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# The Impact of Economy and Ecology Integration on Employment in the Context of Sustainable Development Goals and European Green Deal

*Sürdürülebilir Kalkınma Hedefleri ve Avrupa Yeşil Mutabakatı Kapsamında Ekonomi ve Ekoloji Entegrasyonunun İstihdam Üzerine Etkisi*

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**ÖZET**

*Çalışmada, çevreye duyarlı ekonomi politikalarının genel ekonomi üzerine etkisine ek olarak yeşil dönüşüm sürecinin istihdam üzerine yansımaları tartışılmaktadır. Ulaşılan sonuçlar, insanlığın sahip olduğu sınırsız ihtiyaçların sınırlı dünya kaynakları ile karşılanmasının geleneksel ekonomik yöntemler ile sürdürülebilir olmadığı, hükümetler ve politika yapıcıların ekonomik politikaları tasarlarken ekolojik dengeyi dikkate almalarının gerekliliği savunulmaktadır. Ek olarak yeşil dönüşüm ile geleneksel üretim modellerinin yerini alacak modern üretim süreçlerinin, var olan istihdam üzerine etkisi incelenmiş olup yeşil dönüşümün istihdamı arttırdığı yönünde argümanlar sunulmaktadır. Dünyada artan nüfus ve kentleşmeye paralel olarak üretim seviyelerinde meydana gelen artış, çevre üzerine yüksek seviyede baskı oluşturmaktadır. Var olan sınırlı dünya kaynaklarını yok etmeden, gelecek kuşaklara da yetecek şekilde kullanabilmek adına ekonomi ve ekoloji entegrasyonu sağlanmalıdır. Ekonomik sürdürülebilirliğin sağlanabilmesi ancak ekolojik denge ile mümkündür. Bu bağlamda geleneksel üretim modellerinden vazgeçilerek, çevreye duyarlı ekonomi modellerinin gereksinimleri uygulanmalıdır. Birleşmiş Milletler tarafından belirlenen Sürdürülebilir Kalkınma Hedefleri (SKH) ve Avrupa Birliği tarafından yeşil dönüşümün ekonomik yol haritası olarak sunulan Avrupa Yeşil Mutabakatı (AYM) ortak hedefler doğrultusunda ekonomi ve ekoloji entegrasyonunu desteklemektedirler.*

***Anahtar Kelimeler:***

*Çevre Ekonomisi,*

*Sürdürülebilir Kalkınma Hedefleri,*

*Avrupa Yeşil Mutabakatı,*

*İstihdam,*

**ABSTRACT**

*In addition to the impact of environmentally sensitive economic policies on the overall economy, the study discusses the employment implications of the green transformation process. The results obtained argue that meeting the unlimited needs of humanity with limited world resources is not sustainable with traditional economic methods and that governments and policymakers should take into account the ecological balance while designing economic policies. In addition, the effect of modern production processes that will replace traditional production models with green transformation on existing employment is analysed and arguments are presented that green transformation increases employment. The increase in production levels in parallel with the increasing population and urbanisation in the world creates a high level of pressure on the environment. The integration of economy and ecology should be ensured in order to use the existing limited world resources in a way that will be sufficient for future generations without destroying them. Ensuring economic sustainability is only possible with ecological balance. In this context, traditional production models should be abandoned and the requirements of environmentally sensitive economic models should be implemented. The Sustainable Development Goals (SDGs) set by the United Nations and the European Green Deal (EGD) presented by the European Union as the economic roadmap of green transformation support the integration of economy and ecology in line with common goals.*

***Keywords:***

*Environmental Economics,*

*Sustainable Development Goals,*

*European Green Deal,*

*Employment,*

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## 1. INTRODUCTION

The fact that the unlimited needs of humanity, which have existed since the moment humanity set foot on the earth, are met by the limited world resources causes the depletion of resources over time. Environmental degradation caused by the excessive and continuous increase in the level of production with the industrial revolution attracted a lot of attention in the 20th century. In this context, the concept of sustainability, which carries the main purpose of the meetings and conferences held in the international framework, is a word of Latin origin and etymologically comes from the word "*sustinere*" and has the meaning of continuity (Onions, 1964; Ertoş, 2022).

In 1968, a meeting was held at the Accademia dei Liecei in Rome with the participation of renowned scientists of the time, in response to increasing environmental degradation as a result of increased production. At the meeting, it was declared that the demand created by the increasing population could not be met with the existing production models and that this course was not sustainable. In 1972, the report of the Club of Rome titled "*The Limits to Growth*" prepared by Meadows et al. proved the necessity of economic and ecological integration with data and stated that governments and policymakers should take this integration into account.

Although policy recommendations on integrating the economy into ecology were first published in the Stockholm Declaration, it was only with the report titled "*Our Common Future*" prepared by the World Commission on Environment and Development (UNWCED) that it gained importance at the international level. Therefore, the report is the most serious step taken in the name of sustainable development (Kılıçoğlu, 2005:11).

The report prepared by the Brundlant Commission, established at the United Nations Headquarters, concludes that ecology and economy are interdependent and that integration is essential. Therefore, it is impossible to talk about sustainability in any scenario where natural resources are depleted. Gibson et al. (2003) emphasize that the main objective of sustainable development is to preserve the existence and continuity of ecological resources so that people can sustain their lives.

Sustainable development needs to be accepted by the whole world and incorporated into the economic development strategies of states. Conferences and agreements are based on the view that the realization of ecological sustainability will make sustainable development possible. In addition, the change that environmentally sensitive economic policies will create on many sectors is likely to be supported by technology transfer, transforming existing jobs and creating new business areas. This study examines the implications of the integration of ecology and economy in line with the definition of sustainability, as well as the impact of environmentally sensitive economic policies on employment within the scope of the Sustainable Development Goals (SDGs) and the European Green Deal (EGD).

## 2. SUSTAINABLE DEVELOPMENT

Economic development is a concept that is among the economic goals of all countries; however, Kuşat (2013) states that if economic development is not sustainable, it will not be sustained and will not produce positive results for countries in the long term. Hardi and Terrance (1997) stated that development policies prepared in accordance with the foundations of the concept of sustainability should consist of the implementation of policies that take into account the needs of future generations. Therefore, the harmony between the economy and the environment is of utmost importance for sustainable development. In order for humanity to be able to talk about sustainable development, it should not use the world's resources at such an abnormal level. This situation in itself contradicts the concept of sustainability. We are in an ecological crisis, to best describe a situation that is extremely worrying for future generations. In addition, the ongoing rapid population growth and consumption habits are putting pressure on both developed and developing countries (Singh, 2014:27).

The concept of sustainable development came to the agenda at the end of the 20th century. In this period, the globalization trend came to the fore all over the world as the world experienced a radical change and development in economic terms. Countries need to update their current economic plans in order to initiate economic transformation in the face of this circumstance. The realization of ecological sustainability is the basis of conferences and agreements around the world, making sustainable development possible. Waas et al. (2011) stated in their study that the concept of sustainable development has been internationally accepted in less than 50 years. In addition, Ergün and Çobanoğlu (2017) state that the technologies that we are likely to have in the name of sustainable development in the present and future will help us in this ecological war, but it is an issue that needs attention. Therefore, the overlap between the period when the ecological crisis was felt most intensely and the period when technological developments reached such high levels should not be ignored.

### 2.1. Sustainable Development Goals and Europe Green Deal: Conceptual Framework

At the Rio+20 summit in 2012, participants made various commitments to set a series of goals. The participating states agreed that the new goals should be more inclusive than the Millennium Development Goals previously set. In this regard, they agreed that the new goals should be set under the title of Sustainable Development Goals and integrated into the development agenda as of 2015 (Glaser, 2012). The concept of sustainability, which was included in the development goals within the scope of the 21st Conference of the Parties held in 2015, and the Paris Agreement, which was concluded with it, is the most important step taken in the recent past in order to enable all countries of the world to unite against the climate crisis and to act together in line with the determined goals.

Ağaçayak et al. (2017) interpret the importance of the Paris Agreement as a new structuring process in humanity's struggle against global climate change. They also emphasize that it is a more inclusive agreement compared to the Kyoto protocol by including not only developed but also all countries, and that the desire of the then President of the United States of America Barack Obama to make the United States a party to this agreement within his term of office supports the importance, inclusiveness and speed of entry into force of the agreement. In this context, Karakaya and Sofuoğlu (2015) interpret the submission of international contribution intentions (INDCs) by the United States (15%) and Russia (5%) (approximate values), which have a significant amount of existing carbon emissions, as positive.

The main feature that distinguishes the Paris agreement from the previous Kyoto Protocol is that the targets set must exceed the targets of the previous period. Kozanoğlu (2020) states that this agreement is an effort to reduce the use of fossil fuels and aims to increase the use of renewable energy sources worldwide. Before the Paris Agreement signed at COP 21, countries are required to realize their greenhouse gas reduction commitments, namely the national intentions to contribute (INDC), which is one of the cornerstones of the Paris Agreement, which was worked on at the COP 19 and COP 20 conferences held in Warsaw and Lima, respectively (Sabuncu, 2015). As a result, it is significant that the European Green Deal goals stated in 2019 are beginning to take shape.

According to Wang et al. (2022), in order to achieve the Sustainable Development Goals (SDGs), all spheres of society will need to contribute between USD 5 and USD 7 trillion annually. Climate finance created in this context is regularly seen as a tool not only to effectively combat global warming, but also to address development challenges in countries on the basis of the Sustainable Development Goals (SDGs) (Buchholz ve Rübbelke, 2021). In this context, studies such as the European Green Deal (EGD), launched by the European Union in 2019 as an economic roadmap for green transformation, are important for the creation and distribution of financing for the current Sustainable Development Goals (SDGs) as well as for the integration of green economic transformation into societies. In addition, Karakuş et al. (2022) state that with the memorandum of understanding created by the European Union, it aims to be developmental and solution-oriented and contributes to the green transformation with policies in this direction.

The greenhouse gas reduction targets, which are among the main objectives of the European Green Deal (EGD), point to the years 2030 and 2050 and aim to make the whole of Europe carbon neutral by 2050 (European Commission, 2019:4). In addition to reducing emissions in line with the targets set, the fact that the welfare of societies is taken into account in addition to the reduction of emissions shows the importance that the European green consensus attaches to economic arguments. In support of this idea, Aydınoğlu and Özdemir (2022) revealed in their study that the European Green Deal is a roadmap for a detailed and inclusive economic model. The "*Circular Economy Model*", which constitutes the economic arguments of the European Green Deal, can be

integrated with the Sustainable Development Goals (Karakuş et al., 2022). Within this context, the Circular Economy Action Plan—published in accordance with one of the key objectives of the European Green Deal, namely "A Clean and Circular Economy for Industry"—aims to encourage the transition to resource-efficient, low-carbon, and sustainable production models in industry. In doing so, it not only seeks to reduce environmental impacts but also facilitates the development of new business models that support structural transformation in production and consumption processes. This transformation is expected to create new job sectors and yield positive effects on employment, particularly through circular economy practices that emphasize the reuse, repair, recycling, and extension of product lifespans.

Therefore, the measures to be undertaken within the Circular Economy Action Plan are expected to support not only ecological sustainability but also social and economic sustainability through the promotion of green employment.

This approach also resonates with, the 8th Sustainable Development Goal "*Decent Work and Economic Growth*" (UN, n.d. -b) and the 12th goal "*Responsible Production and Consumption*" (UN, n.d. -c) are within the scope of the model. Following the Paris Agreement, the European Union invites all countries of the world, especially the European region, to fight against the climate crisis by producing pioneering policies in the global crisis with the European Green Deal. Therefore, the basis of the agreements and consensus texts prepared are evaluated from the perspective of holistic perspective, fair transition mechanisms and applicability.

## 3. ECONOMY AND ECOLOGY NEXUS

Economic growth and development have historically been the most important goals for all countries. However, the ecological crisis in the world today necessitates the integration of economy and ecology. This is the basic idea that environmentally sensitive economic policies want to integrate into traditional economic modeling. In this case, it is of utmost importance that economic actions that take ecological sustainability into account are supported and implemented by decision makers. Bai et al. (2023) emphasize the wide-ranging effects of the steps to be taken in the face of climate change by stating that the national action plans that countries formulate to combat climate change will have sustainable effects on economic, environmental and social parameters. In addition, Yılmaz (2023), in line with the definition of sustainability, states that it would be insufficient to fight against the global threat facing humanity only from an ecological perspective, and that it is necessary to balance ecology and economy as well as social policies.

However, the consumption corresponding to increasing production levels and the rising population rate in parallel with these phenomena put negative pressure on the existing ecological balance of the world. Ehrlich (1968), in his work "*The Population Bomb*", states that the rate of population growth will bring environmental problems. In addition, at the Paris Biosphere Conference organized by UNESCO in 1968, the necessity of working in harmony with economic science in order to solve environmental problems was mentioned in the Paris Biosphere Conference organized by UNESCO in 1968 about the necessity of discussing environmental problems at the economic level and creating an integration (Caldwell, 1973; Canan, 2017). This idea is supported by the hypothesis emphasized by Malthus that increasing population is incompatible with economic growth (Costanza and Daly, 1992; Zengin Taşdemir, 2021).

On the necessity of eliminating or gradually reducing the pressure on the environment caused by the production models used in the past and integrating the economy into ecological parameters, Boulding (1966) argues that the level of consumption that occurs in the face of increasing production may create ecological scarcity. In this context, it is essential to revise the level of production corresponding to increased consumption. Kuşat (2013) states that as a result of the steps to be taken to reduce the negative externalities of production, there will be concerns in the markets and society that production costs will increase. In this direction, the costs and advantages that will arise as a result of the integration of economic sustainability, in which ecological sensitivity is indispensable, into existing economic models, have occupied the world agenda in recent years. However, Barbiroli (2011) has managed to clarify this issue. Advantages;

- Maximizing the efficiency levels of the goods to be produced with the new production options that will emerge, and reducing waste and emission rates through these new production systems.
- Producing innovative solutions to meet the global demand in all fields of activity (including foodstuffs) through technological developments.

- As a result of the implementation of sustainable management tools, competition between companies and the competitiveness of companies will be maximized.
- The products produced with new technologies have a suitable, simple and economical lifespan for ecological sustainability.
- Redistribution of income between developed and undeveloped countries in terms of industrialization.
- The sustainable cities to be established will visibly increase living standards.
- With the reduction of mobility within the scope of personal needs and workforce, the noticeable decrease in transportation costs and the increase in energy efficiency due to this situation are seen as an important advantage in this context. In addition, the existing environmental pollution rate is expected to decrease with the effect of technological developments.

Costs;

- It causes prices to rise in energy and mineral resources, as well as in agro-industrial and food resources.
- Damage to trade relations as a result of a decrease in production levels and fluctuations in the dynamics of companies, especially in countries with a developed industrial structure.
- An increase in investment costs to support technological developments.
- The increase in costs in industrially developed countries, which leads to a decline in per capita national income and a negative fluctuation in the purchasing power of households.
- Goods produced in accordance with sustainability standards cause a price increase due to production costs in a free market environment and cause fluctuations in the existing price balance.
- Among the disadvantages of this process is the need for large-scale funding to be allocated to make living and working spaces more efficient with more sustainable systems.
- Although ecologically and economically sound, the high cost of energy-efficient, fast, safe and more accessible systems can be interpreted as a disadvantage.

The above-mentioned costs need to be reduced in the medium and long term through policies and incentives implemented by policymakers at both local and global scales. Reducing the negative externalities on the environment caused by conventional production forms the basis of ecological sustainability. However, if resource consumption is at high levels and environmental factors continue to be damaged, it will be inevitable to move away from the concept of sustainability. Therefore, new approaches need to be developed within the science of economics and revised in accordance with the requirements of the principle of sustainability.

Among the theories of economic thought, Neoclassical Environmental Economics, which offers solutions on the relationship between the economy and the environment, and Ecological Economics, which found its place in the economic literature towards the end of the 1980s, try to explain the existing relationship between the economy and the environment (Manga, 2019). There are many studies in the literature on Neoclassical environmental economics based on traditional economic modeling and the concept of Ecological Economics that emerged towards the end of the 20th century (Costanza, 1991; Hubacek and Van den Bergh, 2006; Munda, 1997; Van den Bergh, 2001; Zengin Taşdemir, 2021).

Zengin Taşdemir (2021) states that the concepts of neoclassical environmental economics and ecological economics have different paradigms within themselves and that both economic thought systems aim to analyze the relationship between human, environment and economy from an economic perspective within sustainable economic models. However, in recent years, the desire to implement sustainable development models that are compatible with the environment and the studies carried out in this direction reveal the concept of Green Economy. Eşenlikçi (2023) states that the idea that development will be possible in harmony with the environment within the green economy has emerged.

**Table 1.** Economic Approaches from the Perspective of the Relationship between Ecology and Economy

| | Green Economy | Ecological Economics | Neoclassical Environmental Economics |
|---|---|---|---|
| **Focus** | Ensuring environmental protection and social equality within the scope of Sustainable Development | Emphasizing the interconnectedness of economy, society and environment. | Providing cost-benefit analysis in addition to market-oriented solutions. |
| **Main Purpose** | Sustainable economic development, resource efficiency and social inclusion | Implementing an approach that values nature beyond economic arguments | Ensuring the continuity of economic growth by taking into account market mechanisms in determining environmental policies |
| **General Thought** | Increasing human welfare, reducing environmental negative externalities and ensuring social equality with the steps to be taken | Reducing environmental pressure and increasing welfare as a result of prioritizing ecological sensitivity | In the context of economic growth, sharing of resources to increase efficiency and the effectiveness of externalities within the scope of economic actions |
| **Policy Approach** | Establishing policies in the perspective of sustainable development goals, balancing economic, social and environmental goals | Supporting policies that integrate economic, social and ecological considerations | Implementation of policies that support market efficiency and cost-benefit analysis |

Source: It was created by utilising the articles of Rodiyah et al., 2023; Orbe, 2021; Bina, 2013.

Green economy emerges as the rising economic model of the 21st century with the aim of realising the concept of development in a fair and environmentally sensitive manner (Siyabi and AHakro, 2020). Therefore, as a current economic model that complies with the definition of sustainability, the green economy aims to increase resource efficiency and balance the economy and ecology at an optimal level, as well as protecting the rights of future generations. Therefore, the economic policies of the European Green Deal (EGD), which is the focal point of the Sustainable Development Goals (SDGs) set by the European Union and later touted as the economic roadmap of green transformation, are shaped around the dynamics of the green economy in order to ensure full and fair sustainable development.

**Table 2.** Definitions of Green Economy

| Source | Definition |
|---|---|
| **Organization for Economic Co-operation and Development (OECD)** | A growth model that prioritizes efficiency in the use of natural resources and minimizes pollution and therefore the pressure on the environment. |
| **World Bank** | Economic model that aims to promote economic growth and development while ensuring ecological sustainability |
| **United Nations Economic Social Commission for Asia and the Pacific (UNESCAP)** | Sustainable economic development integrated with the Sustainable Development Goals (SDGs) by promoting low-emission, social, inclusive and development through environmentally friendly production models |
| **Global Green Growth Institute (GGGI)** | An economic development model that supports the sustainability of economic growth while also giving importance to ecological sustainability |

Source: Kasztelan, 2017.

Although the concept of green economy has been defined by many institutions and organisations on a global scale, the main reason underlying the fact that it is the most applicable model within today's environmental economic models is that it focuses on the sustainability of development without ignoring the needs of humanity while adhering to the principle of sustainability.

In line with the European Union's attitude towards becoming a global leader within the scope of studies on sustainability, it laid the foundations of its strategy for combating climate change in 2005. Within the scope of the strategies it has created, it aims to prevent irreversible ecological disasters by reducing the effects of climate change. In this context, the European Commission aims to make the policies to be determined clearer and more concrete. While short and medium-term measures within the scope of the strategies created cover developed countries, developing countries are also included in the scope in line with the Sustainable Development Goals. In the context of the green economy approach that dominates the necessity of revising production models with technology, the European Commission aims to promote the integration of technology within the scope of the action plan prepared for the European Union. Therefore, the action plan determines the road map of technological integration.

**Table 3.** Green Economy

| **Target** | Managing pollution | Reducing pollution | Reducing dependence on the environment | |
|---|---|---|---|---|
| **Focus Points** | Resource-intensive products and services | Ways to manage resources more efficiently | | |
| **Scope of Application** | All economic activities and sectors | | | |
| **Benefits** | Reduction in energy and resource consumption | Decrease in costs | Increase in competitiveness | Less emissions |
| **Actions** | Providing incentives for the development and dissemination of environmentally friendly technologies | Directing public and private sector investments towards environmentally friendly technologies | Conducting training and awareness-raising activities on the use of environmentally friendly technologies | Promoting international cooperation for the development and application of environmentally friendly technologies |

Source: Based on Wysokińska, 2013.

Šneiderienė and Ruginė (2019) emphasize the importance of technology and state that traditional production models should be revised and technology transfer should be ensured. Therefore, environmentally friendly production to be realized through technology transfer is important for economic and ecological sustainability.

The realization of economic and ecological harmony, which forms the basis of the concept of sustainability, is also extremely important for the Sustainable Development Goals and the European Green Deal. In this context, it is necessary to invest in renewable energy, sustainable industry, sustainable agriculture and sustainable cities under the umbrella of environmentally sound economic policies. In addition, the fair transition mechanism must be integrated in a way to cover all citizens of the world (Karakuş et al., 2022). As a result of the determinations made, it is stated that analyzing the relationship between economic development and nature can only be realized by examining the connection between nature and technology, and that this examination requires a multidisciplinary perspective, not a linear one (Canan, 2020:174).

## 4. GREEN ECONOMY AND EMPLOYMENT

Increasing population brings with it the need to create jobs in addition to requirements such as water scarcity and food security. Green economic transformation is an important strategic plan in terms of employment opportunities for both the public and private sectors, with economic policies developed in line with the Sustainable Development Goals (SDGs) and the dynamics of the European Green Deal (EGD).

While the transition to a green economy significantly reduces environmental risks and ecological scarcities, it is seen as a way out for human welfare and the elimination of social inequality. In this context, green economic transformation allows for the elimination of negative externalities that impact on nature through traditional production methods, which helps to protect the ecosystem and biodiversity in particular (UNEP/ILO/ITUC, 2008:3).

According to the definition of green jobs made by the International Labor Organization (ILO), green jobs are defined as jobs that provide employees with work environments that provide high productivity, as well as adequate income and employee rights (ILO, 2013:23). According to this approach, the need to create green jobs means valuing human labor in order to promote a dignified existence while protecting the environment within the economic plane, in addition to the existing principle of sustainability (Oliveira and Cecato, 2016).

The concept of green jobs is an output of the integration of the "*Decent Work and Economic Growth*" target among the Sustainable Development Goals and the European Green Deal, which is touted as the economic roadmap of green transformation. Green economic transformation constitutes the roadmap of human-oriented sustainable development as well as the direct or indirect effects of green jobs on employment.

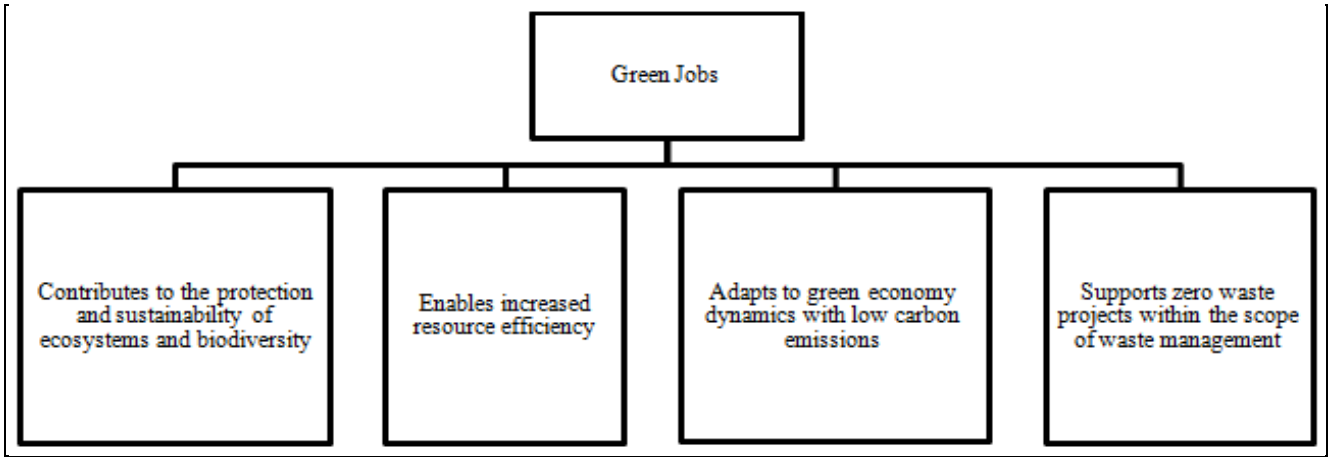
**Table 4.** Road Map of Green Transformation: Green Jobs

| | |
|---|---|
| **Economic** | • Integration of Green Jobs<br>• Productivity Increase<br>• New Employment Opportunities |
| **Ecological** | • Reduction in Carbon Emission Rates<br>• Protection of Work Areas<br>• Natural Resource Management |
| **Social** | • Energy Security<br>• Social Equality<br>• Decent Work |

Source: Özsoy, 2016; Başol, 2018; Yılmaz, 2023.

As indicated in Table 4, the change and development that will be experienced in economic, ecological and social structures with the integration of the green business concept into the markets within the scope of green transformation forms the basis of sustainability, which is a multidimensional concept. With the integration of green transformation, it is possible to increase social welfare, reduce the pressure on the environment and positively affect economic indicators. Therefore, the concept of green business enables the integration of economic, ecological and social benefits into the social structure as a whole during and after the transition to a sustainable economy.

**Table 5.** Characteristics of Green Jobs




Source: UNEP/ILO/ITUC, 2008:3.

In particular, green jobs include jobs that protect the ecosystem and biodiversity and allow them to be passed on to future generations, and are free from the negative externalities that affect nature with traditional production methods (UNEP/ILO/ITUC, 2008:3). Jacobs (1994), who used the concept of green jobs for the first time, states that environmental sensitivity will increase and green jobs will emerge as a result of changes in economic and social policies and revision of traditional production models (Yılmaz, 2014:14). In this context, Kattumuri and Kruse (2017) state that green jobs integrated into the markets with green economic policies not only reflect positively on employment data, but also have social and environmental gains, especially in developing countries. Therefore, green economic transformation enables employment, sustainability of economic growth and eliminating the pressure on the environment. By promoting technology transfer, it contributes to the creation of new job opportunities and economic sustainability of countries by making investments to achieve sustainable development goals. In addition, Li et al. (2023) emphasize the importance of integrating technology transfer and industrial-based green transformation in terms of optimizing the employment structure. Especially in countries with high levels of technology transfer, industrial green transformation will be realized more effectively (Xie et al., 2020).

**Table 6.** The Impact of Green Economic Transformation on Employment

| Effect | Observation |
|---|---|
| Positive and Negative Effects | • Business practices to be created within the scope of green policies can be effective in creating new jobs while preserving existing ones.<br>• Concern that the change that green economy policies will create on production models will increase costs and the thought that costs may increase and affect employment can be considered as a negative impact. |
| Creation and preservation of new jobs | • Technology transfer and sectoral development may be effective in creating employment.<br>• Possible employment loss can be prevented by taking precautions against the changes that traditional production will undergo. |
| Direct or indirect impact on employment | • The increase in production and demand due to technology transfer as a result of environmentally focused investments may have a positive impact on employment. |
| Temporary and Long-Term Employment | • It is likely that short and long-term jobs will arise within the scope of emerging needs. While the employment required for the assembly and installation of wind turbines within the scope of effective use of renewable energy resources can be given as an example of short-term employment, needs such as manufacturing and maintenance in sectors that will be created or transformed within the scope of green jobs can create longer-term employment. |
| Part-time and full-time employment | • Part-time jobs may be expressed as full-time jobs, reflecting the employment generated. |

Source: UNEP/ILO/ITUC, 2008.

On the impact of green economic transformation on employment, Aghion (2014) emphasizes the need to combine carbon taxes with a broader set of macroeconomic policy instruments. These instruments should include interventions for "*green technologies*" and "*green employment*". In this context, as Porter and Van der Linde (1995) point out in their study, even if it is known that raising environmental standards will increase costs, it will bring innovations with market-based policies to be designed with the transition to a green economy. Therefore, it is foreseen that green economy arguments designed in accordance with the requirements of environmental sustainability will contribute to the expansion of the fields of activity of existing professions and create new employment areas in addition to the emergence of new professions (Özçağ and Hotunluoğlu, 2016).

However, even if it is necessary for green jobs to consist of environmentally sensitive jobs, it is not enough. It is very important that green jobs are not only environmentally sensitive but also decent jobs (Özsoy, 2016). According to the report "*Green Collar Jobs in America's Cities*" published by The Apollo Alliance in 2008, in addition to the positive contribution of the green job concept to environmental sustainability, it emphasizes the necessity of providing career opportunities for individuals working in these jobs. In this respect, it is emphasized that green jobs should be integrated with the Sustainable Development Goals (SDGs).

Başol (2018), on the fact that the concept of green jobs will create a transformation on existing jobs and will have positive effects on employment, interprets the benefits of green jobs from an economic perspective and states that new employment areas will be established and productivity will increase in existing sectors. In addition, the study states that negative externalities will also decrease due to the decrease in carbon emissions with new production models supported by technology transfer.

Jackson (2021) emphasizes that investments to be made among the basic components of the ecologically-based macroeconomy in order to ensure the sustainability of the economy will have a positive impact on employment and reveals the positive effect between green transformation and employment. In addition, Yılmaz (2014) argues that the steps to be taken by policymakers by paying attention to environmental problems and considering the optimal benefit in resource utilization will have positive effects on employment as well as ensuring sustainable development.

The sectoral distribution of green economic transformation refers to the interaction of various factors in many sectors. Variables such as reducing environmental pressure, technology transfer, industrial transition and various market mechanisms play an important role in driving green transformation (Liu et al., 2022).

**Table 7.** Sectoral Distribution of Green Transformation

| | | Green Business Potential | Current Green Business Progress | Long-Term Green Business Potential |
|---|---|---|---|---|
| **Energy** | Renewable energy | Very good | Good | Very good |
| | Carbon Capture and Storage | Middle | - | Unknown |
| **Industry** | Steel | Good | Middle | Middle |
| | Aluminum | Good | Middle | Middle |
| | Cement | Middle | Middle | Middle |
| | Pulp and Paper | Good | Middle | Good |
| | Recycle | Very good | Good | Very good |
| **Transportation** | Energy Efficient Vehicles | Fair-Good | Limited | Good |
| | Public transport | Very good | Limited | Very good |
| | Railway | Very good | Bad | Very good |
| | Aviation | Limited | Limited | Limited |
| **Buildings** | Green Building | Very good | Limited | Very good |
| | Strengthening | Very good | Limited | Very good |
| | Lighting | Very good | Good | Very good |
| | Efficient Equipment and Applications | Very good | Middle | Very good |
| **Agriculture** | Small Scale Sustainable Agriculture | Very good | Bad | Very good |
| | Organic farming | Very good | Limited | Good very good |
| | Environmental Services | Good | Limited | Unknown |
| **Forest** | Reforestation/Deforestation | Good | Limited | Good |
| | Agriculture Oriented Forestry | Good-very good | Limited | Good-very good |
| | Sustainable Forestry Management | Very good | Good | Very good |

Source: UNEP/ILO/ITUC, 2008.

Aceleanu et al. (2015) emphasize the potential of green economic policies to transform many sectors and argue that green jobs can contribute to the sustainability of economic growth. In this direction, as shown in Table 7, many sectoral jobs are quite suitable for being revised in an environmentally sensitive manner. Therefore, the steps to be taken by policymakers on behalf of developed and developing countries and sectoral revisions in an environmentally sensitive manner will be very advantageous in terms of increasing employment and increasing new business lines as well as reducing the impact on the environment in the growth and development processes of economies (Wysokińska, 2013).

**Table 8.** Sector Based Employment Data of Environmentally Friendly Economic Policies

| Country Group | Year | Waste Management | Wastewater Management | Other Environmental Protection Management | Energy Resources Management | Water Resources Management | Total Employment |
|---|---|---|---|---|---|---|---|
| EU | 2000 | 880,000 | 695,000 | 910,000 | 596,000 | 137,000 | 3,217,000 |
| EU | 2001 | 894,000 | 694,000 | 944,000 | 636,000 | 137,000 | 3,305,000 |
| EU | 2002 | 901,000 | 673,000 | 921,000 | 987,000 | 134,000 | 3,615,000 |
| EU | 2003 | 913,000 | 663,000 | 896,000 | 828,000 | 131,000 | 3,431,000 |
| EU | 2004 | 941,000 | 640,000 | 884,000 | 855,000 | 134,000 | 3,452,000 |
| EU | 2005 | 975,000 | 605,000 | 864,000 | 893,000 | 139,000 | 3,476,000 |
| EU | 2006 | 1,023,000 | 588,000 | 918,000 | 1,016,000 | 143,000 | 3,688,000 |
| EU | 2007 | 1,002,000 | 608,000 | 910,000 | 1,181,000 | 145,000 | 3,845,000 |
| EU | 2008 | 1,026,000 | 581,000 | 917,000 | 1,245,000 | 142,000 | 3,911,000 |
| EU | 2009 | 1,038,000 | 595,000 | 953,000 | 1,297,000 | 141,000 | 4,024,000 |
| EU | 2010 | 1,074,000 | 576,000 | 956,000 | 1,442,000 | 137,000 | 4,185,000 |
| EU | 2011 | 1,075,000 | 584,000 | 976,000 | 1,664,000 | 138,000 | 4,439,000 |
| EU | 2012 | 1,118,000 | 578,000 | 990,000 | 1,716,000 | 139,000 | 4,540,000 |
| EU | 2013 | 1,105,000 | 594,000 | 986,000 | 1,605,000 | 141,000 | 4,432,000 |
| EU | 2014 | 1,123,000 | 598,000 | 917,000 | 1,494,000 | 142,000 | 4,274,000 |
| EU | 2015 | 1,196,000 | 607,000 | 943,000 | 1,540,000 | 150,000 | 4,437,000 |
| EU | 2016 | 1,204,000 | 569,000 | 947,000 | 1,647,000 | 138,000 | 4,506,000 |
| EU | 2017 | 1,221,000 | 557,000 | 1,026,000 | 1,654,000 | 135,000 | 4,593,000 |
| EU | 2018 | 1,259,000 | 589,000 | 1,042,000 | 1,636,000 | 137,000 | 4,663,000 |
| EU | 2019 | 1,305,000 | 612,000 | 1,079,000 | 1,700,000 | 139,000 | 4,836,000 |
| EU | 2020 | 1,322,000 | 634,000 | 1,144,000 | 1,813,000 | 142,000 | 5,056,000 |
| EU | 2021 | 1,333,000 | 633,000 | 1,167,000 | 1,967,000 | 143,000 | 5,244,000 |

Source: Based on Eurostat database.

Note: Statistical data refers to one thousand full-time equivalent persons.

Table 8. analyzes the employment created in various fields within the scope of the 2000-2021 time series in order to examine the effects of the European Union's (EU) environmentally sensitive economic policies on employment. It is observed that the employment created by the European Union in solid waste management, wastewater management, energy resources management, water resources management and other environmental protection management areas is in a continuous upward trend. Therefore, it shows that the integration of economy and ecology with the aim of economic sustainability of the policies implemented within the scope of the Sustainable Development Goals (SDGs) and the European Green Deal (EGD), which are created with the goal of green transformation, which the European Union has assumed the leadership of globally, can be realized with the green economy model.

The importance given by the European Union to the use and management of renewable energy resources can be seen through the tables and graphs. In this direction, the highest employment increase has been realized in the field of energy resources management. In addition, the importance given to energy resources and the investments made in this field can be interpreted as one of the concrete steps of the European Union to reduce the carbon footprint by reducing the use of fossil fuels. However, the reflection of the European Union's environmentally sensitive economic policies on employment is not limited to the energy sector. Employment has also increased in other fields such as solid waste management, wastewater management and water resources management. This situation shows that the European Union's environmentally friendly policies have endeavored to increase employment in various fields of economic activities. Therefore, the fact that environmentally

friendly economy approaches integrated into the economy through green transformation will provide a total of 5,244,000 new jobs by 2021 proves the positive impact of the policies implemented on employment.

In addition, Table 9. takes into account the fields of activity of the "*Renewable Energy Management*" heading analyzed within the scope of the study. In this context, within the sample group of European Union (EU) member countries and the time series covering the years 2000-2021, the reflections of policies focused on renewable energy and efficiency increase on employment are analyzed.

**Table 9.** Renewable Energy and Efficiency Focused Employment Data within the Scope of Resources Management

| Country Group | Year | Renewable Resources Energy Production | Heat/Energy Saving and Management |
|---|---|---|---|
| EU | 2000 | 342,000 | 254,000 |
| EU | 2001 | 344,000 | 292,000 |
| EU | 2002 | 654,000 | 333,000 |
| EU | 2003 | 453,000 | 375,000 |
| EU | 2004 | 430,000 | 425,000 |
| EU | 2005 | 415,000 | 478,000 |
| EU | 2006 | 473,000 | 543,000 |
| EU | 2007 | 567,000 | 614,000 |
| EU | 2008 | 604,000 | 641,000 |
| EU | 2009 | 651,000 | 646,000 |
| EU | 2010 | 768,000 | 674,000 |
| EU | 2011 | 950,000 | 714,000 |
| EU | 2012 | 966,000 | 750,000 |
| EU | 2013 | 826,000 | 779,000 |
| EU | 2014 | 668,000 | 826,000 |
| EU | 2015 | 671,000 | 869,000 |
| EU | 2016 | 697,000 | 950,000 |
| EU | 2017 | 629,000 | 1,025,000 |
| EU | 2018 | 541,000 | 1,095,000 |
| EU | 2019 | 532,000 | 1,168,000 |
| EU | 2020 | 573,000 | 1,240,000 |
| EU | 2021 | 591,000 | 1,376,000 |

Source: Based on Eurostat database.

Note: Statistical data refers to one thousand full-time equivalent persons.

The data analyzed shows that the steps taken by policymakers in the areas of renewable energy resources generation and heat/energy saving management have yielded positive results. In particular, the steady increase in employment in the renewable energy sector reflects the effectiveness of the EU's investment and incentive policies in this area, demonstrating their political commitment to the Sustainable Development Goals and the European Green Deal. Therefore, the steady increase in employment in the field of heat/energy saving management also allows the positive results of the EU's energy efficiency policies to be seen on the graph.

In addition, in Table 10, the time series 2000-2021 is analyzed in order to interpret the effects of the European Union's (EU) environmentally sensitive economic policies on the employment of the fields of activity in the field of "*Other Environmental Protection Management*" analyzed within the scope of the study.

**Table 10.** Employment Data Within the Scope of Other Environmental Protection Management

| Country Group | Year | Protection of ambient air and climate | Protection and improvement of soil, groundwater and surface water | Noise reduction (except workplace protection) | Preservation of biodiversity and natural appearance | Anti-radiation protection, environmental R&D and other environmental protection |
|---|---|---|---|---|---|---|
| EU | 2000 | 180,000 | 234,000 | 47,000 | 184,000 | 265,000 |
| EU | 2001 | 183,000 | 262,000 | 50,000 | 184,000 | 265,000 |
| EU | 2002 | 181,000 | 281,000 | 46,000 | 168,000 | 245,000 |
| EU | 2003 | 167,000 | 297,000 | 42,000 | 156,000 | 234,000 |
| EU | 2004 | 161,000 | 302,000 | 42,000 | 152,000 | 227,000 |
| EU | 2005 | 146,000 | 317,000 | 39,000 | 144,000 | 218,000 |
| EU | 2006 | 141,000 | 343,000 | 48,000 | 148,000 | 238,000 |
| EU | 2007 | 133,000 | 348,000 | 48,000 | 143,000 | 238,000 |
| EU | 2008 | 132,000 | 358,000 | 46,000 | 140,000 | 241,000 |
| EU | 2009 | 132,000 | 378,000 | 47,000 | 149,000 | 247,000 |
| EU | 2010 | 118,000 | 391,000 | 42,000 | 150,000 | 255,000 |
| EU | 2011 | 122,000 | 411,000 | 43,000 | 147,000 | 253,000 |
| EU | 2012 | 111,000 | 436,000 | 45,000 | 144,000 | 254,000 |
| EU | 2013 | 115,000 | 441,000 | 43,000 | 139,000 | 248,000 |
| EU | 2014 | 105,000 | 439,000 | 30,000 | 119,000 | 224,000 |
| EU | 2015 | 112,000 | 449,000 | 28,000 | 125,000 | 229,000 |
| EU | 2016 | 84,000 | 487,000 | 27,000 | 119,000 | 230,000 |
| EU | 2017 | 84,000 | 561,000 | 27,000 | 121,000 | 233,000 |
| EU | 2018 | 86,000 | 590,000 | 25,000 | 117,000 | 224,000 |
| EU | 2019 | 92,000 | 614,000 | 25,000 | 121,000 | 227,000 |
| EU | 2020 | 90,000 | 652,000 | 28,000 | 123,000 | 251,000 |
| EU | 2021 | 88,000 | 692,000 | 24,000 | 122,000 | 241,000 |

Source: Based on Eurostat database.

Note: Statistical data refers to one thousand full-time equivalent persons.

The data shows employment data in various fields such as protection of ambient air and climate, protection and improvement of soil, groundwater and surface water, noise reduction, protection of biodiversity and natural appearance, protection against radiation, environmental R&D and other environmental protection in the European Union (EU). In addition, it is seen that green economic modeling implemented within the scope of green transformation has created a total of 1,167,000 new jobs in the European Union Countries as of 2021 within the fields of activity examined.

## 5. METHODS

This study examines the theoretical foundations of ecology–economy integration, the developed conceptual framework, and environmentally conscious economic policies in EU countries based on sectoral employment data. First, a literature review was conducted to examine the historical and theoretical foundations of the concepts of sustainable development, the green economy, and ecology–economy integration. During this process, a conceptual framework was formulated by referencing internationally recognized documents such as the Club of Rome's *The Limits to Growth* report, the Brundtland Commission's *Our Common Future* report, and the Paris Agreement. To establish the quantitative dimension of the research, sectoral employment data

related to environmentally sensitive economic policies were collected and analyzed within the scope of a specified time series, utilizing Eurostat's open-access database.

In addition to quantitative analyses, descriptive tables outlining the conceptual structure of sustainability policies were also employed. These conceptual descriptions facilitated the linkage of quantitative findings with policy recommendations. The research method and approach applied allowed the article to provide a comprehensive analysis in both theoretical and quantitative dimensions and revealed the multidimensional impact of ecology–economy integration on employment.

## 6. CONCLUSION

The increasing level of production in the world since the industrial revolution has a positive impact on economic indicators. However, the unlimited needs of consumer societies put pressure on limited world resources. In this context, meetings and agreements made by governments and policymakers on a global scale focus on the concept of sustainability.

The basis of the Sustainable Development Goals set by the European Union and the policies established within the scope of the European Green Deal is to use our resources more fairly and comprehensively with the aim of passing them on to future generations. In this direction, it is essential for the individuals who make up the society to make radical changes in their existing consumption habits with environmental awareness in terms of the policies determined. This situation brings with it responsibilities for all segments of society. This responsibility, which starts with individuals, continues with states and the environmentally sensitive economic policies they will implement.

As a result of the examination of economic models based on the integration of economy and ecology within the scope of the study, the concept of green economy comes to the fore in order to ensure the sustainability of the concepts of development and growth, which are among the main goals of countries while maintaining environmental balance. In addition, "*Green Jobs*" emerging with the green transformation that will start with the concept of green economy concept is analyzed. The results show that green jobs overlap with the goals of "*Decent Work and Economic Growth*" and "*Responsible Production and Consumption*" in the Sustainable Development Goals, as well as the goals and policies set by the European Green Deal.

New business lines integrated into the markets with the concept of green jobs or the renewal of existing business models will reduce the negative pressure on the environment caused by traditional production models. In addition, the positive impact of green jobs on employment is confirmed by the data analyzed in the study.

**YAZAR BEYANI / AUTHORS' DECLARATION:**

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