HANDBOOK for the summer schools

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Summer schools

on environmental protection, sustainability & ecological behavior to support the integration and inclusion of migrants & refugees in the higher education – enhance the university professors competences

Erasmus+ KA2 Cooperation Partnerships in Higher Education

Handbook for the summer schools

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Contents

1. Environmental policy of the European Union

The European Union is a pioneer on the international stage in creating ambitious environmental commitments and initiating action to curb climate change. For years, a united Europe has promoted the idea of sustainable growth, calling for the rational use of natural resources and the application of innovative green technologies in various sectors of the economy. EU environmental policy seeks to prevent risks and mitigate adverse environmental and climate impacts. In accordance with **Article 4 of the Treaty on the Functioning of the European Union**, it constitutes a platform for joint action by the Union and the Member States. Being an area of shared competence, it is created both by EU legislation and by the national laws of the Member States. The **objectives of environmental policy** are integrated into the EU's modernisation strategies and programmes, contributing to gradual changes in production and consumption patterns. The regulations adopted concern many aspects of the daily lives of EU citizens, including waste management, reducing air pollution, protecting water, combating climate change and protecting endangered species of flora and fauna. Moreover, they express the values espoused by EU citizens.

The importance of this policy is demonstrated by the fact that, in accordance with Article 11 TFEU, **environmental protection** requirements must be integrated into the EU's other spheres of action and environmental objectives should be placed on an equal footing with economic and social objectives. The priority of protecting the environment, including biodiversity, is a component of **sectoral policies** such as agriculture, fisheries, transport, energy or industry, determining how they are implemented

Initially, the treaties establishing the Communities did not directly refer to environmental protection, nor did they emphasise the need for policy in this area. It was only the increasing degradation of the environment, caused by irrational human economic activity, and the growing environmental awareness that led to the adoption of **EU environmental regulations**. It was realised that environmental deterioration, ecological imbalance and the destruction of natural resources were occurring while living standards were being improved and major technological advances were being stimulated.

The mobilisation to take remedial action was due to a couple of reasons: firstly, the right to a safe and healthy environment was included in the catalogue of human rights (4th

generation), and secondly, the decreasing availability of natural resources necessitated certain behaviours[1]. The **increasing scale of environmental pollution** began to be seen as a side effect of most market activities. The third motivation stemmed from the realisation that the existing legal discrepancies, of individual EU Member States, in the sphere of environmental protection were obstructing the proper functioning of economic mechanisms, distorting competition in the common market. The need to eliminate so-called environmental dumping made environmental policy one of the fastest growing branches of European law.

Regulation at the community level was preceded by earlier international cooperation at the United Nations the field of environmental protection and anti-pollution. For the first time, in 1969 at the United Nations General Assembly, the term **'eco-development'** appeared in a speech by Secretary General Sithu U Thant, narrowed down solely to the task of nature conservation[2]A declaration adopted at the **1972 UN Conference in Stockholm** established a policy agenda to protect the oceans and terrestrial ecosystems and to study the impact of the environment on health[3].

Of great importance for the work undertaken at the international level was the 1992 UN Conference on Environment and Development in Rio de Janeiro, which adopted a number of declarations and conventions which, although lacking binding force as so-called soft environmental law, influenced the development of international environmental law[4].

The European Communities have shown a growing interest in environmental protection, starting with the **European Council in Paris in 1972**. At that time, it was recognised that economic growth was not an end in itself, but should lead to an improved quality of life and thus contribute to environmental protection. The **Single European Act of 1987**, made environmental protection a sectoral policy in its own right. The basic objectives, principles and criteria for action in environmental protection were then defined. The **Maastricht Treaty of 1993** stipulated that the treaty tasks would be carried out with respect for the environment and that the EU's mission

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[1] The right to the environment is interpreted as the right to live in a non-polluted and non-threatening environment, and falls within the catalogue of rights that can only be realised with the cooperation of the international community. See W. Truszkowski, M. Szwejkowska, *Prawo do środowiska a narastające zagrożenia ekologiczne,* „Studia Prawnoustrojowe" 2014, no. 25, p. 216.

[2] Presented in 1969, the report entitled "*The problems of human environment"* included a diagnosis of the main threats related to the destruction of the natural environment in the world, which included the extinction of many plant and animal species, progressive pollution of soil, air and water, the destruction of arable land, the reduction of open areas and planless urban development. K. Górka, *Ewolucja koncepcji rozwoju zrównoważonego i trwałego oraz jej wdrażanie*, „Ekonomia i Środowisko 2007, no. 2 (32), p. 10.

[3] The conference adopted the Stockholm Declaration, which contained 26 principles of international environmental law that contributed to the development of international environmental law and the adoption of universal standards for international agreements and for national legal systems of environmental protection.

[4] M. Woźniak, *Zrównoważony rozwój jako strategia definiująca nowoczesne gospodarowanie przestrzenią w Polsce (aspekty prawne),* „Ekonomia i prawo" 2011, vol. VII, p. 130.

would be to regulate to guarantee environmental protection on the international stage. The area of competence of the European Union was strengthened and expanded, with the introduction of qualified majority voting in the Council on environmental legislation. The European Union, reconciling the maintenance of economic growth and the protection of the ecosystem, adopted in the Maastricht Treaty as its objective to ensure sustainable development, i.e. to pursue policies and actions in the various sectors of the economy and of social life in such a way as to preserve natural diversity in a state that will provide sustainable opportunities for future generations.

The **1999 Treaty of Amsterdam** mandated the integration of environmental protection into all sectoral policies.

The **2009 Lisbon Treaty** made sustainable development and combating climate change a leading priority. The EU, which with the Lisbon Treaty gained legal personality and the competence to conclude international agreements, is an important manifestation of the EU's activities, in addition to its internal actions, also initiated cooperation with third countries, stemming from the awareness of the global nature of environmental threats. The Union advocates in international fora (such as the UN) for increased action to improve the environment, combat climate change and for sustainable development.

EU standards on the implementation of environmental policy are found in both primary and secondary law. The Treaty on the Functioning of the EU, Title XX (Articles 190-193) lists the objectives and principles on which the policy is based and describes the decision-making procedure. **Article 191 TFEU** lists in detail the objectives of EU environmental policy, which include: preserving, protecting and improving the quality of the environment; protecting human health; prudent and rational utilisation of natural resources; promoting measures at international level to deal with regional and worldwide environmental problems, in particular combating climate change. The priority of protecting the environment is also enshrined in the Charter of Fundamental Rights (Article 37) with the assurance that a high level of environmental protection and the improvement of the quality of the environment must be integrated into the Union's policies and ensured in accordance with the principle of sustainable development[5].

Action in the field of environmental protection is carried out by Member States and the EU in accordance with established principles (Articles 191, 193 TFEU). These include prevention and precaution (foresight), which contribute to the prevention of environmental damage and

[5]. The Charter of Fundamental Rights is referred to in Article 6 TEU, which states: *The Union recognises the rights, freedoms and principles set out in the Charter of Fundamental Rights of the European Union of 7 December 2000, as adapted at Strasbourg on 12 December 2007, which shall have the same legal value as the Treaties.*

ensure a high level of environmental protection necessary for human health. **Precaution** means minimising the risk of environmental disaster. **Precautionary measures** should always be taken when the potential risk of a specific action cannot be effectively assessed scientifically. This obligation lies with the operator who intends to undertake a particular activity. **Compensation** provides for the repair of environmental damage and the polluter-pays principle is reflected in the fee and penalty systems. It imposes an obligation on the offender, to bear all costs, to remove the effects of the activity adversely affecting the environment, to remedy and to compensate for the damage caused. Related to the previous standards is the principle of rectification of damage at source, which stipulates that the **environmental pollution** that has occurred should be rectified at the earliest possible stage (at the place of its origin). Equally important is the principle of a high level of protection, which means that Member States have greater discretion to take more stringent measures (Article 193).

EU environmental policy complements and harmonises national environmental policies and standards are always aligned 'upwards'. The application of the principle of safeguard clauses enables the implementation of **legal and economic instruments** in highly transformed and degraded areas or areas at risk of degradation. In addition, the principle of equal access to the natural environment, interpreted in terms of inter-generational, inter-regional and inter-group equity and balancing the opportunities between man and nature, the implementation of which implies, among other things, the rational use of natural resources and the reduction of burdensome economic activities, is of **key importance**. The EU has also introduced the principle of access to environmental information for citizens.

According to the Treaty, measures to achieve the objectives enshrined in Article 191, including framework action programmes, are adopted by the European Parliament and the Council under the ordinary legislative procedure, after consulting the Economic and Social Committee and the Committee of the Regions. However, some of the matters listed in Article 192 TFEU, paragraph 2 are adopted according to a special legislative procedure which implies unanimous decision-making by the Council, preceded by consultation of the EP and the ESC and the CoR.

In this way, fiscal legislation, measures affecting spatial planning, regulations relating to the quantitative management of water resources and land use (with the exception of waste management), and decisions on the energy supply of Member States are adopted. But for these areas too, the ordinary legislative procedure can be applied, following an unanimous decision by

the Council on a proposal from the European Commission, after consultation of the EP, the CES and the CoR.

The EU is effective in the area of lawmaking, which is driven both by a desire to eliminate the **pollution side-effects of market activity** and to **minimise market failure** by setting standards that are important to consumers in their decision-making[6]. EU environmental legislation sets the standards to which Member States aspire.

It is worth noting, however, that in the first period of its existence, regulation was sectoral and reactive in nature, and it was only with time that an integrated and cross-sectoral approach to environmental protection began to prevail. Today, **EU environmental legislation** should be regarded as one of the most important manifestations of integration activity[7].

Issues that are subject to frequent change, if only due to technological and scientific developments, are regulated in numerous directives that cover the environment as one overall whole, without being divided into specific areas or focusing on one sphere of activity. Examples of general horizontal regulations are **Directive 2001/42/EC** requiring the assessment of the environmental impact of projects before implementation[8], as well as Directive 2003/35/EC guaranteeing public participation in the drawing up of plans and programmes relating to the environment[9] and Directive 2003/4/EC guaranteeing public access to environmental information[10], or Regulation 2018/848 on organic production and labelling of organic products[11].

Sectoral regulations, **adopted since the 1970s**, constitute one of the most developed sections of European Union law, which is grouped according to areas: water protection, waste management, air protection, climate protection, chemicals, genetically modified organisms. Directives of pioneering importance include the **Water Framework Directive** (2000/60/EC), which forms the basis for integrated water resources management in EU Member States[12]. Its objectives are to improve water purity, promote sustainable water use, introduce quality

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[6] S. Hix, *System polityczny Unii Europejskiej*, Warsaw 2010, pp. 302-303.
[7] K. Prandecki, *Międzynarodowa ochrona środowiska*, 2013, p. 9.
https://open.icm.edu.pl/browse/subject?value=polityka%20ochrony%20%C5%9Brodowiska
[8] Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment,
[9] Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC
[10] Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC,
[11] Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007,
[12] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

standards for surface and groundwater, and reduce the effects of floods and droughts. Another example of integrated EU legislation is Directive 2008/50/EC, on air quality and cleaner air for Europe, which, inter alia, sets minimum air quality standards, seeks to harmonise methods of measuring concentrations of pollutants (including carbon monoxide, benzene, ozone, lead, sulphur oxides and nitrogen oxides, and PM2.5) and air quality of member states, and makes monitoring of selected pollutants mandatory, and mandates that information on air quality be made available to the public[13].

Of particular importance for **tackling environmental pollution** is Directive 2008/98/EC on waste, which replaced earlier legislation adopted since the 1970s[14]. Comprehensive regulations governing the management of industrial and municipal waste set out in detail the rules for its disposal (e.g. incineration and landfill) and reuse, obliging Member States both to reduce the generation of waste and to recover and recycle it rationally, and above all to change production methods and consumption patterns.

The main burden of **financing measures** aimed at improving the environment lies with the Member States. In line with the principle of subsidiarity, environmental protection measures (and above all projects benefiting the EU as a whole) are partly financed from the EU budget through the **European Regional Development Fund** and the **Cohesion Fund**, which assists the less developed Member States. Environmental policy objectives are pursued through the Cohesion Policy, which provides support to the most economically backward regions.

A specific instrument is the **LIFE+ fund**, which supports the achievement of environmental priorities. Loans and financial guarantees are provided from the European Investment Bank for various environmental measures. **Market-based instruments** such as fees, fines (from entrepreneurs), tax exemptions, incentives to take action, and state aid (so-called green subsidies) for environmentally friendly new technologies, research and development are also used

Particularly important for the protection of **endangered species** of flora and fauna (biodiversity protection) is the so-called **Birds Directive**, on the protection of wild birds (79/409/EEC) and the Directive (92/43/EEC) on the protection of natural habitats (so-called Habitats Directive). Both directives initiated the creation of **Special Protection Areas** (SPAs),

[13] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe,

[14] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance)

where endangered plant and animal species are found and damaged ecosystems can be restored. A consequence of the EU regulations was the establishment of the **European Ecological Network**, covering the EU's terrestrial and marine areas under the name Natura 2000, whose existence guarantees the health and resilience of Europe's natural systems.

Since the 1990s, the main paradigm underpinning environmental policy has been the concept of ***sustainable development***, which calls for the economical and rational management of inorganic and organic natural resources, including water, energy resources, forests, metal ores, as well as plants and animals. The idea of sustainable development involves striking a balance between social, economic and environmental needs. It is a difficult balancing act between meeting environmental policy objectives and avoiding over-restrictiveness that could hinder economic development and social well-being.

Article 3 of the TEU pledges the EU's efforts to achieve sustainable economic growth and a high level of environmental protection. Sustainable growth was enshrined as a priority objective of both the **Lisbon and Europe 2020 strategies**, which sought to decouple economic growth from the use of resources, shift to a low-carbon economy and increase the use of renewable energy sources and improve energy efficiency[15]. The Union has committed itself to striving to prevent environmental degradation, biodiversity loss and the unsustainable use of resources.

In view of disturbing and increasing atmospheric phenomena (droughts, floods, hurricanes), the topic of combating climate change has gained importance and popularity since the end of the 20th century as an integral part of EU environmental protection. The EU has supported the UN Framework Convention's assumptions about the impact of human activities (in sectors such as transport, energy, industry, agriculture) on climate change. The EU is a party to the **Kyoto Protocol**, in which it has committed to take action to combat global warming, including a reduction in greenhouse gas emissions of at least 5% of 1990 levels by 2012. Also, the EU and all its member states signed and ratified the 2015 Paris Agreement, crowning the 21st Conference of the Parties to the **United Nations Framework Convention on Climate Change** (COP21) in Paris, which committed signatories to keeping global temperatures within safe limits **(**below 1.5°C).

The EU has not only recognised the anthropogenic source of the greenhouse effect, but

[15] *EUROPE 2020 A strategy for smart, sustainable and inclusive growth*, Brussels, 3.3.2010 COM(2010) 2020 final

has taken on the role of global vanguard in promoting environmental and climate goals. [16]Since 2005, the EU has implemented an *Emissions Trading System* (EU ETS) to enable a sustained reduction in greenhouse gas emissions.

Countries implementing the scheme gradually reduce emissions in line with the planned limits for individual industries, while at the same time allowing companies to trade emission allowances. The Union also increased the reduction targets set by the Kyoto Treaty with the adoption in 2008 of the so-called **1st climate and energy package** (called '3x 20' or '20-20-20'), which, based on three main assumptions (competitiveness, sustainability and security of supply), set three targets by 2020: a 20% reduction in greenhouse gas emissions compared to 1990 levels, a 20% improvement in energy efficiency and a 20% increase in the use of energy from renewable sources (RES) [17].

Even more ambitious climate targets were adopted in 2014 in the **Second Climate and Energy Package** providing for a 40% reduction in greenhouse gas emissions by 2030, an increase in the share of renewables to 32% and 32.5% improvement in energy efficiency.

Since 1973, the Communities have periodically developed framework action programmes that set an ambitious direction for EU environmental policy programmes, although not legally binding, inspired national and sectoral regulations and European solutions. The programmes, adopted in accordance with Article 192, paragraph 3 TFEU, contain strategic objectives in the field of environmental protection with specific deadlines for implementation. Member States adapt the programme assumptions to their national environmental policies and to the environmental strategies they adopt.

As of 2022, the EU is already implementing the **8th Environment Action Programme**, which will focus on six thematic objectives until 2030:

1) reducing greenhouse gas emissions, in line with the EU's climate and environmental objectives,

2) strengthening resilience and adaptation and reducing environmental, social and economic vulnerability to climate change,

3) transitioning to a circular economy with regenerative growth,

[16] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, Text with EEA relevance.- Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012

[17] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC,

4) zero emissions,

5) protecting and restoring biodiversity and enhancing ecosystems and their services,

6) reducing the main environmental and climate impacts of EU production and consumption[18].

Also pioneering is ***The European* Green *Deal*,** adopted by the EU in 2019, which is a green transformation plan covering all aspects of the economy, society and the environment . This ambitious programme aims to create a greener, fairer and more climate-resilient Europe, which aims to become the first climate-neutral continent by 2050[19]. The objectives of the EPE set as the EU's top priority the transition to a closed-loop economy, reducing greenhouse gas emissions to zero by 2050 by **using renewable energy sources**, improving energy efficiency and developing new technologies. and achieving sustainable development[20]. This goal determines the implementation of comprehensive changes through accompanying flagship initiatives and numerous regulations.

The implementation of the **European Green Deal** is to be ensured by the EU strategies adopted in 2020: "As an integral part of the new green revolution, these initiatives aim to produce high-quality, healthy food through sustainable farming, further strengthen ecosystems and increase the quantity and quality of the EU's forests. The farm-to-table strategy commits EU Member States to: reduce plant protection products by 50%, reduce the use of mineral fertilisers by 20%, reduce the use of antimicrobials[21].

Environmental protection has determined the implementation of the Common Agricultural Policy for years, influencing farming principles, food safety and quality, biodiversity, as well as the state of forest and rural areas. The greening of agricultural policy is promoted through agri-environmental programmes and payments, which support the development of organic, precision and carbon farming and the optimisation of crops and livestock in order to reduce greenhouse gas emissions[22] .

The payment of **direct payments to agricultural producers** in the EU is conditional on the

[18] Decision (EU) 2022/591 of the European Parliament and of the Council of 6 April 2022 on a global EU Environment Action Programme to 2030. 1

[19] M. Parlińska, J. Jaskiewicz, I. Rackiewicz, *Challenges for agriculture related to the European Green Deal strategy in times of pandemic*, "Zeszyty Naukowe SGGW w Warszawie - Problemy Rolnictwa Światowego" 2020, vol. 20(35), no. 2, p. 23

[20] Communication to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, European Green Deal, COM (2019) 640 final.

[21] Communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A farm-to-fork strategy for a fair, healthy and environmentally friendly food system, COM (2020) 381 final.

[22] Agriculture is responsible for 10 per cent of greenhouse gas emissions, which, like nitrous oxide (N2O), are created by biological processes during the application of mineral and organic fertilisers to arable land and permanent grassland, and, like methane (CH4), are formed in the digestive systems of livestock.

welfare of farm animals (Article 13 TFEU), i.e. guaranteeing that animals, as living beings, have adequate living conditions free from stress and suffering. The greening of the Common Agricultural Policy, as set out in the farm-to-table strategy, means increasing the proportion of agricultural area devoted to organic farming across the EU to 25% by 2030, marking a gradual shift away from mass livestock farming to more sustainable and closer to natural conditions.

Another area of action, the implementation of which is determined by the environmental priority, is the **Common Fisheries Policy**, the aim of which is to improve the state of harvested marine resources by limiting fishing intensity and preventing overfishing, which could lead to an imbalance in the aquatic fauna and even to the extinction of the species concerned. The **2030 Biodiversity Strategy** envisages that at least 30% of the EU's land areas and 30% of the EU's marine areas will be legally protected (ecosystem development) [23].

By 2050, all ecosystems will be supported by restoration. In 2022, the EU adopted a Regulation on the restoration of natural resources, responding to the need to intensify environmental protection[24]. The regulation commits Member States to take action to restore habitats that are in poor condition by setting quantitative targets of at least 30% by 2030, at least 60% by 2040 and at least 90% by 2050[25].

The **Forest Strategy** commits the EU and Member States both to strictly protect the last remaining primary forests and to take action towards climate-friendly sustainable forest management and biodiversity conservation. The strategy envisages planting at least 3 billion additional trees in the EU by 2030, in full respect of ecological principles.

In addition to the **EU flagship initiatives**, the NEEAP includes the '*Fit for* 55' package, which forms 13 climate regulations, adopted in 2023. According to the adopted assumptions, the volume of carbon dioxide emissions in the EU should decrease by 55% by 2030, compared to 2005 emission levels, with the goal of reaching zero net emissions by 2050.

The goal of climate neutrality justifies a number of changes in various areas of the economy, resulting from stringent CO2 emission standards for cars and vans (including the elimination of cars with internal combustion engines by 2035), increased energy efficiency through changes in construction (thermal modernisation, use of innovative materials), increased

[23] Communication to the European Parliament, the European Council, the European Economic and Social Committee and the Committee of the Regions, EU Biodiversity Strategy 2030 - Bringing nature back into our lives, COM (2020) 380 final.
[24] Regulation of the European Parliament and of the Council on the restoration of natural resources and amending Regulation (EU) 2022/869, 2022/0195(COD) LEX 2321, Brussels 24 June 2024 f
[25] New EU Forest Strategy 2030 - Sustainable forest management in Europe C 125/23 Tuesday 13 September 2022 European Parliament resolution of 13 September 2022 on a new EU Forest Strategy 2030 - Sustainable forest management in Europe (2022/2016(INI)

production of energy from renewable sources to 42.5% by 2030. The introduction of the *Carbon Border Adjustment Mechanism*, known as the carbon duty, is intended to prevent carbon leakage and encourage the EU's trading partners to switch to cleaner energy sources. The 'Ready for 55' package envisages changes to emissions trading, leading to a reduction in the cap with a corresponding increase in price, as well as an extension of the scheme to new sectors of the economy.

A **difficulty** in the implementation of environmental policy in the Member States is the considerable national and political diversity, which hinders the coherent development of policies based on common values and agreed objectives. Differing socio-economic development results in divergent visions of threats to ecosystems and a determination to take swift and comprehensive action[26].

The costs of **environmental policy implementation** are also a challenge due to the need for the state and private entrepreneurs to meet high EU standards. There are differences between Member States in the effectiveness of adoption, partly as a consequence of the different determination of political elites (e.g. green parties) and the activity of pressure groups (e.g. industry lobbies, environmental NGOs, animal rights activists) in implementing pro-environmental legislation.

For a long time, there was a noticeable division of the Union into two camps in its approach to environmental policy. The first group is formed by **Western European countries** (e.g. Denmark, Sweden, Finland, Germany), where there is strong public pressure to adopt intensive and comprehensive pro-environmental measures. Citizens in these countries do not see meticulous regulations on, for example, waste segregation as a top-down obligation with financial penalties for non-compliance, but as an important idea to protect the environment. This makes costly projects driven not only by political decisions but also by consumer demand.

A deep-rooted environmental awareness makes **western and northern European** countries the driving force behind the adoption of EU regulations based on high environmental standards. In the second camp, which includes central and eastern and southern European countries, there is greater public resistance to the implementation of ambitious climate policy goals, imposing restrictive regulations (including financial penalties for non-compliance) and advocating a rapid transition to a low-carbon system.

Less affluent societies fear a decrease in the competitiveness of their economies, as a

[26] N. Nugent, *Unia Europejska. Władza i polityka,* Kraków 2012, p. 443.

result of higher energy prices or waste segregation, hence they delay the implementation of pro-environmental laws and expect financial support from the EU for green reforms. In recent years, also in the new Member States, there has been a gradual change in the approach to environmental issues, and the green transformation is being successfully combined with digital innovation, as evidenced by the results of the latest ***Environmental Performance Index*** (EPI) ranking.

According to the ranking, compiled by Yale University and Columbia University, in collaboration with the World Economic Forum and the European Commission's Research Centre, **Estonia** was named the most environmentally friendly country in 2024. The next places on the podium were taken by Luxembourg (2nd) and Germany (3rd). A big surprise is the decline in the position of Denmark, which in both 2020 and 2022 opened the ranking with the best score in 2024 was only ranked 10th[27].

The detailed report produced clearly states that **Western European countries** achieve the highest average environmental performance score (66.9) [28]. The long-term work and actions of the government, aimed at adopting programmes to protect public health or natural resources, were recognised. Among the top 20 positions in the EPI 2024 ranking are as many as 16 EU Member States, mainly from Western Europe but post-socialist countries that joined the Union in 2004 are also present. In addition to the highest ranked Estonia, high rankings were also achieved among the new EU members: Czech Republic (ranked 17th) Slovakia (18th) and Poland (20th).

The CEE region received the second highest average regional score (59.8). The countries' commitment to the protection of biodiversity and wild fora and fauna habitats was appreciated. Of the southern European countries, only Greece, with its 11th position, made it into the top 20. Greece owes its high ranking to a significant reduction in greenhouse gas emissions by moving away from coal-fired power generation and towards renewable energy. Italy was only ranked 27th, due to having the worst air quality among Western European countries.

Among EU countries, the lowest score was achieved by Bulgaria (56.2), which only ranked 37th in the list of 180 countries to be assessed.

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[27] The Environmental Performance Index is a method of quantifying and numerically labeling the environmental performance of a country's policies in terms of achieving the Sustainable Development Goals. The ranking ranks 180 countries in terms of environmental health and ecosystem vitality, examining them in 11 categories such as climate change mitigation, air pollution, waste management, water conservation, fisheries, agriculture, deforestation and biodiversity conservation. https://epi.yale.edu/measure/2024/EPI

[28] In the ranking, a value of 100 indicates the best score and 0 the worst score. Estonia, ranked 1st in 2024, has a score of 75.7 and Vietnam, ranked last 180th, has a score of 24.6.

The report pointed out that even the highest rated countries in terms of environmental performance such as Estonia, Luxembourg and Germany still have indicators that need improvement[29].

Estonia has made the most progress in mitigating climate change over the past decade and has achieved a significant 40 per cent reduction in greenhouse gas emissions. Estonia has achieved this goal through a shift away from oil shale energy generation and greater expansion of wind, solar and biomass energy. The Estonian state's high level of digitalisation is helping to accelerate the energy transition[30]. Estonia has committed to achieving 100% of its electricity production from RES by 2030. Being a leader in biodiversity conservation, Estonia ranks 7th in the world in ecosystem vitality policy and in the category of biodiversity and habitat issues. At the same time, however, Estonia is experiencing a loss of forest cover, with increased deforestation in recent years leading to a decline in ecosystem resilience. This is a consequence of the shift away from energy production from dirty oil shale and the increased use of forest biomass as an energy source

Luxembourg leads the ranking of ecosystem vitality, as more than 55 per cent of its land is covered by protected areas, but at the same time, wrongly, almost 30 per cent of the protected area is covered by farmland and buildings.

Germany, on the other hand, ranked 3rd in the EPI, is ahead of other countries in its rapid deployment of renewable energy sources (reducing greenhouse gas emissions by almost a fifth in the last 10 years), its extensive network of protected areas (which exceed 30 per cent of Germany's land and sea area) and its leading position in solid waste management. On the other hand, however, Germany has been criticised for its high waste generation per capita and relatively poor air quality compared to other countries[31].

The **Scandinavian countries** ranked high: Finland (4), Sweden (6), Norway (7), Denmark (10) and Iceland (16). It is noteworthy that the Scandinavian countries have for years been considered a leader in sustainability, investing in green, green technologies, electromobility, passive or low-carbon construction and, above all, in renewable energy sources. Investments in wind, hydro and solar energy as well as biofuels are making the countries in the region increasingly energy independent. Scandinavia's success has been driven both by a consistent governmental environmental policy over the years, seen as an expression of responsibility

[29] *Environmental Performance Index 2024*, https://epi.yale.edu/downloads/2024-epi-report-20250106.pdf
[30] *Ibid*, p 23.
[31] *Ibid*, p. 30.

towards future generations, and by the developed environmental awareness of societies that want to live close to nature. These countries rank high in the EPI in the category of protecting their citizens from health risks resulting from environmental pollution, which includes indicators for air quality, drinking water, sanitation, waste management and the presence of heavy metals in food.

Sweden was one of the first countries in the world to introduce a carbon tax as early as 1991, significantly reducing the carbon intensity of its economy. The reduction target has been upheld by the Swedish government's declaration that the country will achieve climate neutrality by 2040. Finland achieves some of the highest indicators in air and water quality, as well as sustainable forest management.

Since the 1970s, **Denmark** has been seen as a pioneer in environmental solutions, focused on protecting biodiversity, clean water and environmentally friendly production. Since 2002, Denmark has had an efficient deposit system that guarantees a high return rate for used plastic and glass bottles and metal cans, as well as recycling of packaging. The Swedes are very careful with household waste separation (into recyclables and organic remains), so that only 3 per cent of waste ends up in landfill and the rest is reused. Denmark is initiating measures aimed at improving the welfare of farmed animals, best exemplified by both the labelling system on food products introduced in 2017 indicating the level of standards of animal husbandry prior to slaughter, and the decision in 2020 to completely stop selling caged eggs throughout Denmark. An innovative solution undertaken by the Copenhagen government in 2024 is the funding of a $74 million feed supplement to reduce emissions of methane - a greenhouse gas that is a natural by-product of digestion in cows and other ruminants - by 30 per cent. This is expected to contribute to Denmark's goal of reducing greenhouse gases by 70 per cent by 2030 from 1990 levels.

Some EU countries are struggling to effectively protect the environment, despite their efforts to implement EU legislation. **Poland and Hungary**, whose industry and power generation is based on coal, face air pollution problems from emissions of sulphur and nitrogen compounds from coal-fired power plants. For **Bulgaria and Romania**, the biggest challenges are waste management and water pollution, as well as soil degradation.

The European Union is continuing its efforts to protect the environment, with a focus on achieving climate neutrality by 2050. The key elements of the EU's environmental policy are to reduce greenhouse gas emissions by 2030 and to achieve climate neutrality by 2050, to protect

biodiversity by improving ecosystems and combating land degradation, to reduce air, water and soil pollution and protect the health of Europeans, and to promote a resource-efficient and low-carbon economy.

The challenge in implementing EU environmental policy is both the lack of **effective criminal sanctions** for environmental offences and **the differences in implementation** that exist between Member States. At a time of high inflation faced by the Union since the COVID 19 pandemic and the outbreak of a full-scale war in Ukraine, Member State governments are focusing on economic issues. The rising cost of living and increasing poverty may lead to lower environmental priorities among citizens. High energy prices may force member states to increase the extraction and use of local energy resources, which may lead to weaker environmental policies and less pressure to **tackle climate change**.

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2. Green Economy and Its Place in the EU: Theory

Definition and scope

Understanding the Green Economy (GE) and its significance within the EU framework

Despite significant international and national efforts to implement sustainable strategies, the acceleration of environmental pollution and climate change has raised the need for new and more effective theories. Thus, the **concept of a GE** is presented as a tool to help accelerate sustainable development, focusing on the environmental aspect. One of the first to use this term was the English environmental economists, who presented the government report Blueprint for a GE 1989 (Pearce, Markandya, and Barbier 1989).

The GE is **designed to improve** people's economic lives and increase social justice while intensively reducing environmental damage. Related concepts are green growth and low-carbon economy. Some definitions of GE are presented by various authors. According to the World Bank, GE is the transformation of economic growth processes based on resource efficiency, cleanliness and resilience, without the need to reduce growth (2011). Five years later Enongene and Fobissie presented definition of GE stressing that human well-being improvement and reduced inequalities over the long term, while not exposing future generations to significant environmental risks and ecological scarcity (2016). Chirieleison and Rizzi presented the definition that the underlying principle of the GE is that reducing dependence on natural resources drives innovation, reducing hidden vulnerabilities, using renewable resources and building systemic resilience that ensures a better quality of life for all, within the planet's ecological limits (2023). Manisha and Singh defined the GE as the concept which improves living standards, conserves and promotes the sustainable use of natural resources (2024).

According to **United Nations (UN) Environment Programme**, GE is a low carbon, resource efficient, and socially inclusive economy. In a GE, employment and income growth is driven by public and private investment in economic activities, infrastructure and assets that reduce carbon emissions and pollution, improve energy and resource efficiency and prevent the loss of biodiversity and ecosystem services (2024).

Therefore, the **GE is a concept rooted in** the principles of sustainability, economic justice, and ecological balance. It aims to reconcile economic development with environmental conservation, emphasising the importance of transitioning toward practices that mitigate climate change, reduce resource depletion, improve biodiversity, and promote social equity at the same time. The GE has emerged as an alternative to reckless growth and resource use, emphasising environmental and human health, to strengthen the paradigm of sustainable development (Ginevičius *et al.*, 2023).

The basis of the GE is that each national government should create development guidelines in such important areas as energy, climate change, and others, defining the possible behaviour of market participants, that is, how private companies and the country's population should produce and consume in order to create a greener economy. The GE is about greener investments, greener production, and consumption. The GE does not deny capitalism, does not criticise it, but wants to improve it, creating a new model for the functioning of the GE.

Principles Guiding Green Economy (GE)

1. **Efficiency**: Optimal use of resources to maximise value and minimise waste.
2. **Equity**: Fair distribution of economic opportunities and environmental benefits.
3. **Interdependence**: Acknowledging the interconnectedness of natural systems, economies, and societies.
4. **Precautionary Principle**: Taking proactive action to prevent environmental harm, even in the face of scientific uncertainty.
5. **Polluter Pays Principle**: It is necessary to ensure that those responsible for pollution bear the costs.

Various types of company must contribute to the creation of a GE. A green business is one that is committed to environmental sustainability in its daily operations, seeks to use renewable resources, and constantly reduces the negative environmental impact of its processes. Green business is often used as a synonym for sustainable business.

A green business or **sustainable business** is one that strives for sustainability in its business processes and in its interactions with the environment. It is based on principles that

aim to improve the quality of life for customers, employees, the community, and the planet, while also thinking about future generations. It is part of the strategic thinking that should help businesses generate revenue through product differentiation, brand reputation, improved customer relationships, added value and increased productivity, and save money through efficient use of waste and more effective resource management. Businesses face challenges to go green.

Going green means the likelihood of increasing their costs in areas such as: selecting more responsible and transparent suppliers; motivating their employees; reengineering production, design, and packaging; taking responsibility for the whole product life cycle; and increasing the number of reports produced. The decision not to be sustainable may entail the following risks: loss of customers if competitors become more sustainable and customers start to value them more.

Sustainability in many cases is already **legislated for in the EU**, and then a company that does not invest in it will be forced to withdraw from the market; the fear of the public sphere by not contributing to more sustainable practices can lead to a loss of attractiveness to suppliers and partners, and to the local community. Each risk point must be considered from an environmental perspective. Businesses, therefore, need to change their processes, assessing environmental impacts at all stages.

The **ecological dimension** is measured in terms of knowledge of environmental law, damage assessment, ecological risk management, continuous monitoring of environmentally friendly indicators, identification, and application of the necessary changes, etc. We must strive for greenery to create greater value. By choosing this path, **companies can be rewarded** with higher revenues and lower costs, especially in the area of regulation, can increase efficiency, reduce pollution, improve management, people's motivation, improve their reputation, find new markets, better meet customer needs, improve relations with the community, have greater growth prospects, can reduce the impact of accidents, improve health, etc. However, in the complex global geopolitical environment, where survival and security are more important, the GE and green business face major challenges.

Green finance is the concept which was introduced to transform the economy from brown to green. It was introduced in Paris in 2015. This concept enables the financial sector to expand its responsibilities by taking care of environmental issues. **The green modernisation** of financial institutions covers their green performance and the provision of green products. In many

cases, the concept of 'green finance' is used interchangeably with ‘sustainable finance’.

Green finance covers such important environmental aspects as reducing carbon emissions and pollution, enhancing energy and resource efficiency, and preventing the loss of biodiversity and ecosystem services. (UN, 2021).

On the other hand, **the stress and social dimension of sustainable finance**, which is very important to maintain a unique approach. This term ‘sustainable finance’ is used in the EU's proposed taxonomy regulation (European Parliament, 2020). The term 'climate finance' is used in cases where the most urgent environmental problems such as the prevention and adaptation of climate change are discussed. Financial institutions have been rapidly modifying their processes based on these concepts. Green or sustainable loans and bonds, sustainable linked loans and bonds and some others.

Policy and Implementation: Exploration of EU strategies to promote a GE

The **Sustainable Development Goals of the UN** (2015), the **Paris Climate Agreement** (2015), and the **Green Deal** (2019) supported by many directives are the main directions defining the environmental and social responsibility near economic wealth, especially pointed out the issues related to climate change. The European Union (EU) priorities such type of development encouraging member states and companies to follow issued regulatory frameworks directed to and show incentives.

The **EU's strategies** combine regulatory frameworks, financial mechanisms, and collaborative initiatives to achieve a balance between economic growth, environmental sustainability, and social aspect. The European Green Deal is the cornerstone of the EU's strategy for a GE. The ambitious task of this strategy is to stop impacting climate change at the same time by developing green **economic growth by 2050**.

Key elements include **climate neutrality by 2050**: a legally binding target established through the European Climate Law; Emission reduction targets: the ambitious task to decrease 55% of GHG comparing to 1990 in must to be reached till 2030. The European Green Deal announced in 2019 is the main strategy that provides the transformation of the economy of the EU based on green principles.

For reaching this ambition task, the following actions have been implemented: relocation of capital to a more sustainable economy, expanding risk management by assessing sustainability

issues, defining and regulating sustainability disclosure and reporting. The EU provided a set of regulations for financial and nonfinancial companies to create a standardised framework for sustainability data collection, management, and reporting.

There are **main documents for nonfinancial companies** - Corporate Sustainability Reporting Directive (CSRD), Taxonomy Regulation, and European standards and financial companies also cover **Sustainable Finance Disclosure Regulation (SFDR)** and Pillar 3 disclosures on ESG disclosure on ESG as well as technical standards. In 2022 presented, CSRD provides precise reporting requirements and defines the collection, provision, and validation of sustainable information on environmental, social, human, and governance aspects.

The implementation of the directive phases:

Effective date	Entities Affected
01-01-2024	Companies already subject to the NFRD
01-01-2025	Other large companies not currently under the scope of the NFRD
01-01-2026	SMEs, small/simple credit institutions, and affiliated insurance companies

CSRD assigns responsibility for the development of sustainability reporting standards to the European Commission, which, in turn, is required to consider the technical advice provided by the European Financial Reporting Advisory Group (EFRAG).

The Taxonomy Regulation (EU 2020/852) is a cornerstone of the efforts of the EU to promote sustainable finance by providing a clear framework to classify economic activities as environmentally sustainable. Its main goal is to create a common language for sustainability in the EU, helping investors, companies, and governments make informed decisions that support the environmental objectives of the EU. The EU Taxonomy Regulation "On the Creation of a System to Facilitate Sustainable Investment" (Taxonomy regulation, TR, EU 2020/852) provides criteria for determining environmentally sustainable activities and requires financial market participants to report on achieved or implemented sustainability.

According to the **Taxonomy Regulation of 2021** the European Commission has prepared a delegated act (EU 2021/2178 Regulation (EU) 2020/852) regulating the content, methodology and presentation of information to be disclosed by large financial and nonfinancial companies (Commission Delegated Regulation (EU) 2021/2178, 2021).).

The Taxonomy Regulation highlights **six environmental objectives**: climate change mitigation and adaptation, the sustainable use and preservation of water and marine resources,

the transition to a CE, pollution prevention and control, and the protection and restoration of biodiversity and ecosystems.

In 2022, the **new circular economy (CE)** action plan proposed (the first was introduced in 2015). CE action plan: promotes resource efficiency, waste reduction, and sustainable production and consumption patterns. The EU advocates for a shift from the traditional linear economic model ("take-make-dispose") to a CE, focusing on product design: encourage eco-design standards to enhance product durability and recyclability; waste management: strengthening recycling and reuse systems across member states; sustainable products directive: mandates that products sold in the EU be energy- and resource-efficient.

The plan is dedicated to tackling waste issues and improving recycling processes combing national and international efforts, especially highlighting such intensively using resources industries as textiles, construction, electronics, and plastics (EU 2020). The very important document is packaging rules (EU 2022). Based on such direction EU Member states have presented national CE strategies.

To **decarbonize energy systems**, the **EU promotes**: renewable energy directive (RED II): Sets a binding target of at least 32% renewable energy share in the EU's total energy mix by 2030 (EP, 2018/2001 2018); Energy Efficiency Directive: Encourages improvements in energy use across sectors, with a target of 32.5% energy efficiency by 2030 (EP, 2018/2002 2018); Hydrogen Strategy: Supports the development of clean hydrogen as a key energy carrier. (EC, 2020).

The EU integrates **environmental restoration into its GE agenda through**: EU Biodiversity Strategy for 2030: Aims to restore degraded ecosystems and increase protected areas to 30% of EU land and sea (EC, 2020); Farm to Fork Strategy: Promotes sustainable agriculture and food systems with reduced reliance on chemical pesticides and fertilizers (EU 2020).

Theoretical Introduction: Key theories & principles underlying the Green Economy

The theories related to the GE concept can be divided into two areas: theories which are integrated into the primary design of the concept and theories which help to implement this concept. As was mentioned in the beginning the sustainable development is a concept which very closely related to the GE.

Sustainable development

Global challenges such as climate change, declining biodiversity, high levels of social exclusion, dissatisfaction with business practices, and pressure from consumers, government bodies, NGOs, staff and other stakeholders to contribute to addressing a lot of challenges in EU and the whole world.

At the policy level, the **concept of sustainable development** is the first main background of attempting to address these problems by presenting it as a compromise to reconcile economic development, social welfare development and environmental protection, taking into account the needs of future generations, i.e. sustainable development involves development that emphasises the harmony between the three systems - economic, social and environmental (ecological).

Historical sources mention that the term "**sustainability**" originated in Germany in **1713**, when Hans Carl von Carlowitzius, a German tax accountant and mining administrator concerned about deforestation, wrote a book in which he mentioned the term "Sustained Yield Forestry". The original meaning of the term is that trees can be harvested in a forest as long as the natural regrowth process is not disturbed. In **1804**, Georg Ludwig Harting's work on Sustainable Forestry mentioned the principle that the present generation can harvest the forest at the same intensity as future generations. In **1969**, the International Union for the Protection of Nature (the first international environmental organisation) set out the prerequisite for human development: the protection of the resources of air, water, soil, minerals and living organisms, including mankind, in order to create sustainable living conditions. It was the first organisation to combine the term 'sustainable development' with the idea of combining development and sustainability, stressing that human development is not possible without nature (Mitchell 2010).

In 1980, a report was published entitled **'Sustaining a sustainable world? A strategy for sustainable development'**, which further develops the concept of sustainable development by identifying three key principles - the conservation of essential ecological and life-sustaining

processes, the maintenance of genetic diversity, and the use of natural resources in ecological balance (World Conservation Strategy for Sustainable Development). By the 1980s, this principle was already making a broad political impact, encompassing the use of all the earth's resources, and becoming a key definition of sustainable development.

In 1972, the **UN Conference in Stockholm** raised the idea that development is possible without violating the principles of nature. It is the development of humanity in a way in which present needs can be met without compromising the ability of future generations to meet them (Brundtland 1987). Thus, traditionally, the concept encompasses three equal dimensions of well-being - economic, ecological and social - and their complex interactions (Figure below).

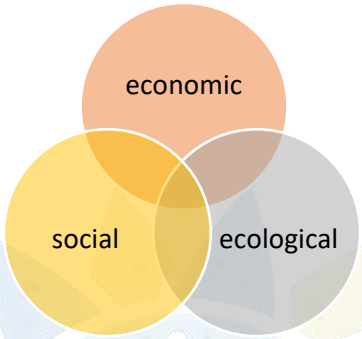

Figure: Main aspects of sustainability

The dimensions of sustainable development describe the pursuit of sustainability by reconciling all aspects of complex human life. At the heart of the principles of sustainable development is the human being, who has the right to a healthy and active life in harmony with the environment (Rio Declaration 1997).

- ✓ **The environmental**, or now often ecological, dimension is the development of the harmony between living and non-living environmental processes, while preserving natural resources and biodiversity.
- ✓ **Economic**: cost-effective development through the proper allocation and use of natural resources, aiming for qualitative rather than quantitative growth.
- ✓ **Social**: development of people's autonomy and social identity, encouraging everyone to participate in decision-making and in solving local environmental problems, in line with cultural and ethical values.

Achieving **sustainable development** depends on the importance and relevance of institutions and their competences. Sustainable development is linked to democracy, human rights and good governance practices. Critics argue that 'sustainable development' is an

oxymoron, i.e. it is not possible to be sustainable and grow rapidly. Despite the criticism, it is the best currently devised, never-ending and sustainable way for humanity to develop, considering ethical principles and different responsibilities.

Sustainable development is a phenomenon that involves a huge amount of complex information. This concept is a long perspective strategy of humans developing now and, in the future, and is based on preserving resources and the whole environmental ecosystem of the planet for future generations.

Sustainable development is measured by a set of indicators provided and compiled by Eurostat, the UN, the European Environment Agency, OECD and other international and national organisations. Different sources compile different numbers of indicators, depending on the policy defining sustainable development.

Sustainability is **measured** by various indices. The **environmental dimension** is measured by indices such as the Environmental Sustainability Index, the Wellbeing Index, the Environmental Pressure Index, the Ecological Footprint and others. The **economic dimension** is highlighted by the Index of Sustainable Economic Welfare and the Genuine Progress Indicator, while the **social dimension** is highlighted by the Human Development Index and the Happy Planet Index. These indices are proposed as a tool to help achieve well-being.

Key theories and principles that provide the theoretical foundation for the GE

Environmental Kuznets curve

Environmental Kuznets curve is the curve presenting the relationship between environmental indicators (air pollutants, water, waste etc.) and economic growth presented by the inverted−U. The theory has been widely analysed since 1990s and in many cases indicates that at certain level of economic growth environmental degradation starts to decrease (Grossman and Krueger, 1991). This curve originally was introduced by the famous economist S. Kuznets in 1955, who analysed the relationship between economic growth and inequality of personal distribution of income.

In 1991, Grossman and Krueger published the article analysing the relationship between environmental indicators and the economic growth for urban areas located in 42 countries (Grossman and Krueger,1991).

The concept started to be known well known since the World Bank Development Report was presented in 1992. The study highlighted **environmental issues as a very important element**

of economic growth and at the same time economic growth is needed for environmental protection. This relationship was shown as an inverted U curve (Shafik, Bandyopadhyay 1992). On the other hand, without development, the resources needed for investment would be insufficient and environmental protection would fail.

Thus, the **positive environmental impacts of growth** were identified. Using additional environmental indicators and more countries, the authors presented that environmental quality improved constantly (due to reductions in pollutants, except for dissolved oxygen and CO2 in rivers) as GDP increase. Per capita CO2 emissions were found to increase monotonically with income growth, while no income breakpoint was identified (Shafik and Bandyopadhyay 1992).

Cycling economy

The CE is one of the main theories integrated in **sustainable resources management**. The aim of this theory is to reach zero waste where unused final products and waste returns to resources. The monitoring of the whole value chain and creating the loop of using material is the aim of this concept. The CE as the GE emphasis environmental issues as the most important, but both theories also highlighting the social aspect as a mandatory prerequisite. The linear production model had been the main for too long in many types of manufacturing industries and the movement to cycling economy is very important to the whole planet and is stimulated by national and international efforts.

CE concept is built on **three main principles**:

- ✓ eliminating waste and pollution;
- ✓ putting products and materials (of the highest value) into circulation;
- ✓ regenerating nature.

In practice, these principles are implemented through a range of strategies: slowing down, closing, reducing and restoring resource flows, which in practice are very difficult to implement and requires all cooperation of participants of the whole value chain.

The **transition to a CE model** therefore requires targeted coordination and the initiation of systematic change, considering all parts of the value chain and the challenges they face.

Europe is at the forefront of the transition to a CE, but circular business models need to move from niche to mainstream. For us to make targeted decisions and manage processes, or to assess the effectiveness of decisions already made, it must be possible to quantify the phenomenon in question at the desired point in time.

To **implement the CE action plan** of the countries and to compare the current situation of different countries, it is important to determine the current position of the country in relation to the development of the CE. Member states track, collect and present the date of CE status.
A large part of the articles deals with cases of CE's measurement being at different scales: CE implementation evaluation at the micro level (single company or consumer), CE implementation evaluation at the mezzo level (eco-industrial parks) and CE implementation evaluation at the macro level (industry, city, province, region, nation).

Stakeholder theory

Edward Freeman stated that a **company's real success lies in satisfying all its stakeholders** (customers, suppliers, employees, investors, communities, and others who have a stake in the organization), not just those who could profit from its stock (Freeman, 1984). Stakeholder theory expands companies' responsibility to all parties which are related with companies' performance. The theory challenges the traditional shareholder-centric view and advocates for addressing the needs and concerns of a broader set of stakeholders.

Stakeholders are individuals or groups who can affect or are affected by the organization's activities. According to this theory **stakeholders are divided into** internal stakeholders: employees, managers, and owners and external stakeholders: customers, suppliers, creditors, communities, governments, and non-governmental organizations. Stakeholder theory posits that companies should balance the interests of all stakeholders, not prioritize one group (e.g., shareholders) over others.

Conclusion

Sustainable development and a GE are the means of future development, but in practice there are many obstacles, and state participation and international agreements of all states are necessary. A person participates in all processes, and the sustainability of business, the state, and the entire planet depends on his choices and values at every step. The **EU's comprehensive strategies** to promote a GE demonstrate its commitment to leading the global transition toward sustainability. By integrating regulatory, financial, and technological initiatives, the EU aims to foster a resilient economy that balances economic growth with environmental stewardship and social equity.

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3. Blue Economy and How to Expand Its Share

Concept and Importance

Defining the blue economy and its role in sustainable development.

The **blue sector**, which encompasses marine tourism, fisheries, offshore energy, renewable energy, and maritime transportation, brings in about two trillion dollars a year. The main goal of this integrated strategy is to protect the environment and stop resources from running out by using aquatic and marine resources in a way that is good for the ecosystem. These are two very important things that affect how many different industries work. The main goal of the blue economy is to encourage modern international business practices that create jobs while also conserving the livelihoods of people who depend on marine and aquatic resources.

The "**Oceans Economy**" or "**Blue Economy**" is a new idea that came out of the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. A key part of this approach is the idea that socioeconomic advancement and environmental degradation are separate things. This goes against the idea that these two things are always linked.

The **goal of this framework** is to bring together business and economic activities with environmental goals in maritime management. The idea also looks at marine ecosystems as a whole. Sustainability means combining consumption and replenishment activities to cut down on or eliminate greenhouse gas emissions. Keeping the oceans healthy and alive is also part of the criteria for sustainability. This is good for both land and water life.

The World Bank in 2020 defined **seven basic objectives for the blue economy** as follows:

1) Identify clear policies and objectives that combine consideration of economic, social, cultural and environmental needs in the ocean area;

2) Provide better guidance and clarity to decision-makers, as well as greater certainty to the private sector;

3) Understand how the marine environment is currently exploited, the needs of different activities, how new technologies are emerging and how the nature of activities is changing;

4) Protect valuable ecosystem services and natural resources and better understand and manage the cumulative effects of different marine activities, both on the ecosystem and on each other;

5) Make more efficient use of available marine space, striking a considered balance

between competing pressures, and considering how different activities can be better integrated into a common space for mutual benefit;

6) Anticipate the impacts of climate change on the marine environment;

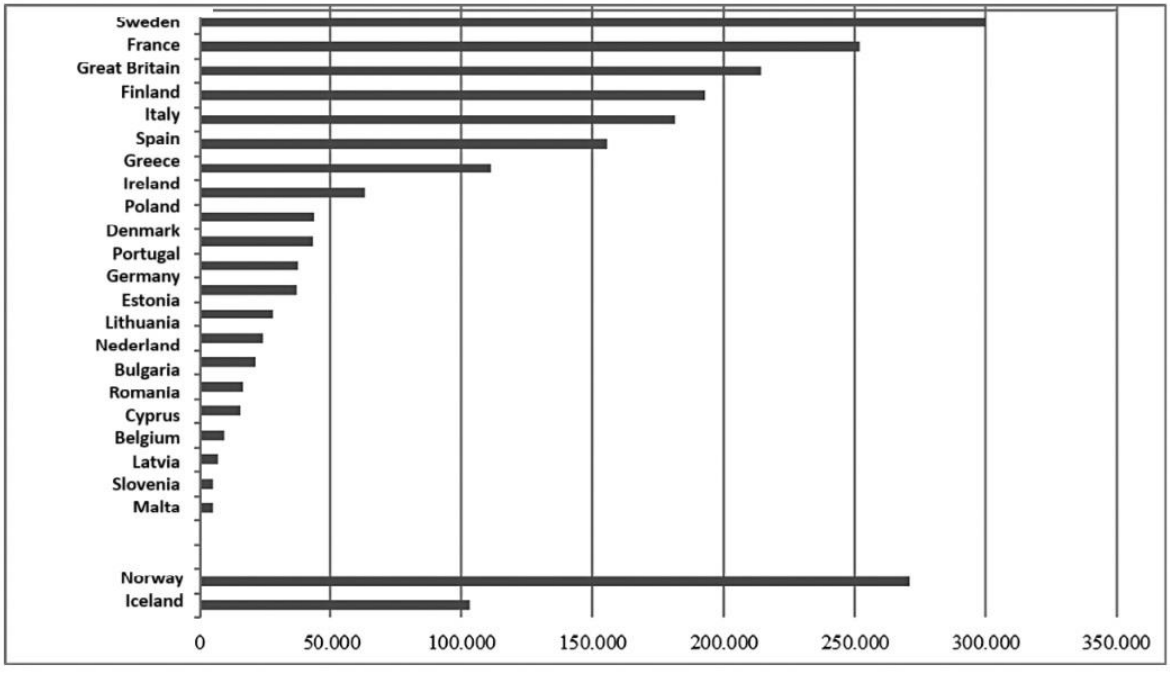
7) Ensure that the views of all those with an interest in the marine environment are taken into account in decisions on how to use ocean resources.

EU Strategies

Policies and initiatives to foster the blue economy

Because maritime governance is so complicated, it needs a strong regulatory framework based on the United Nations Convention on the Law of the Sea (UNCLOS) and a number of other international agreements made by the International Maritime Organization (IMO). These agreements are supported by the global community. This wide-ranging framework is then moved and changed to fit the specific policy and legal needs of each jurisdiction, creating legal and regulatory frameworks at the national, regional, and local levels.

Figure 1. Size of maritime regions, by country, 2012, (km2)



Source: EUROSTAT, Maritime economy statistics 2015

The **European Union's economic policies in the blue economy sector** need to change how value chains work. This includes the following **main goals**:

- ✓ **Achieving Climate Neutrality and Zero Pollution**: The decarbonization of

maritime transport and the greening of maritime transport infrastructure, such as ports, which are important hubs for regional and national economies and have a lot of potential as energy hubs, will help to achieve this goal. The EU also wants to greatly increase the amount of renewable maritime energy that is produced by deploying floating wind farms, geothermal energy, wave, and tidal technologies. It intends to get a 25% of its electricity from renewable ocean energy sources by 2050.

- ✓ **Transitioning to a Circular Economy**: This goal requires a change to a circular economic model that focuses on reducing waste and limiting human impact on the marine environment. Changing the rules for how fishing gear is made, making sure that ships are properly scrapped and decommissioned, and working hard to find ways to cut down on plastic and microplastic pollution are some of the most important things to do.
- ✓ **Preserving and Protecting Marine Biodiversity**: This goal is to restore damaged marine ecosystems, focusing on important habitats like fish spawning and nursery grounds and areas that may hold a lot of carbon. Also, steps need to be taken ahead of time to stop natural catastrophes from happening and lessen their effects, while also protecting fish species and habitats that are at risk. Local involvement in programs like fisheries action groups and community-based development groups is essential for making sure that marine resources are used in a way that does not harm the environment and protects people's jobs.
- ✓ **Enhancing Climate Change Adaptation and Coastal Resilience**: This goal is to make climate change adaptation and coastal resilience better. To do this, we need greater green infrastructure, which is important for protecting coastal ecosystems and landscapes, preserving biodiversity, and encouraging long-term growth in coastal tourism and the economy. It takes a lot of work to make it easier to keep an eye on, copy, and predict what will happen after big disasters like floods, storm surges, and rising sea levels.
- ✓ **Ensuring Sustainable Food Production**: To make sure that food production is sustainable, we need to make the most of marine resources and look for new sources of food for people and animals. This will help minimize the pressure on land-based resources.

Theoretical Introduction

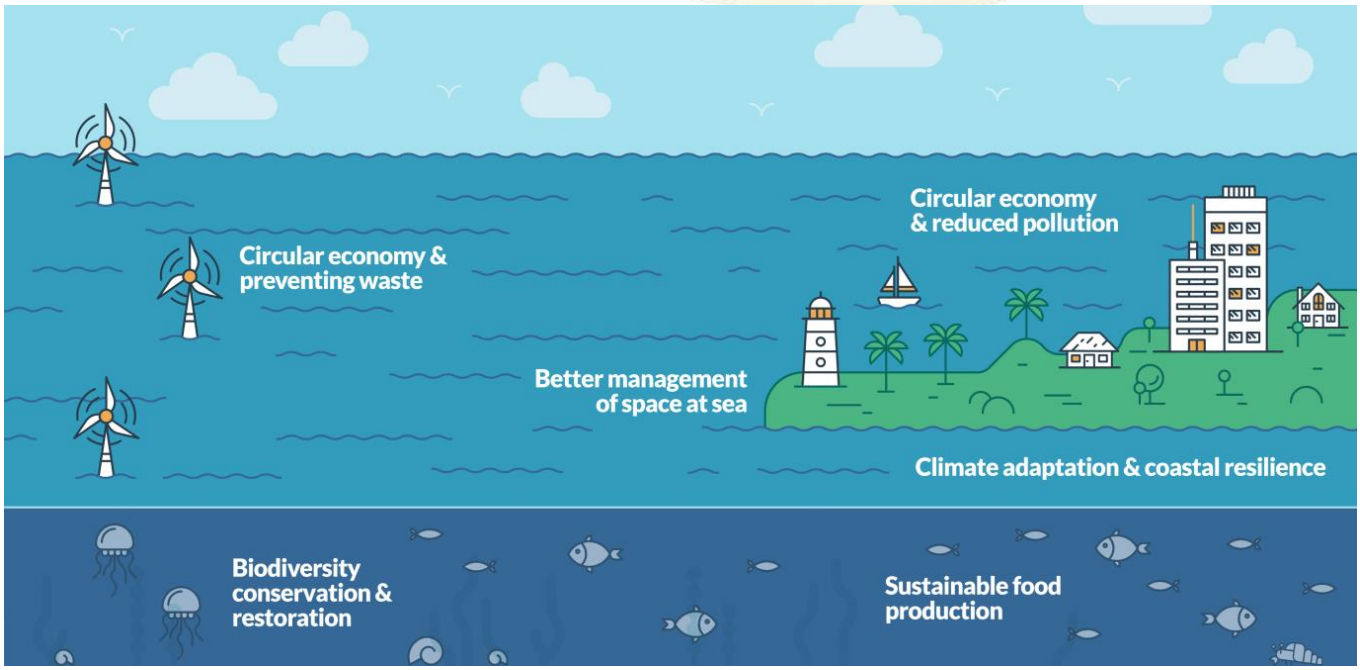
Fundamental concepts and significance of the blue economy.

It is hard to explain the Blue Economy since it depends on the businesses it includes and how easy it is to figure out and measure the direct and indirect economic advantages. The first step is to figure out which areas and activities will be used to figure out how big and how well the Blue Economy is doing right now. For this Report and in line with the method used in earlier editions published since 2018, the term "**Blue Economy**" refers to the following economic activities:

Marine-Based Activities: Those that take place in the ocean, seas, and coastlines. Some examples are aquaculture and capture fisheries, offshore oil and gas extraction, offshore wind energy generation, ocean energy technologies, desalination, marine transportation and shipping, and marine and coastal tourism.

Marine-Related Activities: These are things that use marine resources or make goods and services for the maritime industry. Some of them are seafood processing, marine biotechnology, shipbuilding and repair, port operations, maritime communication, equipment manufacturing and maintenance, marine insurance, and maritime surveillance.

Figure 3. EU's goals for a Sustainable Blue Economy



Source: Sustainable Blue Economy

https://marine.copernicus.eu/explainers/why-ocean-important/sustainable-blue-economy

The **Blue Economy also includes** colleges and research institutes that focus on the water, as well as government agencies that deal directly with coastal and marine issues including national security, coast guard operations, and protecting the marine environment. It is hard to put a dollar amount on the many ecological benefits that the ocean provides.

These functions include defending the shore, taking in trash, storing carbon, making important homes for marine life, and keeping an eye on climate and biodiversity. The Blue Economy is always changing, as seen by the rapid growth of new projects like blue biotechnology. This means that it needs to be included and studied in order to have a complete picture.

The established sectors of the EU Blue Economy made €171.1 billion in direct Gross Value Added (GVA) in 2021. This was 1.3% of the EU-27 economy. This is a big jump of 35% from the 2020 GVA of €126.6 billion, which was 1.0% of the EU-27 GDP. This demonstrates that the economy has recovered a lot since the pandemic, but the 2021 GVA has not yet regained the pre-pandemic level of €186.8 billion that it attained in 2019.

At the same time, the EU Blue Economy's turnover grew by 21% from 2020 to 2021, going from €513.2 billion to €623.6 billion. The gross operational surplus (profit) also went up a lot, reaching €76.4 billion in 2021, a 73% increase from the year before. The number of people working in the industry went up by 17%, from 3.07 million in 2020 to 3.59 million in 2021. This was 1.8% of all jobs in the EU-27 economy. (European Commission, 2024, p. 4)

Figure 4. Overview of the EU Blue Economy by sector.

Persons employed (thousands)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Marine living resources	556.5	555.1	536.1	536.7	520.7	518.5	521.7	529.6	525.2	539.9	550.8	539.4	543.1
Marine non-living resources	34.4	31.6	29.8	30.4	27.7	28.1	27.5	17.9	12.5	11.1	10.1	9.4	8.8
Marine renewable energy	0.4	0.6	0.9	1	1.2	1.7	4	5.1	7	8.3	10.6	12.3	14.3
Port activities	383.5	374.4	361.4	369.4	365.6	405.3	415.9	420.1	417.7	387.2	384.7	387.7	409.7
Shipbuilding and repair	306.8	274.7	263.4	255.5	256.6	258.8	264.1	269.2	274.8	292.8	299.1	305.5	311.8
Maritime transport	358	355	363.7	356.8	356.9	376.4	383.7	368.1	385.2	398.7	403.7	372.1	379.3
Coastal tourism	2 804.7	2 584.8	2 275.4	1 880.1	1 970.4	1 956.6	1 867.4	2 167.0	2 595.2	2 855.5	2 763.7	1 447.4	1 922.6
Blue Economy GVA	4 444.3	4 176.3	3 830.9	3 429.9	3 499.2	3 545.5	3 484.2	3 777.3	4 217.6	4 493.5	4 422.5	3 073.7	3 589.7
National employment	189 682	186 911	186 928	186 213	185 475	187 671	189 703	192 579	195 571	197 687	199 678	196 599	198 039
Blue Economy contribution (%)	2.3%	2.2%	2.0%	1.8%	1.9%	1.9%	1.8%	2.0%	2.2%	2.3%	2.2%	1.6%	1.8%

GVA (€ million)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Marine living resources	15 080	15 602	16 168	16 221	15 772	16 220	17 218	18 521	18 566	19 510	19 560	19 512	21 959
Marine non-living resources	11 190	11 325	11 935	11 237	9 684	8 215	8 431	4 723	3 940	4 291	4 704	2 839	4 161
Marine renewable energy	91	167	220	254	358	443	784	1 122	1 486	1 592	2 104	2 406	3 339
Port activities	23 262	23 442	26 936	24 018	24 313	25 553	26 492	27 271	27 490	26 638	27 996	27 000	29 485
Shipbuilding and repair	11 674	12 217	12 153	11 349	11 464	12 016	11 670	12 790	13 938	15 149	16 050	14 869	18 017
Maritime transport	28 684	31 775	28 879	29 190	30 820	30 556	34 247	28 859	32 803	31 894	36 015	31 285	44 282
Coastal tourism	66 365	64 696	58 858	50 288	53 280	52 539	53 360	59 812	75 793	81 564	80 377	28 646	49 824
Blue Economy GVA	156 346	159 225	155 150	142 558	145 692	145 542	152 202	153 098	174 015	180 639	186 807	126 557	171 068
National employment	9 536 725	9 853 561	10 150 676	10 211 496	10 319 572	10 555 777	10 939 171	11 227 692	11 689 958	12 096 090	12 535 780	12 106 022	13 098 801
Blue Economy contribution (%)	1.6%	1.6%	1.5%	1.4%	1.4%	1.4%	1.4%	1.4%	1.5%	1.5%	1.5%	1.0%	1.3%

Source: THE EU BLUE ECONOMY REPORT 2024, p. 9-10.

The Blue Economy is a **new way to use water resources** in a way that is good for the environment. It encompasses oceans, lakes, rivers, and other bodies of water. This model attempts to promote social participation, economic progress, and better living conditions while also safeguarding the environment. The Blue Economy **aims to separate the decline** of marine and aquatic habitats **from the separation of socioeconomic growth** in ocean-related businesses.

The EAS Congress (2012) described the blue economy as: "...a **sustainable ocean-based economic model** that is largely dependent on coastal and marine ecosystems and resources, but that employs environmentally sound and innovative infrastructure, technologies, and practices, including institutional and financing arrangements, **for meeting the goals of**:

(a) sustainable and inclusive development;

(b) protecting the coasts and oceans, and reducing environmental risks and ecological scarcities;

(c) addressing water, energy, and food security;

(d) protecting the health, livelihoods and welfare of the people in the coastal zone;

(e) fostering an ecosystem-based climate change mitigation and adaptation measures." (http://pemsea.org/publications/policy-briefs/blue-economy-where-are-we-now-where-are-we-headed, 2016, p.1)

Focusing on the following can help many people in the public and private sectors realize how the blue economy, economic growth, and protecting ocean and coastal resources are all connected:

i. The blue economy is all kind of economic activity directly dependent on coastal or marine resources and directly on the ocean. These comprise both **ocean-based and ocean-related economic endeavours**. Ocean-based activities are those carried out in the ocean (e.g., fisheries and aquaculture, offshore oil and gas, mining, ocean energy,

desalination, shipping and marine travel, marine construction). Products and services for the ocean and ocean-based activities (e.g., ship building and repair, ports, tourist resorts, communication, maritime insurance and law, maritime technical services, etc.).

ii. Along with public sector agency activities **with direct coastal and ocean responsibilities** – such as national defense, coast guard, marine environmental protection, etc. – the blue economy also includes marine education and research.

iii. The **ocean generates economic values that are not usually quantified**, such as habitat for fish and marine life, carbon sequestration, shoreline protection, waste recycling and storing, and ocean processes that influence climate and biodiversity.

iv. **Desalination, marine biotechnologies, ocean energy, and seabed mining** are among the new pursuits developing over the past few years. Activities aiming at safeguarding ocean health also include waste-to- energy, low footprint wastewater treatment systems, ballast water and invasive species management, etc. These activities ought to be included and recorded in the accounts of ocean economy. While ocean energy presents low carbon and renewable energy source, ecotourism, eco-ports, and eco-ships seek to make these businesses **more environmentally friendly**. These developments and developing emerging markets present chances for business and investments, so supporting the blue economy growth.

The **World Bank highlights** that in order to qualify as components of the blue economy, activities need to:

- Give present and future generations social and economic benefits.
- Restore, protect, and keep the diversity, productivity, resilience, fundamental functions, and inherent value of marine ecosystems.
- Use technology that is environmentally friendly, renewable energy, and circular material flows to cut down on waste and encourage recycling.

Case Studies: Illustrative cases of blue economy projects.

Case Study 1: *Potential of Blue Economy in Albania*

The Adriatic-Ionian shore is an important part of Albania's economy because it creates jobs and boosts economic growth. The Albanian government knows how valuable its unique

coastal and marine resources are, and it wants to create a system that will make the most of their economic potential as well as the full potential of the Blue Economy. The **coastline is recognized as a national zone of importance** in Albania's General National Spatial Plan (2015-2030) because of its strategic location, exceptional natural values, diverse biodiversity, and rich cultural and historical legacy. According to the country's 2019-2023 Tourism Development Strategy, sun-and-sea tourism has historically been the most popular type of tourism. It also stresses the need to broaden the range of tourism options and come up with new ways to make Albanian tourism more appealing to international markets.

Albania has a long history of **using Integrated Coastal Zone Management approaches**. Still, additional development is dependent on improved governance and coordination among the organizations responsible for planning and managing maritime resources, as well as a coordinated approach to investment. Albania aims to increase its people's living conditions to those of the European Union, and it sees the Blue Economy as a crucial driver of national development. Tourism and fishing are two well-known marine-based industries that could assist the country meet its development objectives.

To fully exploit the Blue Economy's potential, it is critical to **emphasize initiatives such as changing fisheries and aquaculture management**, developing unique tourism experiences, and reducing marine trash. When selecting how to spend resources, the government should prioritize sector development initiatives, using a holistic Blue Economy ecosystem strategy.

This technique requires a thorough evaluation of existing knowledge, uncertainties, and the potential for synergistic interactions across sectors to increase resource productivity. While also ensuring that future generations can benefit from the full range of coastal and marine goods and services, investments in coastal and nautical tourism, fisheries, and aquaculture should be prioritized in a way that meets both ecologically and operationally important goals, as well as the country's changing societal needs.

Fisheries, aquaculture and seafood

The fisheries and seafood business is not a significant element of the Albanian economy today, but it has a lot of potential in the future. 4,215 people work full-time in these fields. The seafood and fish business generates more than twice as much revenue as its principal product, which accounts for the whole economic contribution. According to the findings, the sector's total economic contribution to Albania in 2017 was US$111 million, or 0.9% of the country's GDP. The

sector's contribution is predicted to increase by more than 40% by 2030, totalling more than US$158 million. This indicates that the sector's growth prospects are quite favourable. It is important to highlight that this estimate only considers a limited range of products, including shrimp/prawns, anchovies, cephalopods, seabass/seabream, trout, and mussels.

This means that it only represents a fraction of the sector's total economic impact. Even while the actual amount of fish and seafood contributions to Albania's overall trade value has gradually increased, their proportional share of total trade has remained consistent. (World Bank, 2020, p. 26)

Coastal and Nautical Tourism

Albania's rich cultural history and beautiful natural surroundings make coastal and marine travel much more valuable. This unique mix gives the Albanian coast a great chance to become a major tourist destination known for its natural beauty, authenticity, and variety. Right now, Albania's coastal tourist business is mostly based on traditional beach tourism. Beach tourism and other coastal activities have grown, but there is still a lot of room for growth in specialty tourism areas like marine tourism, boating, yachting, diving, recreational fishing, and other water sports. In 2015, 1,177 vessels, including small and large yachts, arrived off the coast of Albania. Saranda, a popular tourist destination, received 1,650 boat visitors, a big increase over 2019. (World Bank, 2020, pp. 32-33)

Marine Pollution and Plastics

The country's Blue Tourism Strategy focuses mostly on environmental sustainability. To reduce plastic waste in the tourism business, everyone must work together. To reduce the quantity of plastic garbage we produce today, we require both strong public policy frameworks and innovative private sector solutions. To encourage individuals to use resources properly, we must also provide efficient incentive mechanisms.

Albania has a high level of plastic pollution in its natural environment, with an average of 20 kg per person. This may not be the primary source of plastic pollution in the Adriatic-Ionian basin, but it is still an issue.

A 2018 regional survey of marine litter indicated that land-based sources account for 48.9% of the total, much exceeding the contribution of sea-based activities (7.8%). The poll comprised seven countries: Albania, Bosnia & Herzegovina, Croatia, Greece, Italy, Montenegro,

and Slovenia. According to the poll, Albania has the second cleanest beaches among the participating countries, with an average of 0.22 items per m2, trailing only Bosnia and Herzegovina (0.17 items per m2).

In a 2019 World Wildlife Fund study that looked at the percentage of unprocessed plastic trash in the total waste stream, Albania ranked third among Mediterranean nations with high rates of solid waste management. 73% of the garbage was not handled adequately. Albania trails Egypt (93%) and Montenegro (95%) in this ranking.

Albania, like other Mediterranean countries, has a lot of trouble creating and putting into place good waste management systems. This includes all types of waste, such as plastic waste. There are still few waste management services available; they only serve more than 30% of the population. Furthermore, the current trash system has significant gaps in coverage across the country. These issues are made worse by the lack of adequate source-based waste segregation systems and the failure to implement legally required extended producer responsibility and deposit-refund schemes.

As a result, a large amount of municipal solid waste, such as plastic packaging, is either thrown carelessly into river gorges and lakes or put in landfills or older, less controlled disposal sites.

At that point, **Albania needed to take a few steps to maximize its Blue Economy**. They are as follows:

- ✓ **Strengthening Knowledge and Governance** – which includes enhancing data collection, research, and analysis to inform evidence-based decision-making, fostering inter-agency collaboration and implementing effective Marine Spatial Planning to ensure coordinated and sustainable use of marine resources;
- ✓ **Expanding Marine Conservation** – which means enhancing the effectiveness of existing Marine Protected Areas (MPAs) and expanding the coverage of marine areas under conservation to safeguard biodiversity and ecosystem services;
- ✓ **Driving Innovation and Investment** – in other words establishing a dedicated “Blue Economy Innovation Centre” to catalyse private sector investment and foster technological advancements within the sector and developing a comprehensive Blue Economy Investment Plan to guide public and private investments towards sustainable and high-impact projects;
- ✓ **Developing Sustainable Fisheries and Aquaculture** – basically, implementing

comprehensive reforms to enhance fisheries management practices, ensuring alignment with EU accession requirements and promoting sustainable fishing practices, strengthening the position of fishers through improved organization and market access, including the establishment of electronic auction platforms and stimulating domestic consumption of locally sourced seafood;

- ✓ **Fostering Sustainable Blue Tourism** – which means creating an enabling environment for private sector investment in blue tourism by addressing regulatory gaps and enhancing enforcement, promoting the development of "blue clusters" to enhance collaboration and innovation within the tourism sector and improving critical infrastructure, such as marinas and ports, to facilitate the growth of nautical tourism and attract private sector investment;
- ✓ **Addressing Marine Pollution** by strengthening the implementation of integrated waste management systems to minimize plastic leakage into the marine environment, closing existing policy and regulatory gaps related to marine plastic pollution and transitioning towards a circular economy model to minimize plastic waste generation and maximize resource utilization.

Good Examples: Noteworthy examples of blue economy practices.

Example 1

Engaging Migrants and Diaspora Communities for an Inclusive and Climate-Resilient Blue Economy in Kenya

This project aims to **increase Kenyan communities' resilience to climate change** by harnessing the resources and skills of migrant and diaspora populations. The Kenyan government was instrumental in bringing these groups together to discuss policy and forming a set of government institutions dedicated to addressing migration and climate change challenges.

The program also aimed to provide diaspora groups and migrants with the tools and information they need to identify low-carbon, resource-efficient methods to build and expand their economies. The initiative includes specific training sessions for Tana River County farmers and fishermen, as well as immigrants living in Nairobi's unauthorized districts.

These training sessions focused on trash management, sustainable Blue Economy projects such as ocean management, fish preservation, current fishing gear use, and the best farming and coastal farming practices. The initiative also resulted in the founding of the Technical Working

Group (TWG) Migration, Environment, and Climate Change. This inter-agency committee was critical for providing technical guidance and assistance for the project's successful completion. It was attended by members from the Ministry of Foreign Affairs, the Ministry of Agriculture and Livestock, Kenya's Diaspora Consortium (DCK), and the National Coordination Mechanism on Migration (NCM).

The project made migrant and diaspora communities far more resilient, and it also made the government better prepared to sponsor climate-related programs. Here are some of the **most important things** that happened:

1. **Improved knowledge sharing and research**: The TWG, which was run by the government, had group discussions that led to better sharing of information and research on strategies for climate resilience and Blue Economy projects.
2. **Empowering coastal communities**: The coastal villages in Tana River County learned how to use solutions that lessen the negative effects of climate change on the Blue Economy. The focus was on giving people who work in fishing and farming more power.
3. **Empowering urban migrants**: Migrants in Nairobi City County were given tools and instruction in business skills and waste management so they could make money.
4. **Capacity building for government officials**: We did a thorough needs assessment and produced custom training modules for national and local government officials on how migration, the environment, and climate change are all connected.

The project's primary winners are:

- **Government and Civil Society:** National and county-level representatives from the Government of Kenya (GoK) and local Civil Society Organizations (CSOs).
- **Community-Based Groups:**
    - 20 members of the Tawfiq Girls Champion Group in Tana River County.
    - 39 members of the Kipini Beach Management Unit responsible for coastal conservation.
    - Members of the Mathare Youth Conservation Group in Nairobi.

And some of the key activities are directed to:

- **Establishment of the MECC TWG:** Operationalized the Migration, Environment, and Climate Change (MECC) Technical Working Group, comprised government officials acting as technical consultants all through the project. The TWG carried out studies to pinpoint strategic areas and main gaps for properly involving migrant and diaspora populations in advancing inclusive and climate-resilient Blue Economies in Tana River and Nairobi Counties.
- **Waste Management and Youth Empowerment:** Donated five plastic recycling machines to the Mathare Youth Conservation Group in Nairobi's Mathare informal settlement. The group received comprehensive training on the operation and maintenance of these machines.

Example 2:

The Greater Cape Town Water Fund

The Greater Cape Town Water Fund is trying to **bring back natural ecosystems by hiring local women** to get rid of invasive plants that suck up moisture from the soil and block water flow to the aquifer, which is a key source of water for the city. This project shows how important it is to restore biological infrastructure to keep water safe for all Western Cape Water Supply System (WCWSS) customers.

The **Water Fund** raises money through a collective action approach from public and private water consumers, as well as other groups working on ecological solutions, to help fix Greater Cape Town's water problems. This helps to kickstart restoration projects.

Cape Town, which experienced a severe water crisis during the drought from 2015 to 2018, continues to prioritize water security. With a rapidly expanding population (approximately 2.6% per year) and the projected effects of climate change, such as less rain and greater temperatures, there is a substantial risk of water scarcity in the future.

According to forecasts, by 2021, the Greater Cape Town Region's water demand would exceed its existing supply. To meet this demand, an additional 300-350 million litters of water will be required every day by 2028. To satisfy this expanding demand, which exceeds USD 540 million, the city is considering significant public investments in traditional techniques of improving water supply, such as deep aquifer drilling, desalination, water reuse, and increased surface water storage. Nonetheless, invasive plant species that invade other places make water safety significantly less secure. These invasive species have an impact on more than two-thirds

of the sub-catchments that supply the WCWSS. This results in an astonishing annual water loss of 55 billion litters due to reduced water flow to rivers and dams. There is a lot of water in this location, so the losses are significant. Pine and eucalyptus, along with other invasive plants, quickly overtake native plants.

The **Greater Cape Town Water Fund Steering Committee** led a diverse group of public and private sector stakeholders, as well as local communities, to address this challenge. A comprehensive six-step process was utilized to identify the most essential sub-catchments for invasive plant removal, and the return on investment for large-scale implementation of these interventions was assessed. This analysis shows that investing USD 25.5 million in programs to remove invasive plants will result in significant long-term profits. These adjustments are predicted to increase the supply of water by 100 billion litters per year over the next 30 years, compared to how things are currently. Up to 55 billion litters of water gains are significant, with up to half of them realized during the first six years of use. Furthermore, removing invading alien plants requires effort, which generates nearly 350 jobs in the first five years of the project. (The Nature Conservancy, 2018)

The results of this business case show that **getting rid of invasive alien plants and fixing the ecological infrastructure of key sub-catchments is a cost-effective and long-term way to increase the amount of water available i**n the Greater Cape Town Region. Watershed restoration projects will pay off much faster than some established infrastructure options that need a lot of engineering, since better supply will be available as soon as the first winter rains follow restoration. Water funds are a tried-and-true way to bring together local communities, businesses, and government organizations to manage catchments in an environmentally friendly way.

Conclusion and Comments

Summarizing insights and suggesting future steps

To move the Blue Economy forward, we need to invest in infrastructure, conservation, research and development, and building the skills of institutions and people. We also need to share information and build knowledge. The two biggest problems with using sustainable water and marine resources are strategic and financial.

Economically, the main challenge is the large outlay needed to establish and run strong internal monitoring systems for sustainable reporting. Although venture capital financing for

environmentally friendly projects is growing, many businesses still find great difficulty with first costs.

Strategically, one major difficulty is the absence of consistent measuring and reporting systems for environmental impact. This inconsistency can impede the creation and application of sensible sustainability plans.

There are numerous options available, ranging from early warning systems and coastal fortifications to exploring **nature-based solutions (NBS)** such as land reclamation and mangrove restoration. The international community plays a vital role, as well. People should consider hybrid solutions, such as artificial reefs or manmade dunes with parts that do not allow water through. These solutions use both **hard and soft approaches**. Hybrid solutions have potential, but they are not universally accepted. People are reluctant to utilize them because of unclear guidelines regarding how to use them and negative assessments of their cost and lifespan.

To better understand how well these strategies operate in different situations and how cost-effective they are, we must continue to conduct pilot programs and closely monitor them. Accepting inventiveness and fostering collaboration among scientists, policymakers, and engineers will aid in the development of sensible policies to safeguard ecosystems and communities.

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4. Environmental Sustainability

Definition and Goals

Environmental sustainability is a policy that is grounded in science. The idea behind it is that humans have a moral duty to meet their contemporary needs in ways that will not endanger future generations to meet theirs. **Environmental sustainability is based on** the idea that economic growth, social justice, and ecological balance can be achieved at the same time.

The academic background explains partially why sustainability, although it has practical goals, sometimes feels more like a philosophical idea removed from daily realities. Furthermore, it comes from a bureaucratic policy background and includes technical language that most people, even in academic circles, rarely use. This language mainly serves as a way for policymakers to communicate. However, we need to understand this technical language so we can each contribute to the discussion about alternatives to unsustainability from our own fields.

These factors contribute to both the popularity of sustainability and the strong opposition it faces from many development stakeholders worldwide. It is often linked with the idea of sustainable development to avoid a divide between "**development and ecology**."

One of the most **important objectives** of environmental sustainability is that of achieving net-zero emissions. This requires a balance – the amount of greenhouse gases released into the atmosphere is matched by those cut. This also necessitates a gradual shift away from dependence on fossil fuels (i.e., oil, coal, and natural gas) towards solar, wind, and hydroelectric energy. This is why much **more effort needs to be put into improving energy efficiency** in industry, private homes, and transport.

More advanced technologies, including carbon capture and utilization of green hydrogen, are of the highest relevance in mitigating emissions that are difficult to decarbonize (the “hard-to-abate” sectors, such as steel, cement, and petrochemicals). If we can achieve **off-net-zero emissions**, we believe we can sufficiently counter the adverse effects of climate change. Some of these effects are global temperature rise, extreme weather events, and the rise of sea levels. In that way, we can nurture a hospitable climate for generations to come.

We often hear that **biodiversity is essential** because when ecosystems fail, people lose access to pollination, clean water, and protection against climate extremes. Many still take these things for granted. The effects extend well beyond nature, which is why biodiversity has become

a key issue in environmental politics. Preservation of species' genetic diversity helps the natural world **to better adapt to environmental changes**, which is beneficial to us and the whole world.

The strategies that are most frequently discussed are the protection of specific areas and landscapes, and the reduction of deforestation and overfishing. All these activities are connected to our understanding of “nature” and correlated acts.

Generally, it is believed that a **transition to a circular economy** is a key change to achieving environmental sustainability. For this, we need to change how we use resources and treat garbage. In contrast to the traditional "**take, make, dispose**" model, the circular economy aims to create durable and reusable goods. This approach pays close attention to our use of natural resources and the reduction in damage to the environment.

To achieve sustainable development, we must establish renewable systems of energy and sufficient infrastructure. In addition, we need to bring together various aspects of life, e.g., economic development, environmental protection, and social welfare.

Strategies and Actions

It is not easy **to achieve environmental sustainability goals** at the global level. It depends on broad international cooperation and policies that support innovation and green technologies. The EU has become a leader in the area and has introduced many ambitious objectives and related sets of rules. The main agenda that guides its environmental policy is the European Green Deal, which sets the goal to achieve carbon neutrality by 2050. Some of the most critical areas in it are sustainable farming and biodiversity.

Another important EU program is the **Fit for 55 Package**. It is the foundation of the European Union's climate policy. It states the goal of reducing greenhouse gas emissions by 55% by 2030 (relative to 1990 levels).

A similar vision for transformation is presented in **the EU Circular Economy Action Plan**. Its focus is the reduction of waste and improved use of resources. The main goal is to extend product lifetimes through new recycling technologies, sustainable design, better repair, and new purposes.

The goal of the **EU Biodiversity Strategy 2030** is to repair and protect ecosystems in Europe. It involves actions that aim to restore damaged habitats, such as wetlands, forests, and marine ecosystems. It also addresses the root causes of damage done in biodiversity.

The EU created programs that connect financial support with the inclusion of

environmental and climate goals. That structure is named the Sustainable Finance Framework. Among the framework's tools are green bonds and loans for companies that have developed programs to reduce their environmental impact. The goal of the EU is to create a low-carbon economy by connecting private and public investments.

Key Concepts

Environmental sustainability stands on several central ideas. These ideas describe the connection between humans and nature.

The **Sustainability Triangle** is a model that shows how the environment, the economy, and social justice are interconnected and cannot function independently.

The **Ecological Footprint** is a tool that reveals how much people use natural resources and how much waste they create, and then compares it to what Earth can renew. Many countries consume more than their environment can provide. Together, these actions lead to "**ecological overshooting**." The idea behind it is that we should always take care of Earth's limits.

It is well known that many civilizations throughout history have excessively used their environment. This led to soil exhaustion, deforestation, and even the collapse of the ecosystem. Carrying capacity is closely related to the idea of ecological footprints. It refers to the level to which our behaviour is within the limits of sustainability.

Another related concept is that of Planetary Boundaries, an idea that there are limits that the human race should not cross. These include climate change, water use, loss of animals and plants, and changes in land. To remain safe, we must lower emissions, protect animals and plants, and manage land and water in smarter ways. If we stay within the limits, Earth will continue to support us and life generally.

There are also important concepts that challenge the previously mentioned ones, although not necessarily reject them. The concept of *environmental (in)justice* emerged from grassroots struggles in the United States. Scholars such as **Bullard** (2000) and **Schlosberg** (2007) argue that sustainability without justice leads to forms of *green colonialism, the tendency* to impose solutions without respect for local knowledge and needs.

Examples of Sustainability in Europe

One of the most important steps made by the European Union **to address pollution** is its decision to **ban various plastic items**, such as straws and plates. This policy aims to rapidly

eliminate visible waste from the surroundings and create rigorous rules on the management of waste. The results are already visible, and some companies have begun to use or develop alternatives that are more environmentally friendly.

Sweden is frequently cited as a leader in the progress achieved toward reorientation toward renewable energy. Currently, it gets more than half of its energy from ecological sources, such as hydropower and wind. **Sweden's** example proves that transitioning to renewable energy can be achieved with positive consequences for both the economy and social welfare of a nation. In Norway, electric cars have become a visible part of everyday life. That shift happened as planned. For years, the government has offered drivers tangible incentives and established a mostly renewable energy grid.

Environmental sustainability – a view from anthropology

A sustainable environment is not only a technical or ecological issue, but a social and cultural phenomenon that increasingly attracts the attention of anthropologists and other social scientists. Around the world, the relationship to the environment is deeply ingrained in one's sense of identity. Knowledge and beliefs about nature, accompanied by rituals and skills, which are often referred to as **intangible cultural heritage (ICH),** are inseparable from how communities imagine some of the key dimensions pointed out by ecological theory.

Our culture teaches us how we will see responsibility, for example, or what it means to belong to something.

All these are questions that lie at the foundation of the idea of altruistically leaving a sustainable environment to future generations. However, anthropologists and other social scientists are also interested in the negative sides of the insistence on collective identity, and it is precisely within contemporary environmental movements that we most often hear about a "**return to nature**", which somehow simultaneously becomes a return to ancestors, a return to the past, a return to tradition, which is just another word for pseudoscientific backwardness.

That is why we explore the intentional abuse of the heritage-environment nexus, and not only the obviously positive aspects of searching for models of sustainability in traditional cultures. In this way, we discover that **environmental politics, when paired with identity politics, becomes a tool for advancing the interests of particular groups** who use heritage to compete with companies or foreign powers over who will exploit the environment, rather than whether a community can live in a non-destructive way.

Conclusion

Sustainability has become a central focus of political and institutional debate, particularly in the EU. It is no longer confined to environmental agencies, offices, or ministries, nor to the NGO sector. However, even well-funded projects tend to underperform when they fail to grasp how people interpret change in their own cultural terms. Imposing universal solutions across varied contexts has repeatedly resulted in outcomes that are misunderstood or resisted by the very people they aim to support.

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5. Ecological behaviour. Do's & Don'ts: Practical advice for adopting eco-friendly behaviours

Theoretical Introduction

Environmental sustainability is one of the most pressing and important issues of our time. Today, **effective environmental management** and the need to adopt sustainable practices to protect the environment have become priorities in scientific research, political party programmes, national and European political agendas, and environmental organizations (Stolle & Micheletti, 2013; Colmegna et al., 2021).

The continuous depletion of natural resources and the escalating impacts of climate change are part of an anthropocentric viewpoint that has significantly changed the relationship between humans and the planet that supports them (Daher et al., 2024; Capelli, 2024). This illustrates the **complexities of contemporary society**, characterized by narcissistic individualism (Lasch, 2020), where personal well-being and comfort are prioritized, and actions are often motivated by immediate self-serving interests, which results in a focus on individual concerns and a short-sighted approach. However, this mindset prevents the recognition of the intrinsic relationship between humans and nature and, consequently, the important role humanity must play in sustainability efforts.

Conversely, an **ethical-environmental perspective highlights the need to consider future generations** and adopt a broader view that includes responsibility for the future. Taking care of the environment and valuing shared resources have become key issues, starting with concrete actions and **personal responsibility for sustainability**. The aim of these efforts is to change direction regarding the environment, promoting an ecological transition and transformation (Kocher, 2017; Morandini, 2020).

Under this premise, in order to understand the processes of **collective action for environmental sustainability**, it is crucial to investigate the individual actions and motivations that form the basis of collective initiatives. Individual rationality serves as the starting point for cooperative processes and collective rationality aimed at building and maintaining a common good. This perspective pays attention not only to **collective actions and social responsibilities** but also to individual orientations and actions, which directly shape social reality through their

relational dimension.

Environmental protection is a long-term goal that future generations will benefit from, in a way that is both temporally and territorially indefinite. This is because it is impossible to predict which future generation will benefit, or which geographical areas may benefit from the individual's actions. Therefore, the uncertainty about who will enjoy the results of sustainable behaviour makes it difficult for individuals to think in terms of a long-term community vision (Daher, 2022).

However, this means that the strategy of involvement as rational participation does not work, and social actors, unable to move beyond the cost-benefit framework, will aim to maximize short-term personal profit. They will not gain awareness of the deep difference between ecological time and economic time, which would instead be the foundation for creating an operational motivation for ecological behaviour.

The issue of **responsibility regarding environmental topics** seems to operate on different levels: individual and collective action, mutual interaction, environmental socialization, and finally, the organization of ecological action. All these levels can be linked to studies of collective action (Olson, 1965, trans. 1983), which view this action as both the origin and solution to environmental problems (Sandler, 1992). From this perspective, the environment in which awareness efforts take place is **strategic**: the individual has the choice to cooperate or not in achieving the common goal of reducing environmental damage, knowing that the benefit of every action taken for the environment will not only affect themselves but also the community to which he or she belongs (Daher, 2022).

The individual acts rationally based on what he or she believes is right, paying particular attention to the unexpected and unwanted effects that arise from the sum of individually rational behaviours. For example, if at the end of a day at the beach, everyone leaves their rubbish behind to avoid the hassle of finding a rubbish bin, the beach turns into a mess, and the enjoyment of being there would decrease for everyone. In this context, **game theory can be helpful** in understanding how individuals interact with each other based on their goals, the constraints that limit their actions, and their expectations about the behaviour of others, while also considering what others do or might do. Going back to the previous example: under what conditions is an individual willing to look for a rubbish bin? How important is the behaviour of others? How do they react if everyone leaves their rubbish on the ground? (Pellizzoni, Osti 2003).

As a result, **individual behaviour is driven by personal interest**, following the principles

of instrumental rationality. Group behaviour, or collective action, depends on the actions of individuals, which in turn depend on the relative benefits they can gain from taking action compared to alternative behaviours.

Clearing rubbish from the environment or refraining from littering are examples of collective action, where the key feature is that **each individual contribution provides small benefits** shared among many people, but heavy costs for just one person, the one who cooperates. Even though the total benefits generally outweigh the disadvantages – so that society as a whole has an interest in cooperation – the person who participates faces higher costs than the benefits they gain. As a result, it is not beneficial for any single individual to cooperate (Elster, 1989, trans. 1993).

This can be better explained through the collective process known as the "**collective action paradox**" or "**collective fallacy**" (Olson, 1965, trans. 1983), which refers to the situation where each individual, primarily aiming for their personal interest, neglects the pursuit of the common good, which is therefore neither achieved nor preserved.

This paradox is particularly common in cases of collective actions focused on environmental sustainability and is often accompanied by the phenomenon of the "free rider". A free rider is a **rational and self-interested individual** who, by not participating in cooperative actions (assuming others will do it for them), benefits from the results without contributing to the costs. Since the environment is a non-exclusive good, anyone can benefit from it, even those who do not contribute in any way to its preservation (Sandler, 1992).

Similarly, the benefits of **pollution cleanup** are not exclusive, as all residents of the affected area will benefit, regardless of their contribution to achieving this goal. For example, an individual cannot avoid breathing the cleaned air, nor can they prevent others from benefitting from it (Daher, 2000).

In this sense, an individual who carefully weighs the costs and benefits has no interest in participating in a collective action organized by a group they belong to in order to gain access to public goods, because they would still benefit even if they did not directly participate in the action. This is exactly what happens, for example, during a strike for a wage increase: an individual can choose not to participate, but thanks to the agreements made between employers and unions that set wage increases, they still enjoy the benefits obtained by the striking colleagues, who sacrificed hours and days of pay to achieve this goal (Perulli, 2021).

Given the gravity of the **environmental crisis**, it is essential that **ecological conduct** be

guided by a sense of responsibility towards future generations, with a clear emphasis on intergenerational fairness. Our **actions today should not harm the ability of future generations** to access the same natural resources and enjoy a healthy environment. This is closely linked to the principle of climate justice, which is central to youth movements supporting environmental sustainability and represents an ethical and political issue that goes beyond environmental or climate concerns. This **principle enables young people to link the impacts of climate change with wider concepts of environmental and social justice**.

These principles are considered to be closely linked and support the demands of young people regarding issues concerning equality between people and nations, human rights, collective rights, and historical responsibility for climate change (Latini et al., 2020; Montesi, 2021). Not only is the debate intergenerational, but it is also global and territorial.

Following this approach, the concept of climate justice highlights the notion of the environment as a shared and non-exclusive resource that requires safeguarding in order to prevent harm to the **most vulnerable populations**, as the climate crisis disproportionately affects poorer countries and exacerbates economic inequalities between nations. For example, countries in Southeast Asia or Central and South America suffer more due to a combination of geographical, socio-economic, and political factors which heighten their vulnerability and expose them to greater risks in the future.

This approach highlights the fact that those most impacted by climate change frequently bear the least responsibility for its origins, while affluent nations, historically responsible for most CO2 emissions and global warming, continue to be the major contributors (Imperatore, 2023). Viewing climate change through the lens of justice involves striving to maintain ecological balance, promoting social equity, ensuring a fair distribution of resources and power, and pushing for transformative policy changes (Di Pierri, 2023).

Ultimately, this means **adopting a new paradigm of responsible behaviour**, focusing not only on collective action and social responsibilities but also **on individual attitudes and actions, which directly shape social reality through relationships**. As a result, there is a need to develop a new perspective where rationality and action, individuality and community, and the well-being of present and future generations are no longer opposing forces but interconnected needs. This requires creating and promoting new cultural values that encourage a shared and internalized ethic, guiding individuals towards responsible actions in all aspects of social life, both in relation to the environment and to others, near or far in time and space (Daher et al., 2024).

Case Studies

Ecological principles, such as the circular economy, sustainability and environmental stewardship (green energy transition and organic farming) increasingly influence peoples' habits in Italy, having been applied in real-life settings to encourage behavioural changes. The concept of the circular economy is **gaining traction in Italy**, reflecting a shift from traditional linear economic models (where resources are used and then disposed of) towards a more sustainable approach based on reuse, recycling and regeneration. This is **consistent with Italy's dedication** to ecological sustainability and economic resilience. Italy has established a robust framework for promoting a circular economy, guided by both European Union directives and its own domestic goals. In 2017, the national government strategy for the circular economy recognized it as a key tool for achieving sustainability. This approach involves various sectors (such as manufacturing, waste management, and agriculture) and leads to synergies between businesses and the government and the local community.

The National Packaging Consortium (CONAI) has implemented various programmes promoting the use of recyclable materials, in order to contribute to a significant waste reduction. CONAI, established in 1997, is a vital driving force in promoting responsible use of packaging materials. The consortium collaborates with industries to optimize packaging design and promote the use of materials that can recycled and reused. Among CONAI's most tangible successes is that it has contributed to Italy's achievement of a recycling rate that is above 60% for packaging waste. **Their education campaigns** not only directly target businesses, but also raise public awareness about the matter, thus leading to effectively changing consumers' behaviour. In other words, it has emerged as a critical player in the promotion of a circular economy, particularly through its emphasis on the importance of education campaigns, designed not only to inform, but to actively engage consumers, ultimately driving a shift in behaviour that supports sustainable waste management practices.

Indeed, the rationale behind these initiatives stems from a recognized **need to cultivate a culture of sustainability within the community**. As Ghisellini et al. (2016) indicate, effective educational outreach can lead to substantial changes in waste management awareness and consumer attitudes.

In line with its overarching goal to transform public understanding and involvement concerning packaging waste, **CONAI promotes awareness** within the community by providing diverse educational materials. These materials, such as brochures, infographics, and web

content, streamline the recycling procedure by explicitly stating which items are recyclable and highlighting the value of proper disposal, thus helping consumers to make informed decisions (CONAI, 2023).

For example, the *Raccolta Differenziata* (separate rubbish collection) campaign actively promotes the idea of separating recyclable materials at the source. This initiative directly supports studies that illustrate how targeted messages can enhance recycling rates by clarifying what items should be placed in each bin (Gallo & Pappalardo, 2018).

CONAI conducts **nationwide awareness campaigns**, particularly around significant environmental days. To ensure broad exposure, these campaigns utilize diverse channels, including social media, television and radio. By using popular platforms where consumers are most engaged, CONAI can effectively disseminate information and encourage discussions around recycling and sustainability.

An **example would be the *Io Riciclo* campaign**, which encourages consumers to actively participate in recycling through engaging content that highlights the environmental benefits of proper waste disposal. Research shows that regular exposure to consistent recycling messages can boost public participation in such initiatives (Bertella, 2016).

Based on the understanding that **long-term behavioural change** begins with youth, CONAI has developed educational programmes focusing on schools. These programmes include workshops and interactive activities designed to instil an understanding of recycling principles in students. Empirical studies suggest that children who receive education about recycling at a young age are more likely to develop sustainable habits that extend into adulthood (Kahn & Wagner, 2021).

This approach is **exemplified by the *Riciclario* initiative**; by setting benchmarks for recycling education in schools, CONAI equips children with the knowledge and tools to champion sustainability within their families and communities (CONAI, 2023).

CONAI acknowledges the **crucial importance of grassroots participation**, promoting community-led projects like clean-up operations and local recycling campaigns to inspire active citizen involvement in sustainability. Research indicates that **community engagement** not only boosts civic involvement but also strengthens environmental principles among those who participate (Mouratiadou & Bayrak, 2020).

Incorporating regional cultural aspects commonly makes these initiatives more relevant and successful. For instance, collaborating with local artists to create recycling-themed murals

helps to raise awareness while fostering a sense of community pride.

The **positive effects of CONAI's educational programmes** are evident in both their qualitative and quantitative aspects. Current data reveals that Italy's recycling performance has consistently surpassed the EU benchmark, with approximately 70% of packaging waste being recycled (EUROSTAT, 2022). These statistics highlight how sustained educational campaigns contribute to significant behavioural change among consumers.

Moreover, responses obtained via surveys and discussions with participants point to a rise in understanding and recognition of recycling guidelines. Consumers show **greater commitment to recycling**, with numerous individuals reporting that they actively share their knowledge with friends and relatives, cultivating a multiplying impact that promotes wider community participation (Bertella, 2016).

CONAI's education campaigns are highly effective in promoting recycling and driving meaningful behavioural change among consumers in Italy. By disseminating targeted information, engaging public awareness efforts, developing school programmes, and encouraging community involvement, **CONAI effectively cultivates a culture of sustainability**. The alignment of these educational initiatives with empirical research makes them an important factor in shaping attitudes toward waste management, thereby contributing to a more sustainable future.

Italy's green energy shift marks a major development in the country's energy sector, reflecting a comprehensive shift from conventional fossil fuels to renewable energy sources. Italy has long been reliant on fossil fuels and has imported a significant portion of its energy requirements. However, the increasing awareness of climate change and the urgent need for sustainable development have accelerated the movement towards renewable energy. This urgency was highlighted by the 2015 Paris Agreement, dr**iving Italy to commit to ambitious climate targets,** including cutting greenhouse gas emissions and boosting the share of renewables in its energy mix.

More than 18% of Italy's total energy consumption was met by renewable sources like solar, wind and hydroelectric by 2020. This accomplishment reflects the country's pledge within the National Energy and Climate Plan (NECP) for 2030, which aims for a minimum of 55% renewable energy by that date (Ministero della Transizione Ecologica, 2021). This transformation is not merely technological; it also **represents a broader cultural and social change**, reshaping the attitudes of the Italian population towards energy consumption.

A key factor in driving the green energy transition is the increasing awareness and education about **energy consumption and its environmental impact**. Public perceptions of sustainability have been significantly influenced by campaigns launched by government agencies and non-profit organizations. Several initiatives have concentrated on disseminating information regarding the advantages of renewable energy, the importance of improving energy efficiency, and the urgent need to reduce carbon emissions.

Research suggests that **educational initiatives and public awareness campaigns** have **effectively raised understanding** about climate change and renewable energy among Italian citizens. For instance, surveys conducted by the Italian Ministry for the Environment show that more than 70% of Italians support the transition to renewables and recognize that it is vital to reduce dependence on fossil fuels (*Ministero della Transizione Ecologica*, 2021). This newfound awareness has shifted consumer attitudes, leading to greater acceptance and enthusiasm for renewable energy options.

Community engagement has also played a vital role in the green energy transition in Italy. Local governments, grassroots organizations, and citizens themselves have initiated projects aimed at exploiting renewable resources. This trend is clearly demonstrated by the increasing number of **community-focused renewable energy schemes**, such as solar cooperatives and local wind turbines. Initiatives like these not only enable inhabitants to manage their own energy use but also cultivate a shared sense of responsibility for the environment.

The proliferation of community-based renewable energy projects, such as **solar cooperatives and localized wind farms**, exemplifies this trend. These initiatives not only empower residents to take control of their energy consumption but also foster a sense of collective responsibility towards the environment.

For example, initiatives in small towns and rural areas, where residents pool resources to invest in solar panels or wind turbines, have demonstrated how community action can drive change. This localized approach has resulted in increased energy security and resilience and has directly impacted the attitudes of participants who witness firsthand the benefits of renewable energy (Pisano & De Marco, 2019).

Moreover, **Italy's economic environment** is being reshaped by the green energy transition, presenting new opportunities for job generation and economic growth. The renewable energy segment has proved to be a prominent provider of job prospects, with an increasing number of Italians working in the solar and wind energy sectors. The sector is reported

to have created thousands of positions in manufacturing, installation and servicing, thus making renewables an essential component of Italy's economic recovery strategy following COVID-19 (IRENA, 2021).

This economic shift has contributed to **changing attitudes towards renewable energy**. Many people now see renewable energy not only as an ecological necessity, but also as a pathway to economic stability and the creation of local jobs. The interplay of environmental and economic narratives has reinforced public support for sustainable practices and initiatives.

The Italian government has also been instrumental in **facilitating the green transition largely due to** supportive policies and legislation. Incentives such as feed-in tariffs, tax rebates for solar installations, and subsidies for energy efficiency improvements have encouraged both individual and corporate **investment in renewable technologies**. The legal framework developed for renewable energy production has provided a stable environment for renewable energy firms to thrive.

Public support for these policies is evident; surveys show that most Italians are in favour of government incentives for **renewable energy projects**. This has helped reinforce societal consensus around the need for transition, creating a positive feedback loop where increased support leads to stronger policies, which in turn bolster public approval (Pezzi, 2020).

Fundamentally, **Italy's green energy transition** represents a cultural shift towards sustainability and environmental accountability. As citizens become more informed about the impacts of their energy consumption on the planet, they are increasingly willing to adopt sustainable practices in daily life. This includes increased acceptance of energy-efficient appliances, opting for electric and hybrid vehicles, and a deeper commitment to reducing overall energy usage.

Local initiatives that **promote sustainability and environmental justice** have gained momentum, encouraging citizens to reassess their consumption patterns. This has opened discussions on energy consumption and its broader implications for climate change, thereby further integrating sustainability into the cultural fabric of Italian society (Vignola & Eguizabal, 2018). It is only recently that we have seen the spread of environmental youth movements, including Extinction Rebellion, Sunrise Movement and Fridays for Future (henceforth FfF) (Rimanoczy, 2021), which have triggered a new wave of activism, calling on everyone to responsibly reconsider their lifestyles and ways of thinking, in order to restore the human-environment divide and guarantee a more liveable future (Hayes and O'Neill, 2021; Pickard et al.,

2022; Sloam et al., 2022). Through their protests, which initially took the form of demonstrations in the streets, activists urge individuals to assume responsibility through immediate and tangible actions to find solutions for the care of the Planet in order to ensure a sustainable future (De Moor et al., 2020; Francesconi et al., 2021).

FfF youth call on people and governments around the world **to take responsibility** (Boucher et al., 2021); they do this through weekly school strikes (every Friday) and global strikes (twice a year), both of which take place in public squares and on social media. FfF's collective action has spread globally by taking widespread networking forms, both in physical spaces – thanks to street demonstrations or other artistic practices such as flash mobs (Daher et al., 2022), which have given visibility to the movement – and through the use of online spaces, sharing information, not only to achieve greater resonance, but also for purely organizational purposes of events and protests (see paragraph 4) (Belotti and Bussoletti, 2022).

In a time of **increasing environmental difficulties**, particularly in the wake of climate change and urbanization, Italy has embraced innovative solutions to enhance sustainability within its cities. One such initiative is **the Forestami Project**, a transformative urban forestry programme that aims to plant and maintain millions of trees throughout the metropolitan area of Milan and its surroundings. This initiative aims not only to expand green spaces but also to cultivate a holistic approach to ecological recovery and community engagement.

The Forestami Project was launched in 2019 as a joint initiative between public and private entities involving the City of Milan, environmental organizations, and private stakeholders. The underlying objective was ambitious yet clear: to plant three million trees by the year 2030, thereby enhancing the urban green space while addressing pressing environmental issues such as air pollution, urban heat, and biodiversity loss. This initiative is consistent with Milan's broader sustainability objectives and the European Union's Green Deal, which both aim to make cities more resilient and sustainable.

Urban forestry has garnered attention as a **vital strategy for mitigating climate change** impact, and the Forestami project stands out as an exemplary model. Crucially, its scope extends beyond the mere planting of trees: it encapsulates a vision for a greener Milan that promotes biodiversity, enhances recreational spaces, and creates sustainable urban ecosystems.

Italy's transition to green energy is a complex undertaking that comprises technological advancements, public awareness campaigns, community engagement, and legislative support. As Italy moves towards a future powered by renewable energy, the transformation is apparent

not only in energy production but also in the attitudes of the population towards energy consumption. **Increased awareness, community initiatives**, economic opportunities, and supportive policies collectively foster an environment where sustainability is of paramount importance.

Beyond a mere environmental imperative, **this transition is an integral part** of Italy's future identity, aiming to cultivate a mindset that values and prioritizes sustainable practices while addressing the challenges of climate change for future generations.

Organic farming marks a significant departure from traditional agricultural practices; it aligns closely with ecological doctrines that prioritize environmental sustainability, biodiversity and social equity. **Italy**, one of the leading countries in organic agriculture in Europe, **is a prime example of** how this agricultural model can influence consumer behaviour, encourage community engagement, and create economic opportunities while tackling urgent ecological concerns.

Fundamentally, **organic farming embodies** a holistic approach to agriculture that highlights the interdependence of soil health, biodiversity and ecosystem integrity. Unlike traditional conventional farming, which frequently makes extensive use of artificial pesticides and fertilizers, the main goal of organic farming is to enhance soil fertility using natural methods, crop rotations and organic composting. These principles are rooted in the premise that healthy ecosystems facilitate productive agriculture and contribute to overall environmental well-being.

Over the past few decades, Italy has seen this move towards organic farming gain momentum, driven by legislative support and consumer demand. **Organic practices** have been supported by the Italian government through various initiatives and incentives, encouraging farmers to transition to organic methods that uphold ecological principles (*Ministero della Transizione Ecologica*, 2021).

In Italy, **the rise of organic farming** has considerably affected consumer behaviour, showing increased understanding of the importance of sustainable environmental practices and high-quality food.

An **increased interest in food origins** is emerging among Italian consumers, and many prioritize the purchase of organic produce which is considered to be healthier and environmentally friendly.

Market research confirms this trend, showing a significant surge in organic food sales in Italy, making it one of the largest organic markets in Europe. As of 2021, organic products have

accounted for approximately 4.5% of the total grocery market, with the demand for organic fruits, vegetables and dairy products leading the way (SINAB, 2022). This changing behaviour underscores a cultural shift toward more mindful consumption, where aesthetics and personal health are intertwined with ethical considerations regarding food production practices.

The move towards **organic farming promotes community engagement** and cooperation, which are essential for sustainable development. In rural areas of Italy, organic farms often serve as models for agro-ecological practices; they also facilitate knowledge sharing and strengthen local food economies. **Farmers engage with their communities** by offering educational workshops, farm tours, and participation in local farmers' markets. This interaction helps to increase public understanding of sustainable practices and generates broader support for organic farming.

The **Italian Association for Organic Farming** (AIAB) has made significant progress in promoting organic farming in Italy. Their initiatives encompass a wide range of activities with the aim of enhancing the organic agriculture sector, promoting sustainable agricultural practices, and encouraging consumer awareness.

AIAB consistently highlights the benefits of organic foods to consumers. Key initiatives include:

(1) *Awareness Campaigns*: campaigns are implemented to educate the public on the benefits of organic farming, including environmental sustainability and health advantages;

(2) *Participation in Trade Fairs*: organic products are promoted at various national and international fairs to increase visibility for organic farmers.

Moreover, AIAB is also involved in **lobbying to influence agricultural policy** in favour of organic farming. They engage with various stakeholders, including pushing for policies that support sustainable agriculture and the transition to organic farming; they also collaborate with research bodies to promote scientific studies that demonstrate the benefits of organic agriculture.

AIAB is essential in promoting the expansion of organic farming in Italy through education, certification, consumer advocacy, and involvement in policymaking. By fostering an environment in which organic farming can thrive, they not only benefit farmers but also promote a healthier ecosystem and society.

Organic farming in Italy is a prime example of changing behaviour aligned with ecological principles. As consumers embrace the values of sustainability and environmental responsibility,

the demand for organic products is steadily increasing; this influences agricultural practices and fosters positive social and economic impacts.

The ramifications are not limited to mere food production; they represent a broader cultural shift towards sustainable living that places a premium on health, ethical consumption, and environmental responsibility. By embracing organic agriculture, Italy is a leading model of how a resilient and sustainable food system that benefits both people and the environment can be achieved by coordinating agricultural techniques with ecological values.

Ecological behaviour

Ecological behaviour refers to how organisms, including both animals and humans, interact with their environment, and the subsequent consequences of those interactions on the ecosystem. These actions are often driven by instinct, learning, and **prevailing environmental conditions**, resulting in patterns that can have significant implications for their communities.

Individual organisms frequently **exhibit ecological behaviours** that show adaptability and survival strategies. For instance, among New Caledonian crows and chimpanzees, tool use demonstrates advanced cognitive abilities that allow these species to exploit resources more effectively (Hunt & Gray, 2003; Whiten et al., 2009). These behaviours not only ensure their survival but also highlight the evolutionary significance of learning and cultural transmission among individuals.

The migration patterns of birds illustrate **remarkable adaptive behaviour** influenced by environmental cues and individual experiences (Alerstam et al., 2003). Moreover, studies on urban birds reveal how individuals adapt their behaviours to be able to thrive in human-altered landscapes, showing resilience and behavioural flexibility when faced with shifting circumstances (Darryll et al., 2017).

These examples and **patterns of ecological behaviour** implemented by individuals contribute to our understanding of biodiversity, ecosystem dynamics, and the effects of individual choices in shaping ecological outcomes. They provide valuable insights into the importance of preserving the complex web of interactions that support life on Earth.

1. Human-wildlife conflict occurs when the presence and behaviour of wildlife negatively impact human interests, leading to clashes between communities and animal populations. These conflicts can stem from factors like competition for resources, property damage, agricultural encroachment, or perceived threats to human safety. Examples include:

(1) Crop Raiding: elephants and wild boars are known to raid crops, which leads to significant economic losses for farmers. This is common in regions where agriculture intertwines with wildlife habitats;

(2) Livestock Predation: predators, such as lions and leopards, may attack livestock, causing distress among pastoral communities and leading to retaliatory killings of these animals;

(3) Disease Transmission: Close contact with wild animals can result in the transmission of diseases to humans or farm animals, sparking fear and conflict. (Røskaft et al., 2003).

The **consequences of human-wildlife conflict extend beyond** immediate damage, impacting social structures, cultural beliefs and community dynamics. Losses caused by wildlife can put a strain on local economies and often lead farmers to seek compensation from governments or NGOs. Evolving social dynamics can result from competition over resources, especially when outside influences, such as tourism and conservation businesses, exacerbate these conflicts (Bertram & Vivier, 2002).

In order to **develop constructive solutions**, it is essential to understand the sociocultural context of these interactions. Community-based approaches can help mitigate conflicts and promote trouble-free coexistence. Community-based conservation (CBC) prioritizes the involvement of local stakeholders in conservation efforts in order to reduce human-wildlife conflict and foster sustainable practices. Integrating indigenous and local insights regarding wildlife behaviours and habitats ensures that **conservation strategies** are culturally appropriate and effective. When locals are involved, compliance and stewardship improve, as they are more likely to safeguard resources that they understand and cherish.

Financial incentives for conservation can help offset losses caused by interactions with wildlife. Initiatives may involve compensation schemes for killed livestock, ecotourism opportunities and **community-managed protected areas**, which create alternative livelihoods that are advantageous to both people and wildlife.

By **increasing awareness about the ecological role of wildlife**, perceptions can be changed, fostering a move towards coexistence. Educational programmes can address fear and misunderstanding, highlighting the benefits of biodiversity that wildlife brings to local ecosystems. The creation of systems for reporting and **managing human-wildlife conflicts** encourages communication and collaboration between communities and authorities. This can

include early warning systems about wildlife movements or mediation strategies to address grievances (Dawn & Htwe, 2019; Owen-Smith, 2002).

Human-wildlife conflict and community conservation are vital interconnected ecological elements that require collective understanding and joint strategies. The promotion of coexistence between humans and wildlife is essential in order to preserve biodiversity and also support the livelihoods of **communities impacted by ecological challenges**. Ongoing research and community engagement are essential for the development of effective solutions that respect both conservation goals and human needs (Dickman, 2010).

2. Citizen science has emerged as a pivotal movement in the field of environmental conservation as it enables individuals from various backgrounds to engage meaningfully in scientific research. A prime example in this field is the Christmas Bird Count (CBC), organized by the National Audubon Society in North America. This annual event exemplifies how ordinary individuals can collaborate with scientists to gather valuable data about bird populations and biodiversity trends, thus contributing to **larger conservation efforts** and fostering a sense of community and environmental stewardship (Dunn and Weston, 2016).

In 1900, ornithologist Frank Chapman started the Christmas Bird Count (CBC) tradition when he suggested a "**bird census**" as a substitute for the custom of hunting and killing birds during the holiday season. Participants would count the birds instead of killing them, enabling a more ethical method of researching avian populations. Chapman's idea became popular, and the first CBC took place in 25 locations across the United States, with 27 species counted. Over the decades, this event has grown into an extensive citizen science initiative, involving thousands of participants in thousands of locations every year.

The CBS generally takes place between mid-December and early January, a time when it is relatively easy to observe many bird species. Participants, referred to as known as "citizen scientists", form groups and cover designated areas during a 24-hour period, counting all the birds they see or hear. The gathered data is then submitted to the Audubon Society, where it is analysed alongside historical data to identify patterns and trends in bird populations (Fischer, 2017).

The CBC has made **significant contributions to ornithology** and biology by providing long-term data that help scientists understand the impacts of climate change, habitat loss, and other environmental changes in bird populations. For example, CBC data showed a decline in certain

species, which prompted conservation measures and helped to influence policy decisions. Furthermore, the programme has contributed to research on migratory patterns, reproductive success, and potential markers of ecological health.

Apart from its scientific benefits, the CBC promotes community engagement and fosters a sense of connection to nature. Participants of all ages and skill levels come together during the bird counts; this makes it **an inclusive event that promotes environmental education** and awareness. Participants learn about local birds, their behaviours, and their habitats; at the same time, they appreciate being outdoors, and often develop a lifelong passion for birdwatching and conservation (Kelling et al., 2015).

In recent years, **technology has enhanced participation** in the CBC: mobile applications and online platforms like eBird, developed by the Cornell Lab of Ornithology, enable birders to log their observations easily, share findings, and connect with a larger community of enthusiasts. Not only has this integration of technology into citizen science streamlined data collection, but it has also made participation more accessible to a broader audience than ever before.

The **Christmas Bird Count** is an example of the power of citizen science in promoting environmental awareness and contributing to meaningful scientific research. By enabling individuals to participate in data collection, it fosters community engagement, increases appreciation for nature, and strengthens efforts to conserve bird populations and their habitats. This **collective effort**, based on the simple act of counting birds, has lasting implications for the preservation of biodiversity; moreover, it ensures a sustainable future for wildlife and human communities alike (Sauer et al., 2017).

3. Traditional Ecological Knowledge (TEK) refers to the accumulated knowledge and practices of indigenous communities concerning their local ecosystems; it encompasses a deep understanding of ecological interdependencies, resource management, and sustainable practices passed down through generations. This model highlights the **importance of integrating indigenous knowledge** into contemporary ecological practices, thus significantly contributing to conservation and environmental management.

Traditional ecological knowledge refers to the understanding and insights that indigenous and local communities have developed over the centuries regarding their surrounding environment. This **knowledge comprises diverse aspects of ecology**, such as animal behaviour, plant species, weather patterns, and seasonal changes, all of which are crucial for sustainable

resource management. TEK is dynamic and adaptable; it evolves with changing environmental conditions and social contexts (Berkes, 2012).

TEK represents an integrated understanding of ecological systems, taking into account social, cultural, and spiritual aspects as well as biological ones. This **holistic perspective** is crucial for managing sustainable resources adequately; it is intrinsic to traditional indigenous customs and beliefs. It often **reflects spiritual connections** to the land and a sense of stewardship that focuses on the importance of sustainability for future generations (Mauro & Hardison, 2000). TEK promotes flexible management strategies that can adapt to environmental changes and uncertainties. Indigenous peoples possess the resilience and flexibility to modify their practices over time, guided by their observations and experiences (Berkes, 2012).

The **reindeer herding traditions of the Sámi people**, indigenous to northern Scandinavia, serve as a prime example of how Traditional Ecological Knowledge is put into practice. The Sámi manage vast areas of land and use their intimate knowledge of the ecosystem to sustainably herd and care for reindeer. The Sámi understand the seasonal migration patterns of reindeer populations and use this knowledge to guide herding practices. They anticipate the availability of grazing land, water sources, and weather conditions in order to ensure the well-being of their herds (Müller-Wille, 2006).

The Sámi utilize specific herding techniques that show their understanding of reindeer behaviour and the ecological landscape. These include rotational grazing – preventing overgrazing by allowing certain areas to regenerate – and the careful monitoring of the health of the herds (Vitebsky, 2005). Participatory activities, such as traditional ceremonies and community gatherings related to reindeer herding, reinforce community bonds and collective responsibility for resource management.

These aspects are **essential for maintaining social cohesion and fostering respect for ecological limits** (Molin, 2014). Facing climate change and industrial encroachment, the Sámi people are adapting their traditional practices to ensure the sustainability of their herds. They are actively involved in advocating for policies that recognize their land rights and support their traditional practices in the context of modern challenges (Hovelsrud et al., 2011).

Generations of **indigenous groups like the Sámi** have developed Traditional Ecological Knowledge (TEK) with invaluable insights and practices. Reindeer herding serves as a case study that shows the intersection of cultural values, ecological understanding, and sustainable resource management. Integrating TEK with modern ecological approaches not only enriches biodiversity

conservation but also upholds indigenous rights and contributes to environmental sustainability.

4. Protest models related to the environment: protest models raise awareness about ecological issues and motivate individuals and communities to adopt more sustainable lifestyles and practices. The **protest models leading to environmental awareness** have evolved significantly over time, producing various methodologies that effectively engage the public and highlight the importance of ecological issues. These models not only aim to influence policy but also foster a broader public understanding of the interconnected nature of environmental challenges (O'Brien & Selboe, 2019).

The **evolution of protest models** aimed at fostering environmental awareness reflects broader societal shifts, technological advancements, and an increasing understanding of ecological interdependencies. Activists have developed various methodologies over time that not only seek to influence policy but also aim to deepen public engagement and understanding of environmental issues, highlighting their significance in our everyday lives (Thunberg, 2019).

Initially, **environmental activism** in the mid-20th century was characterized by individual initiatives and campaigns at a local level, often led by grassroots organizations. These early efforts tended to focus on **specific environmental issues**, such as pollution control, wildlife preservation, and natural resource conservation. For instance, the inaugural Earth Day celebration in 1970 raised awareness of environmental issues but mostly focused on local problems like water and air pollution. While these **early movements** paved the way for the recognition of environmental issues and their implications for public health, they often lacked a comprehensive understanding of how interconnected systems contributed to these problems (Szerszynski & Brown, 2018).

As **global environmental issues** such as deforestation, biodiversity loss and climate change increased, protest methods started to shift. Activists recognized that the interconnected nature of these issues required a more holistic approach to mobilization. This shift saw the emergence of various methodologies designed to engage a wider audience and to better convey the urgency of ecological degradation.

Moreover, the emergence of social media has changed how **environmental advocacy** is carried out. Platforms like Twitter, Facebook and Instagram enable movements to rapidly disseminate information, coordinate global actions, and engage in dialogue with supporters and detractors alike. **The ability to share personal stories,** scientific data and visuals amplifies the reach of these movements, raising awareness of ecological issues in the public consciousness.

This digital connectivity has also facilitated the formation of global networks, empowering local movements to learn from and collaborate with one another, thus fostering solidarity across borders (Miller, 2019).

In this regard, **The Fridays for Future movement** leverages social media platforms to connect individuals and disseminate information rapidly. Social networks play an instrumental role in organizing events, sharing messages, and amplifying voices. For instance, hashtags like **#FridaysforFuture** and **#ClimateStrike** facilitate online engagement, encouraging followers to participate in offline demonstrations, share educational resources, and highlight climate issues, thus increasing the reach and impact of the movement (Boulianne, 2015).

Fridays for Future has sparked significant dialogue about climate change and mobilized millions of people around the world. **Events such as the Global Climate Strikes** demonstrate the power of social movements to influence public opinion and pressure policymakers to enact more ambitious climate legislation. These events **embody the collective actions** of FFF participants on a massive scale. The movement has successfully engaged not only students but also parents, teachers and various community members, fostering an inclusive network that demands change (Doherty & Hayes, 2020).

The FFF movement illustrates how collective behaviour, shared values, social networks, and group identities can galvanize individuals towards a common goal – in this case, urgent climate action. At the heart of Fridays for Future lies a **collective belief in the need for immediate action to counter climate change**, based on scientific evidence and a sense of moral responsibility. The movement resonates deeply with values surrounding sustainability, intergenerational justice, and environmental stewardship. Activists argue that their generation will bear the brunt of the consequences of climate change, motivating them to demand accountability from political leaders and corporations (Bennett & Segerberg, 2013).

Fridays for Future **cultivates a strong sense of identity** among its participants, who are united by their commitment to climate justice and advocacy. Young activists identify with a global community of like-minded individuals who share the same passion for a cause. This sense of belonging fosters stronger commitment to the movement and encourages individuals to adopt sustainable practices in their own lives and inspire others to act. For example, many participants engage in discussions about reducing waste, promoting renewable energy, and advocating for policy changes (Hoffmann, 2020)

The social influence within the FFF network **motivates individuals to strengthen their**

commitment to climate activism. When participants see their peers taking part in strikes or sharing powerful messages, they are more likely to adopt similar behaviours and campaign for systemic change. This cycle of influence reinforces collective action, leading to larger gatherings, increased media coverage, and heightened global awareness of climate issues (Dwyer, 2020).

The Fridays for Future movement demonstrates how shared values, social networks, and group identities foster collective action on environmental issues. By analysing FFF we can **understand how individual choices**, social dynamics, and broader societal shifts are interconnected in addressing climate change, one of the most pressing challenges of our time.

The evolution of protest models has significantly enhanced their ability to engage the public and emphasize the importance of ecological issues. By creatively intersecting activism with education, art and digital media, contemporary movements not only aim to influence policy but also to cultivate a deeper understanding of the complexity of environmental challenges. These shifts enable individuals to recognize their collective responsibility in advocating for sustainable solutions, ultimately transforming ecological awareness into actionable commitment for future generations.

Conclusion and Comments

The relationship between mankind, nature and culture has always been contradictory, mainly due to humans' aggressive actions on the processes and times of the environment: through the hand of humans, the **power of nature** has been used for human profit, especially since the Industrial Revolution, exceeding various limits and without paying due care and attention so as not to alter the delicate balance of which human beings themselves are part.

Mass culture has delivered the final blow; it has caused a series of imminent **environmental hazards and natural imbalances** that will see life on the planet as the main victim, including the human species itself that caused this. Therefore, the environmental crisis inevitably has human roots, presents itself as an ethical problem, and calls into question our way of acting.

From this perspective, the behaviour of most of us – and thus, in this sense, our collective behaviour – is inadequate and superficial, neglecting long-term consequences; it is also greedy, implementing **a short-term profit economy** that significantly contributes to the socio-environmental crisis. On the other hand, action aimed at the production of a common good would require a change in direction towards building a renewed relationship between man and the environment.

The great difficulty of putting into practice collective actions that are environmentally respectful, and thus aimed at taking care of the planet, emerges as the key theme of what has been discussed so far. The **connection between collective processes and ethical-moral issues** takes on the characteristics of a true paradox, highlighting the gaps in collective action for the environment and revealing a significant obstacle to achieving acceptable sustainability standards at micro, meso and macro levels. In this context, Elster reflects on the inherent difficulty of engaging in moral actions, pointing out how social actors tend to overestimate the disadvantages of cooperation (Elster, 1989, Italian translation 1993).

To support this idea, he provides a definition of collective action that clarifies the roots of the problem:

> *Let's assume that each member of a group can choose between engaging in a certain activity or not. The group faces a collective action problem: it is better for everyone that someone participates, rather than no one doing so, but it is better for each individual to refrain. Whether it is better for everyone if all engage in the activity, rather than none doing so, can be either the best option or not. Whether everyone should do it may or may not be the best thing. Cooperating means acting against one's personal interest in a way that benefits everyone if some – or perhaps all – act in that manner (Elster, 1989: 151).*

To cooperate, therefore, means recognizing that the common good is an achievable goal only by abandoning an individualistic and short-sighted perspective, thus bridging the behavioural and moral gap. Paradoxically, by overcoming the divide between self-interest and the collective good, **individual interest itself evolves**, harmonizing with the collective interest. In this sense, while it was once argued that a clean environment was not an exclusive good and could be enjoyed even by those who did not contribute to achieving it (Sandler, 1992), the severity of today's environmental crisis makes this claim outdated.

In order to solve **ecological issues and guarantee a sustainable future** by lowering environmental risks, **collaboration is now more important** than ever. However, although the environment is a collective good (Olson, 1965, Italian translation 1983) that everyone should benefit from equitably and contribute to equally to ensure its well-being, the reality is far from straightforward.

In this regard, Oliver's call for the collective effectiveness of behaviours seems very relevant: "**If you don't do it, nobody else will**" (Oliver, 1984). It is a clear invitation to action and participation, encouraging more responsible choices regarding climate and ecology.

However, this call often leads to the opposite attitude: "Others are already doing it, so why should I?" When this logic is applied to collective efforts for environmental sustainability, the conclusion is that the benefit produced is not exclusive but shared by everyone, even those who did not actively contribute to achieving it (Sandler, 1992).

As a result, this **mechanism fuels individual inaction** – a paradox known as the "If you don't do it, nobody else will" problem of collective action (Olson, 1965, Italian translation 1983). This ultimately hinders the achievement of the common good, which, in this case, is represented by environmental sustainability (Daher et al., 2024).

How can we address these unproductive tendencies? How can we encourage young people, adults, businesses and institutions to act in order to solve, or at least lessen, a problem that can now be defined as a social issue?

Certainly, young people involved in protests, and thus in global communication and spreading awareness of environmental deficits, sources of proposals and innovative ideas, seem to be emerging as the key players in driving change. By claiming a vital responsibility towards the planet, young people have now taken on the ecological issue and are calling for the involvement of individuals and institutions.

For example, through their resistance and awareness-raising practices, the FfF activists have promoted a new way of experiencing the natural environment, urging both individual and collective subjectivities to radically change their habits with an environmentalist approach and demanding a commitment from institutions to define effective policies to prevent and combat the effects of climate change.

However, **relying solely on the determination of the new generations** is not enough, as it is necessary to **act cooperatively on multiple fronts**, especially in education, in order to provide ecological and practical training that will shape an even more aware generation.

The **principles of sustainability** must be incorporated into both formal and informal educational settings. A comprehensive, intricate and challenge-focused approach is required for sustainable development education. Building an educational community will play a crucial role in transmitting and implementing the principles of a 360-degree sustainability culture, as well as promoting the co-construction of knowledge based on **sustainability principles**, with attention

to diversity, interdependence, limits and uncertainty.

At this time of instability, **upheavals and imbalances in every area of life**, creating new sustainable educational projects that guide and turn actions into constructive steps means focusing on all the factors mentioned so far. It involves adopting an integral ecological perspective, where everything is interconnected, and focusing actions on caring for oneself, others and future generations, within a brand new and as yet undeveloped relationship between humans and the environment.

Understanding the **critical importance of ecological issues** is vital for promoting **sustainable behaviours.** Educational programmes that focus on environmental literacy can effectively raise awareness and motivate individuals to adopt more sustainable practices. Schools and educational institutions should incorporate comprehensive environmental studies into their curricula, teaching students about the relationship between ecological health and human behaviour (Tilbury, 1995).

The importance of **integrating environmental studies** into **educational curricula** stems from the recognition that students today will inherit the environmental challenges of the future. By incorporating a holistic understanding of ecological systems into their education, we can nurture a generation of informed citizens who are not only aware of ecological problems but also prepared to act on them. By thoughtfully **incorporating comprehensive environmental studies into school curricula**, educational institutions can play a pivotal role in shaping a well-informed, proactive generation ready to deal with the pressing ecological challenges of our time. Not only does this holistic educational approach enhance understanding but it also empowers students to become active participants in **fostering a sustainable future, driving societal change**, and promoting ecological health at both local and global levels (Beringer et al., 2008).

Creating an environment in which sustainable behaviours are considered the norm is an effective way of encouraging ecological actions among individuals and communities. By presenting these behaviours as standard social practices, we can use social influence and peer dynamics to **encourage collective actions focused on sustainability**. By strategically employing social comparisons and feedback mechanisms, we can shift perceptions and motivate individuals to align their actions with those of their peers. This approach fosters individual behavioural change and also contributes to a sustainable community ethos. Promoting ecological behaviour is a multifaceted challenge that requires an understanding of human psychology, social dynamics, cultural contexts and systemic influences. By **enhancing environmental awareness**, leveraging

social influence, engaging communities, and utilizing behavioural nudges, we can create an environment that is conducive to sustainable actions (Schmuck, 2005).

The integration of **Traditional Ecological Knowledge**, community-driven and educational institutes initiatives, and participatory governance can enable individuals and communities to operate collectively to make well-informed decisions. Ultimately, fostering ecological behaviour is a collective responsibility that requires education, social engagement, and a commitment to sustainability across all sectors of society.

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6. Importance of Environment Protection to Ensure Earth's Survival and Sustainable Development

Theoretical & General introduction

Those who believe that environmental problems are unique to our modern era are mistaken. **Large rubbish heaps** around ancient cities, systematic flooding due to poor land management, soil erosion, and salinization that transformed fertile oases into barren deserts—all of these are issues humanity has previously faced.

One need not look far for examples: irrational farming practices in the Easter Island led to complete deforestation by around 1600 CE. Without trees to anchor the soil, erosion became severe, reducing the island's agricultural productivity. Native bird species were hunted to extinction, and marine resources were overexploited as terrestrial resources dwindled. These led to the famine and social collapse, contributing to the decline of the highly developed local culture[32].

There are a lot of cases in the past that raise the question: if our ancestors could drive themselves toward extinction using wooden hoes and plows, **what might we expect with our chemical plants and nuclear power facilities**?

The **devastating exploitation of natural resources**, the increase in harmful emissions caused by rapid industrialization, technological disasters, and wars—all of these have led to the emergence of global problems of today, presenting our world with a choice: change or **continue down the path to the destruction of our planet**. The vast majority of the challenges humanity faces at the beginning of the 21st century are related to ecology.

The most threatening issue is **Climate Change.** This term **refers to long-term alterations in** temperature, weather patterns, and global climate systems, primarily driven by the accumulation of greenhouse gases and particulate matter in the atmosphere. The most

[32]Hughes, J. Donald. *An Environmental History of the World: Humankinds's Changing Role in the Community of Life*. 2nd ed. London: Routledge, 2009.P. 100-105

significant long-term forcing agents are carbon dioxide (CO_2) and nitrous oxide (N_2O), with carbon dioxide having a century-long atmospheric lifetime.

Short-term contributors, such as methane (CH_4) and black carbon, are more potent in the near term. The consequences of climate change are already visible worldwide, including extreme weather events such as heatwaves, droughts, wildfires, floods, and severe tropical cyclones. Rising sea levels, exacerbated by climate change, are causing increased damage to coastal regions. The **continuing rise in CO_2 concentrations** is projected to worsen these effects unless global emissions are reduced to net-zero levels, a target aimed to be reached by 2050[33].

Human activities, such as deforestation, habitat destruction, and pollution, are driving the extinction of species at an unprecedented rate. The loss of biodiversity threatens ecosystem stability, the resilience of natural systems and food security. At the same time, intensive farming practices leads to soil erosion, desertification, and a decrease in soil fertility, affecting food production and natural habitats. Air, water, and soil pollution from economic activities contribute to health problems, harm wildlife, and degrade ecosystems. Plastic pollution, in particular, is a growing global concern, affecting oceans and marine life. Other dangerous issues include COVID-19 and other zoonotic diseases, inequality, wars and conflicts[34].

The trend towards **catastrophic environmental degradation** has been noticed for a long time. In the late 1960s, the Club of Rome, which brings together some of the world's leading scientists, became concerned about environmental degradation.

A special study was conducted, and in 1972, its findings were presented to the public in a report titled *Limits to Growth*. According to the document, within the next century, **humanity would reach a point beyond which a catastrophe of unprecedented scale would await**, marked by uncontrollable population decline and a sharp drop in production. The authors argued that the only way to avoid this looming disaster was to establish a balance between economic development and environmental preservation. A balance essential for sustainable long-term development[35].

[33]Brewer, Thomas. *Climate Change: An Interdisciplinary Introduction*. 1st ed. 2023. Cham: Springer International Publishing, 2023.P. 4.

[34]Dolan, Anne M., ed., *Teaching the sustainable development goals to young citizens (10-16 years): a focus on teaching hope, respect, empathy and advocacy in schools*. London ; New York: Routledge Taylor & Francis Group, 2024.P. 4-7.

[35]Meadows, Donella H., Club of Rome, и Potomac Associates, ред. *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*. 2. ed. A Potomac Associates Book. New York: Universe books, 1974.

Twenty years later, in June 1992, the Earth Summit, first UN World Summit on Sustainable Development was held in Rio de Janeiro, Brazil. Representatives from more than 178 countries identified priority goals, including preserving and strengthening natural resources, developing **environmentally friendly technologies**, and integrating environmental and economic considerations into decision-making processes. They adopted *Agenda 21*, a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment[36].It became clear that no international organization or single state, however powerful, could achieve these goals alone; rather, **the responsibility largely rests with citizens and private businesses**—the primary consumers of the planet's natural resources.

In September 2000at the Millennium Summit at UN Headquarters in New York adopted the *Millennium Declaration*[37]. It was stated that the **current unsustainable patterns** of **production and consumption** must be changed in the interest of our future welfare and that of our descendants. The *Millennium Declaration* laid a **cornerstone for the concept of the sustainable development**. While the idea of sustainable development was formally introduced in the 1987 *Brundtland Report*, titled *Our Common Future*, the *Millennium Declaration* was instrumental in turning these ideas into global action.

The 2030 *Agenda for Sustainable Development*, adopted by all United Nations Member States in 2015, **introduced the 17 Sustainable Development Goals** (SDGs), which call for urgent, collective action by all nations in a global partnership:

Goal 1. End poverty in all its forms everywhere.

Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Goal 3. Ensure healthy lives and promote well-being for all at all ages.

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

[36]United Nations Conference on Environment and Development. *Agenda 21: Programme of Action for Sustainable Development ; Rio Declaration on Environment and Development ; Statement of Forest Principles: The Final Text of Agreements Negotiated by Governments at the United Nations Conference on Environment and Development (UNCED), 3-14 June 1992, Rio de Janeiro, Brazil*. New York, NY: United Nations Dept. of Public Information, 2010.

[37]United Nations General Assembly. *United Nations Millennium Declaration*. A/RES/55/2. September 8, 2000.

Goal 5. Achieve gender equality and empower all women and girls.

Goal 6. Ensure availability and sustainable management of water and sanitation for all.

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all.

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Goal 10. Reduce inequality within and among countries.

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable.

Goal 12. Ensure sustainable consumption and production patterns.

Goal 13. Take urgent action to combat climate change and its impacts.

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development[38].

The General Assembly emphasized the **urgent need to protect the planet from degradation, including through sustainable consumption and production**, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.

At the same time, no international organisation or individual state can achieve these ambitious goals without the help of society and business. For companies, sustainable

[38]United Nations General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development*, A/RES/70/1, 25 September 2015.

development means transitioning to a new management model where environmental safety is as integral a part of business strategy as financial success. In other words, environmental protection should be among the core goals of any enterprise. This approach is often referred to as environmental management, eco-management, or environmental and economic management.

Eco-management is one of the most important components of social responsibility of business - an approach that assumes that a private company cares about the interests of society, while expecting a **positive response from the consumer and the state**. A socially responsible company produces high-quality goods and services that people need. The profit generated enriches the company's shareholders and employees, who - let's not forget - are also part of society. The company does not engage in fraud, pays taxes, works in accordance with the current legislation and behaves in a gentlemanly manner in a competitive environment, without resorting to unfair advertising, sabotage, etc. It occasionally donates large sums of money to charity, takes care of social guarantees for its employees and makes sure that its products, as well as its production itself, do not harm human health and the environment.

Socially responsible companies are considered more attractive for investment. There are dozens of investment funds operating in Western Europe and the USA, which invest money only in companies that can prove their value to society. There are even special stock indices of social responsibility, such as the Dow Jones Sustainability Index, FTSE4Good and others.

According to the **FTSE Russell Sustainable Investment Asset Owner survey** (2024), 74% of asset owners surveyed are implementing and evaluating sustainable investment considerations in their investment strategy. In PwC's **Global Investor Survey**2022 survey, 79% of investors said that ESG (Environmental, Social, and Governance) risks are an important factor in their investment decision-making. Additionally, 75% of investors are willing to divest from companies that are not taking sufficient steps to address ESG issues, showing that values-driven approaches are now pivotal for investor interest and confidence.

The interest of companies in doing business based on the principles of social responsibility and sustainable development is due to the fact that consumers, employees, and investors increasingly prioritise values-driven brands. In the 2022 **Edelman Trust Barometer** report, 58% of consumers said they would buy or advocate for brands based on their beliefs and values.

According to **Accenture's Global Consumer Pulse Research**, 62% of global consumers want companies to take a stand on current and relevant social, cultural, environmental, and political issues. The study also found that nearly half of consumers have shifted at least 30% of their spending to more values-driven brands, demonstrating the significant impact of corporate values on purchasing decisions. **Deloitte Global Millennial Survey**(2021) demonstrated that both Millennials (49%) and Gen Z (44%) are increasingly purpose-driven and expect businesses to prioritize social responsibility and environmental impact.

Good Examples

It is believed that **global Climate Change** can even be beneficial for humanity if resources are used rationally and economic policies are sound[39]. As the global population grows, the demand for resources like water, soil, and minerals increases. Overexploitation can lead to resource depletion, as seen with water scarcity in regions like sub-Saharan Africa and the Middle East.

By **promoting sustainable agriculture**, water conservation, and recycling, we can meet current needs without compromising resources for future generations. Preserving ecosystems like forests, oceans, and wetlands helps regulate Earth's climate. Forests, often referred to as "**carbon sinks**," absorb and store large amounts of carbon dioxide, reducing greenhouse gas concentrations in the atmosphere. Deforestation releases this stored carbon, **contributing to climate change and disrupting rainfall patterns** critical to agriculture and drinking water supplies. Protecting these areas helps mitigate climate change and maintain ecological balance. Biodiversity supports food security, water purification, and resilience against natural disasters.

However, **pollution and overfishing threaten ecosystems**. Sustainable practices, such as marine conservation zones and responsible fishing, help preserve biodiversity, supporting both ecological health and economic livelihoods. Clean air and water are fundamental to human health. Pollution from industries and waste disposal leads to **respiratory diseases, waterborne illnesses, and contamination of food sources**. Regulatory measures, like reducing

[39]Blockley, David. *Climate change is an opportunity: why we need principled capitalism*. First edition. Boca Raton: CRC Press, Taylor & Francis Group, 2024.

emissions and promoting waste management practices, directly protect human health while preserving vital resources for future generations.

Environmental protection ensures that future generations inherit a world where they can thrive sustainably. It is not just about preserving nature but about sustaining life, resources, and economies. **Many innovative approaches** were proposed in recent years addressing climate change and other ecological issues, with contributions from various disciplines. They include such solutions as drone-powered aerial seeding to restore forests, assisted evolution and migration to help species adapt to changing climates, and biochar production to sequester carbon and improve soil fertility. **There are futuristic ideas like** carbon coins, lab-grown meat, Pleistocene Park for ecosystem restoration, and geoengineering strategies to cool the planet or reduce CO_2 levels, as well as socioeconomic proposals, including sustainable capitalism, carbon taxes, and the establishment of a Civilian Climate Corps to tackle climate challenges and restore ecosystems[40].

However, it is essential to understand that **on the path to saving nature**, the efforts of ordinary people play a crucial role. For example, waste recycling efforts, which are vital for **conserving the planet's natural resources**, would be ineffective without the support of the millions who sort waste daily. However, people can go beyond participating in government or NGO-led initiatives. Citizen-driven projects and environmental preservation efforts initiated by individuals aiming to improve living conditions in their country or region are also extremely significant.

One of the most striking examples of how even one person can change the world around them is **the story of Brazilian photographer Sebastião Salgado**. He was born in 1944 in the State of Minas Gerais, on a farm situated in a vast valley called Rio Doce, from the name of the river that waters it. His father’s farm was large and self-sufficient, with about thirty families living there and producing rice, corn, tomatoes, potatoes and sweet potatoes, fruit and milk. Driven by a passion for knowledge, Salgado moved to Paris to study, where he eventually chose photography as his profession, becoming one of the most renowned documentary photographers of our time. Salgado is known for his powerful photo essays on the harsh working conditions of labourers and the exploitation of natural resources in South

[40]Pilkey, Orrin H. *Escaping Nature: How to Survive Global Climate Change*. 1st ed. Durham: Duke University Press, 2024.P. 225-230.

America and Africa. As a photojournalist, he covered numerous historical events, from the aftermath of Saddam Hussein's invasion of Kuwait to the genocide in Rwanda.

In the mid-1990s, Salgado returned to his homeland, feeling that his successful photography career had been possible only because his father had preserved the family farm during an economic crisis[41]. However, upon his return, he found only dried streams, destroyed forests, and depleted soil. In 1998, he and his wife, Lélia, established Instituto Terra, a nonprofit focused on environmental restoration in the Vale do Rio Doce. Leveraging his fame, Salgado raised funds to plant three million trees, establish a nursery, a seed laboratory supporting over 200 native tropical species, and a training center for environmental technicians. The project expanded throughout Vale do Rio Doce, achieving river revitalization, reforestation, and biodiversity restoration, which also generated jobs for the local community[42].

However, one doesn't need to be a famous artist to start **a successful environmental initiative with economic benefits for the community**. A great example is a community of Totnes, a small town of just over 9,000 people in southwest England. In November 2007, a group of concerned residents founded the Totnes Renewable Energy Society (TRESOC). Their first major project was a 4.6MW wind farm intended to supply Totnes with clean energy. During the project, involving over 500 town residents, several small solar power plants were also established. The society attracted funds from 109 small investors to build a 300kW hydroelectric plant at Totnes Weir. This work continues today, with TRESOC engaging other communities as well[43].

These examples highlight the importance of empowering people to take practical, impactful actions that reduce dependence on global systems and foster resilient, self-sufficient communities. More about the Totnes community initiative and similar projects can be found in ***The Power of Just Doing Stuff*** **by Rob Hopkins**. The author shows how local action can tackle global challenges through creativity, collaboration, and a focus on sustainability[44].

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[41]Salgado, Sebastião, Isabelle Francq, и Sebastião Salgado. *From My Land to the Planet*. Rome: Contrasto, 2014.- P.160.

[42] https://www.nationalgeographic.com/travel/article/meet-adventurer-photographer-sebastio-salgado-reviving-forests-brazil-vale-do-rio-doce

[43] https://tresoc.co.uk/about/

[44]Hopkins, Rob. *The Power of Just Doing Stuff: How Local Action Can Change the World*. International version. Cambridge: Transition Books, 2013.

Numerous **successful sustainable development and environmental protection** projects show that these efforts can not only improve environmental conditions but also bring significant economic benefits. Unsurprisingly, growing environmental awareness has led more companies to choose sustainable development, investing in their own environmental initiatives to reduce costs over time.

Economists identify **four key areas where environmental and economic management are applied**: production, products, employees, and communications. In production, companies must aim to conserve resources and reduce their environmental impact, employing energy-saving technologies and waste recycling methods. For example, Herman Miller, Inc., one of the world's leading manufacturers of office, healthcare and home furniture, launched an energy conservation program that allowed company to reduce energy costs by more than $1 million annually since 1991[45].

Environmental and economic management also influences product design, packaging, and recyclability. Significant research is underway to develop biodegradable, non-toxic materials that don't harm the environment. For example, recently BASF and Inditex have introduced the loopamid, a new polyamide 6 (nylon 6) created entirely from textile waste. This marks the first fully circular nylon solution for the apparel industry[46].

A company **committed to sustainable development** is expected to organize ongoing training and educational events for its employees. Environmental education has become a vital component of corporate culture at most major global firms.

In terms of communication, a **key aspect of environmental and economic management** is cooperation with governmental and non-governmental organizations. Such collaborations benefit both parties: donations to environmental causes help foster a positive company image, while leveraging the expertise of public organizations contributes to project success. One example is ecological product certification. European consumers may recognize the "**green dot**" (Der Grüne Punkt) on packaging, signifying that production was eco-friendly and the waste is recyclable. This label is awarded to companies that financially support the recycling program **Ecological Packaging** and adhere to its waste disposal guidelines. Several types of eco-labels have been adopted in Europe, some of which are issued by non-

[45] https://copper.org/environment/sustainable-energy/transformers/case-studies/study_transformer.php
[46] https://www.basf.com/global/en/media/news-releases/2024/01/p-24-109

governmental organizations. The European Union also has its own Eco Label, applied to consumer goods that meet EU environmental standards.

Certifying entire enterprises, rather than individual products, based on sustainable development principles is a progressive idea. The UK introduced the first such standard, BS 7750, in 1992. This document includes guidelines for developing environmental and economic management systems and conducting environmental audits. Since 1995, companies have been able to obtain the **EMAS (Eco-Management and Audit Scheme) certificate**, a Europe-wide environmental standard that was updated in 2001. While it is valid across the EU, many companies outside the EU also pursue it.

In 1996, the **International Organization for Standardization's Technical Committee 207 introduced the ISO 14000 series**, which incorporates many principles from the ISO 9000 quality management standards. ISO 14000 series includes several documents to date, of which only ISO 14001 is fully auditable. ISO 14001 certification is awarded to companies whose environmental management system complies with this standard.

ISO 14001 does not specify requirements for waste, emissions, or technology. Instead, companies must comply with the environmental regulations of the countries where they operate. The **main requirement of ISO 14001 is that companies develop and publish** a document outlining their environmental policy, including specific goals and objectives in each operational area. Companies must also continuously monitor environmental impacts and develop an environmental management program, defining responsible personnel, timelines, and budgets. Regular employee training on environmental matters, including emergency preparedness, is required. **Environmental audits** should be conducted periodically by the company or an external organization, and companies are expected to strive for continual improvement of their environmental management systems, with all activities documented in detail. Periodic environmental reports should also be published.

Today, **ISO 14001 is the most widely adopted international standard for sustainable development**, with more than 529 000 companies certified by 2022[47]. Its popularity stems in part from the financial benefits it brings as far as ISO 14001 simplifies the process of securing

[47] https://www.simpleque.com/iso-survey-2022-iso-9001-and-iso-14001-certifications-around-the-world/

loans, improves contract terms, and provides access to new markets. Direct savings also come from lower resource costs, reduced logistics, and decreased waste.

Case Study

Ljubljana – the European Zero Waste Capital

Ljubljana, the capital of Slovenia with a population of over 285,000 people, has become an example of successful implementation of sustainable development in recent decades. In 2014, the city became the first European capital to join the **Zero Waste Europe initiative**. This meant a complete change in the approach to waste management with a focus on reduction, reuse and recycling. In 2016, Ljubljana was awarded the title of European Green Capital, which recognises the efforts of local communities to move towards a greener and more sustainable future. Thanks to the efforts of the authorities and the community, Ljubljana has transformed from a city with low environmental performance into a model of sustainable development.

Problem statement

During the 1970s, Ljubljana was a city with one of the worst air pollution rates, which was caused by the widespread use of stove heating and the predominance of thermal power generation[48]. **The air quality was significantly affected** by emissions from road transport. Already in 1996, there was one car for every 2.46 residents of the city, and this figure grew steadily over the following years. As a result, the city faced systematic exceedances of the permissible levels of carbon dioxide and sulphur dioxide in the air, which significantly reduced the quality of life of its residents.

Since the late 1980s, fresh water consumption in the city has been steadily increasing, but due to the imperfections and deterioration of the infrastructure, about 50% of this valuable resource was lost before it was even received by consumers. Slovenia's economic growth led to a rapid increase in the consumption of goods, which, in turn, resulted in an increase in waste.

In the early 2000s, Slovenia **faced a crisis in waste management**. Recycling rates were low, and most waste ended up in landfills. This created environmental and social problems,

[48] Špes, Metka. «Environmental issues of the Ljubljana urban region». *Dela*, 21 (2004): 567–79. https://doi.org/10.4312/dela.21.568

including soil, water and air pollution, as well as conflicts between communities over the location of landfills.

Solution

The Government of Slovenia, Ljubljana city authorities, NGOs and city residents were aware of the need to join forces to transform Ljubljana into an environmentally friendly environment. **Regulations were adopted to limit the use of single-use plastic products** and encourage businesses to adopt environmental standards. The government supported small business initiatives that operated on the principles of the circular economy, such as packaging-free shops, repair shops and the rental of reusable goods. The strategy for solving environmental problems was based on the following key principles:

Separate waste collection

The city introduced a system of coloured containers for different types of waste: biowaste, paper, plastic, glass, etc. This helped raise awareness among residents and facilitated the recycling process. The **Ljubljana Regional Waste Management Centre** (RCERO Ljubljana) was launched to introduce a comprehensive approach to waste recycling. In particular, a new and expanded landfill was commissioned in 2009. Two years later, the company built an upgraded leachate treatment plant, and in 2015, a mechanical and biological waste treatment and recovery facility. Biowaste was collected separately and converted into fertilisers used in agriculture and horticulture.

Changing the urban environment

The city authorities have been able to formulate a clear vision of environmentally friendly city development, which was set out in Ljubljana Vision 2025. The document envisages a **harmonious combination of urban planning and sustainable development**. The priority is to build energy-efficient and carbon-neutral buildings, increase green and recreational areas, and expand the use of renewable and pollution-free energy resources, mainly obtained through hydrogen generating technology[49].

An example of urban space revitalisation is the **Rakova Jelša Park**[50]. The 75,000-square-metre area on the southern outskirts of Ljubljana was a place where illegal landfills were

[49]https://www.ljubljana.si/en/about-ljubljana/vision-of-ljubljana-2025/environmentally-friendly-city/

[50] Nastran, Mojca, и Helena Regina. «Advancing Urban Ecosystem Governance in Ljubljana». *Environmental Science & Policy* 62 (2016): 123–26. https://doi.org/10.1016/j.envsci.2015.06.003.

operating and invasive plants were growing, which were harmful to biodiversity. During 2014-2017, a project was implemented to clean up and restore the natural balance of this area, which allowed Rakova Jelša to be transformed into a modern park that combines recreational opportunities and creates conditions for the development of local flora and fauna.

Transport policy

Particular attention was paid to improving the transport infrastructure. In 2017, the city adopted an integrated transport strategy to strike a balance between the movement of city residents and tourists on foot or by bicycle, private car travel and public transport. **A large part of the city centre was closed to motorised traffic since 2012**. Instead, bicycle lanes were created and conditions for **pedestrians were improved**. With its Bicike (LJ) system of almost free-of-charge bicycle sharing in the city Ljubljana among the most bicycle-friendly cities in the world. Together with Avantcar, Ljubljana launched an electric car sharing initiative. The joint programme helped to reduce the cost of using rented vehicles for the city's population and tourists, reduce dependence on private transport and the level of harmful emissions into the atmosphere. Important steps have been taken in the field of public transport. The transport company Ljubljanski potniški promet d.o.o. started modernising its bus fleet as early as 2006. Over the past decade, about half of the buses purchased have been using compressed natural gas (CNG) or methane as fuel. Compared to the most common diesel engines, CNG vehicles emit 80% less nitrogen oxides and 10% less CO2

Environmental education

The implementation of all the initiatives would not have been possible if the city had not been promoting awareness campaigns and establishing systematic environmental education for several decades. **To engage the community, educational activities were carried out**, including lectures in schools, media campaigns and trainings for local businesses. An important centre for environmental education is the University of Ljubljana, which has an Ecology and Biodiversity programme. In 2024, the UNESCO Chair on Teacher Education for Sustainable Development was established here.

Results and conclusions

In a few decades, **Ljubljana has achieved outstanding results**. In particular, the level of waste recycling in the city is one of the highest in Europe. It is stated that thanks to the efforts of citizens to sort waste and the activities of RCERO, only about 5% ends up in landfill without the prospect of further recycling. The city has significantly reduced greenhouse gas emissions from landfills.

Due to the expansion of parks and natural forests, there are 560 m2 of green space for every inhabitant of Ljubljana. Citizens' awareness has increased: most residents now actively support environmental initiatives.

The case of Ljubljana shows that sustainable development is possible even with limited resources. **The main success factors were**:

- ✓ A systematic approach covering all stages of waste management.
- ✓ Active community participation through educational initiatives and transparent communication.
- ✓ Political will and involvement of various stakeholders (including private business).

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