training system in Italy (Source: Cedefop and ReferNet Italy)

3.2 Upper secondary level VET programmes include:

- Technical end vocational school programmes (*Instituti tecnici, institute professionali*)
 - Five-year programmes at technical schools or vocational schools. Programmes combine general education with VET and lead to technical education or professional education diplomas. Graduates can continue to higher educational levels.
- Three and four – year Regional education and vocational training programmes – **(leFP)**
 - Four-year programmes leading to a professional diploma. There is possibility to enrol for another year and acquire technical or professional education diploma.
 - Three-year programmes leading to vocational qualification. After competition of three years, there is possibility to attend one more year leading to four-year professional diploma. All upper secondary level VET programmes could also be delivered as apprenticeships.

3.2.1 List of qualifications and diplomas in leFP VET three- and four-years programmes.

VET Qualifications	VET Diplomas
Clothing operator	building specialist
Shoe operator	electrical specialist
chemical production operator	electronic specialist
building operator	graphic specialist
electrical operator	artistic work specialist
electronic operator	wood specialist
graphic operator	motor vehicle repair specialist

thermohydraulic plans operator	specialist in running and maintaining automated systems
artistic works operator	industrial automation specialist
wood operator	beauty treatment specialist
pleasure boats assembly and maintenance operator	catering service specialist
motor vehicle operator	enterprise services specialist
wellness operator	sales specialist
catering operator	agriculture specialist
operator for tourists and promotional services	tourist-sport entertainment specialist
secretarial administrative operator	clothing specialist
sales services operator	hairstyle specialist
logistics services and system operator	cooking specialist
food processing operator	thermal plans specialist
agricultural operator	incoming and promotional services specialist
sea and fresh water operator	food processing specialist

3.3 Post-secondary level VET

Post-secondary VET offers higher technical education for absolvents of four of five-year programme. These programmes are led by universities, schools and various training centres. Post-secondary level includes:

- Higher technical education and courses – 1 year (programmes are defined by regions)
- Higher technical institute programmes – 2 to 3 years (Energy efficiency, sustainable mobility, new technologies life, innovative technologies, ICT)

3.4 Post higher education VET

Those who have completed a university degree can access post-higher education courses offering a specialisation in a given field.

3.5 Key features of Italian educational system

In the EC Education and training monitor (2019) the key educational benchmarks between Italy and European standard/target were compared. Weakest points of Italian education and training systems are:

- Early leavers from education and training (age 18-24)
- Tertiary educational attainment (age 30-34)
- Employment rate of recent graduates
- Adult participation in learning (age 25-64)

2019 European Commission Monitor reports highlights several key features of Italian education and training: Italy invests well below the EU average in education, particularly in higher education; The share of teachers satisfied with their jobs is among the highest in the EU, but only a small share believes that theirs is a valued profession; Compulsory work-based learning in vocational education and training could help provide more structured training for apprentices and ease the transition from education to work; The level of tertiary educational attainment is low, and the transition from education to work remains difficult, even for highly qualified people.

3.6 Key competencies in VET

In the 2016 Thematic perspectives on key competencies in VET in Italy, several competencies were described. These competences should be acquired at the end of the compulsory education or training pathways and serve as a basis to continue learning in a lifelong learning framework. In the Italian educational system, key competences are mainly addressed in the lower and upper secondary cycle of the national education and VET system. The 2015 reform involves lyceum and technical and vocational schools and focuses on those key competences useful in working and social contexts, such as:

- language (English) and communication skills through the development of content and language integrated learning
- literacy and the Italian language for foreign learners;
- mathematical-logical and scientific skills
- digital skills, ICT (computational thinking, critical and conscious use of social networks and media)
- musical, artistic, entrepreneurial skills
- active and democratic active citizenship skills, legal and economic knowledge, healthy lifestyles and education on environmental awareness

3.7 General opinion on VET in Italy

The 2018 opinion survey shows that vocational education and training has a positive image in the country, especially in relation to its capacity of providing job opportunities and preparing people for real work. However, when compared to general education, a majority thinks that general education has better image than VET. In general, VET is associated with an education that prepares you for a specific occupation. VET graduates are generally more satisfied with their education levels than those with general education. In the case of developing work-related skills, VET graduates are far more satisfied than general education graduates.

Survey results also shows that in terms of key competences, on the other hand, such as mathematic skills, VET graduates perceived to have developed less those skills during the upper secondary education than the general education graduates. In the labour market,

VET graduates can find a long-term job in a shorter period of time than general education graduates.

Overall the survey while provides a rather positive picture of VET in Italy, also suggests that the major problem in improving its image relates to the perception of VET as job related training. Indeed, VET is often seen as a type of education that allows you to get a job fast, but not necessarily a well-paid, well regarded job and often less attractive job.

3.8 Advantages and challenges of the VET system

Advantages of VET system	Challenges
	Country-wide differenecees in qualification
	Dual VET programmes do not adress young people under 20
Advisory role of cosial partners	
	IVET dous not meet labour market needs
	Low participation in dual training programmes

Vocational training in Italy is provided independently from general programmes. Both systems shave evolved independently.

The education system and vocational training system (Sistema di istruzione and sistema della formazione professionale) have been brought together and are considered as a right and a duty (diritto-dovere) to be practised for 12 years (from 5 to 18 years of age). This approach has given vocational training a positive image as it is promoted on equal terms with the mainstream programme. It guarantees that each young person has a mainstream or vocational qualification before entering the job market. Vocational education streams have been reorganised and enhanced and apprenticeship contracts have been modified.

3.9 Environmental education in Italy

Italian law defines civic and citizenship education as key objective of education and it is one of the priorities of the 2014-2020 National Operational Programme for the Structural

Funds 2014-2020 for the education sector co-funded by the Structural Funds. One of the supporting objectives of the programme is Environmental education.

Environmental education aims to form citizens able to tackle environmental challenges, knowledgeable about the contents of international climate change agreements, mindful of environmentally responsible behaviours and aware of the characteristics of the territory they live in. Students will be able to develop “reduce-reuse-recycle” schemes, to devise and implement projects for sustainable mobility and for adopting, managing and caring for green spaces, parks and urban spaces.

It is analogical, that this type of education builds solid ground for higher education in the fields of environmental engineering and management.

The Italian Strategy for Environmental sustainable development was updated by the Ministry of Education in the Plan for Education to Sustainability on July the 28th 2017. The plan meets the goals of Agenda 2030 on sustainability.

The road map towards the implementation:

- Guide-Lines for Environmental Education 2015 Strategy for Environmental sustainable development, leading to 2016 Agreement for National Operative Program,
- 2015 Reform of school - Knowledge and respect for environment Active & democratic citizenship, 2016 States General – Paper of Rome Signed by the Minister of Education & the Minister of Environment
- 2017 updating of Italian Strategy for Environmental sustainable development by the minister of Education in the Plan for Education to Sustainability,
- National Operative Programme 2014/2020, for schools financed by Structural European funds.

The updating of the Strategy on Environmental sustainable development presented in 2017 is based on:

20 actions in 4 macro areas that intend to assure that all the buildings of the Ministry will be perfectly sustainable, from the central buildings to all the schools and Universities (5 million euro). Moreover, all the staff and teachers will be trained to promote awareness

and ability in education for sustainability. For that purpose, 20 million euro are provided to introduce ESD in the schools of every order and level.

University and research are encouraged and economically supported in the offer of training, courses and graduation in ESD at any level. Scholarships for students' mobility is financed by 65 Ph.D. grants coherent with the goals of agenda 2030.

The institutional effort of the Ministry of Education (MIUR) has been always carried on in synergy with the Ministry of Environment (MATTEM).

Schools and Universities, as micro worlds, need to become completely sustainable, in the buildings themselves, to reduce energy and water consumption (production or storage), in the correct management of waste. Finally, ESD has to be included in programmes and curricula during all the scholastic years and beyond towards long life learning and no formal or informal education. Support, inclusion and empowering have to be ensured to no governmental organizations supplying no formal or informal education and methods of active education.

In the National Education System, ESD is not considered just a further discipline, it is included in the main teachings; in the Ministerial guide lines of 2015 each discipline is re-examined from the point of view of ESD.

Moreover, territorial agreements are strongly supported to involve Local Authorities and Civil Society to contribute to ESD programs with central administration and schools.

The plan behind the updating of the Strategy of ESD presented on the 28th July 2017, has been built thank to a working group of experts, ministerial directors and managers who worked to facilitate networking and collaboration among experts and educators in ESD for the promotion of actions and for the dissemination of knowledge and skills, lifestyles and models of sustainable production and consumption.

The working group made proposals for dissemination of ESD addressed to any level of education and upper education, actions for the development and support of research and university didactics sustainability oriented, the construction of informal education, the support of the good governance of administration.

The plan meets the goals of Agenda 2030 and make of sustainability the main axis which shapes all the policy of the Ministry of Education: from buildings, to teachers' training, from the central administration to the access to the university, to didactics and research. Moreover, the plan was informed by the supporting principles of ESD from UN documents to the Paper of Rome (States General). The Teaching coming from the Ministry of Environment that promoted The States General.

The Paper of Rome recommends to face ESD in an inter-disciplinary and trans-disciplinary optics, according to a systemic vision of knowledge. To use interactive, participative, innovative methodologies, requiring an emotional and behavioural involvement, besides rational thought. It proposes to ensure teachers and educators a kind of training, arousing also the ability to build interdisciplinary routes and innovative participative teaching methodologies, and also to assess their efficacy.

It also invites to involve in education and training a wide network of actors: educators, students, parents, associations, institutions, societies, universities, research teams, an alliance between school and out of school world and to enjoy the reciprocal benefits. In the end, the Paper of Rome advises and insists to start from a stronger link with the territory, through concrete experiences on the field and exploration of the places.

From 2020, Italian school students in every grade will be required to study climate change and sustainability, in an attempt to position the country as a world leader in environmental education. All public schools will include about 33 hours a year in their curricula to study issues linked to climate change. The lessons will be built into existing civics classes, which will have an "environmentalist footprint" from September 2020.

3.10 Italian activities on education development

- The Italian Ministry of Environment and Territory, as required by its institutive law (law 349/1986), is actively engaged in the field of education for environment and SD - education is considered a crucial tool to support environmental and sustainable development policies.

- National System for Environmental Education, Information and Training (INFEA) - is an innovative integrated system directly involving State and Regions in the programming and financing of initiatives. The System operates on the ground through a network of “Environmental Education Centres”
- National report published every couple of years by The Ministry for the Environment - a national report on the state of environment.
- The National Agency for the Protection of the Environment and for Technical Services (APAT) is engaged in various initiatives of environmental education and professional training.
- Well-structured inter-ministerial cooperation between the Ministry for the Environment and Territory and the Ministry of Education, University and Research is in place since 1987.
- On this basis the 1st national conference on environmental education has been jointly organised in year 2000 in Genoa; and the second national conference in November 2004 in Tuscany.
- An agreement between the two Ministries - developing training programmes for teachers on the topic of sustainable development.
- “Globe project” (Global Learning and Observations to Benefit the Environment), an international program on environmental science and education linking students (5 to 18 years old), teachers, and the scientific community.
- The Ministry of Education agreements with the National Organisation of Natural Science Teachers, the Italian Geographic Society, the Council of Architects and Planners; aiming at developing interactive multimedia tools for training on sustainability aspects.
- Italy became partners of MEDIES (Mediterranean Education Initiative for Environment & Sustainability, with an emphasis on water and waste), a Type II initiative launched in Johannesburg and promoted by Greece. This partnership initiative aims at the development and successful application of innovative Educational Programmes in countries around the Mediterranean basin.

3.11 Conclusion

Italy is one of the first countries to introduce climate change education. The education system is supported and environmental education seems to be deeply rooted. Education in the field of waste treatment and recycling at VET schools was not found. It is difficult to say what students perceive as environmental protection as a whole and strive for sustainable development without further investigation. No informal learning groups found. However, this does not indicate that they do not exist. Students probably know about conservation and sustainable development, but they do not become their priorities. It would be advisable to examine the extent of knowledge and the students' relationship to this topic.

4 SLOVAKIA

4.1 Key Features of the Education System

Public schools provide primary and secondary education free of charge. Higher education is free for full-time students as well, providing that they do not exceed the standard length of study. Private and church schools may charge for the provided education. Education in all types of schools (ISCED 0-3) takes place in compliance with state educational programs, which defines the compulsory content. State educational programs are published by the Ministry of Education, Science, Research and Sport of the Slovak Republic (Ministerstvo školstva, vedy, výskumu a športu SR). All primary and secondary school teachers and higher education teachers must have a master's degree.

The Ministry of Education, Science, Research and Sport of the Slovak Republic, the central public administration authority for education, is responsible for the development of the content, goals, and methods of education. Local self-governance is within the competence of municipalities, which provide most of the pre-primary, primary and lower secondary education in Slovakia. Regional governance is within the competence of higher territorial units, which provide most of upper secondary education. Municipalities and higher territorial units organize and fund the cooperation with founders in their territorial competence, provide methodological and counseling services, monitor compliance with generally binding legal regulations and provide space and material to schools they founded.

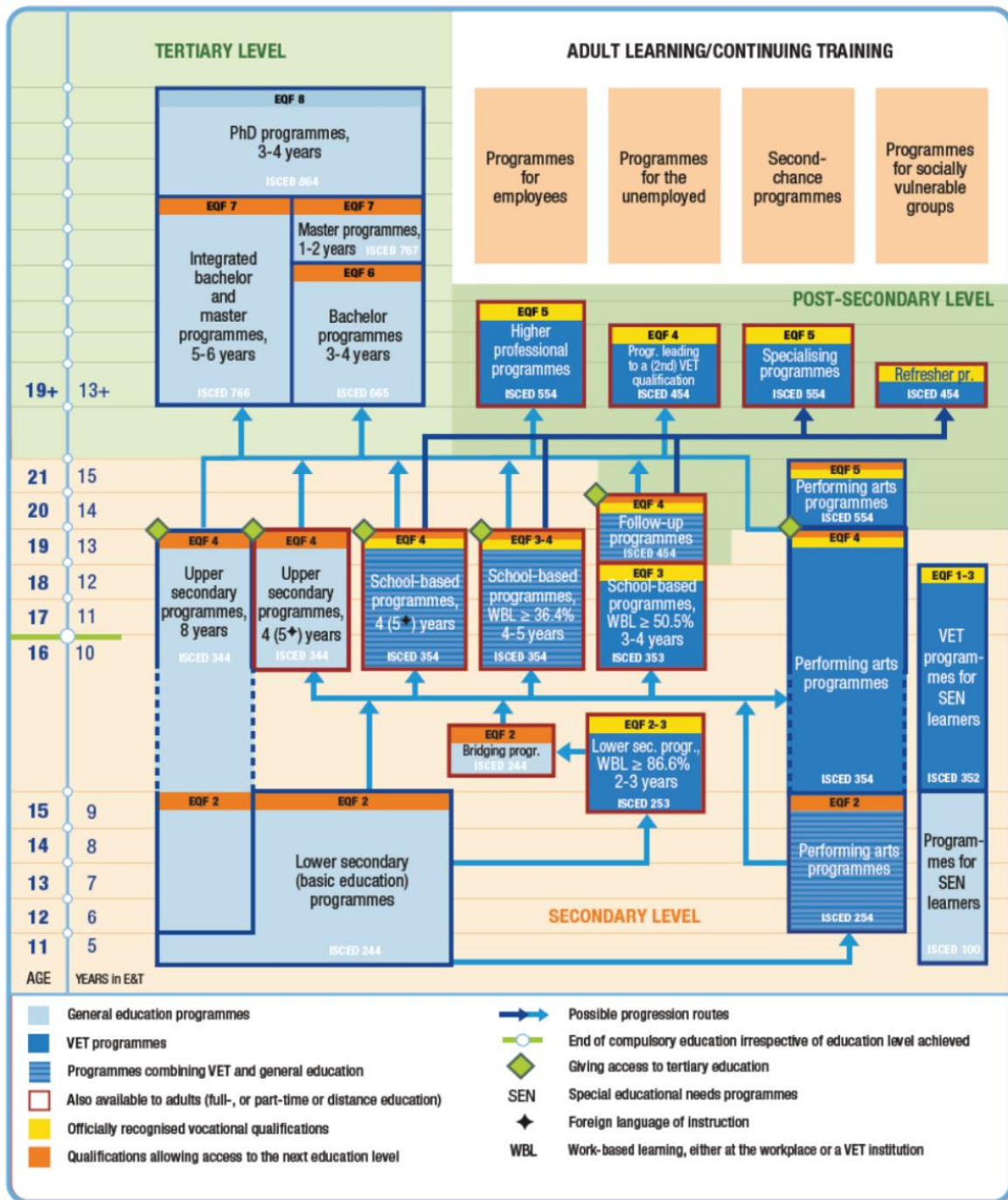
4.2 Stages of the Education System

- Nurseries provide **care of children between the age of 6 months and 3 years**.
- **Pre-primary education** is the first stage of the education system.
- **Compulsory school attendance** lasts ten years (between the age of 6 and 16) and pupils complete it by finishing the first year of upper secondary education or by reaching the age of 16.
- **Primary and lower secondary education** are a 9-year long single structure system (primary education lasts 4 years, lower secondary education lasts 5 years).

Primary and lower secondary education takes place at primary schools (základné školy), where children start to fulfill their compulsory school attendance at the age of six.

- **Upper secondary education** starting age is 15 and its organization structure divides into general, vocational and art education. Four, five or eight-year Gymnasia (gymnázia) (age of 11- 18) provide general upper secondary education. In addition to upper secondary vocational education, secondary vocational schools (stredné odborné školy) also provide educational programs of post-secondary education and tertiary professional education. Study at secondary vocational schools lasts from two to five years.
- **Higher education** has three levels - Bachelor, Master and Ph.D. study programs – fully within the competence of universities (univerzity) and higher education institutions (vysoké školy).
- **Adult education** provides a possibility to supplement, extend and enhance one's obtained education, re-qualify or satisfy one's interests (universities of the third age, language education). It takes place in further education institutions, schools, and non-school institutions.

4.3 Structure of the National Education System



NB: ISCED-P 2011.

Fig. 3. VET in the education and training system in Slovakia (Source: Cedefop)

There is no official definition of an apprentice in the Slovak VET system nor is it a concept defined in legislative (all individuals in IVET are called ‘students’ in relevant legislative). While there is no clear-cut definition of an ‘apprentice’, the term is sometimes used in

common discourse or media. Very recently, the Slovak VET system was organized into two broad school-based VET programs which are part of the secondary educational system:

- Three-year secondary education ending in a final exam resulting in what is called an ‘apprenticeship’ certificate (ISCED 3C level). While this program is often called ‘apprenticeship’ education, it is essentially a school-based VET program (12.9% of all upper secondary education students in academic year 2011/12) that prepares students directly for labor market entry – it does not allow for progression into higher education. Nearly all students in this program (99.8% in 2011/12[2]) have study curricula in which practical education accounts for at least 25% of learning hours, however, it is common that this education takes place in the school rather than at the employer’s workplace.
- Four-year secondary education with a vocational component (ISCED 3A Level) which results in what is called a ‘maturita’ certificate. This VET program covered 56.8% of all upper secondary education students in the academic year 2011/12. However, only about a third of students of this program have study curricula in which practical education forms more than 25% of learning hours – these students typically participate in what is called a study program with extended practical education, which offers both the ‘maturita’ and ‘apprenticeship’ certificates. The practical education typically takes place in school rather than at the employer’s workplace.

Overall, students in study programs leading to ‘apprenticeship’ certificates represented around 40% of all upper secondary students in 2010. However, in 2015 a new Act on VET has been adopted by Slovakia that introduces the possibility for students of ISCED Level 3 VET programs to study them in a mode called ‘System of Dual Education’, which essentially means to undertake theoretical studies in the school and practical education at employer workplace. This newly introduced mode of study can be considered an apprenticeship scheme within the context of this study.

Adoption of the law on vocational education and training (VET) in March 2015 enabled the first generation of students to enter 'dual VET' in the school year 2015/16.

Training is delivered in certified training centers. In contrast to Austria or Germany, where young people have to find a place in a company, companies in Slovakia have to offer training places to young people who participate in VET programs. Companies are free to find individuals and sign training contracts with them, these individual contracts must be complemented by a contract between the company and the relevant VET school which describes how they cooperate.

4.4 Demand and supply of training places by field of study 2015/16

Field of study	Number of places offered by companies	Number of individual contract signed
Engineering and other metal processing	900	280
Electrical engineering	251	89
Textile and clothing	24	0
Wood processing	69	23
printing media	30	0
Building, geodesy and cartografy	58	9
Agriculture and forestry and rural developement	7	0
Economics and organisation, retail and services	99	21
Total	1438	422

The programmes leading to a school leaving certificate (maturita), qualifications that grant higher education access, are more attractive than those leading to an apprenticeship certificate.

There never have been environmental engineering field of study already involved nor Environmental engineering or Waste treatment company in System of dual education.

Vocational education and training aims to acquire the key, general and vocational competencies, more comprehensive and practically focused knowledge and skills that enable the development and overall success of individuals based on their activities, self-awareness, and collaboration not only in familiar situations, phenomena and problems, but also in new conditions of their solution and application.

4.5 State educational programs since 2013

State educational programs (“SEPs”) define the training content approved by Ministry of Education, Science, Statistics and Sport of the SR after discussion with employers, school founders and their professional and interest skills with nationwide activity and departmental ministries within the scope of their tax obligations within the valid tax authorities. SEPs are compulsory curriculum documents for schools of school educational programs, textbooks, textbooks and workbook items, for the control and control of control results.

Environmental education in Slovakia is reported in SEP 39 as Special technical fields. Range of content is underestimated.

4.6 Environmental education in Slovakia

Environmental education in Slovakia has been part of formal education, at both primary and secondary school education, since the 1990s. In this time, it has gone through several conceptual changes. The current model of environmental education was approved in 2006 with education for sustainable development as its priority. This conceptual change was, in 2008, transferred into the National Education Program and environmental education was redefined as a so called cross-sectional topic (it intersects with various educational areas). From September 1, 2015 a new National Educational Program for individual levels of education has been in effect. However, it has not brought about any significant modifications to environmental education at neither primary nor secondary school education. Environmental education has remained a cross-sectional topic as a part of syllabi of different subjects. It consists of pre-schools, schools (primary, secondary,

high), universities, educational institutions, methodological centres. Non-formal ecological education is supported by Ministry of environment according to the Environmental strategy 2030. In 2018 they founded Green fund to support non-governmental organizations focused on non-formal environmental education. There was a long time with a lack of government support for non-governmental environmental education centers. The efforts of all school types to become sustainable schools and inspire their pupils can help in situations can be helpful in the Environmental agenda 2030.

At secondary vocational schools, environmental education is part of biology. Also is one of the cross-cutting themes. At the same time, the State Pedagogical Institute issued methodological guidelines for introducing a cross-cutting topic into school education systems.

We can find various forms of educational processes that focus on possibilities of alternative farming, as well as enlightenment in the field of ecology and relationship to nature, focused especially on such education that brings knowledge through experience:

- School show gardens
- Environmental minimum for teachers
- Ecology film initiative
- Young reporters for environment
- Initiative of the Natural Science Museum
- Green school
- Educational garden
- WEEE education
- Slovak Conservation Council - Initiative on enlightenment in the field of environmental education

The teaching scope in primary and secondary schools and also colleges are rather institutionalized. Teaching that focuses on public takes place through spending the spare time and preferring certain lifestyle that is linked to nature and healthy food. New ways of teaching aimed at primary, secondary and high schools are used by more and more

institutions, confirming its gradual successful implementation in an educational process. Success rate of activities oriented on the general public can be evaluated in terms of a gradual increase in the number of individuals involved as well as in terms of an increase of similar projects and events.

Environmental strategy 2030 ratified by the end of 2018 for Environmental education submits the following key priorities: to improve the quality and efficiency of Environmental Engineering and sustainable development education; to encourage sustainable lifestyles, production and consumption; to support sustainable tourism and promote experiential education in the field. At the same time, support for education in this area is also based on Green education fund – to promote environmental awareness and environmental education with specific focus areas in climate action and low carbon mobility, circular economy, quality of life and green infrastructure and Eco-innovations. According to the Green fund, plans for 2020 in environmental education covered by Ministry of environmental protection are to have accredited Environmental sustainable development courses for teachers (project planning and implementation), adoption of new activating community-based projects (Roots & Shoots, GLOBE), regional strategies for environmental education centres and Education platform for the circular economy.

Also for universities there are few added Environmental courses forms of education as The Socrates Institute University, where students may enrol in a one-year course at The Socrates Institute that offers a program called “Contemporary Society – Challenges and Visions,” which consists of various workshops. This type of education is again the activity of the Centre for Environmental and Ethical Education Živica. The course also teaches topics such as energy policy, ecological agriculture, alternative economic systems, crops growing, and many others. Plus global education is being gradually implemented in the educational process through a project co-financed by the European Union "Modern education for the knowledge society". This project is taught at universities as voluntary two-semester course assessed according to the credit system. If schools decide to include the course in their curricula, they are provided with the study materials, technical support and the possibility of retraining of teachers through multi-day training workshops. Global education responds to current issues in the world - also Environment.

4.7 Performance standards of VET students in Environmental Education

Graduated student has to:

1. characterize the main components of the environment and their relationships,
2. define the conditions for the proper development of ecosystems and humans,
3. characterize the types of sources of contamination and characterize the facilities and options for elimination of environmental pollution,
4. explain physic-chemical and biological methods for sampling and analysis,
5. calculate basic chemical and economic calculations when evaluating selected indicators,
6. be familiar with examples of ecological problems and methodologies for their solution,
7. use legal standards in the environment.

4.7.1 Content standards of knowledge VET students

Abiotic and biotic components of the landscape

Pupils gain basic knowledge of geological sciences, meteorology, climatology, pedology, necessary for the gradual and deeper acquisition of the knowledge needed to understand the interconnection pedosphere, atmosphere, hydrosphere, air dynamics, climate development and climate change factors, movement of matter and energy, development of soils.

It curriculum provides knowledge about the patterns of human relationship to the environment and the evolution of the human population, pupils acquire knowledge about living manifestations of plants and animals, about relations between structure and function bodies, organism and environment unity, development and biocenological relations.

4.7.2 Ecology and landscape ecology

The content of education is focused on basic concepts of ecology and landscape ecology, pupils are able to describe the environment and behavior of organisms in the environment, identify environmental factors biochemical cycles, relief, atmosphere, pedosphere, food factors in relation to living organisms. Receive knowledge of ecology of populations, biocenoses, ecosystems and their function, human development with regard to the evolution of the Earth, global problems, identify the country, the primary and secondary structure of the country, and evolution socio-economic phenomena, analyze and solve ecological problems in different types of landscape. Receive knowledge of remote sensing and LANDEP methodology.

4.7.3 Environmental protection technology

Pupils acquire basic knowledge of processes in industry, agriculture, waste economy, services, transport that pollute the environment - water, air, as well as an overview of the basic pollutants and the impact on human health. They will get to know each other with technical drawing of individual technological equipment for cleaning and polluting and elimination environmental risk, monitoring of individual components and their identification, standards, legislation within the SR and EU. Pupils also gain knowledge about the collection and disposal of individual species waste, their secondary use and importance of waste-free technologies.

4.7.4 Environmental Monitoring

The content of education leads pupils to gain knowledge about physico-chemical methods for determination of chemicals, apparatus and equipment, sampling methods, bases biomonitoring and zoom monitoring.

4.7.5 Buildings in the environment

Pupils gain basic knowledge about the impact of urbanization and large industrial works on living environment and man and the possibilities of eliminating negative impacts such as noise, vibrations, erosion, landslides, radiation, and increase of pollutants, reduction of

fertile areas, disturbance ecosystems and climate. They will acquire knowledge about conflicts of interest, spatial ecological planning, get acquainted with Environmentally friendly approaches and ecological proposals that are needed to increase population in correlation with saving raw materials and improving living conditions.

4.8 Information and communication technologies

The content of education leads pupils to use the operating system, office software and work with normal application software including specific software which is used in the art.

4.8.1 Practical training standards in Environmental education

Graduate knows:

1. master basic operations in a chemical laboratory and microscope,
2. be able to use appropriate apparatus, working equipment and materials,
3. respect the principles of occupational safety and health,
4. design procedures for project design and exhibitions,
5. apply word processing programs, spreadsheets,
6. presentations in all areas,
7. prepare the basic technical documentation in electronic form,
8. prepare economic documentation and administrative documentation,
9. to design environmental plans, models and maps of conflicts of interest.

4.9 Content standards of knowledge of VET students

4.9.1 Abiotic and biotic components

The student can identify crystallographic systems, mineralogical system, recognize magmatic, sedimentary, metamorphic minerals, explain geological mapping, know the rules of work in the laboratory, create a laboratory protocol, adhere to the basic regulations of work safety and health protection, work with a microscope, preparation of plant and animal cell to measure, knows to solve examples from genetics.

4.9.2 Basics of ecology

The pupil can apply theoretical knowledge of ecology in solving ecological problems in the chosen one creating ecological plans, conflicts of interest, modeling ecological problems (eg erosion, waste, tourism), work with maps at different scales and create your own map outputs.

4.9.3 Environmental monitoring

The student is able to apply theoretical knowledge in obtaining samples from water, soil food and analyse selected indicators and compare with the relevant standards. Can create a database of data, evaluate them graphically. He / she can process the protocol, operate laboratory equipment, use protective equipment and adhere to basic occupational safety and health regulations.

4.9.4 Information Technology

The pupil can use the software in processing ecological projects, databases, photo documentation, creation and processing of map attachments, identification of sources of environmental contamination, identification secondary landscape structure. The student is able to process text, spreadsheets and prepare a presentation on a given topic.

4.9.5 Practice

The pupil can use organic waste for composting and inorganic waste to create new ones utility objects. It uses materials such as paper, wood, plastic, glass, metal. Can create a database, take pictures, create projects, and organize exhibitions. Pupil gains practical experience and skills in manufacturing companies eg. sewage treatment plants, drinking water treatment plant, quarry, nuclear power plant, brewery, chemical plants, etc. as well as in universities, environmental departments of district offices.

Some sources consider that for students in upper school, or VET ethics education is about mental practices as analysis, synthesis, comparison, induction and deduction, convergent and divergent thinking but most of all critical dialectic-non-linear thinking and

abstraction. This thinking is “typical for creation of alternatives, hypotheses, exploration, speculation, possibilities evaluation and creation of new ideas and approaches”.

Recommendations for teachers are to use methods and procedures based on experience and the experience of students. Very appropriate are investigative methods, experiment, group problem solving, discussion, simulation, role playing, authentic teaching and project learning. An example might be a yearlong project, which will be more themes from several subjects. In teaching may include cooperation with organizations working in local schools or region (forests of SR, Nature Protection, Club of Slovak tourists, Union of Nature and Landscape). Suitable filling teaching are walking associated with useful activities (garbage collection, cleaning of the exterior walkways, clean streams and wells). This form of learning can also contribute to increase the interest of students in science subjects. In addition to developing a positive attitude towards science, science knowledge and construed as an integral and indispensable part of human culture of the region. It's difficult but even more valuable work of all teachers who choose and implement the educational process activating modern forms.

4.10 Conclusion

Despite high efforts and enormous public pressure, it should be noted that the content of education and the above-mentioned subjects or cursors do not correspond to the content that needs to be introduced into schools today. Pupils cannot distinguish between a problem and its cause or manifestation. In the field of recycling, they are oriented in mostly publicized problems, they can sort out plastic, glass, and paper. They have a problem with biodegradable waste, composite materials, hazardous waste or electronic waste. This deficiency is due to the promotion of ecology, not environmental education. Unlike ecology, environmental science brings a deeper insight. Although environmental education is spreading and actually supported in Slovakia, there are many local groups and protectors who often disseminate information that we could consider based on unstable sources or superficial answers to current topics. The basics of education, as well as the desire to learn about the environment and sustainable development, should above all ask companies and incorporate them into the concept of dual education in Slovakia.

Unfortunately, environmental policy in Slovakia is still limited by the political group in power, there is no such demand for firms in the field of environmental education or sustainable development. This phenomenon is partly due to the fact that we are a post-communist country.

Slovakia has average environmental and ecological information, but we need to improve our knowledge and literacy in this field through experiential learning and excursions in drop-out societies.

5 GREECE

1. Ecology in Greece

Ecology is a particularly new section in Greece. Every year more and more ecological issues come up and have to do with forest protection, cleanness of beaches, maintenance of lakes and biotopes. One of the most important problems that Greece faces every summer is the forest fire, another problem linked with tourism and overflowing Greece with tourists and trash. In this field The Greek Minister of Environment decided to take ecological actions in early past. More active are individuals and many environmental organisation have been set up. As have been found Greece is still learning to handle the waste problem as it is.

5.1 VET in Greece

Greek society has always been characterized by strong demand for general education and university studies. This trend reflects sociological stereotypes, developed after World War II, and has affected the overall attractiveness of VET in Greek society. Major weaknesses and challenges are a) higher dropout rates in comparison with general education; b) multiplicity and complexity of legal framework; c) lack of continuity in design and implementation of VET; d) problematic linkage with the labor market. On the other hand, positive reforming of VET as a) infrastructure of the finest quality; b) extremely qualified teachers are not helping in the opinion of young people who still see vocational education as a last resort, suitable for lower economics brackets.

External factors influencing VET in Greece are demographics, social developments, economic background, labor market, and education attainment. Greece has one of the world's most rapidly aging populations and by 2050 it is estimated that the number of over 65 will have risen to over 32% of the population from 20% in 2016. Population aging is for Greece one of the biggest challenges. Particularly this could lead to a downward spiral of less economic efficiency-related current expenses for infrastructure, teacher training, etc. Present infrastructure and teachers may well become obsolete and furthermore, this reflects on student's performance. The second biggest challenge is

according to the 2014 Eurostat data 7,7% of the population of Greece comprises non-Greek nationals. Since the 2015 authorities have noted a multi-fold increase in the number of migrant arrivals of Greece's shores. The complexity of Greek demographics is shaped by one additional factor, gradually increasing movements of Greek nationals, mainly young and well educated, to European countries and the USA. This includes VET graduates.

Growth in the tourism sector in Greece during 2015 led to an increasing need for skilled personnel. Investment continued to lag in growth compared to other GDP components while the change in inventories had a substantial negative contribution to GDP also investment shortfall is an issue of concern for the whole education system, including VET. Loss of opportunities for skilled graduates searching for work becomes a part of a vicious cycle during which VET becomes even less attractive.

According to the CEDEFOP skills forecast 2018 will employment growth increase 6,5% from 2016 to 2030. The fastest-growing sectors in this period are manufacturing 1,2% and distribution and transport 1,1%. The highest demand occupation in 2016 - 2030 will be sales workers, personal services workers, and market-oriented skilled agriculture workers. The most important information is that about 1 in 3 new job openings will relate to high-skilled occupations.

5.2 The education system in Greece

Education in Greece is separated into 3 stages (Primary, Secondary, Tertiary). Post-secondary initial vocational training, which leads to the receipt of a certificate, is not considered a part of the formal education system. The Greek educational system can be summed up in the figure that follows.

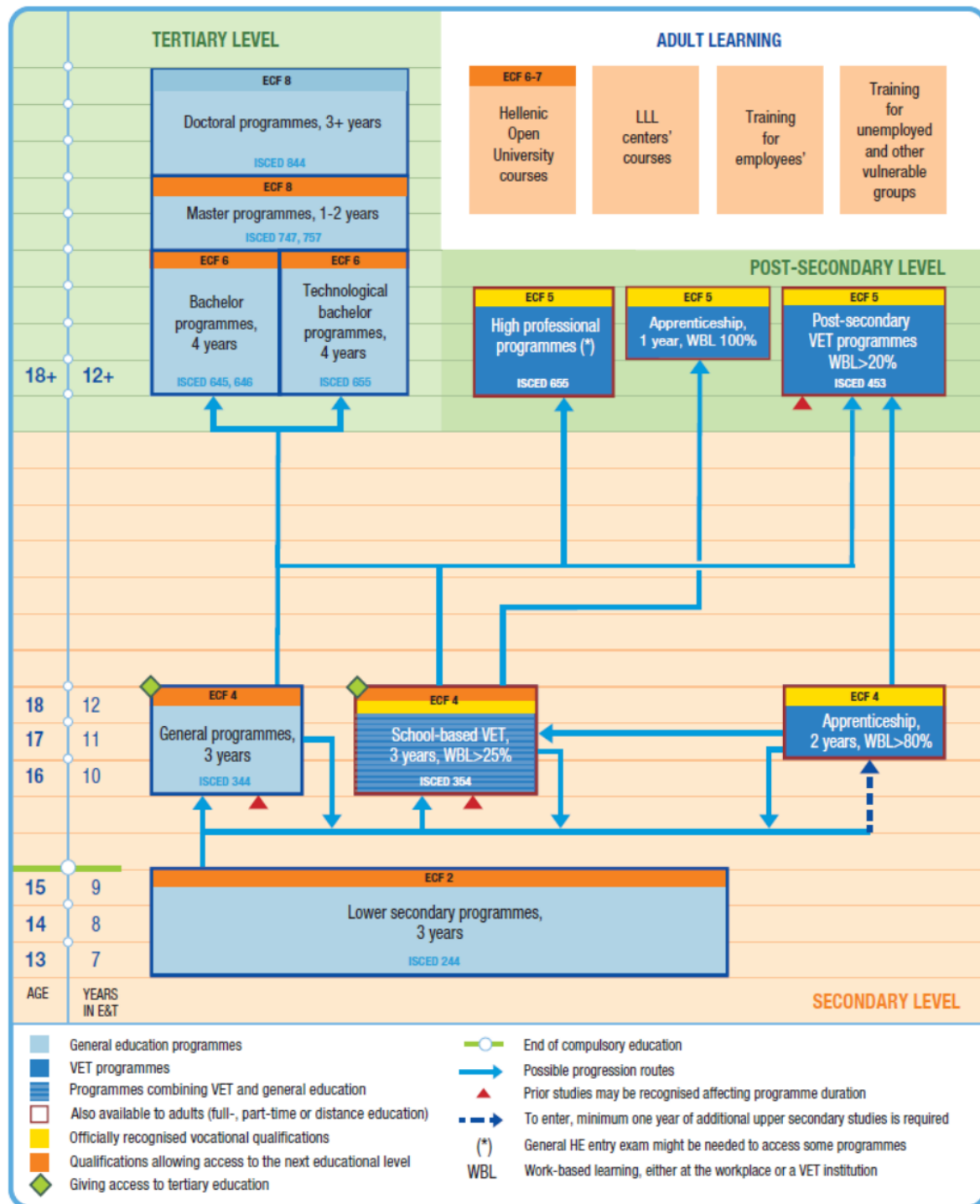


Fig. 4. VET in the education and training system in Slovakia (Source: Cedefop and ReferNet Greece)

5.3 Vocational and training system in Greece

Schooling is compulsory for all children aged 5 to 15 in Greece, includes primary and lower secondary education (three years), at a day or, for working students, an evening school. Graduation from lower secondary education completes the cycle of compulsory schooling and students can then choose whether to continue in general or vocational education. Students can:

- enter upper secondary school (3 years)
- continue in general education - general upper secondary school (GEL) (3 years, qualifications at EQF/NQF level 4)
- attend evening schools for working students (4 years).

In the first year the programme is general, while in the second and third years students take both general education and special orientation subjects.

According to the new law regulating -amongst others- upper secondary VET (Law 4386/2016), students have the following options in addition to the general upper secondary school:

- initial vocational education within the formal education system in the second cycle of secondary education at a vocational upper secondary school (day or evening school);
- initial vocational education at an apprenticeship school (EPAS) at the upper secondary level. The function of EPAS schools supervised by OAED (regulated by Law 3475/2006) has been prolonged till the academic year 2020- 2021 (those enrolled into the first class in 2021 may finish their studies in 2022);
- initial vocational training (outside the formal education system, referred to as non-formal) in post-secondary vocational training institutes, centers for lifelong learning and colleges, and also the post-secondary apprenticeship year (or apprenticeship class) for EPAL graduates.

In 2015 Greek State has set specific VET related goals to improve as: a) creation of a common Quality framework for VET and apprenticeships, b) creation of a skills

forecasting mechanism and procedures for the reforming of VET curricula and certification, c) facilitation of partnerships with the private sector and regional and local authorities, d) development of an implementation plan. Though it is obvious that the reforming of the Greek VET system is high on the education agenda, legislative action cannot solve problematic linkage with the job market and economy, social dialogue with stakeholders, and low attractiveness of VET. And rural areas are far behind in modern education.

SECONDARY EDUCATION - VOCATIONAL EDUCATION

- Vocational High School Epagelmatiko Lykio
- Vocational Evening High School Esperino Epagelmatiko Lykio
- Vocational Training Schools Scholi Epagelmatikis Katartisis

The Epagelmatiko Lykeio (Vocational Lykeio - EPAL) and the Epagelmatiki Scholi (Vocational School - EPAS) offer a curriculum in which general and vocational education are combined. The Epagelmatiko Lykeio takes 3 years to complete, while the Epagelmatiki Scholi takes 2 years. If the chosen program includes an apprenticeship or on-the-job period, attendance is extended up to 1 year. Admission to both EPAL and EPAS is granted based on the Apolytirio Gymnasiou (lower secondary school leaving certificate). Enrolment into the first year of the Epagelmatiki Scholi is based on preference for the courses provided. The specializations offered by the EPAS depend on the demand of the pupils, the socioeconomic conditions, and the needs of the area. Graduates of the EPAS are granted an ISCED-level 3 Vocational Title.

Graduates of an Epagelmatiki Scholi (EPAS) have the option to:

- receive a license to practice a trade or profession (upon completion of exams);
- enrol in the second grade of the EPAL;
- register at an Institouto Epagelmatikis Katartisis (Vocational Training InstituteIEK) in a similar specialisation.

The curriculum of the Epagelmatiko Lykeio (EPAL) consists of general education subjects and technical-vocational education subjects, the latter including theoretical, workshop, design and combined (theory and workshop) subjects, for a total of 35 hours

per week. Graduates of the EPAL are granted a School Leaving Certificate equal to that of the Geniko Lykeio. The final mark on the School Leaving Certificate is the average mark of the subjects of the last grade. The School Leaving Certificate also lists the field, specialisation and marks obtained in the subjects of the last grade. Graduates of the Epaggelmatiko Lykeio (EPAL) have the following options: 1. to seek admission to HEIs (upon completion of national examinations); 2. to receive a license to practice a trade or profession (upon completion of exams); 3. to enrol in an Institouto Epaggelmatikis Katartisis (Vocational Training InstituteIEK)

5.4 The curriculum lessons at secondary education

The curriculum includes basic lessons in general education and technological lessons (theoretical and laboratory) in specific fields and specializations. The following subjects are taught at both cycles:

- Mechanical engineering
- Electronics
- Electrician
- Applied Arts
- Textile and Clothing
- Construction
- Economics and Management
- Agricultural Production, Food and Environment
- Health and Welfare
- Chemistry Laboratory Applications
- Maritime and Shipping Occupations
- Information Science and Networks
- Aesthetics and Hairdressing

5.5 Environmental education

5.5.1 Environmental Education in general high schools and technical vocational agricultural school – secondary education

The design and implementation of environmental education are largely based both on the will and the voluntary participation of students and teachers. In school willing to develop environmental education activities, teachers organize preliminary discussions and meetings, primary between themselves and afterward with students, to formulate proposals for environmental education. Environmental education offices exist in each department of secondary education through the country.

The role of these offices are:

- Environmental student groups
- Environmental education networks
- The nomination of environmental subjects
- Connecting environmental knowledge and action

In technical vocational schools, there is a department for agricultural production and natural resources. This department includes specialization:

- Plant production
- Animal production
- The technology of agricultural products

The analytical program of the first year of study includes the Management of natural resources – environmental protection. The second-year contains the Utilisation of natural resources and third Environmental protection management and Professional environment.

Environmental education in high school is provided through the activities developed by the environmental education office. In technical vocational agricultural schools, it is developed both by the contribution of the environmental education office and the courses.

Environmental education is nowadays dealt with in all university faculty especially in agriculture, forestry, biology, and chemistry.

5.6 Vocational agricultural training – evening training

KEGE provides vocational agricultural training for those involved in agriculture or who are going to be involved – young people, only if they wish it. Vocational agricultural training is also a criterion for participation in EU framework development programs for agriculture.

This courses are also for workers aged up to 50 who wish to improve their job prospects. The applicants are accepted without examination but must possess either a Gymnasium leaving certificate or an equivalent certificate issued abroad.

Agricultural modernization in Greece, unlike in other European countries, was slow. Traditional agricultural practices can still be found in various areas. Until recently the environmental damage caused by conventional agriculture could not always be seen. As a result, the idea of a conscious form of organic agriculture was hard to understand for farmers, consumers and even scientists. It is commonly accepted that certification, when possible, should be carried out by local bodies, i.e. people who are familiar with the peculiarity of local conditions.

The Bureau of Organic Products, Department of the Ministry of Agriculture, is responsible for everything concerning organic farming. It also deals with the supervision of the implementation of EU regulations, participation in meetings at European level, transfer of EU regulations into Greek legislation and supervision of certification and inspection processes. It should be noted that apart from EU-funding, organic farming is not financially supported by the Greek government.

Also according to the information found on the internet, students of secundary education, living in isolated areas of Greece with the implementation of distance learning, have a difficultes to cover wholly the leartning system at the student's interests. The local

communities in these areas do not offer to the student of today further education from that which the school offers. There is a significant inequality in the chances of learning that are being offered to the students of urban centers and the students of rural areas. Distance learning could operate supplementary with the conventional, offering contributory teaching and supplementary didactic support, subjects that belong to the curriculum and are not taught, as well as subjects that are not in the curriculum but interest the students aiming at the equality in the opportunities of learning.

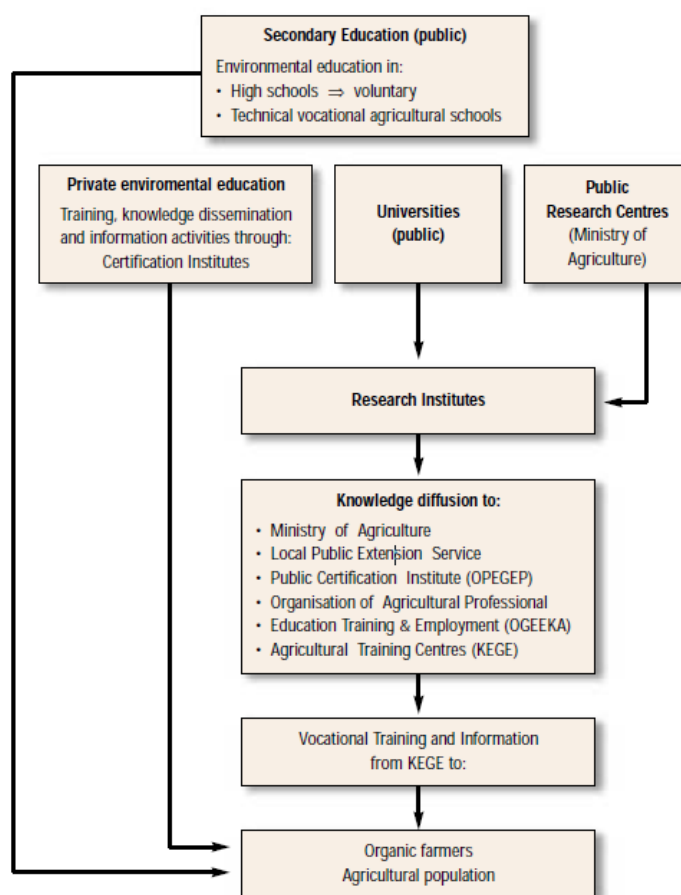


Fig. 5 Environmental education in Greece

5.7 Conclusion

Given the nature of the area, a large number of rural settlements, and the strong development of tourism, it is necessary to introduce environmental education for VET and to support the dissemination of this education in the form of ICT in remote areas. Greece

faces the challenges of climate change perhaps the most among the countries in the project. At the same time, Greece is one of the most important active agricultural countries. Organic agriculture is not a novelty in this country, but it is necessary to support Greece in ecological and sustainable ways of doing business and at the same time introduce ecology as a compulsory subject, especially in the tourism and agricultural sector. Support for environmentally active offices, which are already in schools in the form of an educational game, will clearly be very beneficial. Helpful should be also a spread of collaborations among existing educational organisation from Greece and another countries to exchange and share knowledge.

6 FINAL CONCLUSION

Each country is unique and, in each country, the level of knowledge is at a different level. On the one hand, we have a reluctance of students to choose VET education, anyway, it does not include environmental programs specified for the given market needs in a given country. On the other hand, however, we have a new sustainable strategy that is pushing Europe forward, the effort, and the need to protect the environment. According to desk research, by using ICT technologies for the environmental theme, we will also address students from disadvantaged groups living in remote corners, socially weaker families, or in some cases even immigrants. VET students may “HAVE A FIRST TOUCH” with ecology, but they can acquire continuous and intensive learning in this direction only at universities. To provide students with the opportunity to study in the program also means an increase in employment in the countries according to the green jobs and future sustainable development EU strategy.

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