MEMÒRIA DEL TREBALL DE FI DE GRAU DEL GRAU (ESCI-UPF)

Food Sustainability and Education in the European Union:

State-of-the-art review of European Union's public policies and degree of incorporation of Food Sustainability to Education

AUTOR/A: Laia Hoyos de la Cuesta	**NIA:** 104546
GRAU: GNMI	
CURS ACADÈMIC: 4t	
DATA: 24 de maig 2022	
TUTOR/S: Mercè Roca Puigvert	

School of International Business

Final Bachelor Thesis

Food Sustainability and Education in the European Union. State-of-the-art review of European Union's public policies and degree of incorporation of Food Sustainability to Education

Laia Hoyos de la Cuesta

Bachelor in International Business and Marketing

May 2022

Abstract

Current food systems consume a large quantity of natural resources and are responsible for environmental impacts and biodiversity loss (Mbow et al. 2019 cited SAPEA, 2020). Given the urgency to fight the climate crisis, shifting towards sustainable food systems is needed. Food sustainability aims to ensure sustainable agricultural production, food security, ensure sustainable practices throughout the production chain, promote a healthy and sustainable diet, and reduce food losses and waste (Economist Impact, 2021).

The best method to achieve sustainable food systems is to make all citizens more food literate and sustainability aware. Childhood is a crucial period to develop and foster a mindset that will make children's habits persist during their lives. Schools must integrate a comprehensive food education policy (Smith et al., 2022) that merges with sustainability dimensions. However, many western countries have not yet taken advantage of their full potential to provide consistent food-related school programs (Pérez-Rodrigo & Aranceta, 2003; as cited Sadegholvad et al., 2017). How Food Sustainability Education is understood is not universal (Smith et al., 2022), and neither there is a consistency of such term addressed within the European Union Member States. Under the European Green Deal, Europe has targeted the transition to sustainable food systems under the "Farm to Fork" strategy.

European Union's internal and external policies are trying to be aligned with the SDGs and the European Green Deal's priorities, aiming to deliver quality and sustainability-oriented education among the Member States. Nonetheless, it is not in the Union's prerogatives to legislate on education to promote the integration of food sustainability. Findings of this research show that the EU's recommendations and proposals on learning for sustainability development primarily focus on environmental and climate change-related issues and lack interconnections between food education and sustainability. Results of this research propose a single food curriculum focused on Food Sustainability Education in the EU. A reference framework for the Member States would help direct education policies and incorporate food sustainability education in the respective national curriculums. Nevertheless, further investigation and research are required to support and materialize this transformation.

Key words: Food Sustainability, education, sustainable development, SDGs, European Union, curriculum.

Acknowledgements

First, I would like to express my sincere thanks to the Planetary Wellbeing Initiative for the opportunity to participate in the "Food Sustainability Education in Catalan schools" research project, which deeply inspired me to pursue this Final Bachelor Thesis. Specially to my tutor, Mercè Roca Puigvert, for supporting and guiding me; and to Laura Batlle-Bayer for giving her best insights during the planification and organisation of the thesis.

Table of Contents

Chapter 1. Introduction & Background

There is a need to raise environmental awareness and shift towards sustainable food systems, production patterns, and consumption habits. The most accurate method is to make all citizens more food literate (Smith et al., 2022). Equipping individuals with knowledge and essential competencies related with the environment and, in particular, on food sustainability, is key to transform to more sustainable lifestyles and to contribute to societal transformation, as embedded in the United Nations Sustainable Development Goals (UNESCO, 2018).

Schools and families are responsible to promote this change in education, as childhood is a crucial period to develop awareness and a sustainability-oriented mindset (Smith et al., 2022). This responsibility clashes with the evidence of minimal to almost no inclusion of a provision of consistent food-related school programs (Tippmann, 2020; European Commission, 2022).

What are the limitations and challenges that hinder a thorough food sustainability-oriented curriculum? What is the role of the European Union addressing food sustainability education among Member States? The analysis of the topic in the present project shows that, in Europe, education is mostly an exclusive competence of the Member States. Since the EU cannot legislate on education, it is up to the Member States whether to follow the Union's recommendations on education, leading to gaps in the harmonization of States to achieve the objectives and priorities of the European Green Deal. In this respect, no EU legal disposition has been developed that incorporates 'food sustainability education' neither that proposes its integration in the school curriculum.

A question emerges: if educating on food sustainability is of paramount importance to equip children with the competences and skills to shift towards green and sustainable food systems, as the EU settled with the European Green Deal, what are the alternatives for the EU to act and engage in promoting such education? Can the European Union enact a curriculum that integrates food sustainability and acts as a framework for all Member States?

This Final Bachelor Thesis is a state-of-the-art review about food sustainability education in the European Union. First, it defines the dimensions of food sustainability. Second, it analyses the importance of educating on food sustainability-related issues and how schools could further incorporate such topics into the curriculum. Then, it focuses on the EU recommendations and proposals about learning on sustainable development and food education, and it defines up to what point can the EU influence Member State's education systems to promote food sustainability matters.

The present thesis has the following structure: after the Introduction (Chapter 1), the Research Question & Methodology (Chapter 2) presents the study's research question and explains the steps followed to develop the thesis. The Literature Review (Chapter 3) presents the concept of Food Sustainability and the areas of knowledge/concern it involves and discusses the coverage of food education and literacy in school and curriculum. The Analysis of the Topic (Chapter 4) focuses on understanding the EU's conferred powers on education, how is the EU addressing education on sustainable development and food matters. The chapter is based on a through a revision of legal acts, and the alternatives through which the EU can encourage Member States to foster education on food sustainability. The analysis integrates insights gained from a set of interviews with EU and education experts (See List of Interviews in Appendix 1). Chapter 5 summarises and discusses the key results of the present research. Chapter 6 presents the conclusions and further information regarding the ongoing research project and its future steps.

This thesis has been developed in the framework of the research project "Food Sustainability Education (FSE) in Catalan schools" of the UPF Planetary Wellbeing Initiative, under the name "FoodSeed". The project analyses the degree of integration of skills and knowledge related to FSE in primary and secondary schools in Catalonia. See Appendix 3A for the complete description of the UPF Planetary Wellbeing research project. The objective of the project is to raise awareness and enhance critical thinking within educational agents as a trigger of the urgent required social change towards sustainable food systems and consumption habits and establish a prioritization of the reforms to be promoted.

The research project is conducting an analysis of the degree of integration of food sustainability competencies and education policies in primary and secondary education at a European, Spanish, and Catalan levels; an assessment of the main drivers of the integration of FSE concepts and competencies in the educational system. Further primary research has been carried out at the educational centre level, evaluating the degree of freedom of the schools and teachers, examining the type of courses and activities that enable the incorporation of Food Sustainability related competencies, individual initiatives, or projects as pioneering examples, and seizing the educational resources and their availability. “FoodSeed” counts with the collaboration of a multidisciplinary team (See Appendix 3B for the description of the research Team), including researchers from different centres within the UPF and an external advisor, and myself taking part as Research Assistant (See Appendix 3C for the description of the Research Assistant call offer).

Chapter 2. Research Question & Methodology

2.1 Research Question

Internationally renowned organizations such as the UNESCO, FAO, or the European Union, and a myriad of several researchers (eg. Sadegholvad et al, 2017; Smith et al, 2022; Tippmann, 2020; Torres García et al., 2018), stress that to foster sustainable development and to combat the climate change crisis, individuals need to become more literate on topics around sustainability; and that developing sustainable food systems requires making children more literate on food education. The present work aims to provide understanding of how the European Union promotes education for sustainable development and its limits in introducing food sustainability education in the Member States. Hence, the present research aims to answer the following research questions.

"(1) How is Food Sustainability Education addressed in the school curriculum, (2) how is the European Union addressing Food Sustainability Education among Member States, and (3) what are the mechanisms of the EU to foster FSE?"

2.2 Methodology

The research process has been structured in three blocks. The first block is based on secondary information through a literature review process, which is a fundamental part of the research. A deep revision of previous work and literature by relevant authors was carried out.

The second block focused on the analysis and comprehension of the competences between the European Union and the Member States of what is the degree of competence of the EU in education. Revision of policies, recommendations and proposals issued by the EU that encourage educating for a sustainable development and talk about curriculum reformations on education for learning on sustainability.

Primary research was addressed in the third block through the realisation of interviews to EU and education experts. Questionnaires were designed and adapted to each level of interviews (EU, Government of Catalonia, and schools). The conduction of interviews was carried out between the months of February and May. See Appendix 1 for a List of Interviews.

Chapter 3. Literature Review

This section presents a literature review of the concept of Food Sustainability Education, identifying its multiple dimensions with the aim to define the different topics it covers. The Literature Review is structured as follows. Firstly, a revision of the concepts under the umbrella of Food Sustainability is provided. Afterwards, an assessment of how intergovernmental authorities address competencies on education for sustainable development (ESD) is revised. Finally, food and nutrition literacy and the degree of integration of food sustainability-related topics into the educational curriculum are analysed.

The report of the World Commission on Environment and Development first defined the term 'sustainability' in 1987, and that a durable and resilient system requires three fundamental pillars: environmental, social, and economic sustainability (Brundtland Report, et al. WCED 1987: 43); Greenly, et al. 2022). See Appendix 4 for further explanation of the Sustainability Pillars. In the line of the three main pillars that meet the definition of sustainable development, the United Nations Development Program (UNDP) in 2015 drew 17 objectives, the so-called Sustainable Development Goals (SDGs). The following table aims to provide a representation of the interrelation of the SDGs with the pillars of sustainability.

Table 1. Cross-cutting SDGs with Sustainability pillars

Sustainability Pillar	SDG co-related
Environmental Pillar	SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable; SDG 13: Take urgent action to combat climate change and its impacts: SDG 14: Conserve and sustainably use the oceans, seas and marine resources; SDG 15: Protect, restore and promote sustainable use of ecosystems; SDG 16: Promote peaceful and inclusive societies for sustainable development (Policy Forum on Development, et al. 2016).
Social Pillar	SDG 1: End poverty in all its forms everywhere; SDG 3: Ensure healthy lives and promote well-being for all at all ages; SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all; SDG 5: Achieve gender equality and empower all women and girls; SDG 10: Reduce inequality within and among countries (Policy forum on Development, et al. 2016).
Economic Pillar	SDG 1: End poverty in all its forms everywhere; SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; SDG 10: Reduce inequality within and among countries (Policy Forum on Development, et al. 2016a)

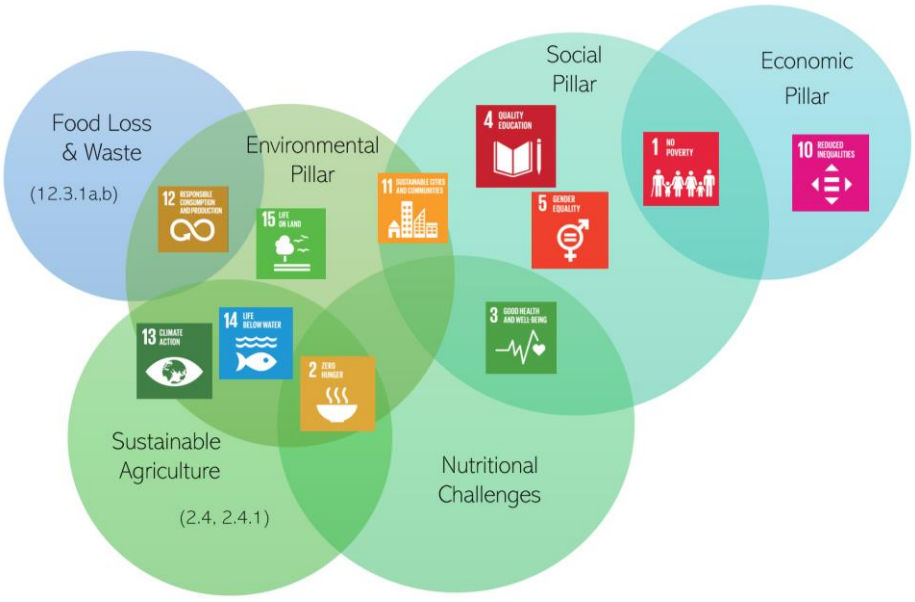
Source: Own elaboration inspired in (Delli Paoli & Addeo, 2019)

3.1 Food Sustainability

Current food systems intensively consume natural resources: 70% of the total global freshwater, and 30% of the primary energy (Batlle-Bayer et al., 2021). Food systems are responsible for 21-37% of greenhouse gas emissions and for causing environmental impacts such as loss of biodiversity and climate change (Mbow et al. 2019 cited SAPEA, 2020).

There is no unique definition of a "sustainable food systems", and neither is there one for "food sustainability". The Food Sustainability Index (FSI) has been the chosen tool to measure sustainability in this research. It measures and indicates how sustainable food systems are in 78 different countries and is based on three areas that address the current food issues and challenges identified at the local and global scale are: 1) sustainable agriculture; 2) nutritional challenges; 3) food losses and waste (Economist Impact, 2021). The following subsections are devoted to each of these food sustainability domains.

Table 2. Venn Diagram of Food Sustainability



Source: Own elaboration based on SDGs, FSI and the Sustainability Pillars.
Note: The Venn Diagram aims to illustrate how Food Sustainability is embedded in different SDGs, and how such are interconnected with the Sustainability Pillars and the dimensions that covers the Food Sustainability Index.

3.1.1 Sustainable Agriculture

Agriculture has an important role for securing a sustainable development. How and where we produce the food that is consumed is a relevant conservation issue because of two reasons. First, supplying and fulfilling the needs of a growing and more sophisticate demand is challenging. According to the United Nations, the global population is expected to grow reaching 9.7 billion people by the year 2050, meaning that food production needs to be increased by a 70% in the next 30 years to avoid further food insecurity and supply insufficiencies (ECO Canada,

2021). Second, agriculture may also threaten wild species and habitats, leading to biodiversity loss, pollution, poverty, and factors contributing to climate change (WWF, 2021).

Sustainable agriculture aims to improve the efficiency of the food production processes to reduce greenhouse gas emissions and water consumption, promoting more sustainable agricultural and farming practices for all the strategic actors involved (BCFN, 2018).

Concretely, sustainable agriculture tackles SDG 2.4 aiming to "ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, (…)", and indicator 2.4.1 for the "proportion of agricultural area under productive and sustainable agriculture" (United Nations, 2015).

A wide range of impacts from unsustainable practices on agriculture activities have harmful effects on not just the environment, but also on biodiversity, natural resources, and human health: the extensive production of food and manipulation of soil, management, conservation, and quality control, the use of pesticides, fertilizers, impacts of farming, plant and animal production practices; and agricultural massive plantations**.** See Appendix 5 for further explanation of harmful activities in sustainable agriculture. To ensure a sustainable agricultural system, all food system stakeholders need to be involved, and financial incentives need to be put in place to encourage biodiversity conservation and making more explicit agricultural policies (WWF, 2021).

3.1.2 Nutritional challenges

Applying sustainable agricultural methods and reaching the required sustainable growth in agricultural production does not guarantee the provision of sustainable and healthy diets. Obesity is tightly related to the individual's lifestyle and food choices and such nutritional habits are cultivated from early childhood to adulthood (de Cosmi et al., 2017), as Appendix 6 shows.

Nutritional challenges in food sustainability are found under SDG 3 to "ensure healthy lives and promote wellbeing for all at all ages". Concretely Target 3.4 that aims to "reduce by one-third premature mortality from NCDs through prevention and treatment and promote mental health and well-being", and Target 3.8 that wants to "achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all". Moreover, SDG 2.2 implies forms of malnutrition (United Nations, 2015).

Everyday individual food choices are influenced by a wide range of factors, such as: psychological and genetic attributes and economic factors such as purchasing power and affordability, which

are determined by income and existing prices of “sustainable” food options. These are key for sustainable lifestyles and prevent childhood obesity and overweight (Muhammad et al., 2017). Childhood obesity and overweight are considered as silent epidemics that threaten European youngsters’ health (Wickramasinghe et al., 2021). Research from the World Health Organization on “Childhood overweight and obesity abatement policies in Europe” provides six areas of recommendation (Wickramasinghe et al., 2021): 1) promotion of healthy food consumption in Member States, 2) promotion of physical activity, 3) preconception and pregnancy care, 4) early childhood diet and physical activity, 5) healthy nutrition and physical activity for school-aged children; and 6) weight management based on community.

Another key factor in daily food consumption choices that is directly related with the information available to the consumer about the products purchased is food and nutrition literacy (Driessen et al., 2014). Many advertisements provide incomplete and contradictory information of food products (“sustainable” product labels, healthy diets). This is exacerbated by the lack of knowledge that enables differentiating between reliable and unreliable sources of nutrition information (Vermeir et al., 2020). This situation can be tackled with rigorous education, and healthy and sustainable food choices (Spiteri Cornish & Moraes, 2015).

3.1.3 Food Loss and Waste

SDG 12 for Responsible Consumption and Production puts its focus on Target 12.3.1 (a, b) to develop two separate indicators that measure losses and waste along production and supply chains (United Nations, 2015).

One third of the food produced annually for human consumption is not eaten (FAO, 2011). In the EU, 88 million tonnes of food are wasted yearly, representing a cost of 143 billion euros, equivalent to 173 kg/person and 20% of food production (Stenmarck, 2016). About a 14% of food produced globally is lost between its collection and distribution in retail: agriculture and livestock production, harvesting and recollection of food (farms, fishing boats), production and manufacturing, packaging, transportation, storage, and distribution (Food Print, 2021). See Appendix 7 for an illustration of Food Loss and Waste (FLW) along the supply chain.

Not only the production industry is responsible for food loss and waste. A 17% of the total global food produced is wasted in households (11%), food service (5%) and distribution (2%) (United Nations, 2021). Individual consumer behaviour plays a crucial role in the management of FLW since, factors such as over-eating, food spoilage, over-preparing, date-label confusion, and overbuying are contributors to food system losses and consumer food waste; not only in households, but also in school canteens, hotels, restaurants, and hospitals (Food Print, 2021).

There is a need for further involvement of the private and public actors to invest in sustainable infrastructures and well-functioning food chains (FAO, 2014). Achieving good practices in the management of FLW will have to be acompassed with a consumer behavioural change, individual and collective, the coordination within food chains and a solid promotion of public policies and private initiatives (FAO, 2014). See Appendix 8 for a summary of the dimensions and challenges of food sustainability.

3.2 Education for Sustainable Development

Societies and individuals are facing economic, social, and environmental challenges, to achieve peace, justice, and sustainability. This has a direct effect on the way that societies produce and consume, as individuals are connected to their social norms and culture (UNDP, 2015).

3.2.1 Culture as the 4th Pillar of sustainability and SDG 4

Culture was integrated as the fourth pillar of Sustainable Development in 2010 as a demand of the World Summit on Sustainable Development (2002), in recognition of the relevance of cultural diversity, awareness, and education to achieve justice, liberty, and peace (UNESCO, 2001) (United Cities and Local Governments, 2010). Culture determines the teaching environments and education systems, which is why schools and educational institutions have an essential role to play in promoting education for sustainable development among the population (Adamas University, 2020). Culture, and therefore education, can only be considered as a pillar of sustainable development if it addresses the challenges that society faces (Adamson et al., 2020). Educating on Sustainable Development (ESD) should be understood as an integral part of quality education and lifelong learning and goes in the line with SDG 4 Target 4.7: “ensure all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through ESD and sustainable lifestyles” (United Nations, 2015).

3.2.2 Integrating sustainability in the educational framework

Educating on Sustainable Development aims to foster knowledge, skills, attitudes, and competencies that allow individuals to take responsible actions that consider current and future social, cultural, economic, and environmental impacts from local and global perspective. These competencies help individuals make informed decisions to respond to local and global challenges (Rieckmann, 2018). The school curriculum is the roadmap of the learning process, as it represents a conscious and systematic design of the knowledge, skills and values that shape the teaching and learning processes by arranging and coordinating what, why, when, and how students should learn (Pataki, 2005; UNESCO-IBE, 2013).

Concretely in the EU, eight specific competencies were described by the Council of the EU in 2006 (2006/962/EC). Likewise, the UNESCO studies what different countries in the world do defines that education amongst countries is approached differently, but in the end, all education frameworks have similarities but under different nomenclatures. UNESCO proposes a framework of competencies, which is rich and interesting but is not taken up at the European level because the EU is already embracing Council's eight competencies. In UNESCO's paper on "Issues and Trends on Sustainable Development", ESD is devised as a holistic approach, addressing learning content and pedagogy in a transformative learning environment.

The report determines that climate change, biodiversity, sustainable production and consumption, global justice, disaster risk reduction, and poverty reduction are key themes in ESD (UNESCO, 2018)[1]. Integrating content on climate change and sustainability in the educational curricula can create an interactive learner-centred teaching that implies a shift in teaching to a more active learning, self-directed learning, with more engaged students' participation and problem solving-orientation (UNESCO, 2016; Rieckmann, 2018).

These capacities will be transformed into real and sustainable actions, enabling individuals and learners need to acquire values and take opportunities in the environment that support sustainability driven actions. In order to acquire competencies in ESD, the respective areas of knowledge and school subjects must include topics on ESD to be able to deliver such competencies to students (Rieckmann, 2018). See Appendix 2 for a Glossary. Appendix 9 provides a representation of learning approaches related to the SDGs. Strong educational policies can only be effective if institutions and authority structures implement them and provide a monitoring framework to ensure their successful implementation (Ofei-Manu, 2014; UNESCO, 2014). See Appendix 10 for how competencies are monitored internationally.

3.3 Food Sustainability Education

This subsection aims to provide a general overview of the benefits of incorporating food education in the school curriculum. Concerns regarding nutritional challenges and the lack of education on healthy and sustainable consumption habits have increased the consideration of pedagogical approaches to tackle such challenges (S. J. Park et al., 2022).

[1] *Transformative education* refers to addressing learning outcomes and the creation teaching materials, through the promotion of the "learning by doing" approach and the use of activities involving the whole school community to become more engaged in achieving a sustainable change.

Childhood is a crucial period to develop and foster a mindset that is going to make children's habits persist during their lives. What is needed to make today's children become tomorrow's adults formed with critical knowledge ready to make challenging food choices is: first, a school culture and teaching re-orientation (Proctor et al., 2020); and second, a consistent, and comprehensive food education curriculum policy (Smith et al., 2022).

3.3.1 Food Education & Literacy

Adolescents and children spend many hours in schools (Burton, 2018). Schools can influence on children, by raising awareness on environment, food, and nutrition literacy to help individuals address the amount of contradictory information about food and nutrition myths on healthy food (Burton et al 2018; Rhea Dankers, 2019; García-González et al., 2020). See Appendix 11 for food education approaches in relation to student's age. Appendix 12 provides a skills-based food education illustration.

Table 3. The change process for food-based education in schools

INTERVENTIONS	SHORT-TERM	MEDIUM-TERM	LONG-TERM
Learning Opportunities & Creating a healthy School Food Environment - Classroom-based food education - School garden with garden experiences integrated into the curriculum - Healthy, appealing, locally sourced (when possible) school meals) - School culture provides and celebrated good food	**Change Students' Values, Knowledge, and Skills about Food** - Increase preferences (liking) for good food - Raise awareness of benefits of a good food diet & risks of an unhealthy diet - Positive social norms - Increase self-efficacy - Goal setting & monitoring - Food system knowledge and basic gardening and cooking skills	**Move Students Toward a Good Food Diet** - Eat more meals with whole foods and ample fruits and vegetables and other plant-based foods - Eat more locally-sourced, seasonal foods - Eat less highly processed packaged foods and foods from animal sources - Engage in more gardening and cooking	**Improved Personal Health** **More Ecologically sustainable Food System** **More Socially just Food System**

Source: Own elaboration based on "Learning, Food, and Sustainability in the School; Chapter 4" (Koch, 2016)

A. Food education in the school curriculum

The implementation of a food education curriculum equips children with the skills and knowledge to comprehend the entire food system and understand how food is interrelated with social and physical food environments and stakeholders (Park et al., 2022). However, schools in many western countries have not yet taken advantage of their full potential to provide consistent food-related school programs (Pérez-Rodrigo & Aranceta, 2003; as cited Sadegholvad et al., 2017). Many think that the current structure of the school system is failing to provide sufficient comprehension, knowledge, and competencies regarding climate change, environmental impacts of production processes, and how to behave in a more environmentally friendly and sustainable way (Ramelow et al., 2020 as cited Tippmann, 2020; European

Commission, 2022). Research shows gaps that explain the limitations of creating a more thorough integration of food and sustainability in the curriculum.

To begin, there is no universal definition for "food education" nor a food curriculum consensus (Smith et al., 2022). See Appendix 13 for the different meanings for 'food education'. Secondly, curriculums that broadly tackle food aspects mainly focus on health and good eating habits and remarkably less on sustainability, social, and cultural aspects (Smith et al., 2022). Concepts about food education on textbooks are currently inconsistent and irregular and cannot be considered very thorough or exhaustive in most of the EU Member States (Tippmann, 2020; European Commission, 2022; Smith et al., 2022).

The lack of national education policies that include food and sustainability dimensions (Slater et al., 2018; Smith et al., 2022) hinder the creation of sustainability-oriented national school programs. Moreover, food and sustainability related content in the curriculum is addressed differently amongst countries (Smith et al., 2022). The omission of necessary food sustainability-related content in textbooks for developing the general competence, limit the expertise and training of teachers (Torres García et al., 2018; European Commission, 2022).

Traditional theoretical learning on food education limits the extent of personal apprentice of the student in skills on such concerns (Braun-Wanke, Carceller et al. 2020 as cited Tippmann, 2020; Smith et al., 2022). See Appendix 14 for an illustration of a survey conducted by the EU on barriers and limitations on ESD.

B. Hands-on experiences for a food education curriculum

Separating food literacy content across diverse curriculums does not provide a uniform comprehension of concepts, as a single food curriculum would give. Still, non-food curriculums can complement food curriculums integrating food and sustainability knowledge in school subjects (Smith et al., 2022). Given that many textbook publishers lack in such topics, it is necessary to develop complementary and innovative resources to cover the curriculum gaps (Torres García et al., 2018). "A detailed food curriculum could support school curriculum design and give teachers clear lessons planning guidance" (Pratt & Atkinson, 2020; Smith et al., 2022).

Studies confirm that integrating interdisciplinary and first-experience activities on food education have the power to enhance positive health, cooking skills, nutrition literacy and sustainability behaviours as a pathway to adulthood (Laska et al., 2012; Lavelle et al., 2016; (Tippmann, 2020). See Appendix 15 for an illustration of Food Literacy skills.

Using school canteens and lunchtime as learning spaces enable teachers and trainers to teach dynamically different aspects of a healthy diet. (de Laine, 2001; Venäläninen, 2010; as cited Janhonen et al., 2016; Sadegholvad et al., 2017). Likewise, school menus must integrate sustainable meals as a role model on children's behaviours (Oostindjer et al., 2017).

Practical cooking helps acquire skills and practices on this domain as an everyday life activity. This puts into practise cultural pedagogies such as the realisation of different eating habits across cultures, encourages and supports healthful dietary behaviours to children and their families (Park et al., 2020). Learning about sustainable food practices through cooking classes normalises eating and teaching healthy ways to cook (Jones et al., 2012), which is a very good methodology for teaching eating disorders among young students and encourage children to try new foods (Wolfson et al., 2017, as cited (Park et al., 2022). Gardening can reinforce cooking classes, and make children realise food seasonality and proximity commerce (Walters & Stacey, 2009). Policymakers should be encouraged to develop and adopt education policies oriented on food sustainability practices, as there is notable potential to better address such topics (Smith et al., 2022; European Commission, 2022).

Chapter 4. Analysis of the Topic

This chapter aims to provide an understanding of the EU's conferred powers on education; to explore how is the EU addressing food sustainability education among Member States; and to describe and complementing it with the mechanisms through which the EU can have an influence in education. This section has been carried out by using secondary information and interviews to EU systems and education experts (See Appendix 1).

According to Ursula Von der Leyen's, "human action has brought us close to causing irreparable damage to our planet, the very source of our existence and well-being" (European Commission, 2022). The Commission's strategy aligns EU's internal and external policies with the SDGs across a range of areas such as energy, environment, mobility, and agriculture together. See Appendix 16 for Commission's priorities crossed with SDGs (European Commission, 2019).

4.1 The EU legislative procedure and conferred powers in Education

The EU's decision-making process works as a co-decision procedure used for adopting EU legislation. The Commission holds the Executive power and initiates new legislative proposals which are discussed and negotiated between the Council and the Parliament. The Commission

can intervene if the legislation has not been implemented within the set deadline or when it has not been appropriately implemented (Interview 1, 2022). See Appendix 17 for a description of the main EU institutions. Appendix 18 represents an infographic of the EU Ordinary Legislative Procedure. Depending on the type of legislation the EU, its adoption process and application to the Members States differ, which are listed in Article 288 of the TFEU .

Table 4. Types of EU Legal Acts

EU Legal Acts	Legal application	Definition
EU Treaties	Binding in their entirety	Negotiated and agreed democratically by all Member States, and ratified by the respective parliaments.
Regulations	Binding in their entirety	Specifies how Member States should exactly transpose and adopt the guidelines of the regulation.
Directives	Binding in their entirety	Generic guidelines which Member States have a limit of two years to adopt them but can introduce more detail on such guidelines in their internal regulations.
Decisions	Binding in their entirety	Specifically indicate to which Member States are those decisions addressed and are binding only to them.
Recommendations & Opinions	Non-binding act	Offer guidance on the interpretation of the EU law, and Member States free to decide whether to adopt them.
Proposals	Non-binding act	The Commission can propose initiatives that complement and help interpret EU recommendations or laws. Even though they do not have a binding force, should a problem appear, the Commission can ask why the Member State did not implement the proposal.

Source: Own illustration based on Article 288 of the Treaty of Functioning of the European Union (TFEU)

The division of powers between the EU, the Member States and Regional and Local authorities was made by the European Committee of the Regions in 2008. Concerning the Union's conferral of powers, the European Union has exclusive and shared competences (Article 3 and Article 4 of the TFEU), meaning that some of the competences cannot be regulated or legislated by the EU, as they are subject to the Member State's decision. The competences of the EU are determined in 3 principles that state how and in what areas the EU may act: conferral, proportionality, and subsidiarity (European Committee of the Regions, 2014). Appendix 22 for a list of EU's competencies and areas of action.

Focusing on the competence of education, EU's power is limited to Article 6 of the Treaty of the Functioning of the European Union , stating that "The Union shall have competence to carry out actions to support, coordinate or supplement the actions of the Member States (including) education (…)" (Treaty of Functioning of the European Union, Title I art. 6e; 1957).

This means the following. First, education is a responsibility and exclusive competence of the Member States. Second, that the EU cannot legislate on education and thus the EU can only act via recommendations and proposals to the Member States. Third, states have full responsibility for legislating the requirements on education and teaching programs as well as for the

organization of their education and training systems, as Member States have developed different legislative procedures for the design and organization of education (Interview 1, 2022).

4.2 Analysis of EU proposals and recommendations on sustainable development

This sub-section provides a synthetised revision of council Recommendations, Proposals, Study Reports on learning for sustainable development. The summary provides the main highlights extracted from the analysis. The interviews made to EU experts helped on the gathering of the main highlights (See annex 1 for List of Interviews). Such documents are analysed to extract relevant information about how the EU is addressing and integrating FSE. See Appendix 21 for further explanation of the documents revised.

Document 1. COM(2022) 11 final 2022/0004 (NLE) "Proposal for a Council Recommendation on learning for environmental sustainability" (2022). This is a proposal under the umbrella of the European Green Deal, EU Biodiversity Strategy 2030, UNESCO's Education for Sustainable Development programme and Target 4.7, among further initiatives and projects presented in Appendix 22. Recommendations have no binding power; this means that it is up to the Member States to incorporate the guidelines into their national education policies. Recognising the broad unawareness and lack of consistency on sustainability topics among the population and schools, recommendations stress to make a move towards a systemic change in education and training that educates to combat for the climate and biodiversity crises (Interview 3, 2022).

Document 2. "Education for Environmental Sustainability: Policies and approaches in European Union Member States" (2021). Revising Member States' curriculums, policies, and innovations on educating for environmental sustainability; the Commission informs and monitor the actions for the Commission involved in education for environmental sustainability. This study calls Member States to teach with a "sustainability mindset".

Document 3. "Concepts for a Sustainable EU food System" (2022). This study report by the Joint Research Centre highlights the needed urgent transformation of food systems to promote green transition. The report identifies deficiencies in food literacy that compromise sustainability. The Commission recognizes the insufficient strategies on education and consumption, and states that food systems and practical cooking skills should be included in the school curricula. It sets out actions towards a 'fair, healthy and environmentally friendly food system'. This is the only document of the ones revised those addresses and defines "food educations" and "food literacy". However, it does not interrelate such concepts with sustainability.

Document 4. Recommendation of the European Parliament and the Council (2006/962/EC) "Key competences for lifelong learning" (2006). This is the first regulatory framework that deals

with integrating sustainability in education. The first recommendation was in 2006 and was revised again in 2018. The recommendation describes eight competences of education that are essential to drive citizens to fulfil a healthy and sustainable lifestyle. Two out of the eight specific competencies integrate sustainability. The final goal of this report is to promote eight "specific competencies" in the curriculum of the Member States and define the direction of the European citizenship on shared knowledge and competencies (Interview 4, 2022).

Document 5. "GreenComp: The European Sustainability Framework" (2022). This report acknowledges that educating through competences enables learners to develop sustainability skills based on knowledge and attitudes that promote responsible action. Moreover, it recognizes a set of competences towards sustainability to be integrated in education programs.

Document 6. Council Resolution (2021/C 66/01) "Strategic framework for European cooperation in education and training towards the EEA and beyond (2021-2030)". According to Interview 1, this is a regulatory mechanism on education that was developed by CULT Committee of the European Parliament, aiming to define EU's objectives and reference levels.

The following table provides a representation of how many times do food and sustainability related concepts appear in the documents analysed.

Table 5. Presence of food sustainability related concepts in the documents.

	Food	Food education	Food literacy	FSE[2]	Sustainable food system	Curriculum
Document 1	0	0	0	0	0	1
Document 2	0	0	0	0	0	104
Document 3	0	1	7	0	50	0
Document 4	0	1	0	0	0	0
Document 5	4	0	0	0	0	2
Document 6	0	0	0	0	0	2

Source: Own elaboration. Based on the documents analysed in Chapter 4 and the main concepts of the Glossary (Appendix 2).

Note: The table shows the lack of integration of food related concepts in the documents regarding education for sustainable development. Such EU recommendations, proposals and reports mainly focus education for sustainable development on environmental issues and do not relate with food topics.

4.3 EU influence on the education systems of Member States

The European Union influence the integration of food sustainability in Member States' education systems through several mechanisms which are outlined in this section: the action of EU decision-making bodies, EU initiatives on education, EU's exclusive competences, designing a European curriculum, and EU funded Programs.

[2] Food Sustainability Education

a. **The action of EU decision-making bodies.** Two committees in the European Parliament are particularly involved in education, food, and sustainability. On the one hand, the Committee on Culture and Education (CULT) is a driving force for new initiatives to improve the quality of education in the EU. In fact, a resolution calling for a common curriculum in the EU was recently approved in this committee whereby they asked the Commission to present a recommendation for a "demonstrative curriculum". On the other hand, the Environment, Public Health, and Food Safety (ENVI) Committee can influence the curriculum to include food sustainability issues (Interview 1, 2022). Both Committees could either suggest incorporating food sustainability EU's Recommendations to Member States, and elaborate own initiative reports that focus specifically on FSE. Moreover, EP's Committees could propose amendments in the reports that introduce FSE concerns (Interview 1, 2022).
b. **EU initiatives on education.** The EU can act through the European Education Area, a collaborating initiative between Member States that focuses on improving the quality in education and training (Interview 1, 2022). Moreover, the European Network of Education Councils (EUNEC) advises national governments of the Education's Councils on education. The "Education and Training Monitor 2020" provides the latest data of EU countries implementation of policies in education (European Education Area, 2020). See Appendix 25 for complementarity on EU's training initiatives.
c. **Other EU competencies.** According to Articles 3 and 4 of the TFEU, the EU has shared and exclusive competencies, where the Union can develop directives and regulations on Member States. See Appendix 20 for a summary of competences and Areas of EU action. As the EU cannot adopt any binding legal acts on education, the EU can act to influence on citizens' food and sustainability education, through other competencies. For example, legislating through "Consumer protection and the Single Market" would have a direct effect on dietary changes among large groups of consumers and be a strong force of control for sustainability (Interview 2, 2022; Joint Research Centre, 2022).
d. **Designing a European curriculum.** According to Interview 1, the implementation of a common European curriculum is not only a possibility, but right now is a reality. The European Economic and Social Committee (EESC) is currently working on a report on "Encouraging the engagement of young people towards achieving sustainable development" which will presumably be presented in the form of a proposed curriculum framework for EU (Interview 3, 2022). It has three objectives: 1) providing an overview of how the SDGs are integrated into the Member States' curriculum, 2) examine the

approach that the respective Member States can be consider a transformative education for sustainable development that can lead to a sustainable future, and 3) detect limitations and barriers to implement this education at national level (Interview 3, 2022).

e. **EU sustainability strategies and action plans.** The European Green Deal acknowledges the crucial role of education and training for the green transition. The "Farm to Fork" Strategy is the cornerstone of food-related issued of the EGD to accomplish a progressive transformation of our European food system towards sustainability (Interview 1, 2022). Specifically, in relation to food sustainability, the "Nature Restoration Plan" is scheduled to come out soon, which would directly affect the improvement of food security since, as we know, a more resilient nature translates into improvements for human health, including the improvement of crops and, therefore, food. Yet, no policies or proposals are on the table that correlate environmental issues with food education (Interview 1, 2022).

f. **EU funded Programs.** The EUNEC states that Education and Training should be financed and supported through public funds to ensure equal opportunities and sustainability for all (EUNEC et al. 2012). For instance, the Commission's DG AGRI launched a program on "School fruit, vegetables and milk scheme" aiming to enhance food literacy in schools and promote a healthy mindset and lifestyle amongst students (Interview 2, 2022; Interview 8, 2022).
More concretely, the European Commission is supporting and funding the Training For Food (T4F) initiative as a part of the Erasmus + project in "Training for Sustainable Food System Development". The T4F addressed new professional training focused on the development of green skills for a more "sustainable, resilient, responsible, diversified and inclusive" food system. It provides a toolbox tutorial and a training kit manual with methodology guidance, a Policy Paper for supporting the implementation of a tailored professional training at local, regional, national and European levels. In addition, education programs can receive funding from The EU's 2021-2027 long-term budget Next Generation Funds, the Green Erasmus , or the "EU Biodiversity Strategy for 2030: Bringing nature back into our lives" (Interview 1, 2022). See Appendix 23 for further funding opportunities in Education.
Overall, the EU could fund and support projects that specifically focus on Food Sustainability Education in schools.

Chapter 5. Results & Discussion

This section focuses on answering the research question proposed through discussing the results obtained from the primary and secondary research: "(1) How is Food Sustainability Education addressed in the school curriculum, (2) how is the European Union addressing Food Sustainability Education among Member States, and (3) what are the mechanisms of the EU to foster FSE?"

5.1 Summary of the Results

First, Food Sustainability Education dimensions are found amongst SDGs (See Table 2), as it aims to educate for sustainable development, but also aims to ensure sustainable agricultural production, food security, ensure sustainable practices throughout the production chain, promote a healthy and sustainable diet, and reduce food losses and waste (See Appendix 8) (Economist Impact, 2021).

Second, renowned organizations recognise that educating with sustainable development knowledge and skills from childhood is essential to address social, cultural, economic, and environmental impacts. Food sustainability is part of the sustainable development. Hence, FSE should be more present in ESD programs to equip children with the competencies needed to acquire food sustainable practices and environmentally friendly habits for life.

Third, the European Union acknowledges the existence of barriers that limit addressing ESD among countries (Appendix 14). School curriculums lack in coverage of relating sustainability topics with food education (Smith et al., 2022). No food curriculum consensus, differences on educational systems across countries, and the inconsistency of topics addressing sustainability and food education in textbooks hinder a thorough food-dedicated curriculum (Slater et al., 2018, Smith et al., 2022).

Fourth, the scope influence of the European Union on education is limited to recommendations, proposals, and opinions to Member States (See Table 4). Since it is up to the national governments whether to follow guidelines or not, this generates internal EU discoordination

Fifth, the EU's recommendations, proposals and frameworks that involve learning for sustainable development do not comprehensively integrate food-related aspects (See Table 5). The documents analysed predominantly focus on sustainable development in general and focus significantly less on interrelating within the SDGs.

Seventh, according to Interview 1 and 3, the EU can enhance its action on education through alternative mechanisms as funding education programs, taking advantage of the co-decisive procedure, and monitoring the integration of SDGs in Member States' education systems, as the EECS is currently carrying out.

5.2 Discussion

The European Union needs to promote the presence of Food Sustainability Education to provide young Europeans with the knowledge of sustainable food systems and adopt healthy and sustainable food habits for life. This research suggests the establishment of a "demonstrative" school curriculum developed by the EU that mainly focuses on addressing Food Sustainability Education dimensions and SDGs (See Appendix 8 and Table 2).

The goal is twofold: first, to provide a harmonized food sustainability education addressed under a separate curriculum; and second, to reinforce education for sustainable development and help Member States be on the same page to address the Commission's priorities and the European Green Deal. Likewise, national policymakers would be encouraged to develop more comprehensive policies on food sustainability. A common European framework of reference would be excellent support for providing guidelines for teachers to better address the current issues in implementing environmental and food activities through clear lessons and guidance and prompt transformative learning within European schools.

EU's alternative mechanisms and areas of action could support its materialization. On the one hand, the Commission's Directorate Generals that address education, food, and sustainability matters could work on initiative reports centred on Food Sustainability Education. On the other hand, the European Parliament's Committees, such as CULT and ENVI, could force new initiatives and suggest the Commission's proposals and recommendations by introducing FSE in such amendments. Furthermore, the Union could support and fund initiatives and projects that present a consistent work of creating an FSE-centred curriculum for the Union.

Chapter 6. Conclusions & Further Research

6.1 Conclusions

The thesis sought to evidence the relevance of educating children on sustainable development and food education and understanding how Food Sustainability Education is addressed in the European Union. Food sustainability is embedded in the UN's Sustainable Development Goals (Table 2). It aims to ensure sustainable agricultural production and food security, ensure sustainable practices throughout the production chain, promote a healthy and sustainable diet, and reduce food losses and waste (Economist Impact, 2021). Educating children on food sustainability is essential to foster sustainable food systems; reduce environmental, social, economic, and cultural impacts; change society's habits of production and consumption and improve individuals' health.

How Food Sustainability Education is understood is not universal, as there is no standard definition for this term, and neither there is extensive research on the topic. Overall, the lack of comprehensive approaches to education for environmental sustainability presents inconsistencies, and food education is neither exhaustive in school curriculums. Teaching environmental education and food literacy is more thorough when tackled by a separate school curriculum program that addresses such concepts (Smith et al., 2022).

The European Union, whose focus is on achieving the Commission's priorities for the green transition and the European Green Deal, acknowledges that the current structure of the school system is failing to provide sufficient competencies on climate change, environmental impacts of production processes, and sustainable behaviours. How food literacy and environmental education are addressed under the EU Member States varies enormously, as the respective national governments have complete responsibility for legislating the requirements on education. However, the EU's recommendations and proposals reviewed on learning for sustainable development primarily focus on environmental and climate change and significantly less on food literacy and food sustainability dimensions and challenges (See Appendix 8).

This analysis indicates that, on the one hand, the lack of integration of consistent food sustainability education in the curriculum comes from missing consistent education policies that regulate environmental, social, economic, and cultural challenges that children would undoubtedly face. Furthermore, on the other hand, although the EU cannot legislate on education, it is not entirely addressing Food Sustainability Education in its recommendations

and proposals for education on sustainable development that aim to encourage national governments to adopt consistent educational policies on sustainability.

The European Union could take advantage of the situation and thoroughly integrate FSE and enhance concern for the Member States. A first approach would entail developing a common education framework of reference in the form of a school curriculum entirely dedicated to addressing food sustainability education in the European Union. Consequently, Member States would be on the same page to address the Commission's priorities for a consistent green transformation in the European Union, and achieve the European Green Deal's objectives.

6.2 Ongoing & Further Research

This dissertation is part of an ongoing research project on "Food Sustainability Education (FSE) in Catalan schools" under the name "FoodSeed" of the UPF Planetary Wellbeing Initiative. A team of researchers is conducting the project, aiming to contribute to a shift in educational programs and policies regarding FSE in Catalan schools. See Appendix 3A for the complete description and motivations of the project, and Appendix 3B for the description of the research team. Research is ongoing, and further outcomes are expected to be executed soon (See Appendix 3D for further description of the Working Packages and scheduling). The project outcomes are as follows.

First, to create "FoodSeed"'s website as a compilation of educational material and resources and the provision of relevant related initiatives related to FSE to promote a food consumption transformation based on the younger generation's awareness. Schools that do not possess sufficient resources or teaching knowledge on FSE can go to *FoodSeed's* website and access the resources and initiatives to integrate them into the school curriculum.

Secondly, this project will serve as a framework to develop a proposal for the application for Horizon Europe Work Programme 2021-2022 to develop a European cross-country study to foster educational policy changes aligned with the objectives of the UPF Planetary Wellbeing initiative.

List of References

Adamas University. (2020). Culture and Education. https://adamasuniversity.ac.in/culture-and-education/ (Accessed: 10 March 2022)

Adamson, N., King, S., & Edward Jane. (2020). Education as a Pillar for Sustainable Development in Tanzania.

Åsa Stenmarck (IVL), C. J. (IVL), T. Q. (WRAP), G. M. (IFR). (2016). Estimates of European food waste levels .

BCFN. (2018). Barilla 2018 Report Good for the Planet. (Accessed: January 2022)

Burton, M. N. (2018). Towards a comprehensive food curriculum for secondary schools.

Council of the European Union. (2021). Council Resolution (2021/C 66/01) on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030).

De Cosmi, V., Scaglioni, S., & Agostoni, C. (2017). Early Taste Experiences and Later Food Choices. Nutrients, 9(2), 107. https://doi.org/10.3390/nu9020107 (Accessed: 16 March 2022)

Delli Paoli, A., & Addeo, F. (2019). Assessing SDGs: A Methodology to Measure Sustainability. ATHENS JOURNAL OF SOCIAL SCIENCES, 6(3), 229–250. https://doi.org/10.30958/ajss.6-3-4 (Accessed: 18 May 2022)

Driessen, C. E., Cameron, A. J., Thornton, L. E., Lai, S. K., & Barnett, L. M. (2014). Effect of changes to the school food environment on eating behaviours and/or body weight in children: a systematic review. Obesity Reviews, 15(12), 968–982. https://doi.org/10.1111/obr.12224 (Accessed: 16 March 2022)

ECO Canada. (2021). What is sustainable agriculture?

Economist Impact. (2021). Food Sustainability Index 2021.

European Commission. (2018). Key Competences for Lifelong Learning.

European Commission. (2019). The European Commission's priorities.

European Commission. (2022). Proposal for a Council Recommendation on learning for environmental sustainability. https://europa.eu/eurobarometer/surveys/detail/2224 (Accessed: 5 April 2022)

European Committee of the Regions. (2014). Division of powers between the EU, the Member States and Regional and Local authorities. https://data.europa.eu/doi/10.2863/11797 (Accessed: 1 May 2022)

European Education Area. (2020). Education and Training Monitor.

European Trade Union Committee for Education. (2022). Education for sustainable development in the EU: the state of play and the barriers and limitations European Trade Union Committee for Education (ETUCE).

European Union. (n.d.). Types of institutions and bodies.

European Union. (1957). Treaty of Functioning of the European Union.

FAO. (2011). Global Food Losses and Food Waste.

FAO. (2014). Food losses and waste in the context of sustainable food systems A report by The High Level Panel of Experts on Food Security and Nutrition. www.fao.org/cfs/cfs-hlpe (Accessed: 10 March 2022)

Food Print. (2021). The Problem of Food Waste.

George Pataki. (2005). Education Policy Centers Network. EPCN Newsletter. Romania: EPCN.

Greenly. (2022). Everything you need to know about the three pillars of sustainable development.

Janhonen, K., Mäkelä, J., & Päivi, P. (2016). Food Education: From Normative Models to Promoting Agency. In Learning, Food, and Sustainability in the School Curriculum.

Joint Research Centre. (2022). CONCEPTS FOR A SUSTAINABLE EU FOOD SYSTEM. https://doi.org/10.2760/381319 (Accessed: 12 April 2022)

Joint Research Centre. (2022). GreenComp, The European sustainability competence framework.

Jones, M., Dailami, N., Weitkamp, E., Salmon, D., Kimberlee, R., Morley, A., & Orme, J. (2012). Food sustainability education as a route to healthier eating: evaluation of a multi-component school programme in English primary schools. Health Education Research, 27(3), 448–458. https://doi.org/10.1093/her/cys016 (Accessed: 22 February 2022)

Joshi, A., Ratcliffe, M., & Feenstra, G. (2014). Evaluation for Transformation: A Cross Sectoral Evaluation Framework for Farm to School.

Koch, P. A. (2007). Growing Food.

Koch, P. A. (2008). Farm to Table & Beyond.

Koch, P. A. (2010). Choice, Control & Change.

Koch, P. A. (2016). Content and Experiences Appropiate for Food Education. In Learning, Food, and Sustainability in the School Curriculum.

Laska, M. N., Larson, N. I., Neumark-Sztainer, D., & Story, M. (2012). Does involvement in food preparation track from adolescence to young adulthood and is it associated with better dietary quality? Findings from a 10-year longitudinal study. Public Health Nutrition, 15(7), 1150–1158. https://doi.org/10.1017/S1368980011003004 (Accessed: 3 April 2022)

Lavelle, F., Spence, M., Hollywood, L., McGowan, L., Surgenor, D., McCloat, A., Mooney, E., Caraher, M., Raats, M., & Dean, M. (2016). Learning cooking skills at different ages: a cross-sectional study. International Journal of Behavioral Nutrition and Physical Activity, 13(1), 119. https://doi.org/10.1186/s12966-016-0446-y (Accessed: 1 April 2022)

Muhammad, A., D'Souza, A., Meade, B., Micha, R., & Mozaffarian, D. (2017). How income and food prices influence global dietary intakes by age and sex: evidence from 164 countries. BMJ Global Health, 2(3), e000184. https://doi.org/10.1136/bmjgh-2016-000184 (Accessed: 10 January 2022)

OECD. (2017). PISA for Development and the Sustainable Development Goals.

Oostindjer, M., Aschemann-Witzel, J., Wang, Q., Skuland, S. E., Egelandsdal, B., Amdam, G. v., Schjøll, A., Pachucki, M. C., Rozin, P., Stein, J., Lengard Almli, V., & van Kleef, E. (2017). Are school meals a viable and sustainable tool to improve the healthiness and sustainability of children´s diet and

food consumption? A cross-national comparative perspective. Critical Reviews in Food Science and Nutrition, 57(18), 3942–3958. https://doi.org/10.1080/10408398.2016.1197180 (Accessed: 15 December 2021)
Park, D., Park, Y. K., Park, C. Y., Choi, M.-K., & Shin, M.-J. (2020). Development of a Comprehensive Food Literacy Measurement Tool Integrating the Food System and Sustainability. Nutrients, 12(11), 3300. https://doi.org/10.3390/nu12113300 (Accessed: 14 December 2021)
Park, S. J., Yeatman, H., Russell, J., & MacPhail, C. (2022). Food pedagogy-key elements for urban health and sustainability: A scoping review. Appetite, 168, 105672. https://doi.org/10.1016/j.appet.2021.105672 (Accessed: 20 November 2021)
Parliament, Council, & Commission. (2012). Joint Statement of the European Parliament, the Council of the EU and the European Commission on decentralised agencies.
Paul Ofei-Manu, R. J. D. (2014). Quality Education for Sustainable Development: A priority in achieving sustainability and well-being for all.
Policy Forum on Development. (2016). Working Group: Economic Pillar of Sustainable Development.
Pratt, K., & Atkinson, R. (2020). How do some primary schools in England organise and implement the broader curriculum? Education 3-13, 48(4), 357–364. https://doi.org/10.1080/03004279.2019.1609541 (Accessed: 8 December 2021)
Proctor, R., Guell, C., Wyatt, K., & Williams, A. J. (2020). What is the evidence base for integrating health and environmental approaches in the school context to nurture healthier and more environmentally aware young people? A systematic scoping review of global evidence. Health & Place, 64, 102356. https://doi.org/10.1016/j.healthplace.2020.102356 (Accessed: 16 January 2022)
Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: in search of conceptual origins. Sustainability Science, 14(3), 681–695. https://doi.org/10.1007/s11625-018-0627-5 (Accessed: 4 January 2022)
Rhea Dankers, J. H. H. H. (2019). Ernährungsbildung in allgemeinbildenden Schulen Eine Analyse der Rahmenvorgaben der Bundesländer für den fachbezogenen Unterricht.
Rieckmann, M. (2018). Chapter 2 – Learning to transform the world: key competencies in ESD.
SAPEA (Science Advice for Policy by European Academies). (2020). A sustainable food system for the European Union.
Slater, J., Falkenberg, T., Rutherford, J., & Colatruglio, S. (2018). Food literacy competencies: A conceptual framework for youth transitioning to adulthood. International Journal of Consumer Studies, 42(5), 547–556. https://doi.org/10.1111/ijcs.12471 (Accessed: 3 April 2022)
Smith, K., Wells, R., & Hawkes, C. (2022). How Primary School Curriculums in 11 Countries around the World Deliver Food Education and Address Food Literacy: A Policy Analysis. International Journal of Environmental Research and Public Health, 19(4), 2019. https://doi.org/10.3390/ijerph19042019 (Accessed: 10 April 2022)
Spiteri Cornish, L., & Moraes, C. (2015). The Impact of Consumer Confusion on Nutrition Literacy and Subsequent Dietary Behavior. Psychology & Marketing, 32(5), 558–574. https://doi.org/10.1002/mar.20800 (Accessed: 17 March 2022)
Tippmann, M. (2020). Education for Sustainable Food and Nutrition – Towards Criteria for German Secondary Schools. Glocality, 3(1). https://doi.org/10.5334/glo.28 (Accessed: 19 February 2022)
Torres García, M., Marrero Montelongo, M., Navarro Rodríguez, C., & Gavidia Catalán, V. (2018). ¿Cómo abordan los textos de Educación Primaria la competencia en alimentación y actividad física? Revista Eureka, 15(1). https://doi.org/10.25267/Rev_Eureka_ensen_divulg_cienc.2018.v15.i1.1103 (Accessed: 5 December 2021)
UC Davis. (n.d.). Sustainable Agriculture Research & Education Program. A program of UC Agriculture & Natural Resources.
UNDP. (2015). What are the Sustainable Development Goals?
UNESCO. (2001). Universal Declaration on Cultural Diversity.
UNESCO. (2014). Education for sustainable development goals : learning objectives.
UNESCO. (2016). Education 2030: Incheon Declaration and Framework for Action for the implementation of Sustainable Development Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
UNESCO. (2018). Issues and Trends on Sustainable Development.
United Cities and Local Governments. (2010). Culture: Fourth Pillar of Sustainable Development. https://www.agenda21culture.net/sites/default/files/files/documents/en/zz_culture4pillarsd_eng.pdf (Accessed: 17 January 2022)
United Nations. (2015). THE 17 GOALS.
United Nations. (2021). International Day of Awareness on Food Loss and Waste Reduction 29 September.
Vermeir, I., Weijters, B., de Houwer, J., Geuens, M., Slabbinck, H., Spruyt, A., van Kerckhove, A., van Lippevelde, W., de Steur, H., & Verbeke, W. (2020). Environmentally Sustainable Food Consumption: A Review and Research Agenda From a Goal-Directed Perspective. Frontiers in Psychology, 11. https://doi.org/10.3389/fpsyg.2020.01603 (Accessed: 3 May 2022)
Walters, L. M., & Stacey, J. E. (2009). Focus on Food: Development of the Cooking with Kids Experiential Nutrition Education Curriculum. Journal of Nutrition Education and Behavior, 41(5), 371–373. https://doi.org/10.1016/j.jneb.2009.01.004 (Accessed: 10 March 2022)
WCED. (1987). Report of the World Commission on Environment and Development: Our Common Future.
Wickramasinghe, K., Chatterjee, S., Williams, J., Weber, M. W., Rito, A. I., Rippin, H., & Breda, J. (2021). Childhood overweight and obesity abatement policies in Europe. Obesity Reviews, 22(S6). https://doi.org/10.1111/obr.13300 (Accessed: 2 March 2022)
WWF. (2021). Sustainable Agriculture.

List of Appendices

APPENDIX 1. List of Interviews

EU-Level Interviews

Interview 1.

Name: Anonymous

Charge: Member of the European Parliament, ENVI Committee

Date and place: Brussels, 08/04/2022

Interview 2.

Name: Elisenda Fatjó-Vilas March

Charge: EU Senior Policy Officer in Agriculture, Delegation of the Government of Catalonia to the European Union

Date and place: Brussels, 22/03/2022

Interview 3.

Name: Antoni Torras i Estruch

Charge: EU Senior Policy Officer in Education, Health, Culture and, Transport and Network, Delegation of the Government of Catalonia to the European Union

Date and place: Brussels, 31/03/2022

Interview Template (in Spanish)

El papel de la Unión Europea en la ordenación educativa

Las siguientes preguntas tienen relación con el marco educativo de la Unión Europea en el que se regulan las competencias y resultados de aprendizaje que se trabajan en los centros de primaria y secundaria en los Estados Miembros.

Tienen como objetivo conocer más en profundidad el grado de intervención de la Unión Europea en el marco de educación, y entender cuáles son los mecanismos que garantizan los logros de competencias y resultados que se regulan en el marco educativo.

1. Siendo educación una competencia exclusiva de los Estados Miembros,
    a. ¿Cuál es el grado de involucración que tiene la Unión en educación respecto al poder de decisión los Estados Miembros?
    b. ¿Qué organismos de la Unión Europea están involucrados en el proceso de decisión y creación de recomendaciones en educación?

c. ¿Puede la Unión Europea realizar directivas en educación, o únicamente recomendaciones?
d. ¿Cuál es el papel del Parlamento Europeo en educación?

2. El documento de investigación publicado por el CEDEFOP, "*Curriculum reform in Europe: the impact of learning outcome*s", explora la práctica de los enfoques orientados a los resultados educativos, concluye haciendo hincapié en que los agentes y organismos de educación y formación deberían preocuparse más por proporcionar competencias y conocimientos suficientes.
    a. Podría explicarme desde su experiencia profesional y personal, ¿Cómo funciona el proceso decisivo y legal para la aprobación de un decreto/resolución en el ENVI Committee?
    b. Una vez que la recomendación/propuesta/decreto es aprobada por el Consejo de la UE, ¿Cómo se desarrolla el proceso de adopción de dicha recomendación/propuesta/decreto en los Estados Miembros? ¿Cuál es su función en este proceso?
3. ¿Qué mecanismos de control tiene la Unión Europea para evaluar el grado de implicación de dichas recomendaciones a escala nacional, y el grado de logro de los contenidos curriculares regulados (inspección / informe PISA, informes OECD)?
4. ¿Se destinan recursos (económicos o materiales) para la innovación pedagógica por parte de algún organismo de la UE? Caso positivo, ¿a qué tipo de proyectos/actividades y programas (ej. Erasmus +) se dirigen?
5. Según he podido informarme, el "*Área de Educación Europea (European Educational Area)"* participa en la formación y composición de las ciencias de la educación y ayuda a los Estados miembros de la UE a construir unos sistemas educativos más resistentes e inclusivos para promover el acceso a una educación de calidad e inclusiva (tal y como se recoge en el European Pillar of Social Rights). La iniciativa centra sus esfuerzos principalmente en la mejora de la calidad y la equidad en la educación y la formación; en los profesores, formadores y líderes escolares; en la educación digital y ecológica.
    a. Desde su experiencia personal, ¿Cuál diría que es el nivel de protagonismo y de eficiencia de la EEA en el proceso de decisión en materia educativa?
    b. ¿Podría explicarme un poco más sobre los objetivos propuestos para el 2025 y en qué medida se están realizando dentro del Parlamento Europeo?

El papel de la Unión Europea en educación en Sostenibilidad Alimentaria

Las siguientes preguntas consisten en la revisión de las políticas, recomendaciones y propuestas de la Unión Europea; y el grado de incorporación de la Sostenibilidad Alimentaria en el marco educativo.

6. ¿El Comité de Medio ambiente, Salud Pública y Seguridad Alimentaria (ENVI) puede incidir en el currículum educativo para la inclusión de temáticas de sostenibilidad alimentaria?
7. Según el "*Proposal for a Council Recommendation on learning for environmental sustainability (2022; pg. 2)*" (ver documento) de la Comisión actúa como instrumento legal y señala el compromiso de los Estados miembros sobre la inclusión de la sostenibilidad medioambiental y la biodiversidad en los planes de estudio/currículum educativo. Según el documento, estos temas no pueden considerarse muy completos o exhaustivos en los planes de educación en la mayoría de los Estados miembros de la UE y, de hecho, son pocos los países que cubren temas específicos de sostenibilidad y cómo relacionar las competencias de aprendizaje en las clases.
    a. ¿Cuál es su opinión respecto a esta afirmación?
    b. Desde su experiencia, aparte de propuestas y recomendaciones, ¿existen directivas europeas en la incorporación de sostenibilidad alimentaria en la ordenación educativa?
    c. ¿Qué acciones se toman desde el comité ENVI respecto a seguridad alimentaria y sostenibilidad alimentaria y qué grado de incidencia tienen en los Estados Miembros?
8. ¿Cuáles son los temas actuales en la mesa de debate en la Comisión de Medio Ambiente, Salud Pública y Seguridad Alimentaria?
    a. ¿Qué temas se tratan en relación con la sostenibilidad alimentaria?
    b. ¿Y en educación en temas de desarrollo sostenible/sostenibilidad alimentaria?
9. Desde la posición del ENVI Committee, ¿A través de qué competencias propias de la UE se dirigen las recomendaciones en educación en sostenibilidad alimentaria (consumidores, mercado interno, transporte…)?
10. ¿Hay prospectivas de futuro por parte del Parlamento Europeo en introducir una legislación que incluya la educación en sostenibilidad alimentaria en los Estados Miembros, y/o bien la implementación de un currículum educativo europeo común? ¿Cuál es su opinión personal?

Government of Catalonia (Generalitat de Catalunya) Interviews

Interview 4.

Name: Ramón Grau

Charge: Organization: Subdirector d'Ordenació Curricular del Departament d'Educació de la Generalitat de Catalunya

Date and place: Barcelona, 22/04/2022

Interview 5.

Name: Francesc Colmé

Charge: Organization: Inspector d'Educació a la Generalitat de Catalunya

Date and place: Barcelona, 25/02/2022

Interview Template

Organismes d'ordenació educativa

1. Quines organismes/normatives/directives europees o supranacionals incideixen en l'ordenació curricular espanyola i catalana?
2. A nivell espanyol i català: Quins organismes/agents públics/agents privats intervenen en el disseny curricular? Amb quin rol?
3. Quines competències legislatives educatives delega el Ministerio de Educación al Departament d'Ensenyament de la Generalitat de Catalunya?
4. Quin marge de maniobra té el Departament d'Ensenyament de Catalunya per adaptar el currículum educatiu espanyol?

Marc normatiu d'ordenació curricular

1. Quin és el procés que segueix el desenvolupament d'una nova llei educativa (ordenació curricular)?
2. Quin és el procés d'implantació d'una nova llei educativa (a nivell estatal i la seva implementació a Catalunya)?
3. A través de quins organismes/canals reben els centres educatius els continguts curriculars regulats? (decrets d'inici de curs?)
4. Quins mecanismes de control tenen les administracions del grau d'assoliment dels continguts curriculars regulats? (inspecció / informe PISA)
5. Quin nivell d'estructuració obligatòria suposa l'ordenació curricular (treball per assignatures, per projectes, optativitat, crèdits de síntesi, crèdits variables, etc.)?

Projectes educatius a nivell de centre:

1. Quin marge tenen els centres per a promoure competències més enllà del currículum regulat?
2. Quins són els principals motors d'innovació per a la incorporació de continguts/competències més enllà de la regulació? (professorat, polítiques internes…)
3. Es destinen recursos (econòmics o materials) per a la innovació pedagògica per part d'algun organisme públic? Cas positiu, a quin tipus de projectes/activitats s'adrecen?

Currículum i sostenibilitat alimentària

1. Sap si hi ha incorporació del concepte de sostenibilitat (en general i si escau en alimentació) dins del contingut curricular?
2. Sap si els canvis de currículum de l'última llei incorporen nous conceptes/competències relacionats amb la sostenibilitat?
3. A quins cursos/assignatures/activitats hi ha més marge per a incorporar conceptes/competències relacionats amb la sostenibilitat alimentària?

<u>Primary & Secondary Catalan Schools Interviews</u>

Interview 6.

Name: Anna Valero

Charge: Directora Escola Horitzó

Date and place: Barcelona, 24/02/2022

Interview 7.

Name: Ruth Lladó

Charge: Professora de Secundària I membre de l'equip motor NCA

Date and place: Barcelona, 04/03/2022

Interview 8.

Name: Matilde Camps, Vicenç Cases, David Muns (Teachers of the school involved in Nazaret Cuida project for learning for sustainable development)

Charge: Col·legi Mare de Déu dels Àngels

Date and place: Barcelona, 08/03/2022

Interview 9.

Name: Roser Reina

Charge: Directora INS A. Satorras

Date and place: Barcelona, 04/05/2022

Interview Template

Marc normatiu d'ordenació curricular

Les següents preguntes tenen a veure amb el marc normatiu que regula les competències i resultats d'aprenentatge que es treballen als centres d'educació primària i secundària de Catalunya. Tenen com a finalitat conèixer en més profunditat el grau de delimitació i regulació que suporta el projecte educatiu dels centres i els mecanismes que garanteixen l'assoliment de les competències i resultats d'aprenentatge que regula l'ordenament educatiu.

1. A través de quins organismes/canals reben els centres educatius els continguts curriculars regulats?
2. Per quins organismes/mecanismes tenen participació els centres educatius en el disseny curricular regulat?
3. Quins mecanismes de control tenen les administracions del grau d'assoliment dels continguts curriculars regulats?
4. Quins continguts o competències que es troben en l'actualitat a l'ordenació curricular (regulats) es podria relacionar amb la sostenibilitat i/o sostenibilitat alimentària?
5. En particular, quines de les següents temàtiques es tracten i en quin context?
    a. Seguretat alimentària
    b. Pràctiques sostenibles al llarg la cadena de producció i aprovisionament
    c. Dietes saludables i sostenibles
    d. Reducció de pèrdues i malbaratament alimentari
6. Com creu que es podria incorporar el concepte de sostenibilitat (en general i si escau en alimentació) dins del contingut curricular? Quins canvis s'han experimentat durant la darrera dècada? Creieu que hi haurà alguna reforma educativa en aquest sentit?

Projectes educatius a nivell de centre:

7. Quin marge tenen els centres per a promoure competències més enllà del currículum regulat?
8. Quins són els principals motors d'innovació per a la incorporació de continguts/competències més enllà de la regulació? (professorat, polítiques internes…)
9. Reben recursos econòmics o materials docents per a la innovació pedagògica per part d'algun organisme públic? Cas positiu, a quin tipus de projectes/activitats s'adrecen?

Sobre el centre educatiu on treballa:

10. Heu promogut iniciatives voluntàries relacionades amb la sostenibilitat alimentària? Cas positiu:

a. Quines iniciatives voluntàries heu promogut relacionades amb la sostenibilitat alimentària?
b. Com s'han articulat? (tipus d'assignatura/activitat, context, agents implicats, etc.)
c. D'on prové la demanda d'aquestes iniciatives (professorat intern, pares, Generalitat, decrets educatius, think tanks…)?
d. Heu rebut algun tipus d'ajut per promoure-les?

11. Teniu contacte algun moviment o associació que promogui la sostenibilitat alimentària a les escoles? Quin? (p.ex. escoles sostenibles)
12. Coneixeu alguna font de recursos pedagògics per al treball de competències relacionats amb la sostenibilitat alimentària? Cas positiu, podria donar-nos-en referència?

APPENDIX 2. Glossary

The following Glossary provides the lecturer the definition of the terms and technical concepts related to Food Sustainability Education.

Food Education. "Education that supports learning about food, nutrition, and the role that food plays in one's life, relationships, culture, communities, environment, and in history and society." (Sutter (2019) pg 995, as cited Smith, 2022)

Food Literacy. "Investigate the relationship between food knowledge and food choices…[and] typically refers to a stronger emphasis on food preparation and other practical food related skills…., [while] bringing forth the need for approaches that include an examination of personal and environmental factors on the background of declining nutrition knowledge and choosing unhealthy options" (Janhonen et al., 2016).

Nutrition Education. "Any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition-related behaviours conducive to health and well-being…[and] delivered through multiple venues and involves activities at the individual, community, and policy levels" (Contento, 2016; as cited Smith, 2022)

Area of knowledge. "It is the grouping of the different curricular subjects that make up a broader and global conception of knowledge. The current curricula group the subjects in areas of

knowledge that facilitate the assimilation of the competences that are inherent to them." (XTEC, 2017)

Competencies. "They are the ability to solve real problems, applying and relating knowledge, skills, and attitudes in different contexts. The competency is the learning objective that, from a selection of contents, promotes in students the ability to apply knowledge, skills, attitudes, and values in a transversal way in new and complex contexts and situations. Competency-based learning promotes a balance between the four main pillars of learning: knowing how to know, knowing how to do, knowing how to be and knowing how to live together" (XTEC, 2017)

Content. "Scientific knowledge, skill, attitude or value to be learned by students and that must guide the educational practice of teachers in order to reach a certain degree profile."(Universitat de Barcelona, 2018)

Curriculum. "Definition of the general lines of an educational process considering the target audience, objectives, cultural contents, competencies to be acquired, organization of educational activities, learning methods and evaluation criteria."(XTEC, 2017)

Key Competencies. "The key competences are those that develop knowledge and skills linked to different knowledge, in an interactive and transversal way, and are those that all people need for their personal development, as well as for active citizenship and insertion in the labour market" (XTEC, 2017)

Learning Outcomes. "They are the objectives that the teacher expects the student to assume as a consequence of his active participation in the teaching and learning process, and they must be coherent with the competencies mentioned (AQU, 2005)"(Pompeu Fabra University, 2022)

OECD's Key Competencies. "The OECD project 'Definition and Selection of Competencies' (DeSeCo) classifies key competencies into three categories: Using tools interactively (the ability to use language, symbols and texts interactively, the ability to use knowledge and information interactively, and the ability to use technology interactively); Interacting in heterogeneous groups (the ability to relate well to others, the ability to cooperate, and the ability to manage and resolve conflicts); and Acting autonomously (the ability to act within the big picture; the ability to form and conduct life plans and personal projects; and the ability to defend and assert rights, interests, limits and needs) (Rychen, 2003)" (Marco Rieckmann, 2018)

Specific competencies. "It is the purpose that each subject will contribute to the achievement of the 8 key competences, according to the Council of Europe. They are the assessment criteria

to monitor that the curriculum is achieving the competences described. Is in fact, the outcome of the merging of key competencies with areas and subjects of knowledge." (European Commission, 2018)

Subject. "Unit of structure of a study plan that includes the specification of certain competencies to be acquired by the student, learning objectives and methodological and evaluation criteria. Each subject is assigned a number of credits and can be basic, compulsory or optional. For the purposes of programming, development and teaching evaluation, each subject is divided into subjects."(Universitat de Barcelona, 2018)

Transformative Education. "Changing perspective from a teacher's position encountering pupils in a reflexive and interpretive manner, instead of adopting the traditional expert role,…[through] meaningful dialogue connected with young people's everyday lives can offer educational professionals opportunities to see their own experiences…[and] provide young people with spaces for developing their understanding of how their actions affect others and how other people's values and priorities might not always be in line with theirs (Percy-Smith, 2012)" (Janhonen et al., 2016)

Transversal Competencies. "Those that must be developed in all subjects and do not have a specific disciplinary support" (XTEC, 2017)

APPENDIX 3. UPF Planetary Wellbeing Initiative

APPENDIX 3A. "FoodSeed" description

Project

Research objectives

To contribute to the integration of Food Sustainability Education (FSE) in primary and secondary Catalan schools by:

(1) Analyzing the present situation.
(2) Identifying priorities and required actions.
(3) Compiling/disseminating materials/practices that promote this integration.

Background

In the last decades, **food habits** have been changing, with an increase of consumption of red and processed meat, saturated fat, sugar, refined and energy-dense foods, together with low physical activity. This type of eating habits, together with low physical activity, are related to overweight and obesity, which can cause non-communicable diseases. In Catalonia 35.4% of the adult population are **overweighed** and 16.7% has **obesity**. Concerning children (6-12 years old), 24.4% are overweighed and 13.8% have obesity. To tackle this, in 2006, the Health Department of the Catalan Government launched a 10-years Comprehensive **plan for health promotion** through physical activity and healthy eating (PAAS in Catalan). Regarding education, PAAS established interventions that aimed at promoting a healthy food environment and physical activity for pupils in schools and encouraging health education. While a strong focus was placed on improving school meals and healthier food consumption in the published guidelines, little has been done to integrate food education within the curricula.

This proposal focuses on **Food Sustainability Education** (FSE). Food production and consumption are essential elements for the wellbeing of the population, which are facing global and local challenges. These include the growing food demand (due to global rising population), food waste, biodiversity reduction, pesticide use, water scarcity, and malnutrition issues, such as undernourishment and obesity. To tackle these global issues, policy initiatives on shifting towards sustainable food systems have been created, such as the Food Systems Summit 2021 (at the global scale), the Farm to Fork strategy (at the European Level), the Milan Urban Food Policy Pact (MUFFP) at the city level (in which Barcelona has signed the pact and this year hosts the 7th MUFFP Global Forum,); and other initiatives at more local scales, of which the UPF initiative on Planetary menus in the canteens is an example.

Besides the nutritional and health-related reasons, the adoption of sustainable food consumption habits is an essential step to reduce **environmental** impacts, as reported by the IPCC and the EAT Lancet Commission. Global food systems are responsible of 20-30% of the anthropogenic Greenhouse Gases (GHG) emissions and they are **resource intensive**: they consume70% of the total global freshwater and 30% primary energy. In particular, an average Catalan adult emits about 2 tonnes of CO_2, consumes 146 m^3 of blue water and uses 2,556 m^2 of land, related to the food she or he consumes in a year. Moreover, **food losses and waste** contribute to 20% of these environmental impacts. Tackling the problematics related with food production and consumption is necessary and urgent, not only for environmental concerns, but also for economic and ethical reasons.

Individual Food choices depend on a range of socio-economic variables, including purchasing power, as well as on the information available to the consumer. Education is an essential transformative factor of the behavior of future generations that in turn has the potential to impact on present-day family behaviors and to shape social food consumption patterns. Several studies show the importance of **Education Sustainable Development** (ESD) to enhance awareness and critical thinking among pupils. The UNESCO explicitly states the importance of integrating ESD in all curricula of formal education as well as in teachers' education, as a powerful change agent. Moreover, UNESCO highlights that ESD should not only add new content, but educational centres should be spaces to learn and experience sustainable development. This is in line with the UPF Planetary Wellbeing initiative as a commitment of the university to *tackling the major challenges of society in the 21st Century*.

This proposal aims to contribute to a shift in educational programs and policies regarding FSE in Catalan schools. While there are numerous initiatives that integrate FSE at the individual school level and there are particular targeted programs for specific issues, such as school menus, we aim to contribute to integrate food related concerns to the educational system by **prioritizing, raising awareness, assessing, generating knowledge and developing information and teaching materials** targeted to Catalan schools. The specific areas that these materials shall cover will be determined in the exploratory phase. However, relevant topics such as nutrition and wellbeing; social, economic, and environmental impacts of food consumption and production; food ecolabeling literacy; food waste and loss; or, the impacts of food packaging, are foreseen as key issues to be incorporated in FSE.

Stages of research

WP1: Analysis of FSE in Catalonia

1.1. Analysis of the curricula, regulatory framework, and policies for FSE in Catalonia.

1.2. Networking and inventory of existing FSE initiatives in Catalonia.

1.3. Survey to schools and/or students: awareness, knowledge, and interest in FS(E).

WP2: Diagnosis of the required changes in FSE in Catalonia

2.1. Identification of FSE key topics (not) covered in the curricula.

2.2. Prioritization of food sustainability competences/objectives to be covered and mechanisms for their effective incorporation.

WP3: Development/compiling FSE resources

3.1. Compiling educational FS resources that: 1) raise awareness, 2) enhance curiosity, 3) encourage information search, and 4) develop understanding/critical-thinking

3.2. Developing/compiling assessment tools to evaluate the integration of FS in schools.

WP4: Dissemination and continuity of research

4.1 Sharing results.

4.2 Scientific publishing.

4.3 Internationalization: Research calls and cross-national studies

APPENDIX 3B. UPF Planetary Wellbeing Initiative Research Team

The team is multidisciplinary in nature, including researchers from different centres within the UPF and an external advisor:

- Sergi Jimenez-Martín (PI)
- Antonio Ladron de Guevara (PI)
- Mercè Roca i Puigvert (project coordinator)
- Laura Batlle-Bayer
- Pere Fullana-i-Palmer
- Laia Hoyos de la Cuesta (research assistant)
- Christian Reynolds (external advisor)

The research team comprises members of 5 research groups within the UPF:

1. The Business Analytics Research Group (BARG) of the UPF Department of Economics and Business.
2. The Centre(CRES-UPF) of the UPF Department of Economics and Business
3. The Research group in International Studies and Economics (RISE) of ESCI-UPF
4. The UNESCO Chair in Life Cycle and Climate Change of ESCI-UPF
5. The Sustainability Observatory of UPF BSM

And an external advisor from The Centre for Food Policy of City, University of London.

APPENDIX 3C. Research Assistant call offer

ESCI upf. School of International Studies

¿Are you a 4th year GNMI student? ¿Are you Interested in Food Sustainability and Education? ¿Would you like to do your TFG around this topic and at the same time participate in a wider UPF research project?

WE ARE LOOKING FOR A RESEARCH ASSISTANT!!

As part of a multidisciplinary research team within the UPF, the researchers of the UNESCO Chair of Life Cycle Analysis and Climate Change and the RISE group of ESCI-UPF Mercè Roca and Laura Batlle were recently awarded funding to undertake the Project Food Sustainability Education (FSE) in Catalan Schools. We are now recruiting one paid research assistant to aid in this research project while she/he at the same time undertakes the TFG around a topic related with the project.

Project description: The project "Food Sustainability Education (FSE) in Catalan Schools" aims to contribute to the integration of Food Sustainability Education (FSE) in primary and secondary Catalan schools by analyzing the present situation, identifying gaps and priorities, and developing teaching materials that promote this integration. The objective is to raise awareness and enhance critical thinking within educational institutions and agents as a trigger of the urgent required social change towards sustainable food systems and consumption habits.

See further details of the project in this LINK

WHAT WE OFFER:

- Guidance and supervision to undertake the tasks of research assistantship within the UPF Planetary Wellbeing Project
- Paid assistantship to contribute to the UPF Planetary Wellbeing Project with an average of 10 hours/week of work at 200€ per month during 9 months. Starting in October 2021.
- Guidance and supervision of a related Final Degree Project (specific topic to be agreed on) by the researcher Dr. Mercè Roca.
- Aid in transforming the Final Degree Project into an academic publication.
- Certificate of recognition as ESCI-UPF Research Assistant.

THE STUDENT WE ARE LOOKING FOR:

- Interested in Food Sustainability and Education.
- With an average of 10 hours/week dedication during 9 months. This time does not include the time specifically devoted to the realization of the Final Degree Project.
- Proactive attitude and good communication skills
- Good domain of written English. The reports for the UPF Planetary Wellbeing project as well as the related Final Degree Project shall also be written in English.
- A student that is able to (or to rapidly learn to): search and manage databases, develop and launch surveys with online tools, and analyze data.

If you are interested in this opportunity, please write to merce.roca@esci.upf.edu with a short explanation (less than 1 page) of your interest and fit for the position.

APPENDIX 3D. Description of the Working Packages & Scheduling

WP0: Kickoff meeting, work coordination, and scope definition

Establishing the basis of the research activities and define the social, economic, environmental and health aspects that will be considered regarding food sustainability.

WP1: Analysis of FSE in Catalonia

1.1. Analysis of the curricula, regulatory framework, and policies with respect to FSE in the Catalan schools.

1.2. Inventory and analysis of existing pioneering initiatives regarding FSE in Catalonia.

1.3. Organization of an online Symposium on FSE to discuss current educational initiatives on food-sustainability and to identify development needs among key Catalan stakeholders.

1.4. Conducting a survey to Catalan primary and secondary schools, to gather information about the level of awareness, knowledge, incorporation, and interest regarding food sustainability contents in educational programs and policies. The questionnaire will consist of an email survey, addressed to the directors or heads of studies of educational institutions.

WP2: Diagnosis of the required changes in FSE in Catalonia

2.1. Identification of existing gaps. Based on the results of WP1, identifying the FSE-related topics that are (not) covered in the general educational curricula of Catalan primary and secondary schools.

2.2. Prioritization of food sustainability related issues to be incorporated in the educational curriculum and identification of the optimal mechanisms for this effective incorporation.

WP3: Development of FSE packages

3.1. Development of information and educational packages to integrate FSE in the curriculum and institutional practices of primary and secondary schools. The pedagogical approach of the teaching packages will be that of participative ***flipped-classrooms*** where the process is to: 1) raise awareness of what lecturers and students do and do not know about food sustainability issues, (2) enhance curiosity, (3) encourage and accompany in the search and discrimination of relevant information, and (4) develop understanding and critical thinking that promote a behavioural change. Amongst others, the resources and insights of the EDvolució project at UPF will be taken into consideration to develop these packages, properly adapted at the primary and secondary school levels.

3.2. Development of an instrument to assess the integration of FSE in the schools' curriculum. Inspired by the FAO[14] approach and methodology, a questionnaire will be developed to assess the integration of Food Sustainability considerations. This tool will identify the needs to be tackled in schools that aim to incorporate FSE in their curricula.

3.3. Pilot testing of FSE packages. One or two schools, involved in the SFE Symposium, will be invited to test the educational packages.

WP4: Dissemination and ensuring the continuity of the research line

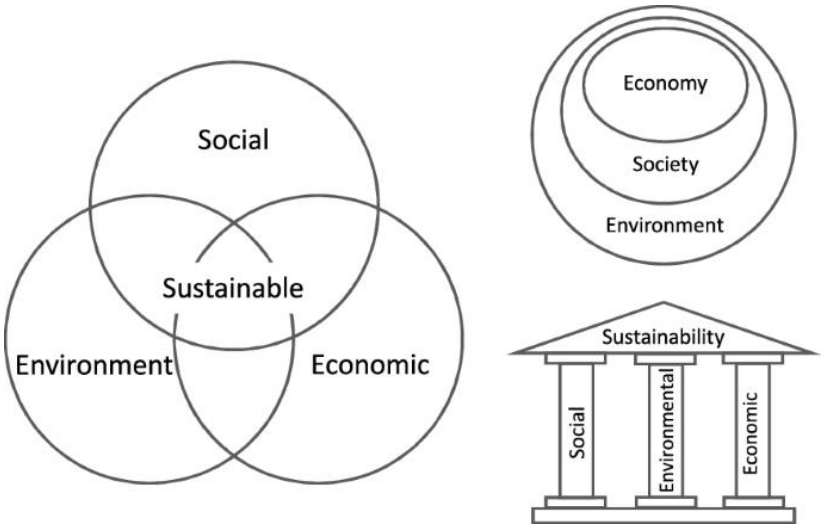
4.1 Dissemination of the results and educational packages. The results of the research project will be shared with all the participant organizations of the WP2 Symposium and the survey.

4.2 Scientific publishing. The project aims at publishing the research conducted in refereed sustainability related journals of the highest academic standards.

4.3 International research calls. This research is aimed to act as a seed for cross-national studies to be proposed in the coming Farm-to-fork Horizon EC calls (for example, HORIZON-CL6-2022-FARM2FORK-01-07 and HORIZON-CL6-2021-FARM2FORK-01-15). These proposals will focus on estimating the health, economic, social, and environmental effects of further incorporating FSE concerns in the existing educational curricula and policies across European countries.

Work packages	Activities	T1	T2	T3	T4	T5	T6	T7	T8
WP0									
WP1	1.1								
	1.2								
	1.3								
	1.4								
WP2	2.1								
	2.2								
WP3	3.1								
	3.2								
	3.3								
WP4	4.1								
	4.2								
	4.3								

APPENDIX 4. The Pillars of Sustainability



Source: (Purvis et al., 2019)

The **Environmental Pillar** is defined as the positive or neutral impact on nature, and the commitment to reduce the risks that could harm the environment (Greenly, 2022). This pillar also stands for the laws, regulations, and other policy mechanisms that concern environmental issues including air and water pollution, solid waste management, ecosystem management, maintenance of biodiversity, and the protection of natural resources, wildlife, and endangered species (Policy Forum on Development, 2016).

The **Social Pillar** is meant to promote fairness and respect for individual rights by assessing the social consequences of a production system, a company, or an activity. In this pillar, social discrimination and exclusion are fought to support gender equality, the reduction of the gender gap, and promoting training and education to promote solidarity and contribute to the well-being of stakeholders (Greenly, 2022). The seeking of the well-being of society is carried out through the support of social issues, which include aspects like healthcare, education, housing, employment; and those individuals do not suffer through lack of knowledge of their rights and exercise a responsible influence on the development of social policies and services, both locally and nationally (Policy Forum on Development, 2016).

The **Economic Pillar** embraces trade and investment, employment growth, and private sector development; while taking into consideration domestic and international trends, creating tax policy, public-private partnerships, trade and employment policies, national and international finance, among others. Furthermore, looks after the development of a responsible economic system by encouraging environmental labelling certifications (Greenly, 2022).

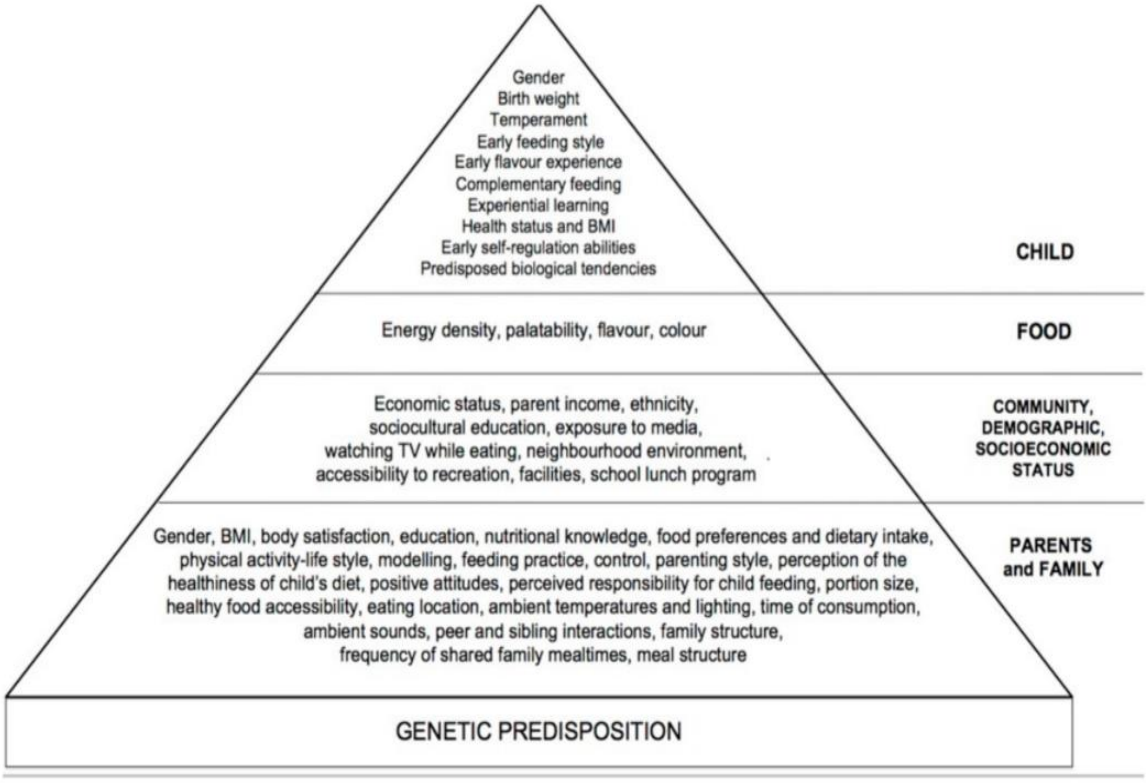
APPENDIX 5. Further information of harmful activities in Sustainable Agriculture

The extensive production of food and manipulation of land deteriorates the base of soil nutrients, causing the inability of future generations to plant in good conditions, produce and grow (UC Davis, n.d.). For instance, the agricultural sector employs excessive amounts of water (is accounted to consume an average of 69% of the planet's fresh water), and at the same time the excessive use of water degrades its quality.

Water management, conservation, and quality control (salinization and contamination); and irrigation systems, have a heavy impact on droughts, wildlife habitat and agroforestry (WWF, 2021). On the other hand, pesticides, fertilizers and other kinds of toxic farm chemicals or drifts from spraying emit nitrous oxide that poison and pollute fresh water, marine ecosystems, air, and soil that last for generations.

Regarding the other side of agricultural activities such as farming, plant and animal production practices are also responsible for impacting the environment while pursuing their activities. The FAO holds that 18% of the total Greenhouse Gas production (GHG) comes from the livestock sector, as a cause of some farming practices such as burning fields or the use of gasoline machinery in the farming sector. Moreover, when forests are cut or burned for intensive planting production the carbon that is stored in virgin forests is liberated in the surface. In addition, agricultural massive plantations and expansion take big responsibility when it comes to deforestation and destruction of ecological habitats and biodiversity loss (WWF, 2021).

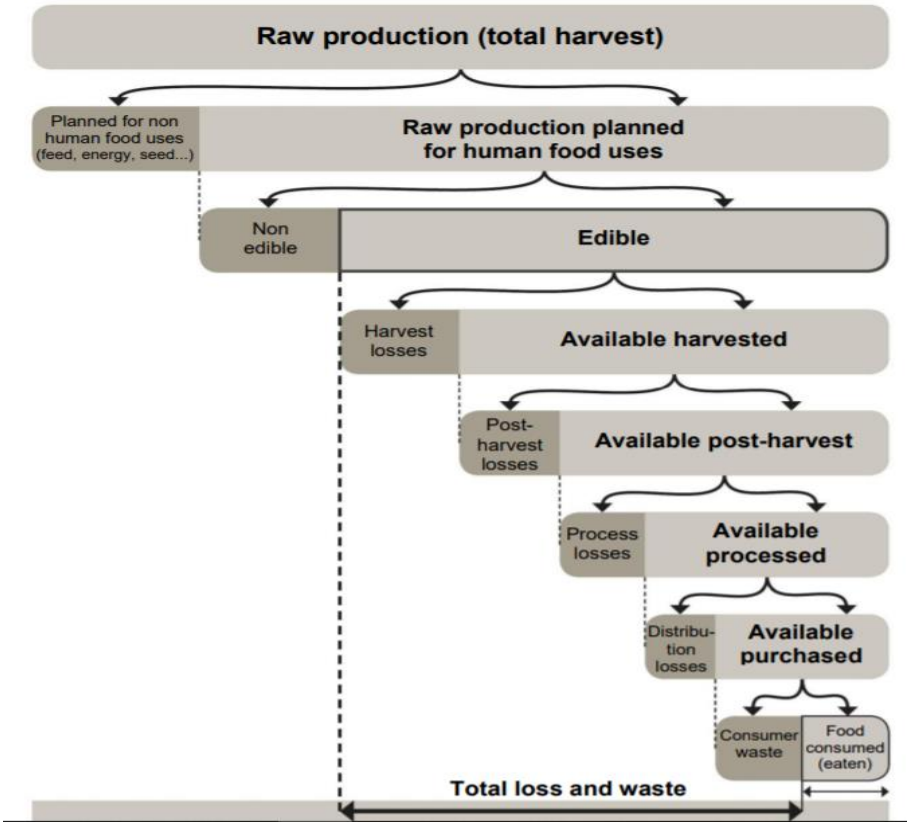
APPENDIX 6. Factors that impact on child eating behaviour and future individual food choices



BMI: Body Mass Index

Source: (de Cosmi et al., 2017) "Early Taste Experiences and Later Food Choices"

APPENDIX 7. Food Loss and Waste along the supply chain



Source: FAO (2014) "Food losses and waste in the context of sustainable food system"
Note: The "waste" focus is centred on reducing waste of all kinds, and diminishing negative impacts derived from the treatment of food and non-food waste; considering the activities carried out after the waste, such as feed, recycling for energy production (compost to nutrient the soil), incineration and landfills. Alternatively, the "food" focus considers parts of food that are edible for humans but lost or thrown out at a stage of the food chain, and the consideration of the functioning of the food system, with a food chain perspective

APPENDIX 8. Food Sustainability dimensions and challenges

DIMENSIONS	SUB-DIMENSIONS	TOPICS & CATEGORIES	FOOD SUSTAINABILITY INDEX		
			Sustainable Agriculture	*Nutritional Challenges*	*Food Loss and Waste*
Environment	*Water*	Water management and scarcity			
		Conservation			
		Quality control (salinization and contamination)			
		Irrigation systems			
		Droughts			
		Impacts on wildlife habitat and agroforestry			
		Sustainability of water withdrawal			
		Fisheries			
	Air	Pesticides, fertilizers and chemical drifts from spraying			
		Greenhouse Gas emissions from livestock: farming practices, gasoline machinery.			
		Burn of intensive planting production			
	Soil & Land	Manipulation of soil			
		Deterioration of soil nutrients			
		Impacts on soil for future plantations and growing			
	Biodiversity	Deforestation, destruction of ecological habitats			
		Biodiversity loss			
		Industrialized monocultures			
	Energy	Renewable & non-renewable energy sources			
Economic		Financial performance			
		Employment rate			
		Economic distribution			
		Farmers and production rights			
		Diversification and resilience of the productivity of the agricultural system			
		Land ownership and use			
Social		Gender/Equity			
		Inclusion (international)			
		Inclusion (national)			
		Food Justice & Sovereignty			
Food & Nutrition	*Food Security*	Food access and availability			
		Lack of support to actors for investments and good practices			
		Lack of private and public infrastructure for well-functioning food chains			
	Food Loss & Waste	Food loss on different stages of the food supply system: agricultural and livestock production, harvesting and recollection of food (farms, fishing boats), production and manufacturing, packaging, transportation, storage and distribution			
		End-user waste: Restaurants, households (food spoilage, over-preparing, date label confusion, overbuying, poor planning), school centres and canteens, hotels, hospitals, among many other institutions			
	Nutrition Literacy & Dietary habits	Individual Food choices – Economic, socio-cultural, psychological and nutrition literacy factors – Sustainable diets & diet composition – Affordability and availability off healthy nutritional choices – Reliable food information available – Food security policies – Consumption norms and habits consumer behavioural change			
	Life Quality & Expectancy	Prevalence of malnourishment			
		Healthy nutrients			
		Sustainable and healthy diets			
		Childhood obesity			
		Eating disorders			
		Increase of food demand			

Source: Own elaboration based on SDGs and Food Sustainability Index

APPENDIX 9. Examples of learning approaches and methods related to the SDGs

SDG 12 "Responsible production and consumption"	▪ Calculate and reflect one's individual ecological footprint. ▪ Analyse different products using the Life Cycle Analysis (LCA) (food, cell phones, clothes, class material…). ▪ Role-playing performing different roles in trading systems (producer, consumer, waste manager…).
SDG 13 "Climate Action"	▪ Develop and run a project for climate protection (web page, blog…). ▪ Explanation and work on a case study on how climate change could increase the risk of disasters in children's environment and local communities.
SDG 14 "Life below water"	▪ Excursions and daytrips to coastal sites and debate the sustainable use and management of fisheries. ▪ Perform lab experiments to provide the evidence of ocean acidification.
SDG 15 "Life on Land"	▪ In the children's local area, mark the places where there is diverse wildlife and barriers as roads or invasive species. ▪ Composting workshop and show organic material formation. ▪ Plant a wildlife garden for wild animals (bee-friendly flowers, insect hotels) in urban areas. ▪ Celebrate and create one-day projects for days as the Earth Day (22nd April) and/or World Environment Day (5th June).

Source: adapted from UNESCO (2017), "*Education for Sustainable Development Goals: learning objectives"*

APPENDIX 10. International monitoring education competencies

The inclusion of ESD in further international assessment tests that influence curriculum content in many countries, is an area that needs further investigation (Rieckmann, 2018). All competencies and learning development should be monitored by authorities to ensure the quality education for all, and a way to do it is though the Program for International Student Assessment (PISA), which was designated by the UNESCO Institute of Statistics (UIS), the UN Statistical Commission, and the Organization for Economic Co-operation and Development (OECD), which are the bodies also responsible for monitoring progress towards SDG 4.

The PISA tool was designed to be an indicator that measures and internationally compares the competences levels of secondary school students in a systemic way to establish the level of basic knowledge and competences applied in different areas and thematic of the educational curricula (OECD, 2017).

APPENDIX 11. Learning approaches and age range of learners

Behaviour change	Level of Education	Justification	Examples	References
Interventions & Short-term: Create a Healthy School Food environment & Change Student's Values about Food	Lower Elementary Students	Many students eat at least one meal per day at the school, so it's a beneficial approach to from an early stage start embracing values about food. Childhood obesity has risen over the past decades, and school programs should make a step on tackling healthy food interventions.	First-hand experiences: – Gardening – Cooking – Tasting foods grown locally while discussing what fruit gives our body to be active and healthy Participation in projects that provide schools guidelines: – Framework for Farm to School – FoodCorps (Healthy School Progress Report)	(Koch, 2016) (Joshi et al., 2014)
Middle-term: Move Students toward a Good Food Diet	Upper Elementary and Middle School Students	Help students adopt behaviours to prevent obesity. Comprehension of the complex food system. Students will learn that they should not be guilt over their choices, but instead understand how the system and marketing is influencing on their unhealthy food choices.	– Comparing and contrasting experiences with food in the garden and cooking classes or school cafeteria – Explore how the marketing and "green-washing" is influencing in our choices with simple examples	(Koch, 2007, 2008, 2010)
Long-term: Health, Ecological Sustainability & Social Justice	High School Students		– Nutritional content of food (vitamins, antioxidants) – Unhealthy products (sugar, fat , processed, salty added…) – Examine food policies and become advocates for change – Examine large carbon footprint associated with producing, packaging, and transporting their meal	(Koch, 2016)

Source: Own elaboration. Inspired on (Koch, 2016)

APPENDIX 12. Life skills that can be developed through skills-based food education

Communication and interpersonal skills	Decision-making and critical thinking skills	Coping and self-management skills
Communication skills – persuade parents and friends to make healthy food and menu choices Refusal skills – counter social pressures to adopt unhealthy eating practices Advocacy skills – present messages of healthy nutrition to others through posters, ads, performances, and presentations – gain support of influential adults such as headmasters, teachers, and local physicians to provide healthy foods in the school environment	Decision-making skills – choose nutritious foods and snacks over those less nutritious – convincingly demonstrate an understanding of the consequences of unbalanced nutrition (deficiency diseases) Critical thinking skills – evaluate nutrition claims from advertisements and nutrition-related news stories	Self-awareness and self-management skills – recognise links between eating disorders and psycho logical and emotional factors – identify personal preferences among nutritious foods and snacks – develop a healthy body image

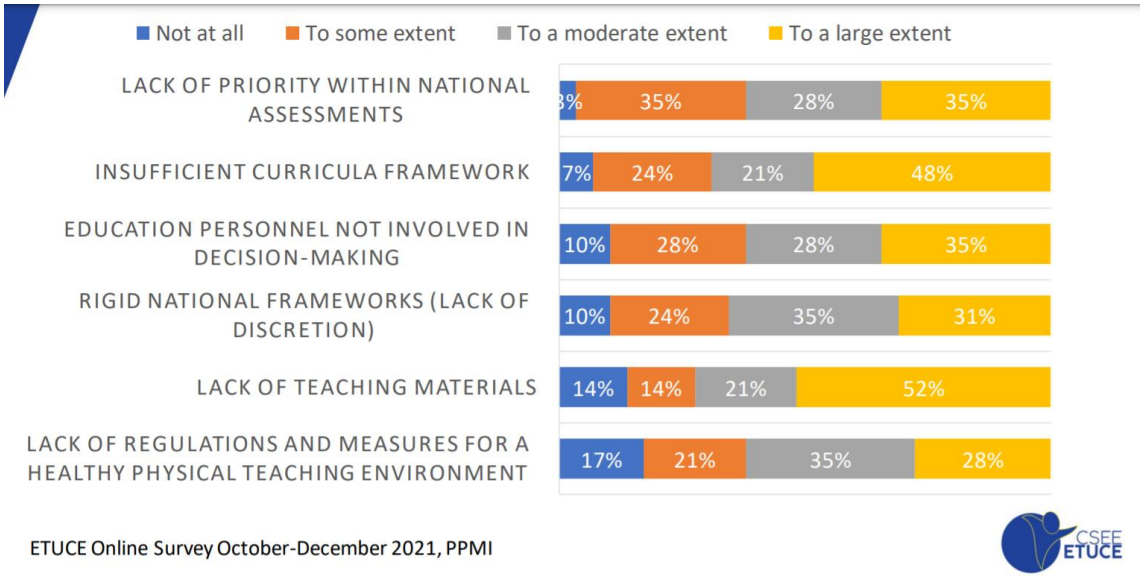
Source: World Health Organization (2003)

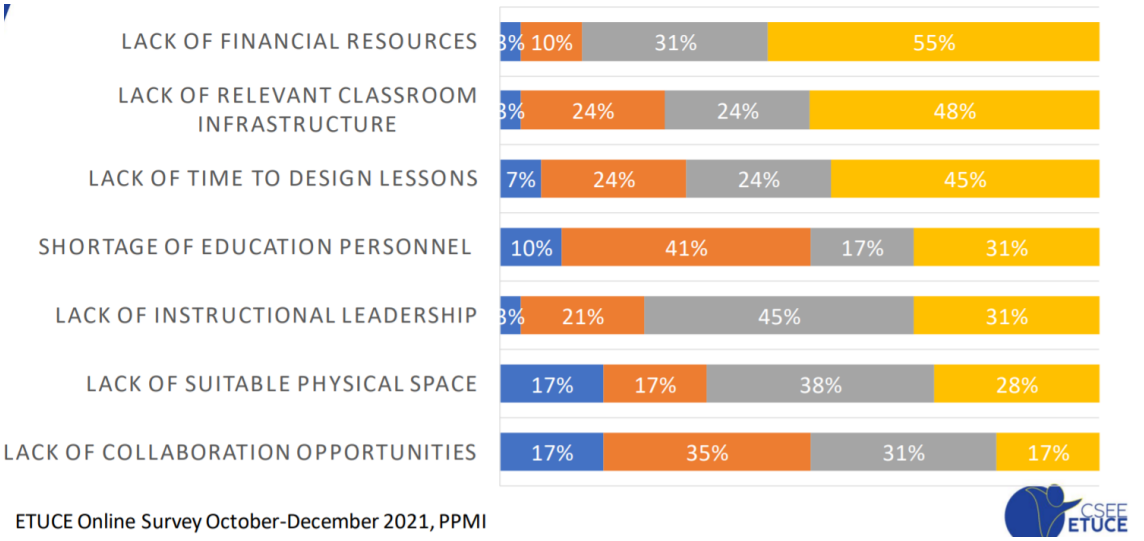
APPENDIX 13. Food education terms defined

Food Education Term	Definition
Home Economics	"at school, the study of cooking, sewing, and subjects relating to the management of a home" [18]
	"a curriculum . . . to discover and further develop their own resources and capabilities to be used in their personal life, by directing their professional life, preparing them for life" [19]
Food Technology	"knowledge and skills to design and make food products effectively . . . use the physical, chemical and nutritional properties of foods to meet a specific need . . . implement their design hygienically, safely and effectively. They need to evaluate the design and the product" [20]
Nutrition Education	"any combination of educational strategies accompanied by environmental supports, designed to facilitate voluntary adoption of food choices, and other food and nutrition-related behaviours conducive to health and wellbeing (of individuals, community, planet)" [21]
Food and Cooking Skills	"a wide range of skills required to feed families, including not only factors involved with the meal preparation . . . but also knowledge of how to plan and budget for food and organise and plan meals that other members of the household will find acceptable" [22]
Food Education	"Education that supports learning about food, nutrition and the role that food plays in one's life, relationships, culture, communities, environment, and in history and society" [23]
Food Literacy	"the ability of an individual to understand food in a way that they develop a positive relationship with it, including food skills and practices across the lifespan in order to navigate, engage, and participate within a complex food system. It's the ability to make decisions to support the achievement of personal health and a sustainable FS considering environmental, social, economic, cultural, and political components" [24]

Source: (Smith et al., 2022)

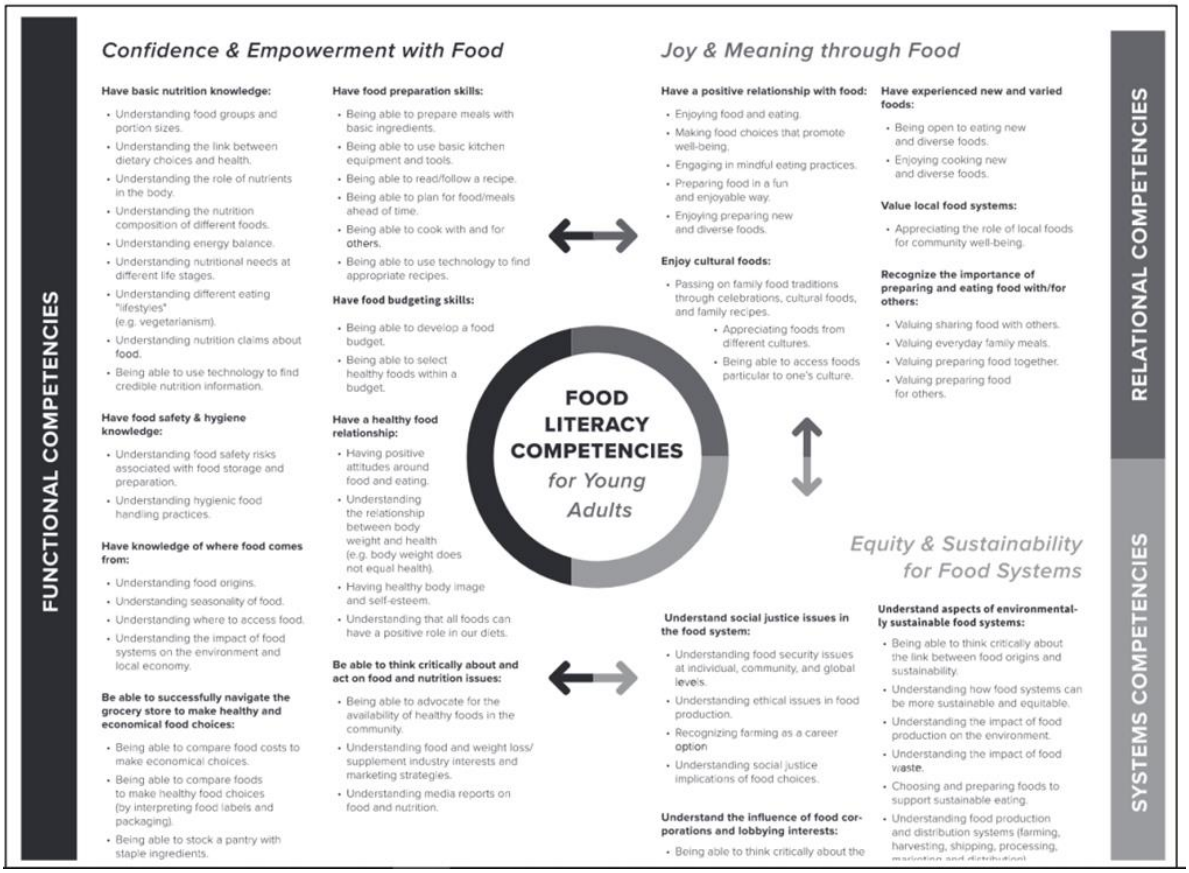
APPENDIX 14. EU survey opinion on barriers and limitations on Education for Sustainable Development





Source: (European Trade Union Committee for Education, 2022) "Education for sustainable development in the EU: the state of play and the barriers and limitations"

APPENDIX 15. Food Literacy skills and aptitudes gathered into three areas of knowledge



Source: (Slater et al., 2018 as cited Smith et al., 2022)

APPENDIX 16. Commission's holistic approach for sustainability and the SDGs

Source: European Commission (2020)

APPENDIX 17. The EU institutions

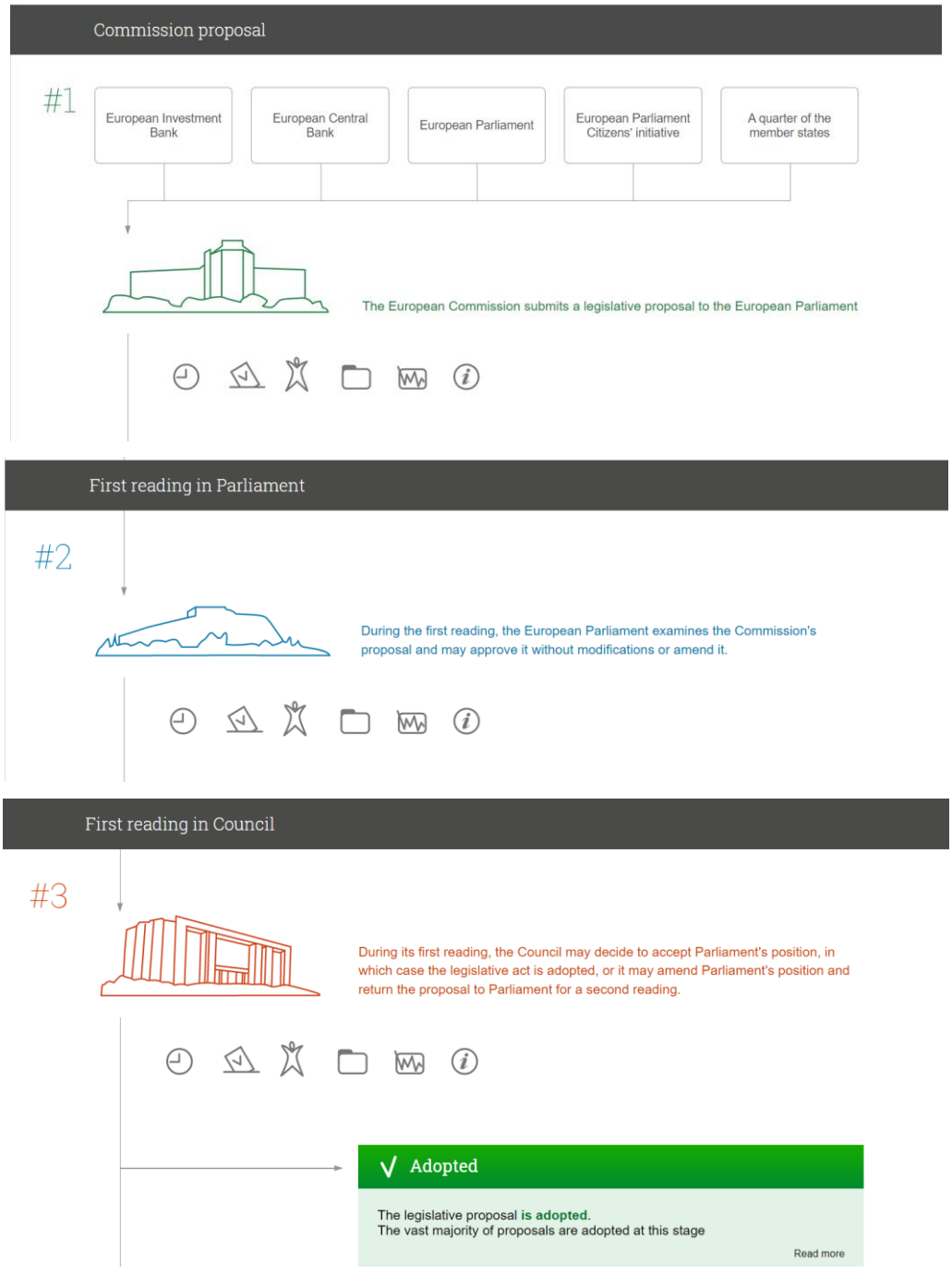
The distribution of powers, functions, and decision procedures f the European Union institutions are gathered under the Treaty of Functioning of the EU (1957), Treaty on the EU (1992), the Treaty of Lisbon (2007). The main four EU institutions coordinate their distinct functions to work together to EU's agenda and coordinate the EU-law making following the Ordinary Legislative Procedure.

The European Parliament and the Council of the European Union are the two legislative bodies of the European Union. Moreover, the European Council does not make laws but can amend and make changes to determine EU's political direction. Likewise, the European Commission holds the Executive power and has the initiative to initiate new legislative proposals which are then discussed and negotiated between the Council of the EU and the Parliament.

The main EU bodies involved in the process of deciding and creating recommendations in education are the European Commission, the European Parliament, and the Council (European Parliament et al., 2012). Specifically, the European Parliament is involved in discussions and debates related to non-legislative acts involving education. In addition, as a legislative body, it can participate in possible legislative dossiers to be presented. The Parliament can create own-initiative, non-legislative reports; or it can make a report on a legislative act proposed by the European Commission, exercising its power of co-decision. In both cases, the reports or resolutions are discussed and voted in the Parliamentary Committees, so that they can then go through the same procedure in the plenary session. In the case of legislative dossiers, a negotiation process with the Council and the Commission begins after the adoption of the report in Parliament until a final text is reached.

Once the report is approved by the EU Council, the process of adoption of such a report in the Member States relies on the European Commission, as it is its role to act as the "guardian of the Treaties". This means that is the Commission the one responsible for ensuring that the European is correctly applied in all Member States, according to Article 17 of the Treaty on the Functioning of the European Union (European Union, n.d.).

APPENDIX 18. European Union's Ordinary Legislative Procedure



Second reading in Parliament

#4

Parliament examines the Council's position and approves it, in which case the act is approved; or rejects it, in which case the act will not enter into force and the whole procedure is ended; or proposes amendments and returns the proposal to Council for a second reading.

Adopted

The legislative proposal **is adopted**.

Read more

Not adopted

The legislative proposal **is not adopted**

Second reading in Council

#5

The Council examines Parliament's second reading position and either approves all of Parliament's amendments, meaning the act is adopted, or does not approve all amendments, leading to the convening of the Conciliation Committee.

Adopted

The legislative proposal **is adopted**.

Read more

Not adopted

The legislative proposal **is not adopted**

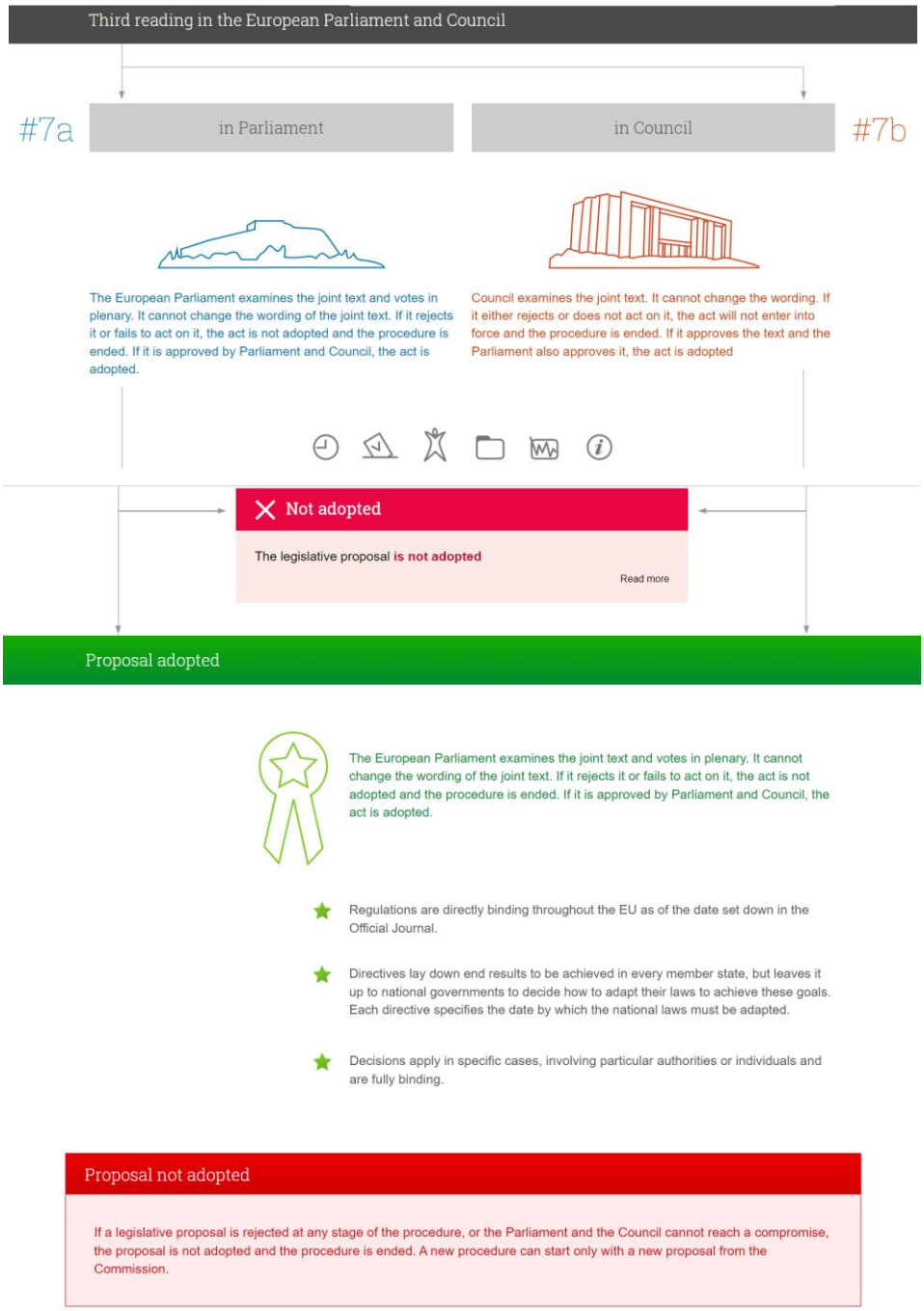
Conciliation

#6

The Conciliation Committee, composed of an equal number of MEPs and Council representatives, tries to reach agreement on a joint text. If unsuccessful, the legislative act will not enter into force and the procedure is ended. If a joint text is agreed, it is forwarded to the European Parliament and Council for a third reading.

Not adopted

The legislative proposal **is not adopted**



Source: [European Parliament, Legislative procedure]

APPENDIX 19. The Three principles of EU's areas of action

Principles	How can the EU act?
Conferral	The EU has only that authority conferred upon it by the EU treaties, which have been ratified by all member countries.
Proportionality	The EU action cannot exceed what is necessary to achieve the objectives of the treaties.
Subsidiarity	In areas where either the EU or national governments can act, the EU may intervene only if it can act more effectively.

Source: Own elaboration based on the areas where the EU can act.

APPENDIX 20. Checklist of competences and Areas of EU action

Areas of action	Only EU can legislate	EU or national governments can legislate	Member countries legislate, EU helps	EU plays special role
Customs union				
Competition rules for the single market				
Monetary policy for the eurozone countries				
Trade and international agreements (under certain circumstances)				
Marine plants and animals regulated by the common fisheries policy				
Single market				
Employment and social affairs				
Economic, social and territorial cohesion				
Agriculture				
Fisheries				
Environment				
Consumer protection				
Transport				
Trans-European networks				
Energy				
Justice and fundamental rights				
Migration and home affairs				
Public health (for the aspects defined in Article 168 of the Treaty on the Functioning of the European Union)				
Research and space				
Development cooperation and humanitarian aid				
Public health				
Industry				
Culture				
Tourism				
Education and training, youth and sport				
Civil protection				
Administrative cooperation				
Coordination of economic and employment policies				
Definition and implementation of the Common Foreign and Security Policy				
The 'flexibility clause', which under strict conditions enables the EU to take action outside its normal areas of responsibility				

Source: Own elaboration, based on the Areas of EU Action.

APPENDIX 21. further information of the EU documents analysed.

Appendix 21A.

Document 1. COM(2022) 11 final 2022/0004 (NLE) "Proposal for a Council Recommendation on learning for environmental sustainability".

In this proposal, the European Commission fully recognises the broad unawareness and lack of consistency on sustainability topics among the population, and the low accomplishment of schools on providing learners a sufficient comprehension, knowledge, and competences regarding climate change, environmental impacts of production processes, and how to behave in a more environmentally friendly and sustainable way. It outlines the challenges that hold the integration of such as environmental sustainability or Food Sustainability in the school curriculum in a thorough or exhaustive way in most of the EU Member States. Specially, reflects that just few countries cover specific sustainability topics, and how to relate the learning competences in the lectures (European Commission, DG Education Youth Sport, and Culture 2022).

Furthermore, it is reinforced that:

a) Embedding environmental sustainability in all education and training policies, programmes and processes is vital to build the skills and competences needed for the green transition.
b) Action should be taken vertically and horizontally: from individuals to institutions; and integrating all stakeholders in the education experience.
c) It is urgent to make a move towards a systemic change in education and training that educates to combat for the climate and biodiversity crises.

With this, the Commission is aiming to suggest guidance and action that can be pursued by Member States to further embed environmental sustainability in education and training and develop the sustainability competences of all learners. It also facilitates the sharing of policy maker, researcher and educator expertise and best practices at system and institution level, and provides measures as well for the system, support for the learners and support on educators to facilitate learning for environmental sustainability (European Commission, 2022, p. 11)

Yet, the extent of influence and the legal basis of this Recommendation is limited, since a Council Recommendation are non-binding tools that influence on education matters as the EU is responsible for supporting the commitment of Member States to the measures presented. This means that has no EU regulatory power or binding policies on Member States, the purpose is purely for internal coherence, not for regulation. The respective Member States are the

responsible ones to decide in accordance with their national conditions in the field of education and training, how this Council Recommendation is going to be implemented (Interview 3, 2022).

Appendix 21B.

Document 3. "Concepts for a Sustainable EU food System"

The Joint Research Centre elaborated in January 2022 a recommendation recognizing the insufficient strategies on education, and an unstructured information to consumers about sustainability. It highlights the needed urgent transformation of food systems worldwide and in the EU to become. In the line with the EU Farm to Fork Strategy, being a cornerstone of the European Green Deal, the document takes a food system perspective and sets out actions to move towards a 'fair, healthy and environmentally friendly food system'. Its Action Plan foresees the development of a legislative framework for sustainable food systems, to facilitate and accelerate the transition towards a sustainable EU food system (European Commission, Joint Research Centre, 2022).

This is the only paper from the ones analysed that has a reference to food literacy in the whole document. The term "**food literacy**" is defined as the "knowledge about food, where it comes from, how it is produced and its sustainability performance, food labels, what constitutes a healthy diet, and the ability to cook are essential for enabling consumers to choose a healthy diet from a sustainable food system". The document declares that:

> "School curricula should include the food system and cooking, and there should also be education on offer for adults. Public procurement and school food can also educate and promote healthy diets" (Joint Research Centre, 2022b)

One of the main drivers of such concerns are consumers, as they are the final cornerstone of food and nutrients of the sustainable food system. For this reason, it is needed to introduce appropriate measures to change food environments, including food education, that can create accurate conditions for implementation of healthy diets in a sustainable food system.

Appendix 21C.

Document 4. Council Recommendation (2018/C 189/01) "Key competences for lifelong learning"

This Council Recommendation is important because it is the first. It describes eight competences, which particularly 2 of them embrace sustainability topics. The eight competences presented are the following: 1) Multilingual; 2) Mathematical, science, technology, and engineering; 3) Literacy; 4) Digital; 5) Personal, social, and learning to learn; 6)

Citizenship, 7) Entrepreneurship, and 8) Cultural expression (European Commission, DG of Education Youth Sport and Culture, 2018).

Such competencies develop the learner's knowledge with specific contents, where they have to develop and relate their answers to a concrete real situation. Such cognitive competencies enable them to plan a consistent proposal and deliver a real solution, while enhancing their cognitive capabilities (Interview 4, 2022).

The final goal of this report is to introduce "specific competencies" in the curriculum of the Member States, and that the learners can achieve such specific competencies. Specific competencies are the outcome of how that each subject will contribute through the specific competences to the achievement of the eight key competences following key contents of the subject. That means that since the key competencies presented by the Council integrate contents on sustainability, there must be topics on sustainable development in relation to the area of knowledge that the respective subjects are tackling and dealing with (See Glossary in Appendix 2).

Appendix 21D.

<u>Document</u> 5. "GreenComp: The European Sustainability Framework"

Following the areas of action of the Farm to Fork Strategy and the European Green Deal, the European Commission together with the Joint Research Centre developed a common European competence framework on sustainability. Being one of the policy actions in the European Green Deal, acts as a motivation and incentive to encourage the teaching and learning on environmental sustainability topics in the EU, and is designed to be a non-prescriptive reference for learning schemes that foster sustainability as a competence in the EU and aims to provide empiric scientific support as an input to the EU's policymaking process (European Commission, Joint Research Centre, 2022).

"A competence-based education that helps learners develop sustainability skills based on knowledge and attitudes can help promote responsible action and stimulate willingness to take or demand action at local, national and global level. Becoming competent in sustainability issues will enable learners to overcome the cognitive dissonance that comes from knowing about an issue but lacking the agency to act" (Joint Research Centre, 2022).

This common framework of reference recognizes a set of competences towards sustainability to be embraced in education programs with the intention to help learners and individuals to further embrace knowledge and develop capabilities that promote ways to think and act with more empathy and responsibly for our planet and public health. Still, as its legal basis as a

framework of reference is limited to the EU's opinion and recommendation, having no binding power on Member States.

Appendix 21E.

Document 6. Council Resolution (2021/C 66/01) "Strategic framework for European cooperation in education and training towards the EEA and beyond (2021-2030)"

Following the Covid-19 crisis and the consequent forced adaptation to an online education system, the Commission adopted in September 2020 new initiatives to strengthen the European Education Area, as well as more funding and cooperation between Member States. Later, in 2021, the European Parliament presented its report on the European Education Area, which came out of the Committee on Culture and Education (Council of the European Union, 2021). Since the adoption of this report, the Parliament has continued to insist on increasing the ambition of this Area by 2025. Inclusive, green, quality, affordable and accessible education are some of the points called for in this report, all SDG targets from the UN 2030 Agenda (Interview 1, 2022).

APPENDIX 22. Complementarity and synergies with other EU education and training initiatives

- "Rethinking education: Investing skills for socio-economic outcomes" delivers a set of proposals and recommendation for governments and heads of state, stressing the importance of investing in young people and adult's talents and training, and how those competences bring a solid basis for sustainable societal development (European Commission *et al*. 2012).
- Communication on achieving the European Education Area by 20255
- Council Resolution on a Strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030)
- Communication on a new European Research Area for Research and Innovation
- Council Recommendation on a Pact for Research and Innovation in Europe
- European Skills Agenda for sustainable competitiveness, social fairness, and Resilience
- Council Recommendation on vocational education and training (VET) for sustainable competitiveness, social fairness, and resilience
- Digital Education Action Plan (2021-2027)
- Council Recommendation on the key competences for lifelong learning
- Council Conclusions on the European Universities
- The future Erasmus+ Teacher Academies
- EU quality framework for early childhood education and care
- The Education for Climate Coalition
- The proposal for a Council Recommendation on a European approach to micro credentials for lifelong learning and employability

APPENDIX 23. Further funding opportunities in Education

Green Education EU initiatives

- Council Recommendation on education for environmental sustainability
- European competence framework on sustainable development and climate change (GreenComp)
- Education for Climate Coalition

EU stakeholders on education

- *eTwinning* platform connects schools, teachers, and their classes all over Europe, offering the opportunity to communicate, collaborate, develop projects, share and, in short, feel and be part of the most exciting learning community in Europe.
- *The School Education Gateway* engages European policies through practical activities for school education, including Early Childhood Education and Care and Vocational Education and Training.
- *EPALE* - the Electronic Platform for Adult Learning in Europe aims to guide and give support to staff, researchers, and policymakers

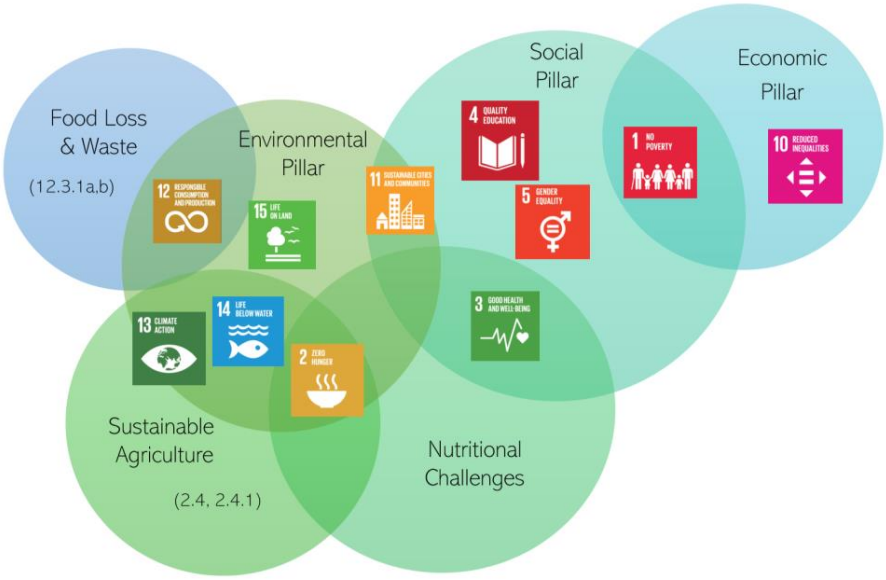
List of Tables and Figures

Table 1. Cross-cutting SDGs with Sustainability pillars

Sustainability Pillar	SDG co-related
Environmental Pillar	- SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable; - SDG 13: Take urgent action to combat climate change and its impacts: - SDG 14: Conserve and sustainably use the oceans, seas and marine resources; - SDG 15: Protect, restore and promote sustainable use of ecosystems; - SDG 16: Promote peaceful and inclusive societies for sustainable development (Policy Forum on Development, et al. 2016).
Social Pillar	- SDG 1: End poverty in all its forms everywhere; - SDG 3: Ensure healthy lives and promote well-being for all at all ages; - SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all; - SDG 5: Achieve gender equality and empower all women and girls; - SDG 10: Reduce inequality within and among countries (Policy forum on Development, et al. 2016).
Economic Pillar	- SDG 1: End poverty in all its forms everywhere; - SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; - SDG 10: Reduce inequality within and among countries (Policy Forum on Development, et al. 2016a)

Source: Own elaboration inspired in (Delli Paoli & Addeo, 2019)

Table 2. Venn Diagram of Food Sustainability



Source: Own elaboration based on SDGs, FSI and the Sustainability Pillars.
Note: The Venn Diagram aims to illustrate how Food Sustainability is embedded in different SDGs, and how such are interconnected with the Sustainability Pillars and the dimensions that covers the Food Sustainability Index.

Table 3. The change process for food-based education in schools

INTERVENTIONS	SHORT-TERM	MEDIUM-TERM	LONG-TERM
Learning Opportunities & Creating a healthy School Food Environment - Classroom-based food education - School garden with garden experiences integrated into the curriculum - Healthy, appealing, locally sourced (when possible) school meals) - School culture provides and celebrated good food	**Change Students' Values, Knowledge, and Skills about Food** - Increase preferences (liking) for good food - Raise awareness of benefits of a good food diet & risks of an unhealthy diet - Positive social norms - Increase self-efficacy - Goal setting & monitoring - Food system knowledge and basic gardening and cooking skills	**Move Students Toward a Good Food Diet** - Eat more meals with whole foods and ample fruits and vegetables and other plant-based foods - Eat more locally-sourced, seasonal foods - Eat less highly processed packaged foods and foods from animal sources - Engage in more gardening and cooking	**Improved Personal Health** **More Ecologically sustainable Food System** **More Socially just Food System**

Source: Own elaboration based on "Learning, Food, and Sustainability in the School; Chapter 4" (Koch, 2016)

Table 4. Types of EU Legal Acts and their legal application

EU Legal Acts	Legal application	Role of Member States
EU Treaties	Binding in its entirety (legislative act)	They are negotiated and agreed democratically by all Member States. Afterwards, they are ratified by the respective parliaments.
Regulation	Binding in its entirety (legislative act)	It states how should Member States exactly transpose and adopt the guidelines of the regulation.
Directive	Binding in its entirety (legislative act)	They are generic guidelines, in which Member States have a limit of two years to transpose them. Member States can introduce more detail on such guidelines in the internal regulations.
Decision	Binding in its entirety (legislative act)	It is specified to whom it will be binding.
Recommendation	No binding force	Are free to decide whether to adopt the suggested course of action. After adoption reports can be drawn upon their implementation.
Opinion	No binding force	The EU can draw statements based on opinions, but they are not subject to any legal obligation.
Proposal	No binding force	The Commission can propose initiatives that complement law and help interpret recommendations or laws drawn by the EU. Even though they do not have a binding force, shall a problem appear, the Commission can ask why the Member State did not implement the proposal.

Source: Own illustration based on the power of co-decision procedure of the European Union introduced by the Maastricht Treaty (1992).

Table 5. Counting of food sustainability related concepts in the documents revised

	Food	Food education	Food literacy	FSE	Sustainable food system	Curriculum[3]
Document 1	0	0	0	0	0	1
Document 2	0	0	0	0	0	104
Document 3	0	1	7	0	50	0
Document 4	0	1	0	0	0	0
Document 5	4	0	0	0	0	2
Document 6	0	0	0	0	0	2

Source: Own elaboration.
Note: Based on the documents analysed in Chapter 4, the table aims to provide the inclusion of food related topics in the text.

[3] "Curriculum" here is understood as the school program.