



Embedding citizen deliberation and deliberative democracy for sustainable development into the official VET curricula

Pedagogical Guide: Citizen Engagement and Deliberative Democracy for Climate Action in Vocational Education and Training (VET)

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Table of Contents

Deliverable Factsheet	2
Consortium	3
Table of Contents	4
List of Figures	6
List of Tables	7
Learning outcomes	8
Target groups	8
Structure and components of the Guide	8
Materials and resources	9
Unit 1: Pedagogical approaches for using citizen deliberation (CD) in the context of the Green Deal for VET-specific courses	10
1.1. The European Green Deal	12
Value of the Green Deal for the Agricultural sector	13
Value of the Green Deal for the Energy sector	14
1.2. Environmental education in VET curricula	15
“Greening” the VET sector	17
1.3. Incorporating citizen deliberation for climate action in VET courses	20
Unit 2: Deliberative democracy: barriers and opportunities for adoption in the VET sector	22
2.1. Citizenship education in the VET schools’ curricula	24
2.2. Barriers to the adoption of DD in the VET sector	25
2.3. Opportunities for the adoption of DD in the VET sector	28
Unit 3: Radical climate action: understanding motivations, combating radicalisation	30
3.1. Introduction and preliminary definitions	30
3.2. Motivations to engage in climate action	32
3.3. Movements active in climate action	35



Educators and researchers in VET as active citizens	40
3.4. Types of climate action	41
3.5. How deliberative democracy in VET can respond to the need for urgent climate action	44
Unit 4: Democracy in practice: how democratic principles of argumentation can be adopted in “heated” topics of discussion and leverage the VET sector	46
4.1. The art of hearing and dialoguing: building democratic values in the VET sector	47
4.2. Designing deliberative processes in VET schools	50
4.3. Engineering and Agriculture sector “heated” topics of discussion answered through citizen deliberation	53
Unit 5: Insights into the Agriculture sector in VET	55
5.1. Types of Agricultural practices	57
5.2. Agricultural impact on VET	62
5.3. Environmentally educated and deliberative society – hope for the future	64
5.4. Agriculture and Climate Change	66
5.5. Best practice: Climate adaptation of agriculture through permaculture in VET	68
Unit 6: Citizen science in VET schools as a bridge between citizen engagement, deliberative democracy and active learning in education contexts	70
6.1. Citizen Science	70
6.2. Citizen Science in VET schools	72
6.3. Citizen Science in deliberative processes	74
Conclusions	77
Acknowledgments	78
Bibliography	79
Secondary Resources	90



List of Figures

Figure 1. Surface air temperature anomaly for June 2022 relative to the June average for the period 1991-2020. Data source: ERA5. Credit: Copernicus Climate Change Service/ECMWF 10

Figure 2. The interconnection between human society and climate change, and the way towards a more climate resilient future for humanity, Source: IPCC, 2022: Summary for Policymakers, p.8, <https://www.ipcc.ch/report>..... 11

Figure 3. The European Green Deal, Source: SUSEET, <https://www.suseet.eu/2020/02/29/climate-change-eu-strategy-european-green-deal/> 12

Figure 4. The UNESCO publication “Education for Sustainable Development Goals, Learning Objectives”, 2017, Source: https://www.unesco.de/sites/default/files/2018-08/unesco_education_for_sustainable_development_goals.pdf 15

Figure 5. Visual representation of GreenComp, The GreenComp, 2022, Source: <https://publications.jrc.ec.europa.eu/repository/handle/JRC128040>..... 16

Figure 6. UNEVOC, Greening Technical and Vocational Education and Training, A practical guide for Institutions, 2017, fig. 1, p.12, Source: <https://unevoc.unesco.org/up/gtg.pdf> 18

Figure 7. One form of citizens’ participation in shaping policies are citizen assemblies like the one this photo is showing, Source: <https://www.positive.news/society/politics/citizens-assemblies-go-mainstream-a-way-to-bring-about-radical-change/> 21

Figure 8. Brussels Citizens’ Assembly, Photo credit: Edwin Andrade – Unsplash, Source: <https://ldnet.eu/towards-a-brussels-citizens-assembly/> 23

Figure 9. Rebellion photo created by Drazen Zigic, Source: www.freepik.com 25

Figure 10. Protest photo created by freepik, Source: www.freepik.com 27

Figure 11. Youth together, Source: www.freepik.com 28

Figure 12. There is no planet B, Source: Unsplash 31

Figure 13. Planet over PROFIT, Source: Unsplash 33

Figure 14. A placard saying “Climate Justice Now!”, Source: Unsplash 34

Figure 15. Camp for Climate Action, 2006, Source: <https://risingtide.org.uk/content/camp-climate-action-2006-location-decided> 36

Figure 16. Fridays For Future climate march, Source: Unsplash 37



Figure 17. Placard in an Extinction Rebellion climate march “The Climate is changing, so should we! #ACT NOW”, Source: Unsplash..... 38

Figure 18. An example of Extinction Rebellion climate action, Source: Unsplash ... 39

Figure 19. A young protestor with a poster saying “Time is running out!”, Source: Unsplash 44

Figure 20. "Change the politics, not the climate!" A sign made by kids during the Friday's for future climate strike at the Helsinki Parliament in April 2019, Source: Unsplash 45

Figure 21. Students dialoguing, Source: Unsplash..... 46

Figure 22. Thinking..., Source: Unsplash 49

Figure 23. Agriculture and its impact on biodiversity and ecosystems, Source: Unsplash 54

Figure 24. Harvesting and land destruction Source: Unsplash 56

Figure 25. Scientific research, Source: Unsplash 71

Figure 26. A child exploring nature, Source: Unsplash..... 73

Figure 27. Community engagement for the environment, Source: Unsplash 75

List of Tables

Table 1. Characteristics of Debate, Dialogue and Deliberation, Source: Bone at al. (2006)..... 50



Learning outcomes

Participants are expected to:

1. acquire a deeper knowledge of climate policies in the EU and the role of environmental education and citizenship education in vocational and education training (VET);
2. explore deliberative democracy as well as the barriers and opportunities for its integration in official VET curricula;
3. explore climate activism based on concrete examples of climate movements;
4. learn how deliberation can be applied in VET;
5. explore citizen science and its contribution to the fostering of climate action in VET.

Target groups

The module's target groups are:

- VET educators and trainers, specifically those who teach in Agriculture and Engineering.
- VET professionals.

Structure and components of the Guide

The guide is divided into 6 parts, in particular:

- Unit 1: provides an overview of the European Green Deal and environmental education for the VET sector.
- Unit 2: focuses on deliberative democracy, the barriers and opportunities to its integration in VET.
- Unit 3: deals with climate activism through the presentation of three climate movements as well as of types of climate action.
- Unit 4: explores how deliberation can be applied in the VET sector with a particular emphasis on the Agriculture and Engineering subjects.



- Unit 5: focuses on the Agriculture sector in VET.
- Unit 6: concentrates on citizen science for climate action as a means of fostering scientific literacy and citizen engagement of VET students.

Approximate duration: 8 learning hours

Materials and resources

The module's main materials are based on a variety of resources:

- Studies and reports issued by distinguished authors and international organisations on citizen deliberation and climate action in VET;
- Resources collected by the GreenVETers partners through desktop research in the first phase of this result.



Unit 1: Pedagogical approaches for using citizen deliberation (CD) in the context of the Green Deal for VET-specific courses

Authors of this unit: Stefania Oikonomou, Katerina Zourou

Experiencing climate change has become a common phenomenon for most people around the world. As scientific research is being assisted by more sophisticated, advanced tools and means to monitor, store and analyse data, humanity obtains a clearer picture of the scale and the impact of climate change in natural and human habitats. For example, data provided by the [Copernicus Climate Change Service](https://climate.copernicus.eu/) (<https://climate.copernicus.eu/>) shows the constant rise in world temperatures, with June 2022 being the third warmest June on record in relation to the 1991-2020 average temperatures. Naturally, **increased temperatures are only one sign of climate change** and the consequent destabilisation of the ecosystems, with other data (measuring air quality, sea ice, etc.) completing this alarming landscape.

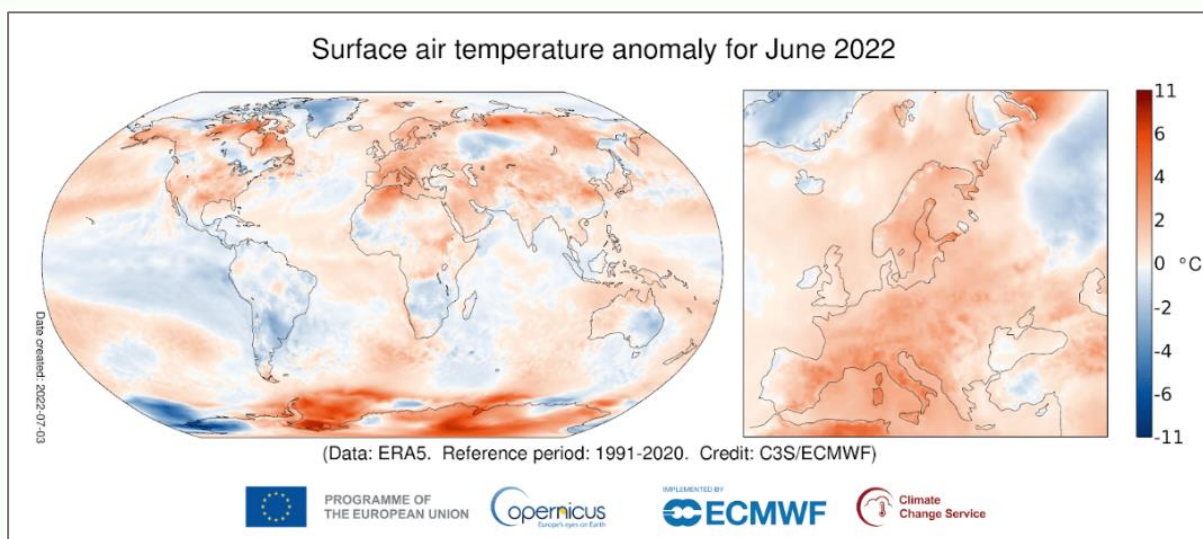


Figure 1. Surface air temperature anomaly for June 2022 relative to the June average for the period 1991-2020. Data source: ERA5. Credit: Copernicus Climate Change Service/ECMWF

As pointed out by the latest report of Working Group II of the Intergovernmental Panel on Climate Change (IPCC, 2022: Summary for Policymakers):

“Human-induced climate change, including more frequent and



intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability”

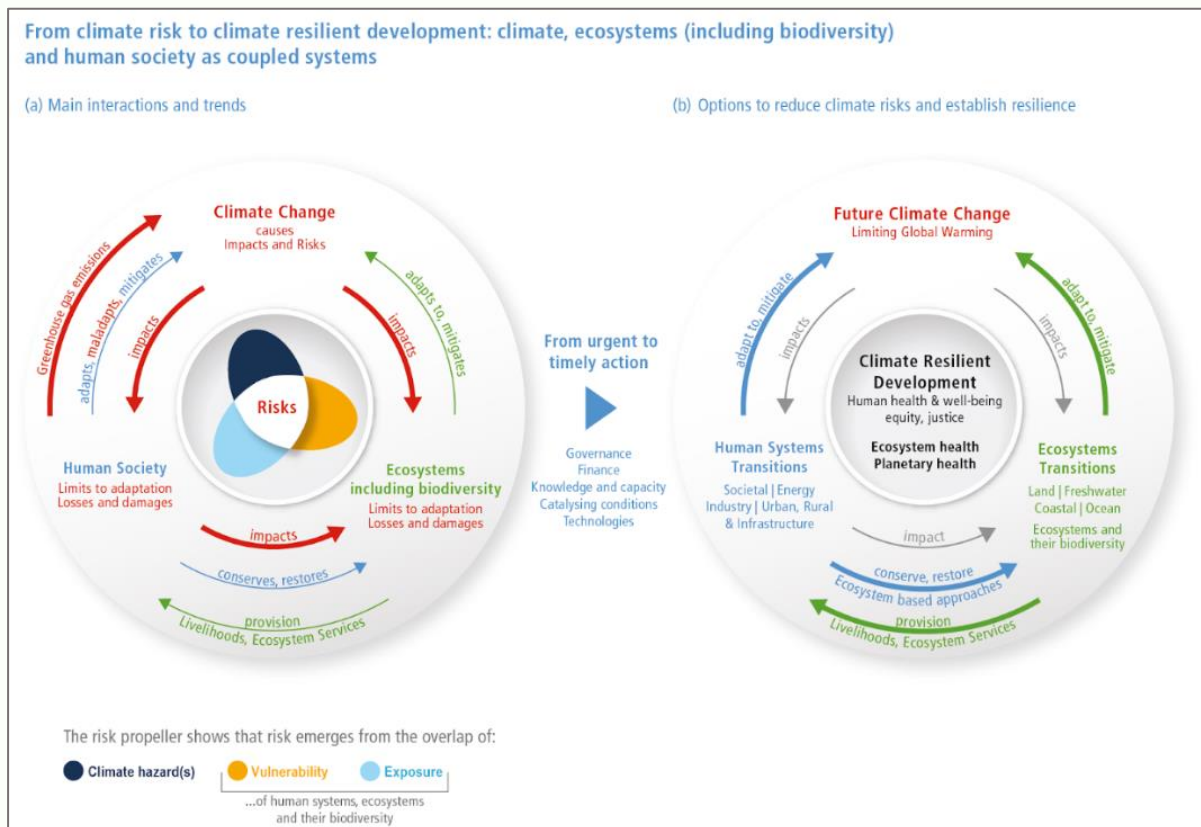


Figure 2. The interconnection between human society and climate change, and the way towards a more climate resilient future for humanity, Source: IPCC, 2022: Summary for Policymakers, p.8, <https://www.ipcc.ch/report>

Having realised that human activities have been the root cause of climate change, efforts are being made by the international community to tackle consequences. One such detailed plan at the European policy level is the Green Deal.



1.1. The European Green Deal

This section will map out the priorities and wider objectives of the European Green Deal. Next, it will focus on particular aspects of this policy for the agricultural and engineering sector.

In the late 2019, the European Commission released the European Green Deal as a response to the climate change emergency calls for action. The Green Deal was subsequently amended with the aim to revitalise the European economy in the post-COVID-19 era. One of the most important commitments made through the Deal is the 55% reduction of emissions in the EU by 2030 and the pledge to become climate neutral by 2050.

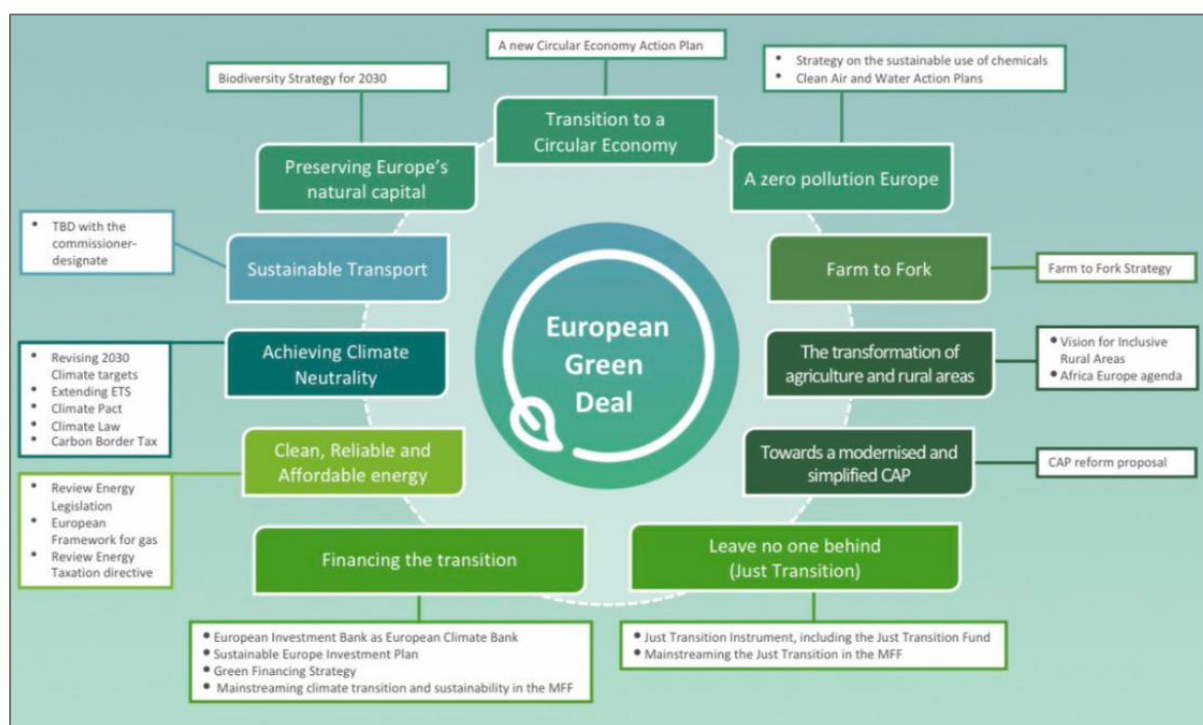


Figure 3. The European Green Deal, Source: SUSEET, <https://www.suseet.eu/2020/02/29/climate-change-eu-strategy-european-green-deal/>

Eight areas of intervention are set, namely:

- *fresh air, clean water, healthy soil and biodiversity*
- *renovated, energy efficient buildings*
- *healthy and affordable food*



- *more public transport*
- *cleaner energy and cutting-edge clean technological innovation*
- *longer lasting products that can be repaired, recycled and re-used*
- *future-proof jobs and skills training for the transition*
- *globally competitive and resilient industry*

The value and importance of these priorities rests in their intersectionality and cross-sectoral dimension that makes indispensable the close collaboration of a variety of sectors, stakeholders and communities to bring these priorities into fruition.

In this context, the Agricultural and Engineering sectors play a preponderant role in mitigating the effects of climate change in our human and natural environments.

Watch in [this video](https://www.youtube.com/watch?v=H37grur6HaU) (<https://www.youtube.com/watch?v=H37grur6HaU>) a short presentation of the European Green Deal.

Value of the Green Deal for the Agricultural sector

The Agricultural sector plays a pivotal role in the creation of a healthy, sustainable and biodiverse ecosystem. At the EU level, the Common Agricultural Policy has standardised the way agricultural networks and business are operationalised in all member-states. However, it soon transpired that the factor of “sustainability” should be incorporated into the policy as well. This is why the EU has also distinguished a set of specific goals for the Agricultural sector within the framework of the Green Deal, which are:

- to ensure food security in the face of climate change and biodiversity loss
- to reduce the environmental and climate footprint of the EU food system
- to strengthen the EU food system’s resilience
- to lead a global transition towards competitive sustainability from farm to fork.

You can find out more on Agriculture and the Green Deal [here](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/agriculture-and-green-deal_en) (https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/agriculture-and-green-deal_en).



Value of the Green Deal for the Energy sector

In its efforts to transform European societies into more sustainable and “green” places, particular focus has been placed on transportation, energy efficiency, clean energy and the renovation of buildings; all of which are the Engineering sector’s area of expertise and interest. Indicatively, the EU has pledged to i) reduce car emissions by 55% by 2030, ii) to promote renewable energy that will account for the 40% of the Union’s energy mix for 2030 and iii) to achieve 49% of renewable materials in buildings by 2030.

You can find out more on these targets [here](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en) (https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en).



1.2. Environmental education in VET curricula

In the context of the climate crisis, it is important to understand the value of adopting environmental education or education for sustainable development (ESD) at all levels of the education system, from kindergartens to schools as well as vocational and education training (VET). As it is emphasised in UNESCO’s publication on *Education for Sustainable Development, Learning Objectives* (2017):

“Education for Sustainable Development aims at **developing competencies** that empower individuals to reflect on their own actions, taking into account their current and future **social, cultural, economic and environmental impacts**, from a local and a global perspective.”

Furthermore, the publication highlights the value of integrating ESD in curricula of formal education “*including early childhood care and education, primary and secondary education, technical and vocational education and training (TVET), and higher education*” (UNESCO, 2017a). This way, education for sustainable development fosters the realisation of the 17 Sustainable Development Goals (SDGs) that have been adopted by the UN General Assembly in 2015 and constitute an essential part of the 2030 Agenda for Sustainable Development.

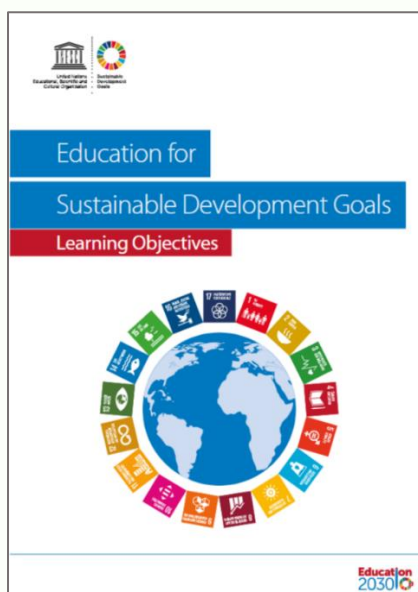


Figure 4. The UNESCO publication “*Education for Sustainable Development Goals, Learning Objectives*”, 2017, Source: https://www.unesco.de/sites/default/files/2018-08/unesco_education_for_sustainable_development_goals.pdf



The European Commission (EC) is committed to matching the expectations set by the SDGs. Thus the Commission has placed its efforts toward the identification and promotion of a shared vision of sustainability. Specifically, the EC focuses on the sustainability skills that are deemed crucial for the resilience of European economies and societies in the next decades. To do so, among numerous initiatives, the European Commission released *The European sustainability framework* (GreenComp) in 2022. Sustainability is defined as:

“[A framework] prioritising the needs of all life forms and of the planet by ensuring that human activity does not exceed planetary boundaries.” (GreenComp, 2022)



Figure 5. Visual representation of GreenComp, *The GreenComp*, 2022, Source: <https://publications.jrc.ec.europa.eu/repository/handle/JRC128040>

As in the UNESCO publication, in GreenComp too particular focus is given on the role education and educators play in developing sustainable skills, knowledge and attitudes among students. Sustainability competences are defined as “empowering learners to embody sustainability values, and embrace complex systems, in order to take or request action that restores and maintains ecosystem health and enhances justice, generating visions for sustainable futures” (GreenComp, 2022, p.12).

You can expand your knowledge on GreenComp and EU initiatives on sustainability and competences [here](https://green-comp.eu/about/) (<https://green-comp.eu/about/>).



“Greening” the VET sector

In this context, bringing these considerations and knowledge about climate change, sustainability and climate action to the VET sector is considered essential for the empowerment and inclusion of all members of society in collective efforts to tackle the effects of climate change.

Specifically, since the beginning of the 21st century, UNESCO has founded the International Centre for Technical and Vocational Education and Training (UNEVOC) to promote worldwide innovation and capacity-building in this sector. As scientific data and advocacy on global warming and climate change spread throughout the world thanks to scientists and climate activists, UNEVOC made its contribution by publishing the “Greening Technical and Vocational Education and Training: A practical guide for institutions” in 2017 (available [here](https://unevoc.unesco.org/up/gtg.pdf): <https://unevoc.unesco.org/up/gtg.pdf>). The guide provides educators and managers with the necessary, detailed steps to follow in order to create a “green” VET service.

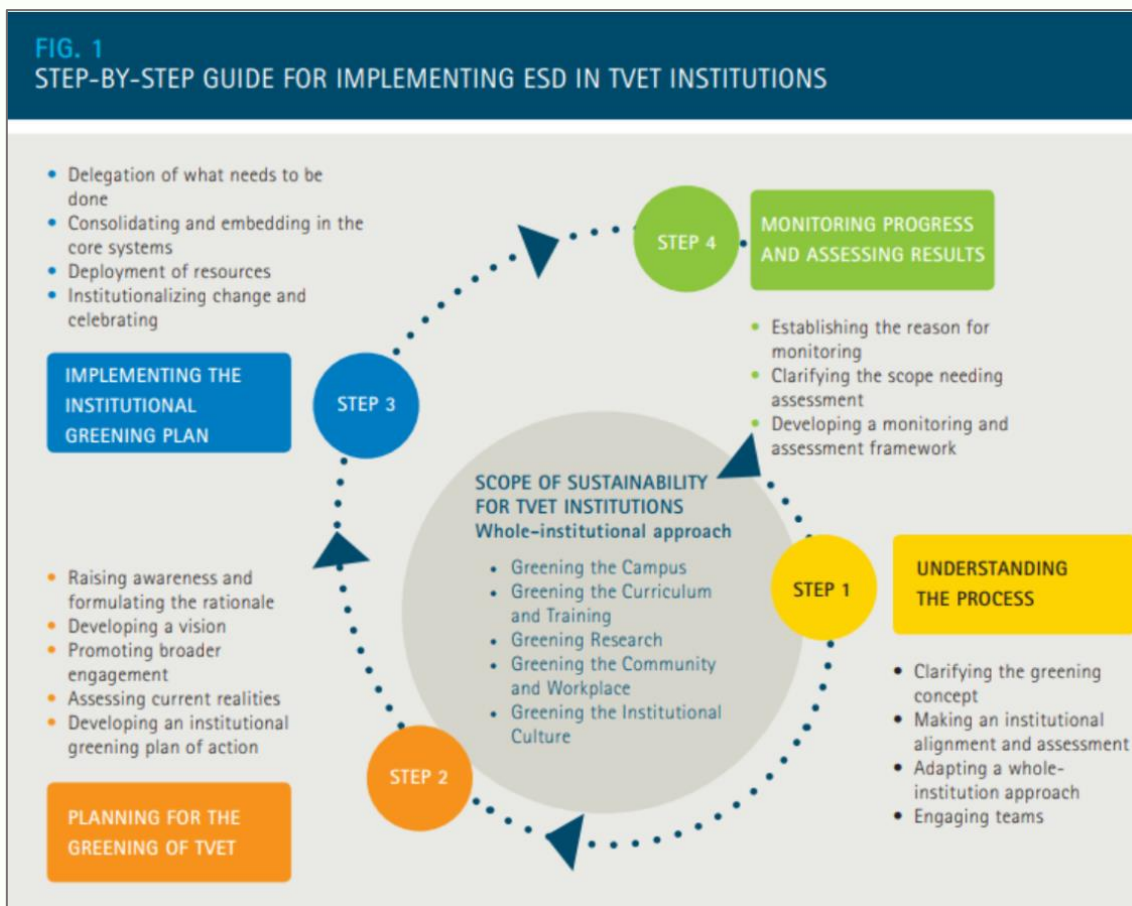


Figure 6. UNEVOC, *Greening Technical and Vocational Education and Training, A practical guide for Institutions*, 2017, fig. 1, p.12, Source: <https://unevoc.unesco.org/up/gtg.pdf>

Moreover, on April 6, 2022, UNEVOC organised a workshop on TVET and climate change action that you can consult here:

<https://unevoc.unesco.org/home/+TVET+and+climate+change+action>

Furthermore, as societies move towards new ways of producing energy, transporting goods, generating food and meeting consumers' needs, VET institutions are in the forefront of education for the green transition age. This social transformation also entails the radical shift of VET curricula from the previous model of standardised skills and knowledge that they deliver to their students, to marking a new course in which sustainability and climate change awareness are at the heart of their learning.

According to Viertel (2010), [VET for sustainable development] “may be defined as VET that is generally geared towards developing the competences that allow individuals to actively and responsibly shape society and offer contributions to a just



and environmentally sound development of the community”. By applying cross-disciplinary pedagogical approaches that incorporate environmental and social aspects as well, VET can prepare its students to face the challenging social and climate issues that are already present in societies. Similarly, Kamis (2017) pointed to the need of adopting a “sustainability-related curriculum” in VET in order to raise awareness among students and foster environmental sensitivity.

Acknowledging the important role that teachers play in promoting sustainability and green skills in VET, the European Training Foundation organised a Facebook Live event on Green Skills and Vocational teachers that you can watch [here](https://www.youtube.com/watch?v=BW_IXcLxWil):
https://www.youtube.com/watch?v=BW_IXcLxWil.

Finally, it would be useful to fill in the gap in environmental education and green skills in VET by integrating citizen deliberation practices that foster both students’ and teachers’ abilities to perceive, deliberate and eventually, take action against climate change in their communities.

As Moldovan (2015) claims:

“the Vocational Education and Training (VET) system needs a paradigm shift and revision of **its role in society** from focus on delivering competences for a market economy towards **delivering competences for sustainable development.**”



1.3. Incorporating citizen deliberation for climate action in VET courses

Climate change has accelerated the need to take action to tackle its effects on a global scale. As Haf and Robison (2020) have pointed out:

“climate challenge means that there is a need to engage more with a greater number of people and allow for the input of more citizens in policy development” (*How Local Authorities can encourage citizen participation in energy transitions*, p.18)

In this collective effort, VET students and teachers are also called upon to participate in a meaningful and active way. Teachers should focus on pedagogical approaches that foster citizen participation and deliberation in relation to climate action.

Undoubtedly, this is not an easy path to follow. Studies such as the one conducted by Nylund, Ledman, Rosvall and Ronnlund (2019) argue that “policy goals such as promoting unification, equality and citizenship have largely been replaced, or reinterpreted, by the promotion of goals such as competition and employability” in VET pedagogical codes and practices.

[In this 1:42 minute video](https://www.youtube.com/watch?v=y39ULf9QRXE) (<https://www.youtube.com/watch?v=y39ULf9QRXE>), you can see why there is a need for global citizenship education in order to face the climate emergency.



Figure 7. One form of citizens' participation in shaping policies are citizen assemblies like the one this photo is showing, Source: <https://www.positive.news/society/politics/citizens-assemblies-go-mainstream-a-way-to-bring-about-radical-change/>

Talking about climate action within VET courses and giving VET students the means to intervene and deliberate in a structured and bottom-up approach will also generate positive citizen engagement in wider social issues and political debates. Aiming to generate a culture of social participation and inclusion in European societies, citizen deliberation for climate action in VET schools can be a starting point that will enable democratic practices and active citizenship among VET students and educators.

Finally, the Council of Europe organised a Forum Lab on Deliberative Democracy for Climate on January 25, 2021 that you can watch [here](https://www.youtube.com/watch?v=z8Zllp1koM&t=1892s) (<https://www.youtube.com/watch?v=z8Zllp1koM&t=1892s>).



Unit 2: Deliberative democracy: barriers and opportunities for adoption in the VET sector

In the last two decades, there has been an increase in deliberative democracy practices and events in Europe in an attempt to involve citizens in public deliberation concerning local, national and European policies. According to the OECD (2020) definition of deliberative democracy:

“**Deliberative democracy** is the wider political theory that claims that political decisions should be a result of fair and reasonable discussion among citizens” (OECD, 2020)

In this context, in order for citizen deliberation to take place, it is essential to provide participants with the necessary **information** and **knowledge** that will help them evaluate and consider the issue they are being called upon to deliberate. The overall aim of citizen deliberation is to generate meaningful and facts-based discussion among participants in order to reach a common ground of consent and eventual solution to be adopted by the group.

Deliberative democracy is often seen as a solution to engage frustrated and disappointed citizens in shaping public policies and values. As social inequalities, misinformation spread by media channels and environmental degradation are gaining ground in public discourses and realities, public trust in institutions has been losing ground in contemporary societies. To address this socio-political challenge, deliberative processes have been supported and expanded in local (52% of processes follow deliberative democracy practices), regional (30% of processes subscribe to deliberative democracy practices), and national (15% of processes follow deliberative democracy practices) governments (OECD, 2022).



Figure 8. Brussels Citizens' Assembly, Photo credit: Edwin Andrade – Unsplash, Source: <https://ldnet.eu/towards-a-brussels-citizens-assembly/>

Furthermore, deliberative democracy should also entail the **interaction** between citizens' decisions and public policy. This way, citizens can see the value of participation in deliberative processes, like **citizens' assemblies, citizens' juries, round tables, consensus conferences** etc. As Ryfe (2005) has pointed out, deliberation *requires a mixture of* "knowledge/skills, motivation, and civic identity". In addition, technology has extended the reach and the variety of tools that can facilitate citizens' participation in deliberative processes. One such example of a digital platform that gathers deliberative events throughout the world is the *Participedia* platform that you can access [here](https://participedia.net/) (<https://participedia.net/>).

You can find out more on deliberative democracy and citizen participation by reading the OECD publication "Innovative Citizen Participation and New Democratic Institutions" (2020) [here](https://www.oecd-ilibrary.org/governance/innovative-citizen-participation-and-new-democratic-institutions_339306da-en) (https://www.oecd-ilibrary.org/governance/innovative-citizen-participation-and-new-democratic-institutions_339306da-en).



2.1. Citizenship education in the VET schools' curricula

Vocational and education training sits within national education systems and as such, it is indispensable in engaging VET educators, students and institutions in debates that shape public policies. Especially regarding climate change and its impact on human and natural environments, VET schools should be actively engaged in climate action in their communities.

Deliberative processes on the issue of climate action are also a theme which Agriculture and Engineering students may feel directly connected to given the nature of their profession and specific skills. Realising the benefits of deliberation for VET schools and their communities and the positive consequences that this process will generate to participants is key to adopting citizen deliberation in VET curricula.

In particular, as Bonne, Crockett and Hodge (2006) have highlighted:

“Deliberative dialogues build on the capacities of the public to **think, talk and act together** in their common interests and are designed to produce a **change in the way people habitually interact with each other over public issues**. People learn they can find **common ground** and work together on issues in their communities even though they may see the issue from very different viewpoints.”

Through their participation in a deliberative process for climate action, VET students' learning capabilities will also be enhanced since deliberative democracy is based on “informed, reasoned and respectful discussions that focus on facts, the future and the consideration of the needs of others” (Deliberative futures toolkit, 2021). However, deliberative processes as well as courses on politics and democratic practices are selectively taught or almost entirely absent in VET schools' curricula, thus posing a great barrier to the adoption of such processes in a learning environment which is often labour skills-based rather than society and environmental needs-based.

As it has been demonstrated in the research study of Rosvall & Nylund (2022),

“structures such as class, gender and ethnicity permeate



society, including vocational programmes, and limit education’s potential to reduce inequalities of power and influence, thereby enhancing democracy and transforming society”.

Mapping barriers and opportunities, (as we do in the next sections), serves to gain insights and better understand the main aspects that need to be taken into account when integrating deliberative democracy in VET.

2.2. Barriers to the adoption of DD in the VET sector

Based on current literature, there are two barriers to the adoption of deliberative democracy in the VET sector.

Firstly, due to the emphasis on professional skills required to cover labour market needs, VET training focuses on the knowledge and skills relevant to the particular discipline in which the training is offered. Consequently, the limitation of participation and active citizenship education opportunities may further narrow the opportunities for VET students to shape policy and social action in their communities.



Figure 9. Rebellion photo created by Drazen Zigic, Source: www.freepik.com



The second obstacle is the public perception about VET students and their place in society. In contrast with university students who are more frequently called upon to participate in public deliberation processes or are learning about them, VET students are only taught the necessary skills that will guarantee them a job in the labour market.

Social prejudice is a significant barrier to overcome in order to incorporate citizens' deliberation in the VET sector. In addition, the current scarcity of material available on VET students' perceptions and attitudes on public participation and social action can be addressed by increased efforts in studying and listening to VET students' voices regarding their opportunities to be engaged in discussions on public policies.

Nevertheless, despite the gap in literature relating to this topic, there has been some research on the issue, like the one organised by Finnish scholars who wanted to explore this topic within the Finnish VET sector (Meriläinen, 2021). According to their research outcomes, VET students do participate in societal issues, like climate change, but at an individual and personal level. This way, participation is still shaped by personal choices and is dependent on the influences of different actors on students. Moreover, students may participate in society but they don't feel they have a real impact on policies and are rarely asked to express their opinions on pressing societal issues. As one student pointed out:

“I don't really feel that I have an impact on society, at least not yet, maybe when I'm older and when my name counts for more”. (Meriläinen, 2021)



Figure 10. Protest photo created by freepik, Source: www.freepik.com

The Finnish case study outlines a lack of deliberative processes on VET schools that perpetuates patterns of exclusion and social categorisation of citizens: those who have the right to learn and participate in policy and society and those who are less encouraged and equipped to do so.

Despite this harsh reality, studies and guides like these begin to fill these gaps and foster change in the VET sector by pointing also to the opportunities for incorporating deliberative democracy in VET.



2.3. Opportunities for the adoption of DD in the VET sector

Having assessed the current status of deliberative democracy in the VET sector, it is now equally important to address the opportunities for the adoption of deliberative processes in VET curricula. In particular, it is imperative to realise that developing VET curricula that go beyond prescribed learning outcomes and qualifications will enhance VET students' perception of active citizenship as well as their role in society.

One significant way to incorporate deliberative democracy in VET is to begin with existing courses on climate change, sustainable farming, renewable energy etc. and foster deliberation of students on those issues. As knowledge and information are fundamental preconditions for citizens to engage in deliberative processes, VET students who acquire technical knowledge will have the opportunity to further assess and reflect on the socio-political aspect of the climate emergency as well.

What is important to realise is that “being useful and being virtuous are important but, for a healthy democracy, the overriding aim is for education to produce capable citizens and to promote favourable conditions for lifelong engagement with the ideas and practices of democracy” (Evans, 2014).

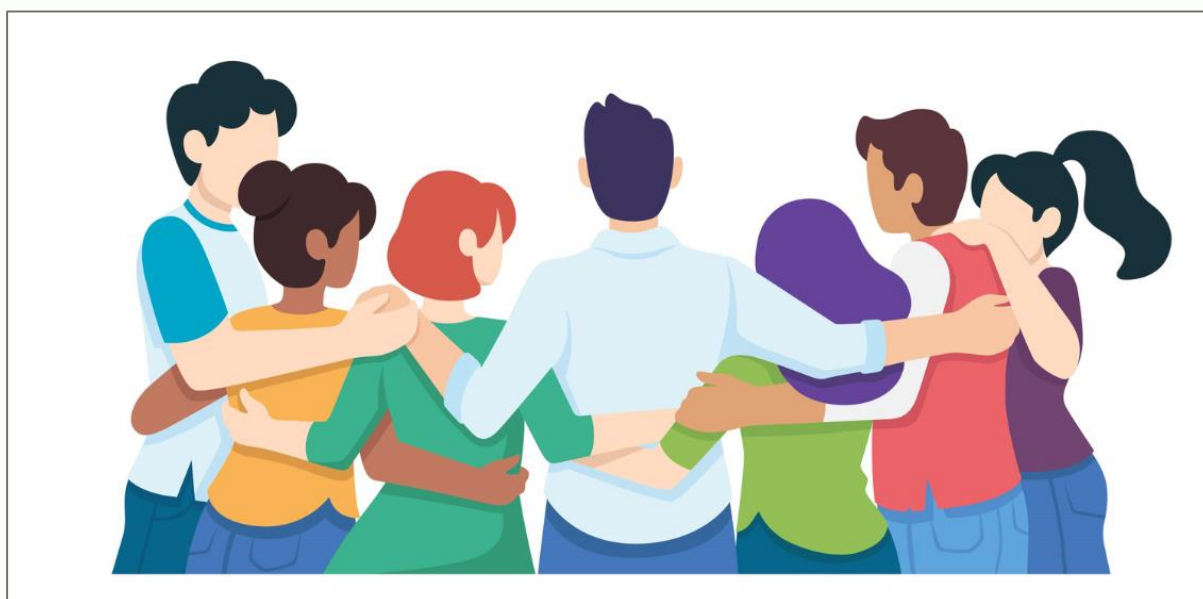


Figure 11. Youth together, Source: www.freepik.com



In fact, VET can be even more closely associated with social activism (i.e., for climate change) as VET students are usually directly involved in key stages of humanity's economic activities, such as the food chain, technology and engineering. As Kreber (2015) points out, "vocational practices include a civic element" that they should incorporate, nurture and develop.

Citizen deliberation for climate action in VET schools concentrates all fundamental elements that allows it to be quite easily adopted in VET curricula. Any missing educational material or information regarding deliberative democracy processes can be complemented by existing and ongoing materials (like those developed by the GreenVETers project) and experiences that can build confidence in VET educators and challenge traditional perspectives on VET, thus creating the necessary space for VET students to set in motion their public deliberative skills as active members and citizens of their local and global communities.



Unit 3: Radical climate action: understanding motivations, combating radicalisation

Authors of this unit: Stefania Oikonomou, Katerina Zourou

In this section, you will be introduced to climate action through a presentation of some of the core motivations leading people to engage in it. In addition, we will showcase 3 climate movements that represent different types of climate action in order to highlight the wide spectrum of forms that climate action can take. Finally, we argue that deliberative democracy in VET can foster climate action and citizen engagement on this topic in students and educators.

3.1. Introduction and preliminary definitions

With the intensification of climate change and its negative effects on the planet in the 21st century, climate activism has become an integral part of political agendas in numerous human societies. As mentioned previously, climate action should be treated as an expression of positive civic engagement, as a way for citizens to shape public environmental policies and politics ([politics](#): the art of governing, [policy](#): the course or method of action to guide present and future decisions, *definitions by Merriam-Webster dictionary*).

This way, climate action should not be seen as a disruptive and undesirable expression of civic dissent towards public policy, but rather as another form of citizen engagement. Especially among young people, participating actively in a social cause can have a positive impact on their perception of politics and citizen engagement. Fisher and Nasrin (2020) refer to climate activism as *civic engagement that specifically aims to pressure governments to take action that addresses the issue of climate change* and it's under said prism that this guide will deal with climate action.

This generation of young people (“Generation Z”) finds itself in the middle of climate change manifestation and the adoption of climate-related policies, especially in the period between 2020-2050. As Corner, Roberts, Chiari, Völler, Mayrhuber, Mandl and Monson (2015) have pointed out, it is this generation “whose adult lives will



overlap most closely with this policy window, they are potentially best-placed to define the long-term societal response to climate change”. Yet, climate action is not uniformly expressed throughout the world. As the consequences of climate change have hit human societies in varying degrees, the same study shows that those countries that are characterised by a political culture of active participation and citizen engagement are experiencing an increase in climate action related to other countries.



Figure 12. *There is no planet B*, Source: [Unsplash](https://www.unsplash.com)

In addition, as young people become more disillusioned with public policies (from employment and financial policies to environmental policies) participating in climate action can be seen as a way to re-engage youth in democratic politics. As digital technologies have also become symbols of this generation, action taking has now evolved and expanded to places and forms never experienced before in such a degree and intensity.



3.2. Motivations to engage in climate action

Climate action, as with almost all forms of human activity, comes in different forms, targets diverse audiences and has differing goals. However, the various ways in which climate action has been presented to the public have generated a negative view of climate activists who are being portrayed as “disruptors” of social order and cohesion (Stenhouse & Heinrich, 2019). In order to avoid such oversimplifications or misguided interpretations, it is imperative to look into the motivations, types, objectives, as well as the learning and educational potential of climate action movements.

Specifically, one of the most important motivating factors which leads young people to engage in climate change is the impact on their social and climate environment. Being involved in climate action means exploring different ways to foster change at an individual and public level.

Additionally, climate anxiety plays a significant role in making people participate in action for climate change. Mental Health UK defines climate anxiety as “a sense of fear, worry or tension linked to climate change” (Mental Health UK, n.d.). The realisation of climate change and the direct experience of its consequences has led to an increased anxiety in young people, as their future seems to be dominated by violent changes in climate patterns, affecting the stability of the earth’s ecosystems and human societies.



Figure 13. Planet over PROFIT, Source: [Unsplash](#)

In particular, climate change has become one of the main priorities and issues of concern among young people who have come to realise the severity of the situation and who therefore demand urgent action by policymakers and relevant stakeholders. As [O'Brien, Selboe & Hayward \(2018\)](#) have justifiably stressed:

“The clock is ticking, and the future for young people today will be largely decided by generations that will be gone before the most severe impacts of climate change are felt.”

Motivation behind climate action is set to grow as scientific knowledge and warnings on climate change are spreading daily on the internet, social media and news channels. Similarly, studies on the motivations of youth engagement in climate action show how emotions, like anger, frustration, hope and solidarity play an important role in fostering young people’s participation. In addition, what enhances citizen engagement in action is the public perception and expectation of the effectiveness of this participation.

Engaging citizens in climate action can also be a transformative learning experience and method to use with students, as their involvement in climate action will change



the way they perceive and identify the problem, share their opinions and experiences and finally, engage in sustainable solutions (Kowasch, Cruz, Reis, Gericke, Kicker, 2021). Students' participation in climate action should not be prohibited on account of misleading views on climate action movements, but rather be pursued as an exercise of democratic and active citizenship that is needed to build a more sustainable future. Furthermore, giving students the necessary scientific information on climate change and engaging them in deliberative processes will enhance their critical thinking and nurture their dialoguing abilities. As Kowasch, Cruz, Reis, Gericke and Kicker claim:

“By proposing innovative and, sometimes, radical solutions to the climate crisis, such as less greed for profit of private companies or the limitation of flights, the interviewed students show their political participation and leadership as citizens within a democratic system”.



Figure 14. A placard saying “Climate Justice Now!”, Source: [Unsplash](#)



3.3. Movements active in climate action

Climate action can be performed either in an individual or collective way, ranging from changes in personal behavioural patterns and lifestyles, to a more political and citizen led approach within a community. In either case, individual choice is not separate or disconnected from the socio-economic and political context in which they operate, while collective actions influence personal perceptions and lifestyles.

In the last decades, a multitude of climate movements have emerged as a consequence of public realisation of human-induced climate change and its repercussions. To map all these movements or attempt a single categorisation is practically and scientifically impossible, as they range from hyperlocal to international ones, to movements advocating for one short-term issue (i.e., shutting down a fossil fuel production site) to those advocating wider changes in society (i.e., system change). Moreover, as objectives and means of action vary among climate movements, so do the motivations of people engaged in them, as pointed out in the previous section.

Therefore, providing a one-fits-all presentation of climate movements would have been scientifically incorrect and would have diverged substantially from the learning outcomes set out by the author of this Guide.

In this section, we will briefly look at three climate movements that have grown in popularity within and beyond their communities. Our aim is to understand their objectives and processes, thus gaining valuable information that will permit us to better navigate and coordinate deliberation on climate action by using examples and retrieving considerations which have arisen from these movements.

A renowned climate movement that emerged at the beginning of the 21st century is Camp for Climate Action. Camp for Climate Action was one of the first climate movements to emerge in the UK, in 2006 and consisted of a group of activists who contested the G8 Conference that took place in Scotland in 2005. The movement's approach encompasses a participatory and self-organising way of practising climate action, while their focus turns on collective action as an effective means of change and political pressure rather than on individual choices (e.g., buying a "green" car), that are seen as politically unharmed (Schlembach 2011).



Following the same philosophy of climate action based on collective action that aims to put political pressure on the topic of climate change, a more recent and popular climate movement came into being. We refer to Fridays For Future (FFF), a students-led movement that became known in August 2018, when Greta Thunberg, then a 15-year old student, launched a school strike for climate action every Friday. The objectives of the Fridays For Future movement, as they are portrayed in the official website, are: a) keep the global temperature rise below 1.5°C compared to pre-industrial levels, b) ensure climate justice and equity, c) listen to the best united science currently available. In its official website, the movement has dedicated a page on How to strike, with instructions and materials for both students and teachers. Fridays For Future also has its own YouTube channel that you can access [here](https://www.youtube.com/watch?v=aARLfcmt-9Q) (<https://www.youtube.com/watch?v=aARLfcmt-9Q>).



Figure 15. Camp for Climate Action, 2006, Source: <https://risingtide.org.uk/content/camp-climate-action-2006-location-decided>



Figure 16. Fridays For Future climate march, Source: [Unsplash](https://www.unsplash.com)

A few months after the emergence of the Fridays For Future movement, what began as a peaceful citizen gathering in London on 31st October 2018, resulted in the Extinction Rebellion movement. Indeed, Extinction Rebellion is now considered an international climate action movement based on non-violent civil disobedience. Since its launch, Extinction Rebellion has drafted its own “XR Constitution” whilst its organisational structure is based on autonomous and self-organising groups all around the world that adhere to its principles and goals.



Figure 17. Placard in an Extinction Rebellion climate march “The Climate is changing, so should we! #ACT NOW”, Source: [Unsplash](#)



Figure 18. An example of Extinction Rebellion climate action, Source: [Unsplash](#)

There are differences between these three movements with regards to their objectives, target groups and mobilisation tactics. However, it can be claimed that all three of them engage in actions of civil disobedience (“refusal to obey the demands or commands of a government or occupying power, without resorting to violence or active measures of opposition” (The Editors of Encyclopaedia Britannica, 2022), namely disruptive forms of activism). Their forms of civil disobedience (i.e. public marches, blockades, occupations) vary in terms of objectives, disruptiveness and means of deployment, and that’s why this brief presentation does not intend to make a comparison of them. Their presence in the Guide is considered useful in that they



provide a popular base of information and are an example of 21st century climate movements.

Educators and researchers in VET as active citizens

Engaging in climate action is not a characteristic present only in students or young people in general. On the contrary, teachers, educators and researchers, as active citizens in their respective communities, also realise the importance of setting an example in demanding immediate climate action. However, their engagement in climate action does not always come without repercussions to their professional identities. A relevant example of this is Scientist Rebellion; a movement of academics and researchers engaged in climate action.

Scientist Rebellion activists carry out climate marches, strikes and acts of civil disobedience in order to raise awareness and demand that immediate climate action and climate-related policies be integrated in their workplaces as well as within the public sphere. Despite their professional status, academics and researchers belonging to the movement are often faced with negative attitudes in their workplaces or are criticised for their actions. At times they have to endure more severe measures, like being arrested, having to go through a disciplinary procedure in their institution or being fired.

All these challenges can make people reluctant to engage in climate action. In this case, we should take into consideration that climate action can be expressed through different forms, and not only as acts of civil disobedience. Specifically, we argue that fostering citizen deliberation in VET schools can be seen as an incentive for teachers, educators and researchers to be involved in climate action. Following the example of Scientist Rebellion, VET teachers can make their contribution to climate action by integrating citizen deliberation for climate change in their courses, thus achieving the engagement of their students or their institution. As will be pointed out in section 4 of the Guide, **deliberation is a process** through which knowledge exchange and evidence-based discussion are taking place to generate better public understanding and to formulate conclusions on climate policies.



Therefore, it is important to realise that in order to be effective, climate action necessitates wide and active citizen engagement, as well as a thorough understanding of climate change and its consequences on the planet. Citizen deliberation embraces both these elements, whilst empowering people to become agents of change in their communities and beyond.

3.4. Types of climate action

Having stressed the issue of motivations and explored several environmental and climate movements engaged in fostering change in attitudes and policies, it's necessary now to dive into the world of climate action by looking at its various forms.

Specifically, climate action activities range from public gatherings and membership in environmental NGOs, to strikes, demonstrations, sit-ins and general disruption of key elements of social life. Efforts to distinguish between the diverse types of climate action (whether it be a movement or a public event) usually focus on the worldview that these movements and their members/participants have of the root-causes of climate change, as well as on their objectives and ways to tackle climate change and social and environmental injustice.

One of the renowned typologies on climate action movements is the one proposed by O'Brien, Selboe & Hayward (2018). In particular, their study concentrates on youth activism on climate change, as their focus lies on the degree of dissent manifested in climate action movements. According to them, "expression of any form of political dissent requires support, including education, to enable young people to reflect critically" (2021). Based on their typology, the ways young people express their dissent can be distinguished as:

- *Dutiful dissent*
- *Disruptive dissent, and*
- *Dangerous dissent*

Dutiful dissent characterises the kind of climate action that is being carried out within the context of the given socio-political norms and institutions, following the



belief that active engagement in the public sphere (public and private institutions, NGOs, political parties etc.) can bring change in society. A form of dutiful dissent in relation to climate action can be the organisation of a community garden or a public event organised to raise awareness on climate change.

Disruptive dissent is based on the questioning of the existing socio-economic and political order which is seen as the root-problem and cause of climate action and social injustice. As O'Brien, Selboe and Hayward (2018) point out “disruptive actions explicitly challenge power relationships, as well as the actors and political authorities who maintain them, often through direct protests and collective organization”. Disruptive dissent can also be found in the discourse of official NGOs and organisations that promote an alternative view on current environmental and social policies.

Dangerous dissent rejects the given status quo not only by opposing it but also by developing and realising a totally different model of production, consumption and politics which in turn aims to create a more long-term and longer lasting impact on human societies. Interestingly, the authors of the study define dangerous dissent as “the degree of threat that these alternatives present to established power elites and investments over the medium and long term”, and claim that “the “danger” also lies in the way that **youth are claiming, taking back, or generating their own power and strengthening their personal and political agency**, or simply questioning what to others appears to be inevitable, such as a fossil fuel-based economy, hyperconsumption, and increasing social inequality”.

Typologies, like the one presented above, result from the study of climate activism through different lenses and perspectives. What is important to realise is that climate action can be manifested in various forms and through diverse means to achieve multiple goals.

In this context, another typology of action taking place is the one proposed by sociologist Charles Tilly (1929-2008). In his study of activism for a social purpose, Tilly proposed the term “repertoire of contention” to describe the various means and forms of action that are being selected by social movements and organisations. According to Tilly, each movement determines its own methods and types of action



based on their relevance to the people engaged in them as well as on the activists' perception on how they should proceed with their actions.

The meaning of Tilly's repertoire lies in highlighting the vast spectrum of actions that individuals and movements can choose to engage with in a social cause (i.e., climate action). Additionally, the types of climate action you can choose to be involved with may vary from quieter to disruptive ones, as you will base your own choice on the perception you have on what better serves your cause and objectives. You can also blend types of climate action if you believe that a more nuanced approach may contribute to the desired impact.

Likewise, "quiet" types of climate action may entail less visible tactics, fostered mainly through persuasion and influence at an individual and collective level. For example, if you wish your school to engage in recycling, you and your students may consider writing a letter to the head of the school asking for recycling to be pursued by your institution.

Furthermore, if you aim to raise awareness on climate change among your students and colleagues, you may organise special workshops and lectures on the topic or set up environmental campaigns in your institution and/or your community. The more people you engage in the process and the more "noise" you make on your cause will determine the degree of disruptiveness of your actions. For example, if you and your students demand more immediate and determined climate policies from the mayor of your city, you may engage in public marches and blockades of public spaces in order to attract the attention of public figures and urge them to accept and commit to your demands. Naturally, these more "disruptive" forms of climate action (i.e., marches, blockades, occupations) can be peaceful and subscribe to the notion of nonviolent civil disobedience that is synonymous to citizens' refusal to legitimise public policies that are deemed unfair or inadequate.

Finally, it can be claimed that the citizens' view of the current environmental and social policies fuels the degree of their participation in climate action. In the same way, it should be highlighted once more that climate action comes in different forms and ways of expression, thus making it necessary to approach and evaluate it based on these different forms, means and objectives within which it unfolds each time.



3.5. How deliberative democracy in VET can respond to the need for urgent climate action

What arises out of the description of climate movements is their focus on changing individual and collective lifestyles, ways of producing and consuming as well as changing the responsibilities that are present and inherent in relation to social status and political power. However, defining every climate action movement as “radical” can lead us to assumptions which may be misleading, especially during times in which citizens are actively engaged in climate actions, campaigns and movements. Besides, this guide has provided an overview of three climate movements that can be seen as radical by their embracing of the values of civil-disobedience and non-violent climate action.



Figure 19. A young protestor with a poster saying “Time is running out!”, Source: [Unsplash](#)



Climate movements often become radical when public policies fail to generate meaningful impact. For example, the Paris Agreement has been ratified by governments, but few national climate plans integrate concrete and bold climate objectives.

A remedy to this misalignment of public policies can be provided by deliberative democracy. More specifically, by promoting deliberative processes, we can expect citizens' participation in debates which shape policies to increase. This is why numerous forms of deliberative democracy, such as citizens' juries and citizens' assemblies, have been organised in Europe (i.e., France, UK) with the scope of discussing climate action and identifying key climate-related needs and policies to be adopted. Nonetheless, not all deliberative processes are bottom-up. In fact, most of them are planned and carried out in a predetermined context that aims to lead to an a priori defined thesis, leaving little space for citizens to actually shape the discussion and its outcomes (Willis, Curato, Smith, 2021). This point needs to be taken seriously into consideration when designing deliberative processes.



Figure 20. "Change the politics, not the climate!" A sign made by kids during the Friday's for future climate strike at the Helsinki Parliament in April 2019, Source: [Unsplash](#)



Unit 4: Democracy in practice: how democratic principles of argumentation can be adopted in “heated” topics of discussion and leverage the VET sector

Authors of this unit: Stefania Oikonomou, Katerina Zourou

One of the functions of educational systems is to instil trust in democracy and democratic values among students, who are the future generation of adult citizens. This means that the way democracy and its principles are taught and transmitted to students will probably affect their understanding of democratic processes and will shape their participation in the socio-economic and political life of their communities later on.



Figure 21. Students dialoguing, Source: [Unsplash](#)

This unit will focus on the democratic principles and approaches that need to be integrated into VET curricula to foster VET students’ active citizenship, civic engagement and social inclusion, while a closer look will be given to “heated” topics of discussion in the Engineering and Agriculture sector that can be addressed



through deliberative democracy.

4.1. The art of hearing and dialoguing: building democratic values in the VET sector

Engaging in a deliberation process requires having good knowledge and a grip on some of the most important democratic principles and values when it comes to argumentation and the “art” of hearing and dialoguing. Especially in the context of deliberative democracy, participants are required to be acquainted with these principles in order to engage in meaningful deliberation with their peers. As Carson and Elstub (2019) have highlighted:

“Deliberation requires that participants:

- (a) become **well informed** about the topic,
- (b) consider **different perspectives**, in order to
- (c) arrive at a public judgement (not opinion) about “**what can we strongly agree on?**”. [The students] consider this to be a superior form of political participation as it leads to more informed and rounded public opinion, and, arguably, better decisions.”

According to the Bureau of International Information Programs (IIP), U.S. Department of State (n.d.), some of these democratic principles and values are majority rule, freedom of speech and equal representation:

- ❖ **Majority rule:** “is a means of organising government and deciding public issues” (Principles of Democracy). Majority rule often seems to be in conflict with minority rights that are established to protect minorities from being overruled or excluded from public dialogue by the majority. In order to respect both, it is imperative to talk to VET students about the value of the inclusion of minority (or marginalised) groups in a deliberative process, while using the majority rule as a way of making a decision based on a discussion that involved the participation, active expression and viewpoints of everyone



engaged in the deliberation.

- ❖ **Freedom of speech:** “For a free people to govern themselves, they must be free to express themselves – openly, publicly, and repeatedly; in speech and in writing” (Principles of Democracy, n.d.). In public argumentation, it is important to follow the principle of freedom of speech if we wish to engage in a democratic dialogue that makes sure all voices are heard. Furthermore, alongside freedom of speech there is another democratic principle that is meant to protect citizens from being discriminated against, and that is the principle of non-discrimination. To achieve a balanced and effective use of both principles, VET students should realise that they are called upon to express their opinions but with respect to other people’s identity and vice versa. If the principle of non-discrimination is not applied during deliberation, then freedom of speech results in a mere exercise of minority subjugation by the will of the majority.

- ❖ **Equal representation:** is one of the most important democratic principles entailing the participation of every segment of society in politics and public deliberation. As highlighted in the next section, a democratic deliberation process should guarantee the equal representation of people, by taking into consideration gender quotas, minority groups’ presence and active involvement in the process, people coming from diverse social statuses etc. In this way, the core task of deliberative democracy is achieved since deliberation is carried out by a variety of actors bringing together different cultures, experiences and points of view, thus ensuring a rich dialogue and a polyphony of opinions and ideas that reflect the diversity present in our societies.

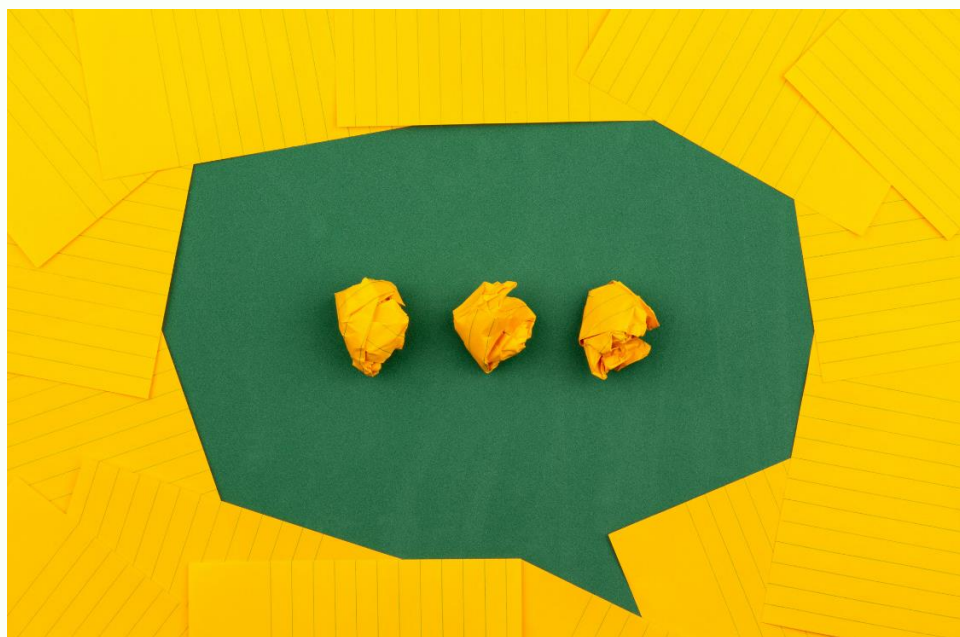


Figure 22. Thinking..., Source: [Unsplash](#)

You can find out more on fundamental democratic principles by watching the short video by Student Vote Canada 2019 [here](#) (<https://www.youtube.com/watch?v=rhtEuH2G6bg>).

Based on a study by Vaessen, Daas and Nieuwelink (2022) on views of adolescent VET students regarding democratic values in the Netherlands, VET students realise the importance of these values, but they *experience little room at school to share their views on subjects such as democratic issues*. According to the authors, by talking to them about democratic values and by giving them time and space to express themselves, VET students will be better able to recognise the importance of such practices and principles, which in turn will enable them to deliver mature responses and opinions.

The advice is to embrace the deliberation processes in curriculum design and offer (more) courses on active citizenship and civic engagement that will “stimulate students to take different perspectives, be beneficial for students’ prosocial and moral development and attitudes such as tolerance, respect, and autonomy” (Vaessen, Daas and Nieuwelink, 2022).



4.2. Designing deliberative processes in VET schools

[...] citizen engagement involves much more than just organising different opportunities to mobilise citizens’ knowledge into debates, co-creation or other processes (e.g., policy, research, planning, monitoring, etc.).

Citizen engagement requires that policymaking institutions recognise and accept participatory governance styles and therefore create listening mechanisms to bring citizens’ knowledge, expectations, values and imaginaries into the planning, decision or policy processes. (Ângela Guimarães Pereira, Thomas Völker, 2020)

Setting up a deliberative process in VET schools requires educators to take into account several aspects that are connected to its design, organisation and implementation. In this section, there will be a short introduction and presentation of some of the most important points to take into consideration when deliberation is to take place.

First of all, it is crucial to acknowledge that deliberation follows a different approach to the practice of dialogue or debate. As deliberation should result in decision-making or recommendation-making for a social matter of concern, this suggests that a ground of compromise should be achieved at the end of the process. In addition, during deliberation, all points of view are noted and weighed, in contrast to dialogue or debate where opinions are seen as competing or merely exchanged among participants. Deliberation also aims to be a learning experience for participants, as argumentation is based on scientifically based evidence and information provided to participants in order to help them perceive the issue in the most holistic way. The table below, retrieved from Bone at al. (2006), outlines the similarities and differences between the practice of “debate”, “dialogue” and “deliberation”.

Table 1. *Characteristics of Debate, Dialogue and Deliberation, Source: Bone at al. (2006)*

Debate	Dialogue	Deliberation
Compete	Exchange	Weigh
Argue	Discuss	Choose



Promote opinion	Build relationships	Make choices
Seek majority	Understand	Seek overlap
Persuade	Seek understanding	Seek common ground
Dig in	Reach across	Framed to make choices
Tight structure	Loose structure	Flexible structure
Express	Listen	Learn
Usually fast	Usually slow	Usually slow
Clarifies	Clarifies	Clarifies
Win/lose	No decision	Common ground
Most useful when: A position or course of action is being advocated and winning is the goal.	Most useful when: People want to talk together about something without desiring any particular outcome from the conversation.	Most useful when: A decision or criteria for a decision, about the best way(s) to approach an issue or problem is needed.

Having understood the main characteristics and objectives of deliberation, it is useful to bear in mind some of the fundamental principles that should accompany the exercise of deliberative democracy, independently of the form the deliberation process may take. In particular, the Deliberative Futures Toolkit (2021) points to these guiding principles:

- **Inclusion:** the representation of diverse groups with diverse views.
- **Equality:** equal voice within the discussions.
- **Considered judgement:** Participants are invited to explain and justify their preferences on a matter. They are also asked to respectfully consider the differing opinions of others, and to be open to changing their position on an issue if, in the light of new information, they can no longer justify it.

At this point, one can claim that the democratic principles of argumentation and the main principles of deliberation are interconnected in a way to guarantee inclusion, respect for others' opinions, non-discrimination and equality in representation. However, as in all deliberative processes, and likewise within the VET context the issue of who can participate in the deliberation and how their active engagement is



ensured is still a matter that is not always taken seriously by organisers of deliberation events.

Participation should include everyone, without any restriction based on gender, religion, social status or educational background. Although this principle may be applied to most cases, Turnhout, Van Bommel and Aarts (2010) argue that *“Participation unavoidably involves (1) restrictions about who should be involved and about the space for negotiation, (2) assumptions about what the issue at stake is, and (3) expectations about what the outcome of participation should be and how the participants are expected to behave”*.

Combining the above-mentioned statement with the assumption that *“the ability to participate is not evenly distributed within society”* (Völker, & Pereira, 2021), then the issue of “who gets to participate” in deliberation becomes a serious barrier to overcome.

Eventually, what is most important to consider when incorporating deliberative processes in VET (and in any education sector) is the level and quality of knowledge and information provided by educators to students, as well as the degree of competences that educators have developed regarding deliberation, its scope, methods and values whatever the topic of discussion may be. This guide, as well as the GreenVETers project as a whole, aims to train and empower VET educators; to render them capable of sustaining deliberative processes within their classes and everyday learning/teaching practices.

You can find out what it is like to be part of a deliberative process by watching the short video by democracyCo (2020) [here](https://www.youtube.com/watch?v=OAiy3_bqA1s) (https://www.youtube.com/watch?v=OAiy3_bqA1s).



4.3. Engineering and Agriculture sector “heated” topics of discussion answered through citizen deliberation

“To feed and fuel our 21st century lifestyles, we are overusing the Earth’s biocapacity by at least 56%.”

(Living Planet Report, WWF, 2020)

With climate change posing serious threats and challenges to the Agricultural and Engineering sectors, engaging VET students in these fields in the deliberation for climate action seems critical. It is now proved by studies that the intensification and industrialisation of agriculture systems has accelerated the degradation of soils, biodiversity loss and the destabilisation of ecosystems (Agovino, Casaccia, Ciommi, Ferrara, Marchesano, 2019). One example showcasing the interrelation of agriculture to climate change can be retrieved from the Living Planet Report issued by WWF (2020) that clearly mentions:

“Agriculture is a significant driver of climate change, and climate change, in turn, adds further stress to land systems, worsening existing risks”.

In relation to biodiversity loss, the responsible use of pesticides and the measures needed to ensure a soil’s viability and good condition are only a few of the heated topics of discussion that should concern VET students specialising in the agricultural sector. Naturally, students also need access to relevant scientific and technical information in order to understand in depth those challenges and then deliberate on the course of action in their communities.

In the Engineering sector, the challenges posed by climate change are obvious in the field of transportation, energy and construction. Adopting sustainable practices and efficient energy measures (i.e., renewable energy) are just a proportion of the important issues that VET students ought to deal with.

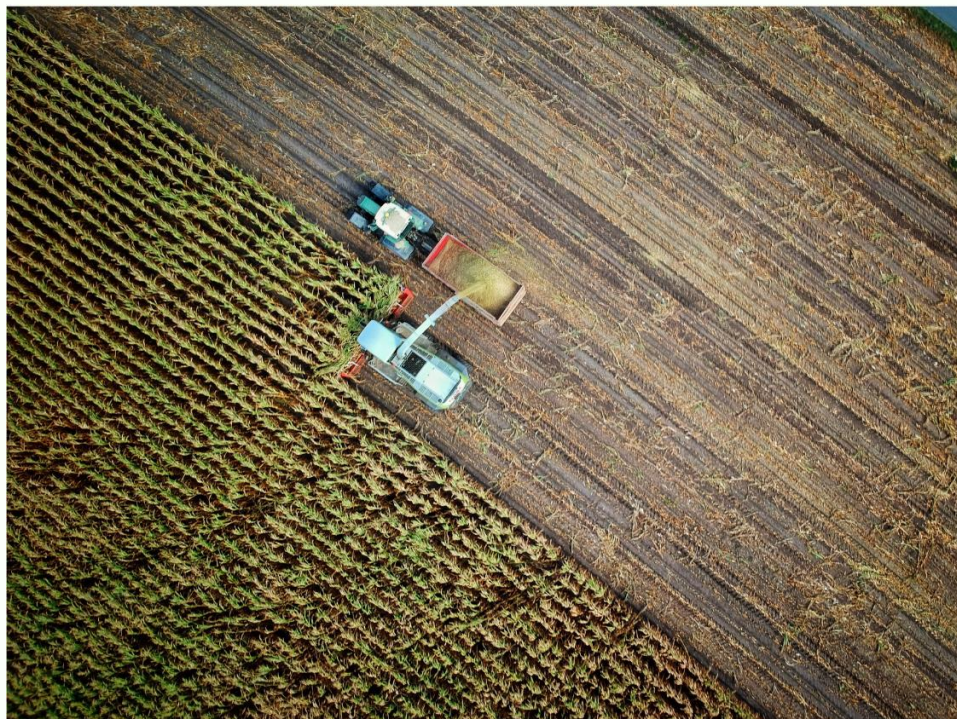


Figure 23. Agriculture and its impact on biodiversity and ecosystems, Source: [Unsplash](#)

What citizen deliberation can bring to these “heated” topics of discussion is an effective and educative way to a) raise awareness and b) develop citizenship identity among VET students. As the main goal is not only to discuss these issues, but also to learn from available resources and engage in meaningful deliberation with peers

-each of them expressing a different or divergent perspective- VET students will sharpen their critical thinking abilities as well as feel more confident and finally, more used to public deliberation practices that aim to impact and shape policies.

In both the Agriculture and Engineering sectors, innovation and sustainable practices cannot be implemented without the consent and active involvement of people who work in these fields. To address this issue, citizen deliberation can show the way towards more participatory, bottom-up and citizen-led initiatives that will enhance both citizens’ civic engagement and institutions’ legitimacy and connection to society and its needs.

You can find out how deliberative processes can generate better policies for food systems by watching the OECD webinar on this topic [here](https://www.youtube.com/watch?v=x1vPuT2TI6s) (<https://www.youtube.com/watch?v=x1vPuT2TI6s>).



Unit 5: Insights into the Agriculture sector in VET

Authors: This unit is written by the Polish Farm Advisory and Training Centre Not-For-Profit Sp. z o.o in cooperation with their network of experts on the field of Agriculture in VET.

The practice of raising crops and animals is known as agriculture or farming. Agriculture was the most important development in the rise of sedentary cultivation. The refinement of domesticated species created a food extra that allowed people to live in the municipality. Agricultural history dates back thousands of years. After harvesting wild seeds at least 105,000 years ago, emerging farmers began cultivating wild seeds about 11,500 years ago. Plant cultivation was practiced separately in at least 11 regions of the world. Meanwhile, pigs, sheep and cattle were tamed over 10,000 years ago.

Traditional farming is distinguished by having very little technology and using it sparingly. Because of this, its extensive production is not particularly fruitful. The only people who benefit from the production in this area are the farmer and those who work the land. Tools like the sickle, hoe, and shovel are frequently employed. Farmers typically don't operate tractors at full capacity. Traditional agriculture is a highly fundamental activity that relies heavily on the physical strength of the farmer and his employees to produce its goods. Due to this, resource optimization for better products and productivity are both low.

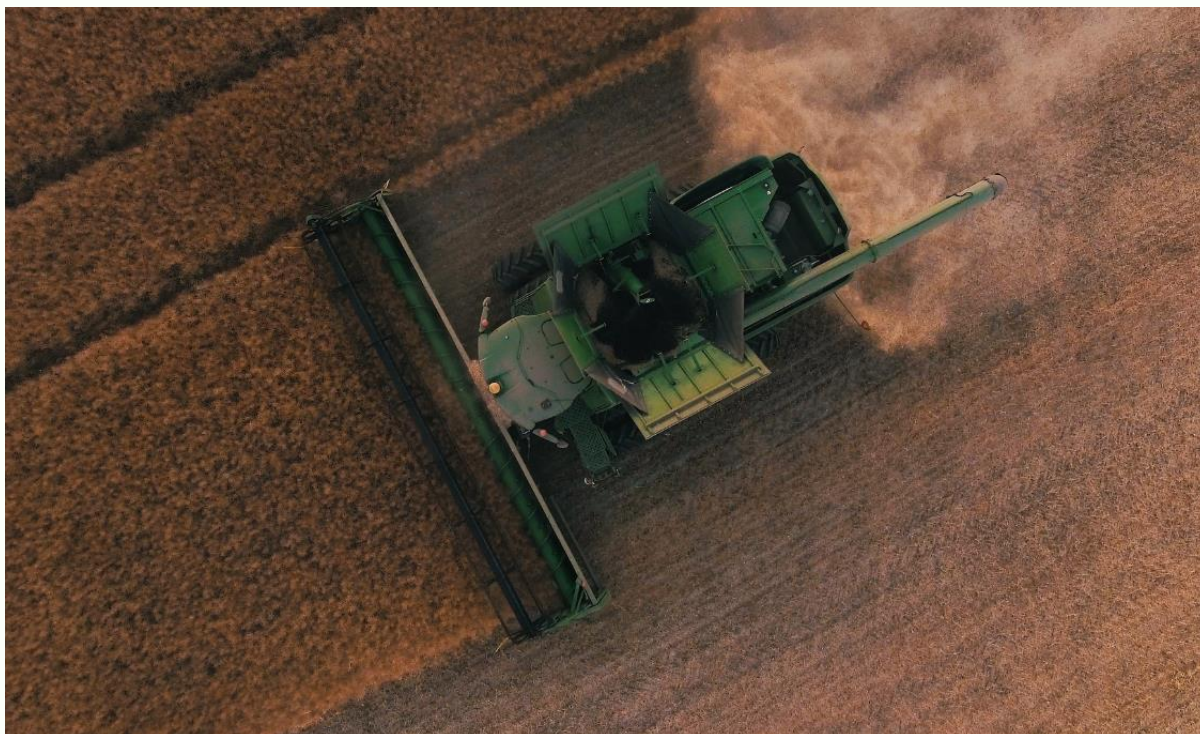


Figure 24. Harvesting and land destruction Source: [Unsplash](#)

In the 20th century, nearly two billion people still trusted on subsistence agriculture, but industrial agriculture based on large monocultures dominated agricultural production. Industrial agriculture not only contributes to environmental degradation, but also to biodiversity loss, deforestation, land deterioration and global warming that reduce crop productivity. Environmental consequences provoked by modern agriculture include habitat change, climate change, water use and toxic emissions. Moreover, today agriculture releases many toxins into the environment, containing pesticides, particularly when growing cotton. According to the UNEP Green Economy Report, agriculture accounts for approximately 13% of global anthropogenic greenhouse gas emissions. The release of inorganic fertilisers, pesticides, herbicides and fossil fuel gases into the atmosphere contribute to this.



5.1. Types of Agricultural practices

Activities like beekeeping, dairying, egg production, floriculture, fish or fur farming constitute agricultural practice (*Agricultural practice Definition*, n.d.). The types of agricultural practices are as follows.

Pastoral Farming - one of the oldest forms of agriculture is pastoral farming. It is the practice of keeping animals only in frigid, moist conditions that are not suitable for growing crops. There is little nutritional value in these steep slopes, and they are specifically designed to support plant growth and mechanisation. This soil is generally favourable for grasses and weeds. Pastoral farming can be divided into the following categories: **intensive farming** and **extensive farming**. Through massive inputs of capital and labor, intensive farms tend to take up a relatively small amount of land yet produce a high output. One example of these farms is the *Concentrated Animal Feeding Operation*, in which machines and new technologies are used to increase efficiency and reduce cost. It is common to see intensive agriculture in many parts of the world, such as the Canterbury Plains of New Zealand, pig farming in Denmark, and rice cultivation in the countries of Southeast Asia. Using the appropriate technology, people obtain the highest yields. Machines, capital, and labour are all working in “intensive mode” in this industry.

Intensive farming is the opposite of extensive farming. As compared to the money injected into them or the labor employed, the farms extend considerably in size. Cattle ranches in central Australia are good examples of extensive agriculture. As part of the cattle ranching process, huge areas of rainforest are cleared (their trees are usually burned instead of chopped down and sold). Immediately, the cattle eat all the vegetation left and cause soil erosion to become a huge problem. Large-scale farming also refers to producing livestock and crops on large, unproductive lands. (*Pastoral Farming · Farming Systems*, n.d.).

Arable Farming - This cultivation includes only growing crops. Its main purpose is to grow food crops to meet human needs. It can be made on minor, mercantile or large farmhouses. Such agricultural habits exist principally to meet the growing demand for vigorous foods and habits. The above applies mainly toward annual crops like as vegetables, seeds, peas and potatoes. The size of specialist arable farms can range



from less than 100 hectares to more than 250 hectares. Lothians and Borders have the largest arable units. A mixture of livestock production and arable crops is more often found on the lower slopes of hills, particularly in Grampian. Scottish crops include winter wheat and winter barley - the main crop, oilseed rape, potatoes and other root crops - mainly in Tayside and Fife, soft fruit such as strawberries, raspberries and blackcurrants, and vegetables such as peas, carrots, turnips and swedes. Arable fields often depend on high levels of inputs (e.g. it is less diverse than other farmland habitats due to agricultural inputs (fertilisers and pesticides). In contrast, when managed less intensively and with arable margins, conservation headlands, or beetle banks, may be able to sustain small mammals, birds, insects, and rare plants (*Arable farming*, 2022).

Shifting Agriculture - Agricultural migration involves developing crops in treed zones after deforestation in the tropics. The locals are engaged in agriculture in the forest areas until the land becomes infertile. It commonly takes 3-5 years for the land to become barren or for native plants to be submerged. Following the infertility of the land, the farmers move on to the next forest and repeat this process every year until the forest is fertile again. This agricultural practice is primarily used for grain production in the tropics. Features of mobile cultivation: a sufficient supply of land is restored over a long period of time (about 10-20 years), and the demand for food is not too high, so the system is suitable for the poor environmental conditions and vulnerable ecosystems of the tropics. Migrant farming is limited to India only (*What is Shifting Cultivation - Characteristics, Process & Types*, 2022).

Mixed Farming - In terms of adaptability, mixed farming is one of the best agricultural practices. Animals and plants can be bred and grown simultaneously. Europeans have primarily practiced it in wetlands. The cultivation method involves growing different crops continuously with different grain filling periods and planting methods. For this agricultural system to succeed, adequate irrigation facilities and optimal rainfall are essential. Traditional mixed farming involves raising livestock and arable crops on the same farm and traditionally involves a wide range of crops and livestock being raised at the same time, thereby spreading the risk of one crop failing. Dairy farms produce a lot of manure, which is incredibly valuable for mixed farms. In addition to being a soil conditioner and enhancer, farmyard manure is a



valuable source of nitrogen that is imperative to successful crop production. It does not eliminate the need for artificial inputs, but it does reduce the amount of fertiliser spread, which is both economic and environmentally beneficial (*About Mixed Farming*, 2021).

Nomadic Agriculture - Cattle grazing on natural pastures is an agricultural practice called nomadic agriculture. Travellers need food, water and grass. Universally, these agricultural practices are principally found in arid and semi-arid regions. Their places are inhabited by many types of animals, including goats, sheep, camels, cattle, horses, and donkeys. As a result of pastoralist migration, animals are exposed to natural disasters, die from exhaustion due to long-distance travel, soil structure is disrupted (compacted), and new diseases are easily transmitted (George, 2022).

Sedentary Agriculture - It is primarily found in the tropics and is a continuous agricultural practice that takes place on the same land repeatedly. Several years are required for the land to regain its fertility after it is lost. Among the crops commonly grown in sedentary agriculture are woody plants and cereals. Farmers raise several animals, including cattle and buffalo. Cattle are used not only for milk and meat, but also for fodder. Typically, grains are sown during the chilly season, grown during the wet season, and harvested during the dry season. In South America and Southeast Asia, many sedentary farmers find work on their fields during the off-season, returning home with a consistent income. Subsistence farming is frequently linked with agriculture or the gathering and selling of forest products in Southeast Asia and West Africa. This farming technique grows maize, millet, rice, veggies, sweet potatoes, crops, bananas, tobacco, small cereals, and pulses (*Paragraphs on Sedentary Agriculture*, 2014).

Subsistence Farming - In this practice, there is only one breed that takes care of the needs of the farmer and his family. Plant cultivation and animal husbandry are generally restricted to small-scale, low-income, sustainable farming systems. A traditional and ancient method of cultivation is used in this practice. The yields are low, as this is a small-scale farming system, mostly adopted by poor farmers without access to new technologies or inputs. As a result, farms are the only ones that actually produce. The techniques of subsistence farming are essential to the growth of human civilisation. It has been around for 12,000 years and was the mainstay of



most cultures' first means of survival. When homo sapiens learned to domesticate plants after the Ice Age, they started to live in one spot rather than go hunting and gathering. This shift created what we now refer to as "subsistence agriculture," allowing the emergence of complex civilisations. This change is referred to as the "Neolithic Revolution" by anthropologists. Corn, beans, tomatoes, squash, and potatoes are just a few of the delectable crops that American subsistence farmers produced in large quantities as they were incredibly productive (Undlin, 2019).

Commercial Agriculture - The practice of growing cash crops and trees for commercial purposes is called commercial agriculture or industrial agriculture. Crops and trees grown commercially often require large landscapes. Nonetheless, small-scale cultivation relies on its high commercial value. Palm oil, mango, apple, pineapple, tea, coffee, rubber, coconut and grapes are the main cash crops. Due to their nature, tree crops cost a lot to grow. This farming is primarily done by Indian farmers. Additionally, 75% of the population in rural areas is engaged in commercial farming. Farming business owners in metropolitan areas buy property to plant crops, but they lease it to farmers to take care of it and grow the crops (*What is Commercial Farming? Its Characteristics & Advantage*, 2021).

Intensive Farming - In equatorial regions with high rainfall and diverse plant communities, exhaustive agriculture is an important practice. Globally, rice is a dual crop that matures intensively and is domesticated for food and for export. Agriculture is often productive on a large scale and also contributes to the economy of the country. Other high-yield crops are also planted there. Parts of Central America, South Africa, Asia, and the Middle East practise intensive farming. The term "pasture intensification" refers to the rise in value and output that results from the addition of resources like cash, labour, and pesticides, specifically to the pastures where farmed animals graze. As new farming techniques and rising yields enabled for greater people to thrive, historians feel that pasture intensification and agricultural intensification was a vital step in building contemporary societies. Boosting the amount of land planted or grazed has historically been the most popular and efficient strategy to increase inputs, enhancing the farm's output. While biodiversity is lost when native plants and grasses are destroyed, increasing the quantity of land used can have further detrimental effects on it (Staff, 2022).



Extensive Farming - A livestock breeding practice that mainly uses wheat, acorns, grains, and barley as the main crops in low-yielding agricultural areas. Argentines, Peruvians, and Americans frequently use it. Because there is no compost to add to the soil and no artificial fertilisers, this farming practice is considered eco-friendly. Farmers and breeders, however, find its actual productivity lower than global demand.

Crop Rotation - Rotation is a type of agricultural exercise in which crops full-grown in the same land by turns in different seasons. After the primary harvest, this practice supports the restoration of soil fertility and nourishment. Furthermore, it reduces the frequency of environmental factors and their impact on plant productivity and stress tolerance. Wheat, turnips, mustard, alfalfa, and corn silage can be examples of crop rotation. As is typical in conventional farming, if a farmer plants the same crop in the same location every year, she/he will recurrently extract the same nutrients from the soil. Since their favourite food source is always present, pests and illnesses establish a permanent residence. These monocultures necessitate higher concentrations of chemical fertilisers and pesticides to maintain high yields while keeping pests and disease at bay. Without using artificial inputs, crop rotation assists in replenishing soil nutrients. Additionally, the approach breaks the cycles of pests and diseases, boosts soil health by increasing biomass from various crops' root systems and strengthens biodiversity on the farm (Rodale Institute, 2020).

Plantation Agriculture - Agricultural plantations grow a single crop in large quantities. It is common for businesses or government agencies to own farms that grow cereal for export. Tropics are home to many farms, but they are particularly prevalent there. Agriculture for a profit is a form of commercial farming known as plantation agriculture. For plantation farming to be lucrative, many different locations are needed. These conditions are ideal for farming. The distinction among plantation agriculture and other types of farming is one that many people are unaware of (Musa, 2022; Aslam, 2022).



5.2. Agricultural impact on VET

A three-circle instructional paradigm is used in agricultural education. These include leadership training, experiential learning, and classroom and laboratory education. Each of these three elements can be successfully combined to create a powerful program that develops well-rounded individuals ready to lead in business, industry, and agriculture. When the Smith-Hughes Act was established by the United States Congress in 1917, agricultural education was first incorporated into the public education system. In the 50 states and three U.S. territories, official agricultural education instructional programs are now being taught to over 800,000 students in grades seven through adult.

The goals of agricultural vocational training should be clearly stated, with emphasis on the necessity of providing farm workers of various categories with the knowledge and skills required for the practice of their profession, including managers, operators, as well as instilling in them a sense of the social significance of the work they are doing and securing its recognition by the public. More efficient use of land, diversified natural resources as well as the preservation of soil are some of the most significant goals. These goals include also raising the level of nutrition and improving incomes, standards of living, employment opportunities, working conditions, and prospects for advancement in agriculture as a contribution to resolving the lactose intolerance.

Regarding youth engagement in agriculture, some of the most important objectives of policymakers should be encouraging young people entering the various branches of agriculture in sufficient numbers, providing assistance in overcoming the issues of seasonal unemployment and underemployment in agriculture, and closing the gap between technological advancements affecting agricultural production. In order to achieve these goals, training should include instructions in appropriate work techniques and methods, the development of critical skills, and, when necessary, skills in the planning of farm operations and principles and practice of farm management. The training should be related progressively to the farm population's capacity to absorb information, which is influenced, among other things, by the level of social and economic development, and should be accessible to all farm population members.



The right steps should be made to achieve an equal grade of education in rural and urban areas, as well as a shared foundation for that education. The needs of rural places and the environment of rural children should be considered while developing teaching strategies and, when necessary, curricula in rural primary schools. Formal classroom instructions provided in a system of primary schooling should be supplemented, where possible, by practical courses in the use of school gardens and in home crafts as part of schoolwork in order to give a sound, general education to impart an appreciation of nature and develop manual facility. When secondary schools do not offer specifically vocational agriculture training, general agricultural instructions should be provided. These instructions have to be modified according to local and national conditions in rural areas.

Additionally, the agricultural workforce should be included in the vocational training program without distinction of race, religion, nationality, or sex, and regardless of the legal status in relation to the land, including potential and current farmers and farm workers, including seasonal workers, farm women, and employees in occupations closely related to agriculture. When necessary, the programme's scope may be constrained in the early phases and in developing nations to the people who can be reached and instructed most effectively by the staff on hand as well as to the communities and groups of people who will benefit most from teaching. The establishment of a group of qualified professors and instructors with an appreciation for and compassion for agricultural life, and who, whenever feasible, have had personal experience of farm life and work, should be one of the first steps in underdeveloped areas lacking training facilities. Attention also should be given to the establishment of training facilities on farms where the operator is suitably qualified to offer practical teaching, even in cases where such trained teachers and instructors are not readily available. Moreover, programmes of vocational training in agriculture should incorporate both formal classroom education and associated general topics such as rural social studies (*International Association on Work in Agriculture - International Association on Work in Agriculture, n.d.*).



5.3. Environmentally educated and deliberative society – hope for the future

At European level, 84% of young Europeans express their concern about climate change, while 46 % of them consider climate change as the most threatening issue of modern world. When asked about their source of climate news, young Europeans pointed the internet at the first place (56%) and school at the very last one (21%) (Wyszkowski, 2022). On top of that, according to UNESCO data, countries most vulnerable to climate change effects and least responsible for global warming are now more likely to integrate environmental education in their school curricula (UNESCO, 2022).

In this context, climate education is often perceived as identical to environmental education. In fact, climate education goes beyond notions of environmental protection and learning pro-environmental attitudes, as it focuses primarily on the planet's climate, the impact of natural factors and human activities on its change, and the consequences of a possible climate catastrophe. Therefore, climate education reminds us of the ecological elements and of ourselves being an integral part of the environment. Likewise, it is important to emphasise the interdisciplinarity of these issues, the impact of climate change on the environment as well as on all aspects and spheres of life (Wyszkowski, 2021).

Civic education is needed to learn how to dialogue with decision-makers at various levels of government, strive for climate neutrality as a society, and change the market for the production of goods and services for the benefit of citizens. Climate education should also include global education, which - by explaining the social, economic, cultural, political and environmental interdependencies between different regions of the world and their inhabitants - prepares for the global challenge of climate change (Jazukiewicz, 2021).

Apart from gaining detailed knowledge and learning practical competences, the development of social skills is necessary for being active and aware when it comes to environmental policy. Being part of the civic society, active participation in social deliberation is necessary for people in agriculture-related jobs to shape policy makers decisions. In order to start implementing democratic practices in VET, more



effective communication processes are needed between the different actors in this field, from the level of practice and education to the level of European policy makers (Grollmann & Ruth, 2006).

According to CEDEFOP's recent study, VET systems in some countries are characterised by a certain degree of individualisation in terms of determining the content of VET programmes or qualifications, as well as adopting a balance between different types of skills and competencies. The overall focus is determined not only at the programme level, but also at the level of schools and even the individual student. In recent years, VET programmes and qualifications in many EU countries have been reported as giving a greater emphasis on transversal skills such as: social and communication skills, learning to take initiative, being able to work with others, environmental/green skills and digital skills. While the evidence remains weak, the changes observed at the curriculum level may reflect and reinforce national trends for upper secondary education in general. Countries with strong VET systems have experienced mostly academic trends, while countries with traditionally weak enrolment in VET have experienced vocational drift. Overall, it can be claimed that the integration of transversal skills challenges the traditional construction of the curriculum in vocational education and training, which is essentially built from three categories: general school subjects, theoretical vocational knowledge and practical vocational skills (CEDEFOP, 2022).

Moreover, introducing citizen deliberation for climate action in VET comes in line with young people's growing interests in climate matters. As youth climate movements spread solidarity for climate action, more and more young people are forming bodies and organisations and engaging in dialogue with decision makers. Such initiatives provide youth with valuable experience, allowing them to gain knowledge, skills and attitudes in informal learning contexts.

Finally, civil society -in which climate movements and organisations can be included- plays an important role in addressing environmental issues by drawing the attention of decision makers to the climate emergency, raising public awareness, promoting innovative ideas and approaches, and advocating for transparency and in environmental policies (Ismailov, 2017).



5.4. Agriculture and Climate Change

Changes in higher mean temperatures, more frequent extreme weather events, and an increase in inter-annual weather variability are anticipated to have a negative impact on agricultural producers and have an impact on current management techniques. Therefore, it is necessary to address agricultural adaptation, given the trends in climate change and the deteriorating effects of climatic impacts.

For slight modifications to current agricultural systems, there are numerous potential adaption solutions available. Agriculture and forestry both face significant and growing resource conservation, such as nonpoint water pollution and biodiversity protection. Resource conservation refers to the preservation and sometimes even improvement of natural resources. An ecological resource that is readily depleted without adequate management is soil organic matter. Following initial cultivation, soil organic matter rapidly decreases in almost all agricultural systems, often to 40–60% of original values within a few decades. Nevertheless, soil organic matter is an important resource because it offers habitat and energy to soil organisms, a soil structure that is good for plant growth and water retention, and a chemical structure that is good for nutrient retention (Cradock-Henry et al., 2020).

In the late 1980s, global public awareness of climate change began to grow. People frequently conflated climate change with other environmental problems like ozone depletion as a result of early 1990s media attention. Al Gore's documentary *An Inconvenient Truth* (2006) and the science fiction film *The Day After Tomorrow* (2004) both focused on climate change in popular culture. Interestingly, there are notable regional, gender, age, and social disparities affecting the public's understanding of climate change. People with higher levels of education, as well as women and youth in several nations, are more likely to perceive climate change as a significant concern. Likewise, opinions on the causes of climate change differ greatly amongst nations. The earth is continuously heating up. Major climatic changes have already been triggered by humans, and further changes in temperature and weather patterns are expected.

Global warming will continue for at least a few more decades, even if humanity stopped generating greenhouse gases right away. In many industries and locations



around the world, the transition to a 1.5°C above pre-industrial temperature goal for global warming is already under way (medium evidence, high agreement). Over the past few years, solar energy, wind energy, and electricity storage technologies have significantly improved, however, nuclear energy and carbon dioxide capture and storage (CCS) in the power sector still lag behind. Deep emissions reductions in energy-intensive industries are necessary to keep global warming to 1.5°C. These reductions would be made possible by electrification, hydrogen, bio-based feedstock replacement, and, in some circumstances, carbon dioxide collection, utilisation, and storage (CCUS) (de Coninck et al., 2018).

Additionally, the demand for food is rising as a result of changing diets and a growing worldwide population. Nevertheless, according to a 2020 estimate, the number of undernourished people has increased by about 60 million over the last five years to reach close to 690 million, or 8.9 percentage of the world's population. As human societies plan to produce almost 70% more food by 2050, in order to feed an expected 9 billion people, the issue of food security will only get worse.



5.5. Best practice: Climate adaptation of agriculture through permaculture in VET

Climate change presents significant threats and opportunities to agriculture. Agricultural producers may be adversely affected by higher average temperatures, more frequent extreme weather events, and increased interannual climate variability, which may affect established management practices (Cradock-Henry et al., 2020). The strong trends already observed in climate change, the potential for further changes and the increasing magnitude of possible climate impacts call for a more coordinated response to agricultural adaptation (Howden et al., 2007).

Climate change disrupts the agricultural ecosystem, resulting in change in agricultural climatic elements such as temperature, precipitation, and sunlight, while further influencing the arable, livestock, and hydrology sectors (Chang-Gil & UN.ESCAP, 2012). A changing climate makes growing conditions more difficult. But there is a lot that can be done to help farmers. There are many potential options for adapting to changing margins of existing agricultural systems, often altering climate risk management. Planning for the adaptation of agricultural and forest landscapes to climate change remains a challenge due to the large amount of information that needs to be processed. This information extends to climate scenarios, geolocation, socio-economic data and many possible adaptation measures (Vizinho et al., 2021).

Consequently, there is an urgent need for frameworks that can regulate adaptation strategies in the agroforestry sector. Permaculture is an approach that connects environmental, social and economic aspects. Permaculture means new opportunities for soil protection, saving natural resources and ensuring greater self-sufficiency (Vovk & Zeman, 2016).

Permaculture offers a ray of hope – a way forward. It offers everyone the chance to be part of the transition to a more eco-friendly, ethical, and sustainable future. It integrates land, resources, people, and the environment through mutually beneficial synergies – imitating the no waste, closed loop systems seen in diverse natural systems. Permaculture studies entail holistic solutions that are applicable in rural and urban contexts at any scale. It is a multidisciplinary toolbox including agriculture, water harvesting and hydrology, energy, natural building, forestry, waste



management, animal systems, aquaculture, appropriate technology, economics, and community development (*What Is Permaculture?*, 2019).

The philosophy behind permaculture is one of working with, rather than against, nature; of protracted and thoughtful observation rather than protracted and thoughtless action; of looking at systems in all their functions, rather than asking only one yield of them; allowing systems to generate their own evolutions (*What Is Permaculture?*, 2019).

By adopting this approach and applying these principles, we can make the transition from being dependent consumers to becoming responsible producers. This journey builds skills and resilience at home and in our local communities that will help us prepare for an uncertain future. The techniques and strategies used to apply these principles vary depending on the location, climatic conditions and resources that are available. The methods may differ, but the foundations to this holistic approach remain constant. By integrating these principles, VET students and educators can acquire valuable thinking tools that will help them become more resilient in this transition era (*Permaculture Principles*, n.d.).

Finally, it is important to claim that teachers and trainers are the backbone of any VET system, and any educational intervention requires their vivid interest and active involvement. Therefore, it is essential that VET teachers and trainers acquire a balanced mix of technical, methodological, and pedagogical skills to stimulate VET students' learning and participation in climate action.



Unit 6: Citizen science in VET schools as a bridge between citizen engagement, deliberative democracy and active learning in education contexts

Authors of this unit: Stefania Oikonomou, Katerina Zourou

Activated by groups of citizens who seek to participate in activities that foster scientific understanding of climate-related questions, citizen science can be seen as a possible bridge between citizen engagement, deliberative democracy and active learning in the VET sector.

This unit provides a definition of citizen science that maps out its value in VET-specific contexts. Finally, we will address the issue of citizen science as a means to foster civic engagement and tackle misinformation.

6.1. Citizen Science

Citizen science is not a new field of research as it has already come a long way since its first manifestations in the 19th century. There are many citizen science definitions, depending on the discipline they are embodied in. In this guide, the following definition is being adopted:

“Citizen science uses the collective strength of communities and the public to identify research questions, collect and analyse data, interpret results, make new discoveries, and develop technologies and applications – all to understand and solve environmental and social problems” (Environmental Protection Agency, 2021).

The European Citizen Science Association (ECSA) has published the “Ten principles of Citizen Science” (ECSA, 2015), in an effort to build a common understanding.

Several factors have increased the popularity of citizen science. The rapid evolution of digital technologies is one of them; allowing citizens to use free-of-charge or low-cost devices to monitor air, soil, and water quality therefore acquiring first-hand



experience of data observations in their community. In addition, the educational value of citizen science in terms of educating citizens (including young people) in climate change awareness by means of scientific evidence is important. Citizen science can maximise research outreach thanks to its flexibility in data gathering from any part of the world in an ongoing period of time, unlike traditional, location-based only research.



Figure 25. Scientific research, Source: [Unsplash](#)

Additionally, citizen science has been associated with the space and opportunity it gives ordinary people to engage in science. By involving citizens in scientific research through data collection and/or data analysis, their attitude towards science and science-related policy is enriched, while skills are developed. In fact, as Zourou (2020) points out:

“the term “citizen” should not disguise the **wealth of roles, competences and skills** present within projects, the orchestration of which is a key feature of the design of a project”.

As citizen science projects mostly deal with environmental issues, citizen science can be used as an effective way for citizens and students to better conceptualise and



gain practical knowledge on these topics, especially climate-related issues (i.e., climate change, biodiversity loss, air quality, marine pollution etc.). The European Commission in its publication on Citizen science for environmental policy (European Commission, 2018) argues that:

“citizen science projects can engage people in decision-making processes by increasing first-hand understanding of environmental issues and fostering environmental stewardship”.

In this context, carrying out a citizen science project for climate action can enhance a student’s ability to better understand climate change and foster in them an active citizenship dimension.

6.2. Citizen Science in VET schools

The potential citizen science brings to participants in terms of participatory and learning outcomes has made the case for its integration in school curricula. As citizen science projects often deal with issues like air quality, marine pollution, biodiversity and inclusion, they can also promote the achievement of sustainable development goals (SDGs) by collecting valuable data to feed into existing indicators (Queiruga-Dios, López-Iñesta, Diez-Ojeda, Sáiz-Manzanares, Vázquez Dorrió, 2020).

As the educational value of citizen science becomes highly recognised, its integration into VET curricula, in combination with the adoption of deliberative processes, will transform the level at which VET students’ engage in public policies. In particular, thanks to the interdisciplinary approach of citizen science projects, it is possible for VET students from different educational fields, like Agriculture and Engineering to be involved in the same project. Those students can then be engaged in a citizen science initiative that combines knowledge exchange and co-production across these sectors.

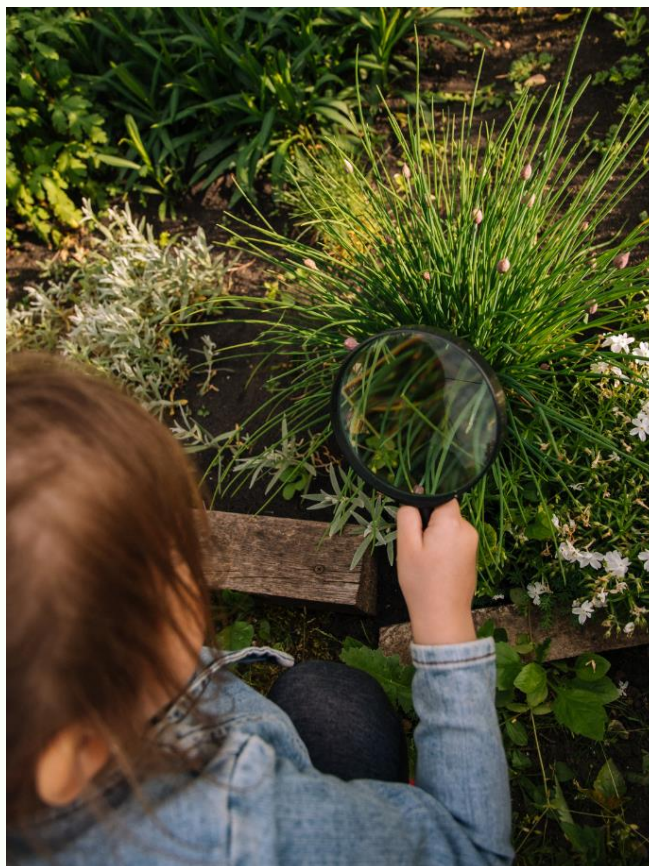


Figure 26. A child exploring nature, Source: [Unsplash](#)

In an article on *Citizen Science, Education, and Learning: Challenges and Opportunities* (Roche et al., 2020), authors claim that:

“Citizen science practice could be exercised as one means of educating active citizens; by empowering communities to advocate for their local environment through research, or by enabling citizens to gather evidence on, and articulate, pressing issues”.

Furthermore, the importance of citizen science as an educational and learning experience for students is supported by the White Paper on Citizen Science in Europe (Socientize project, 2014). The White Paper refers to the need to introduce citizen science and its methodology in educational systems from an early stage, so that future citizens become acquainted with the practices of science and technology from a young age. In particular, the paper states that educational programmes should be updated



“...in order to promote and to recognise new forms of **community engagement** and **digital skills** in the curriculum. New tools and educational materials should foster citizens' autonomy and responsibility for change at an early age (encouraging curiosity, criticism, self-learning, self-expression) through lifelong learning. Educational programmes should stress **collaboration between schools and scientific institutions**, which needs to be reflected in scientific and educational value systems” (Socientize project, 2014).

In this context, citizen science projects in VET will aim to foster VET students' scientific and digital literacy skills as well as to introduce a more environment-centric approach to learning that goes beyond standardised technical skills.

6.3. Citizen Science in deliberative processes

With the spread of digital technologies, the emergence of misinformation and fake news has posed a serious threat to social cohesion. Indicatively, during the Covid-19 pandemic huge misinformation campaigns were released, thus leading to the emergence of the term “infodemic” (Druckman, 2022).

In times of science and climate change scepticism, citizen science combined with democratic deliberation processes could restore trust in science and democratic values. In fact, some citizen science experts have already introduced the term “democratic citizen science that aims to foster a science which serves the interests of all, which asks and researches questions that are important to the whole of society, and listens to marginalised voices” (Jaeger, Masselot, Greshake Tzovaras, Senabre Hidalgo, Haklay & Santolini, 2022).

The need to democratise citizen science has emerged as citizen science projects usually adopt a top-down approach in which decisions on the objectives of the research and who can access the collected data are taken by scientists and - project organisers. In this case, citizens are merely treated like volunteers who assist researchers in data collection, and no opportunity is given to participants to deliberate on the organisation, scope and outcome of the project.



Taking into account this controversial feature of citizen science, advocates of a more democratic citizen science point to the need for a bottom-up approach, one that can be associated with the quest for more deliberative processes in society. In this context, the principles of deliberative democracy can be beneficial for democratising citizen science. As Herzog and Lepenies (2022) argue:

“citizen science needs to move towards a more empowered approach for citizens, in which citizens do not only deliver data points, but also participate in discussions about the goals and implications of research”.



Figure 27. Community engagement for the environment, Source: [Unsplash](#)

Eventually, dealing with social phenomena such as misinformation, fake news, science denial and climate change scepticism requires close collaboration between



scientific institutions, schools and policymakers. All these stakeholders should also work towards the development of citizenship identities that are equipped with critical thinking skills, communication skills and scientific literacy competences in order to build sustainable societies.

You can explore how citizen science is connected to climate action and activism by watching the INOS project webinar “From Open and Citizen Science to Activism: Roles of Academic staff”, available [here](https://inos-project.eu/2022/07/14/report-from-open-and-citizen-science-to-activism-roles-of-academic-staff/) (<https://inos-project.eu/2022/07/14/report-from-open-and-citizen-science-to-activism-roles-of-academic-staff/>).



Conclusions

The pedagogical guide “Citizen engagement and deliberative democracy for climate action in VET schools” of the GreenVETers project aims to support educators in their effort to integrate citizen engagement and deliberative democracy principles and practices into Agriculture and Engineering VET fields.

To achieve its mission, the guide first dealt with the issue of climate change by providing some data that shows the extent of the threat and damage afflicted in natural and human habitats so far. The focus then turned on the European Green Deal which is briefly presented as a European policy agenda which encompasses a multitude of intervention areas, especially concerning reforms in Agriculture, Engineering and the economy sectors (i.e., circular economy, transformation of agriculture, sustainable transport etc.). In addition, the guide presented the Sustainable Development Goals (SDGs) and the Education for Sustainable Development (ESD) adopted by the United Nations. In this context, the integration of citizen deliberation for climate action in VET was adopted as a means to foster citizen engagement.

In section 2, it is argued that citizenship education is hardly incorporated in VET school curricula, while the main barriers for the adoption of deliberative processes in VET (i.e., social prejudices, curricula aimed at the proliferation of certain labour-focused skills) were exposed and opportunities to integrate citizen deliberation in VET were assessed. Section 3 of the guide explored the motivations and the drivers of climate movements, their objectives, visions and ways of mobilising. The guide focused on three climate movements, namely Camp for Climate Action, Fridays For Future and Extinction Rebellion. The overall aim of section 3 was to highlight the many different forms that climate action can take, as well as its diverse manifestations through time and space.

Section 4 dealt with deliberative democracy and its main principles. In this section, it was argued that deliberation for a social purpose in VET necessitates the upskilling of educators in deliberative democracy practices. This guide seeks to provide educators with useful knowledge and resources to facilitate and promote citizen deliberation in vocational and education training.



Finally, section 5 deals with important aspects of agricultural education in VET, while section 6 focuses on citizen science as a bridge to foster scientific and digital literacy of VET students. In this final section, it is claimed that citizen science can enhance democratisation of science and citizen engagement in debates that shape public policies. Eventually, as the Agriculture and Engineering VET sectors are connected to policies adopted at European level in this transition period, it is argued that pursuing deliberation and citizen science in VET schools can foster the VET sector's capacity to actively respond and contribute to the fight against climate change.

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Secondary Resources

The following are resources collected during the secondary desktop research conducted by the GreenVETers partners in their respective national context and they served to draft Unit 4.

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