

Towards greening – benefits and challenges of the green revolution

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Abstract: Our present economy, which is strongly dependent on fossil raw materials, is gradually changing into an economy based mainly on renewable raw materials. The European Union has given a very strong political signal to support the green economy across Europe. The European climate strategy and the transition to a decarbonized economy indeed call for a deep transformation of the production, and consumption in the Community. This process either can be described as a transition, generally defined as the process of changing from one state or condition to another, or in a more restricted sense, transition leading to an entirely new way of fulfilling societal needs. In this process, we are referring to the two sides of the human-nature relation - the principle of ecological dependence, and the principle of ecological impact.

The goal of this article is to review main effects on the environment influenced by bioeconomy implementation and sustainable agriculture. Particular attention will be also given to the EU’s Green Agenda and the impact of its implication over the quality and efficiency of education and science, entrepreneurial level, market adaptability

Keywords: Bioeconomy, climate change, carbon fingerprint

Introduction

There is only one planet Earth, yet by 2050, the world will be consuming as if there were three (European Commission 2020). European Union has some of the highest environmental standards, developed gradually year by year. Their policy helps the EU economy become more environmentally friendly and implements the sustainable usage of all resources. This is a very important factor for the health and well-being of people living in the EU. However, it faces several serious challenges like climate change, unsustainable consumption and production, various forms of pollution etc.

Sustainable development is an overarching objective for the EU, which is committed to a 'high level of protection and improvement of the quality of the environment (Treaty on European Union/Art.3) There are many policies and still the European Union and the United Nations are natural partners in the efforts to shape a more sustainable, safer and better world for all. EU adopted the Sustainable development goals (SDG) and considered that for a successful path towards implementing the 2030 Agenda, monitoring and reporting the progress.

Materials and methods

The tasks to be accomplished in this research are related to: 1) Bioeconomic policy review for sustainable growth; 2) Carbon footprint monitoring and impact to the environment; 3) Bioeconomy and green revolution impact to entrepreneurial. Global international research is based on the mathematical and statistical approaches.

Results and discussion

EU green policy affects various fields and covers all possible sections to protect and influence our daily life in the best possible way. We can describe different areas of action for greener policy such as affecting the climate, water and air pollution which will affect the sustainable economic growth. From environmental and legislative point of view, it protects the natural habitats, keeps the water and air clean, also ensures the waste is treated correctly with less damage for all of us. On climate change, there are policies in implementing different strategies, taking a leading role in international negotiations on climate. It is committed to ensuring the successful implementation of the Paris Agreement. In this regard, EU countries have agreed to meet various targets in the years to come. The EU seeks to ensure that climate concerns are taken on board in other policy areas (e.g., transport and energy) and also promotes low-carbon technologies and adaptation measures.

An important part of the prevention is the fight against pollution. Pollutions` most harmful impacts on human health are typically monitored by the most vulnerable groups. These include children, who can suffer serious long-term harm to their development, people with medical conditions, older persons, persons with disabilities, and those living in poorer socio-economic conditions (European commission, 2021).

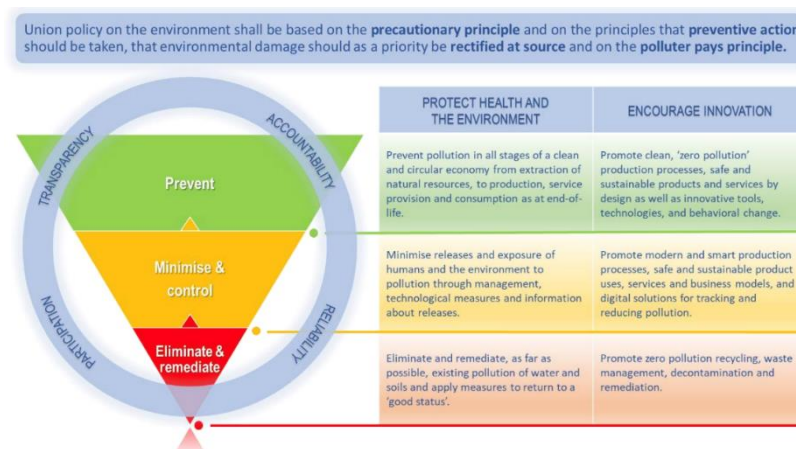


Figure 1. The zero-pollution hierarchy – reversing the pyramid of action, prioritizing the approaches for tackling pollution

Decades of regulation and large investments to reduce point source water pollution have brought substantial gain for the economy, human health, environment and social values. (OECD, 2017).

Circularity is an essential part of a wider transformation of industry towards climate-neutrality and long-term competitiveness. It can deliver substantial material savings throughout value chains and production processes, generate extra value and unlock economic opportunities. In synergy with the objectives laid out in the Industrial Strategy 16, the Commission will enable greater circularity in industry. Measures introduced under the new Circular Economy Action Plan aim to:

- make sustainable products the norm in the EU;
- empower consumers and public buyers;
- focus on the sectors that use most resources and where the potential for circularity is high such as: electronics and ICT, batteries and vehicles, packaging, plastics, textiles, construction and buildings, food, water and nutrients;
- ensure less waste;
- make circularity work for people, regions and cities;
- lead global efforts on circular economy (European Commission 2020).

In order to cope with the increasing challenges, EU green deal draws specific path for achieving their top priority goals.

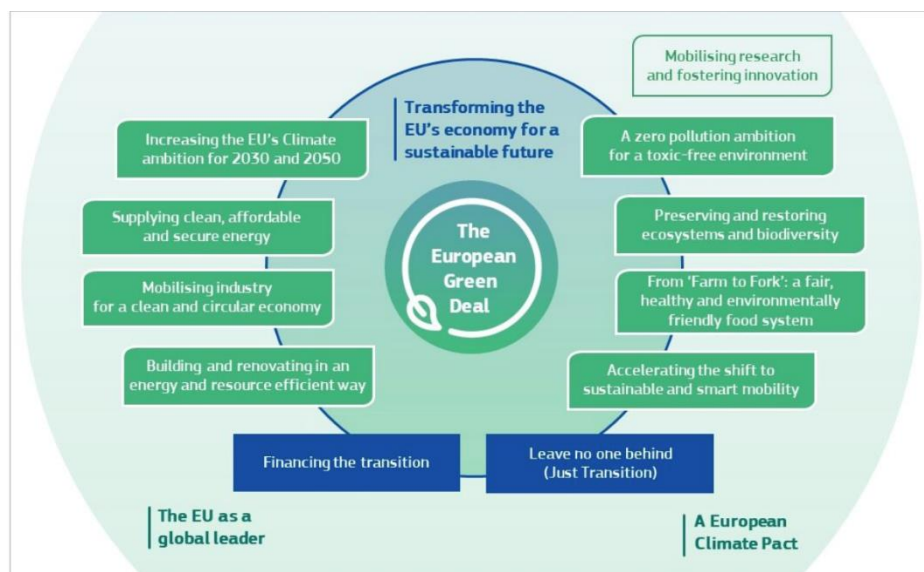


Figure 2. Policy areas of the EU Green Deal

Embedding the concept of sustainability in the way we produce and consume our food will bring benefits for all the actors in the food chain and in particular for farmers. (European Commission, 2020) We can describe the benefits on the next way:

- New business opportunities for all players in the food chain
- Higher returns due to new sustainable models which will lead to more premium consumer's demand
- Lower cost coming from the better production optimization and implemented innovations
- New global markets with potential better connection to customers.

Still, there are many other challenges and one of them is how to protect environment while producing effectively and sustainable.

Carbon footprint importance for environment – how to calculate it and what is global influence

The carbon footprint is a factor that is gradually becoming increasingly important in consumers' perceptions and is becoming part of a complex set of decisions that help them make informed decisions about certain purchases.

According to the Merriam-Webster online dictionary, the carbon footprint is “the amount of greenhouse gases and specifically carbon dioxide emitted by something (such as a person's activities or a product's manufacture and transport) during a given period”. The carbon footprint is monitored throughout the production chain of a product until it reaches the end user and the end of its lifecycle, i.e., from raw materials, through production, packaging, distribution, sale, use and disposal or recycling of the product. For example, the food supply chain is affected by the impact of greenhouse gas emissions from the use of agricultural land of different crops, livestock farming, processing, transport, sale, distribution, packaging and consumption.

The concept of carbon footprint is also used as an indicator of the sustainability of all industries. This is particularly important from a strategic point of view and takes on different dimensions in the European Union's vision for the development of economic and social life in the Member States. Appearing in various documents, but mostly under a number of measures, part of the European Green Deal, the idea of reducing the carbon footprint of European citizens finds its full expression in the goal of a carbon-neutral continent by 2050, and the intermediate goal “Fit for 55” to achieve at least 55% reduced carbon emissions by 2030.

Emitted greenhouse gases and carbon footprint are calculated according to a uniform methodology for all Member States. It was developed in connection with the implementation of Regulation (EU) No. 691/2011 on European environmental economic account. The carbon footprint of the European Union is one of the indicators that can be the subject of targeted measures to improve its current impact on the environment. Eurostat categorizes six main product groups according to their origin, determining their weight for greenhouse gas emissions. This distribution is presented in Figure 3.

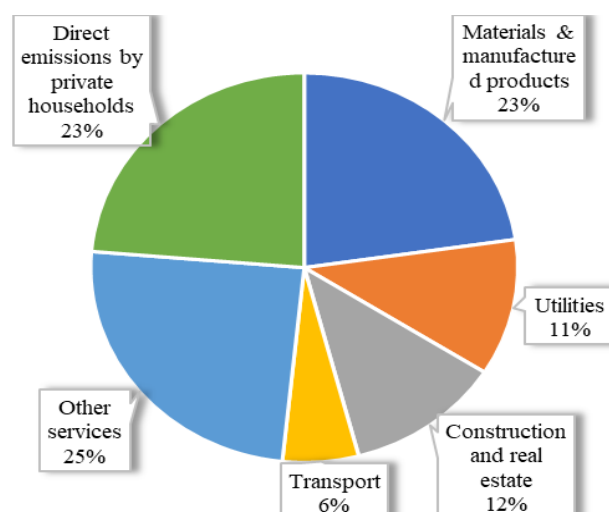


Figure 3: CO2 footprints, by product group in EU, 2019 (%)

Almost a quarter of the EU's carbon footprint is directly related to private households, but the remaining 75% includes sectorial activities directly related to various areas that could be easily associated to their everyday activities.

If the CO₂ footprints are considered by product groups, there are mainly six categories responsible for the largest carbon footprint in kilogram per person – Energy production; Construction; Equipment; Trade services; Food, beverages and tobacco; Fossil fuel and chemical products. Their impact is shown in Figure 2. The transition to a greener economy means that these sectors will undergo the most significant changes in the coming years. Naturally, energy is one of the sectors in which innovative environmental methods are most widely promoted and the goals to be achieved are relatively easy to trace, as the entry of renewable energy into the energy mix of EU countries has been observed for several years. Construction is one of the sectors that has significant potential to be more environmentally friendly using innovative approaches and materials originating from bioeconomy and circular economy. The same goes for the food production and food processing sectors that shall become greener, which would be largely supported by the new Common Agricultural Policy entering into force as of 1st of January of 2023.

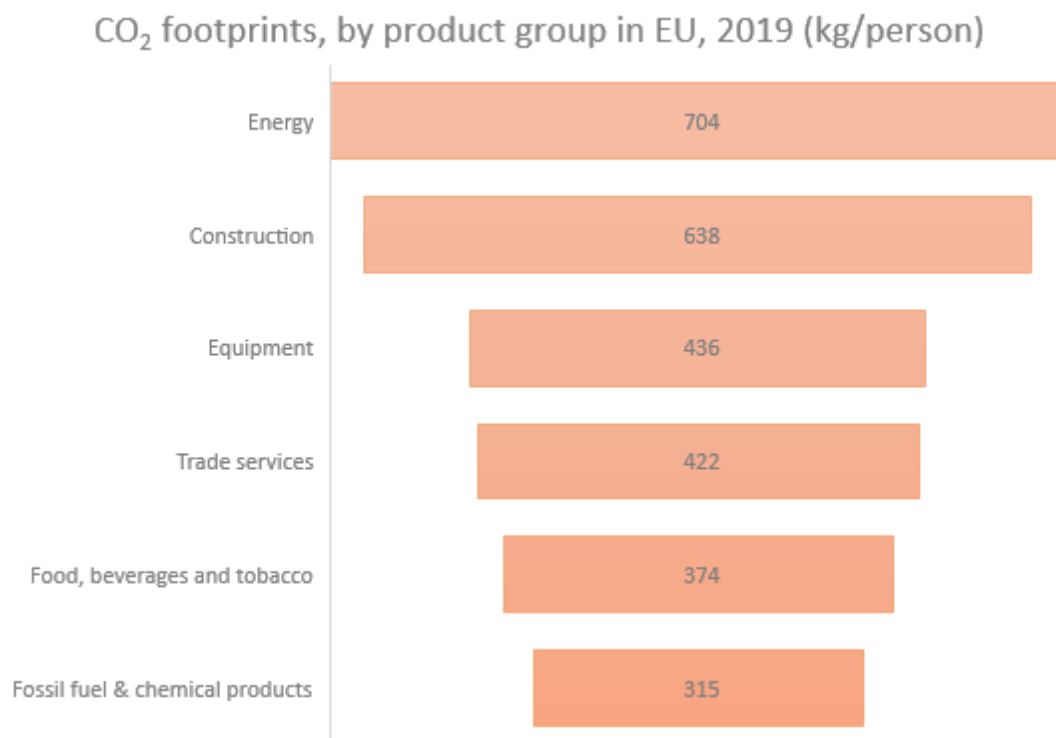


Figure 4: CO₂ footprints, by product group in EU, 2019 (kg/ person)

Agriculture is one of the sectors that in the process of industrialization has become one of the most important in terms of greenhouse gases emissions per kilogram of final product. Longer supply chains are one of the reasons for the increase in carbon footprint per capita. It is at the same time, one of the sectors that might benefit from shorter supply chains stimulating local consumption, an observation made during the COVID-19 pandemic.

Some possible solutions to limit the size of the carbon footprint per capita in the EU could be:

- Achieving the set goals for renewable energy sources as part of the energy mix of Member states;
- Use of construction materials originating from the bioeconomy;



- Shortening supply chains, especially food supply chains, stimulating consumption of local products;
- Stimulating low-carbon agriculture, including agricultural practices to capture carbon from the atmosphere.

Bioeconomy and green revolution impact to entrepreneurial level. EU Green Agenda and its influence to quality and efficiency of education/science.

The landscape is changing. Following the recent forecasts, it is expected that by 2050 the employment in the green sector will reach 2.7 million in Europe, equating to 6.4% of the total number of jobs in Europe. Greening occupational profiles apparently is inevitable, so as the processes of re-skilling and up-skilling the workers at various levels to reach satisfactory understanding of the bioeconomy and the green ecosystem. In parallel, business is facing multiple challenges. Driven by a combination of fundamental tendencies such as the climate change and its impact on agriculture and biodiversity, green entrepreneurship and greening the entrepreneurial potential emerged as a key item in the political and economic agendas, while promoting for a new growth/ business model for unlocking regional potential. Global demand for eco-friendly technologies, environmental products and services and ideas for sustainable design is expected to gain momentum in the years to come. The global market, currently valued at €2 trillion a year, could almost double. In these tendencies, eco-innovation remains crucial to address the challenges of resource scarcity, air, water and soil pollution or water efficiency.

Optimizing production resources use, reducing waste and harmful substances along the value chain, as well as promoting recycling, has the potential not only to limit negative environmental impacts, but also to create opportunities for growth and jobs, while enhancing the competitiveness of the economy.

The fundament of the green economic model is limiting the energy dependence on fossil fuel imports, as well as reducing carbon emissions by increasing energy efficiency and renewable energy production. One of the main challenges for the promotion of environmentally friendly and resource-efficient industries is the formation of public awareness and culture on environmental issues, to introduce sustainable patterns of behaviour aimed at protecting nature, saving energy and water resources, using RES, recycling waste, etc. To reach balance, the sharing economy and Industry 4.0 bring innovation at all levels, including technological, social, human, cultural and economic. The trend is to maintain the close interaction of strategic measures with climate and environmental policies, food safety and health issues, the rural digital agenda and the bioeconomy, knowledge and innovation, enlargement and neighboring policy, trade and development policy.

New business models and technologies related to resource efficiency, improved solutions and services to reduce environmental impact, as well as to improve the life cycle and sustainable development of innovation processes have already been identified in a number of European countries. In our country there is still a limited understanding of the added value of eco-innovation, the effects of defragmentation of the value chain, the consequences of the limited use of environmental investment, as well as the lack of appropriate financial instruments to stimulate technological progress.

However, a positive change has been identified. Recent statistics show the progress that Bulgaria has been trying to achieve. We are performing and reaching results above expectations for its level of development. On the Innovation score board, we are steadily climbing, while reporting intensive increase of the innovation outputs (Figure 5, 6).

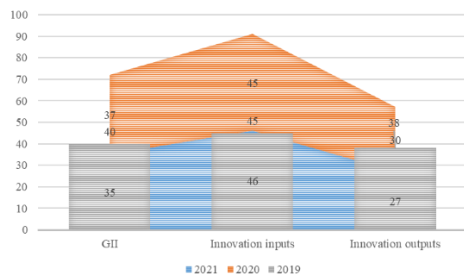


Figure 5: Ranking for Bulgaria (2019-2022)

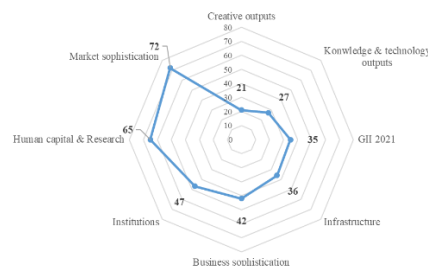


Figure 6: GII pillar ranks for Bulgaria, 2021

Bio-based industries and their value chains face complex and substantial technology and innovation challenges. The full deployment of such technologies on the market requires sustainable and new business models and a set of competences that integrate all economic actors into value chains. In this regard, a number of stakeholder studies have been conducted in recent years and analytical reports have been prepared, showing that the key competencies needed can be presented in eleven key areas (Figure 7):



Figure 7 Key competencies and areas for improvement

The specific requirements for knowledge and skills presented above, related to the needs of the sector, should be transferred in a balanced way as burden, level of acquisition of competence and practical knowledge and skills at all educational levels. These changes are likely to shape the development of new professional units and positions.

Conclusion

Ensuring long-term economic growth depends to a large extent on the introduction of sustainable production and consumption patterns that are in line with the capacity and capacity to restore ecosystems and do not cause environmental degradation. Bioeconomy is not just a way whereby we could increase agricultural production but also solution to achieve a sustainable use of resources, climate change mitigation and adapting to it. Transition from overconsumption and depletion of resources to sustainable economic growth goes together with the recovery of natural resources. Bioeconomy integration and sustainable agriculture implementation have further effects on the carbon footprint in the environment, so it is important to examine and monitor that kind of impact.

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