

Review

Environmental Economics and the SDGs: A Review of Their Relationships and Barriers

Widhayani Puri Setioningtyas ^{1,*}, Csaba Bálint Illés ², Anna Dunay ², Abdul Hadi ¹ and Tony Susilo Wibowo ³

¹ Doctoral School of Economic and Regional Sciences, Hungarian University of Agriculture and Life Sciences, 2100 Gödöllő, Hungary; hadiabdul02@gmail.com

² Institute of Economic Sciences, Hungarian University of Agriculture and Life Sciences, 2100 Gödöllő, Hungary; illes.balint.csaba@uni-mate.hu (C.B.I.); dunay.anna@uni-mate.hu (A.D.)

³ Department of Management, Faculty of Economic and Business, Universitas PGRI Adi Buana, Surabaya 60234, Indonesia; tonysus_sw@unipasby.ac.id

* Correspondence: setioningtyaswidhayani@gmail.com or puri.setioningtyas.widhayani@phd.uni-mate.hu

Abstract: Recently, environmental issues have increased, whereas the Earth's natural resources have deteriorated. These problems have forced people and companies to engage in environmental economics to achieve sustainability. However, several barriers have been identified in the implementation of environmental economics. This literature review provides insights into environmental economics and the sustainable development goals (SDGs), as well as the correlation between these two subjects in general. Thus, information about potential barriers to the implementation of environmental economics and possible solutions will be presented. A total of 75 documents were analyzed, including articles, books, official reports, or paperwork from governments and/or related institutions. This study is beneficial, especially for developing countries that are just preparing for, or in the process of conducting, the initial implementation of environmental economics, as well as achieving the sustainable development goals. Interdisciplinary topics that integrate human aspects with environmental economics are limited yet crucial for future research.

Keywords: environmental economics; the sustainable development goals (SDGs); the SEEA; fiscal policy; green consumerism



Citation: Setioningtyas, W.P.; Illés, C.B.; Dunay, A.; Hadi, A.; Wibowo, T.S. Environmental Economics and the SDGs: A Review of Their Relationships and Barriers. *Sustainability* **2022**, *14*, 7513. <https://doi.org/10.3390/su14127513>

Academic Editor: Antonio Boggia

Received: 25 May 2022

Accepted: 14 June 2022

Published: 20 June 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

It is acknowledged that various economic activities, including human and industrial activities frequently result in various environmental problems, such as water and air pollution [1]. According to the World Health Organization (WHO), water pollution is one of the most major health risks, causing about 2 million human deaths each year. Annually, nearly the same number of premature deaths are caused by air pollution all over the world [2]. Air pollution, moreover, can lead to a severe degradation of the atmosphere, as well as many other environmental issues, including climate change, drought, and famine [1]. The depletion of natural resources and environmental deterioration are two further environmental consequences of extensive economic activities [3]. In the long term, all of these issues will not only disrupt the economy but may also affect society's well-being [4]. Considering all of these issues, it is important for all governments, particularly those in developing countries, to implement environmental economics in order to mitigate the negative impacts of economic activity.

While environmental economics is gaining interest among governments and economists, the world has also been introduced to the sustainable development goals (SDGs). The SDGs are arranged by the United Nations for all countries to participate in providing a global framework for achieving global development, while balancing social,

economic, and environmental sustainability [5]. The SDGs are an interconnected set of measurable goals designed to address interrelated challenges and achieve global sustainable development as well as trace the sustainability path until 2030 [6].

However, the path to achieving environmental economics and the sustainable development goals might not be so simple. Environmental problems continue to grow in severity, and the solutions provided by environmental economists have proven ineffective [7]. It is also known that the implementation of environmental economics strategies leads to several other consequences, both economically and socially. For example, the rise of the “shadow economy”, which is caused by inefficient fiscal policy. The “shadow economy” has spread to 162 Western countries, accounting for an average of 34.5 percent of official GDP [2]. In Asian countries, the average percentage of the “shadow economy” has reached about 31% of the official GDP. In the long term, the increasing level of the shadow economy can disrupt the stability of the economy [8]. Another consequence is market monopolization, which is found in the implementation of the green consumerism strategy. Market monopolization allows some companies to fully control price limits and maximize their profits, resulting in unfair competition, especially in the market for environmentally friendly products [9].

Despite all of these consequences, achieving environmental economics and sustainable development goals is becoming more difficult, especially for developing countries, due to various limitations, such as a lack of funding, technology, expertise, and human awareness of the importance of sustainable economic activities [10]. Furthermore, to the best of the researcher’s knowledge, no published literature review has looked into the relationship between environmental economics and the SDGs, as well as the potential barriers or consequences of implementing environmental economic strategies. In addition, no published literature review has analyzed possible solutions to these issues. Based on this, we decided to conduct a literature review to examine the relationship between environmental economics and the SDGs in general. Following this, we will analyze the potential barriers or consequences of implementing environmental economic strategies. Lastly, we analyze the possible solutions to address these issues.

The contribution of this study is to fill the literature gap by first presenting a generic overview of the relationship between environmental economics and the SDGs. Secondly, we provide insights regarding the barriers or consequences of implementing environmental economic strategies. Thirdly, we provide information about possible solutions to address these issues. This study is beneficial, especially for developing countries that are just preparing for, or in the process of conducting, the initial implementation of environmental economics as well as achieving sustainable development goals.

The remainder of the paper is organized as follows. The literature review is presented in Section 2. We explain the methodology in Section 3 and report the study findings in Section 4. In Section 5, we discuss the topic, and in Section 6, we conclude the study.

2. Literature Review

In this section, we explain the general concept of environmental economics and the sustainable development goals (SDGs), as well as their related programs for improving human lives and protecting the environment.

2.1. Environmental Economics

Environmental economics can be defined as the study of how environmental resources are managed using economic concepts. The study of environmental economics draws from both microeconomic and macroeconomic perspectives, although more from the microeconomics side. It primarily examines why and how humans make decisions that have consequences for the natural environment. It also evaluates how economic structures and policies might be changed to bring these environmental impacts more into balance with human preferences and ecosystem needs [11]. Furthermore, economists in this field defined sustainable development as development that preserves capital for future generations,

where capital refers to the total human capital (skills, knowledge, and technology), human-made capital such as machinery and buildings, and natural capital (environmental goods).

Previously, mainstream economic theory assumed that economic systems are independent of environmental restraints and therefore can be ignored. Environmental pollution was classified as an externality, which occurs when a company's or consumer's consumption or production has a direct impact on the welfare of the consumers, and those causing the damage are not financially accountable for it. Pollution damage fits neatly into this framework. Polluters cause damage to third parties but may not be required to pay for that damage. Market-oriented economic systems cannot maximize human well-being because they do not account for externalities [12]. Moreover, it is recognized that this system can potentially lead to other major problems such as drought and climate change. As a response, environmental economists began to investigate the influence of the natural environment on positive economic model forecasts and normative suggestions [13]. For them, the natural environment is an important component of the economic system, and they aim to treat the natural environment in the same way that we treat labor and capital, that is, as an asset and a resource, and as commodities that can be bought, traded, sold, saved, and invested [14].

However, some environmental economists believe that only scarce environmental resources deserve environmental treatment and need to be protected, while others argue that environmental treatment is based on issues that people indirectly care about because they influence the production of other commodities that are (1) scarce, (2) available outside markets, and (3) impacted by the activities of others [13]. This implies that humans are more likely to protect environmental resources because they benefit from them, so human impulses may affect environmental economic movements [15].

Regarding the human–environment relationship, it is widely acknowledged that the majority of environmental problems are caused by human activities that create long-term ecological changes, such as biodiversity depletion, freshwater shortages, and so on. Therefore, reducing human activities may be the most effective technique to both decrease environmental problems and increase the size of the resource base [16]. On the other hand, human activities are essential for economic development. This is why it is necessary for economists to investigate the human activities and related issues that have significant consequences for resource management, economic values, economic appraisal processes, and the emerging environmental economic policies and strategies [17].

Furthermore, for most economists, economic growth is necessary; they believe the economic system must grow if they are to survive. Since the environment is now viewed as part of the economic system, providing service to it, any measure of the economy should include some measure of natural capital. This implies the need to modify national accounts to take account of the depreciation of natural capital, and environmental economists aim to find ways to do this [12]. In addition, environmental economists argue that external costs and benefits should be “internalized” by adjusting prices so that the person purchasing the goods or services incurring external costs is obliged to pay for them [14]. The assumption in internalizing the costs is that environmental damage can be compensated and that this is as good as, if not greater than, preventing the damage in the first place [18]. Currently, this concept is being implemented in the green consumerism strategy [9].

Environmental costs, moreover, can be recovered by means of a tax or charge implemented by governments, thus making external costs part of the polluter's decision. In theory, the payments can be used to correct the environmental damage they cause [18]. All of this implies that the charges are proportional to the damage caused, although this is rarely the case. However, even where environmental taxes do not internalize the full cost of environmental damage, they are favored by environmental economists who believe they will stimulate technological change and provide an incentive for polluters to reduce their emissions [12]. The degree of incentives provided will also depend on how large the charge, tax, or subsidy is that is regulated by governments. Therefore, the role of governments is crucial in determining the amount of tax, charge, and subsidy as well as expenditure for

major investments in plants and equipment for environmental improvement. It is known that government taxation and expenditure are two tools of fiscal policy [19].

In this context of dependence on an environment with finite resources, there is a growing interest in alternative economic models such as de-growth. Instead of focusing on green investment in the environment, de-growth embraces the limitations of resources and is willing to accept lower, or even negative, growth rates in order to balance natural and economic systems [20]. Although de-growth is frequently presented as a mutually exclusive alternative, this economic model has aspects that are common for both the importance of human well-being and natural resources [21].

Regardless of various environmental economics approaches, by far, there are four primary strategies that are most commonly used and identified in this study: the inclusion of natural capital in the national accounts [12], green consumerism [10,15], fiscal policy [19,20], and the de-growth economic model [21,22]. Furthermore, the goals of these strategies are integrated into the United Nations' sustainable development goals (SDGs). These strategies will be further explained in the sub-chapter below.

2.1.1. The Inclusion of Natural Capital in the System of National Accounts (SEEA)

It is widely accepted that much economic activity is dependent upon natural capital and natural resources, which are generically termed "environmental assets" in an accounting context. Environmental assets are under the threat of depletion and degradation from economic activity. As a consequence, the incorporation of information on environmental assets into standard accounting frameworks is an essential element in mainstreaming environmental information and broadening the evidence base for economic decisions and the assessment of sustainability [4]. This recent accounting theory can be found in the System of National Accounts.

The System of National Accounts (SNA) has always been regarded as an essential information source ever since countries developed economic policies to manage their involvement in the Second World War. In this challenging situation, national accounts provided the structured information needed to assess reconstruction and development options for countries around the world. The SNA covers all aspects of economic activity, including production, consumption, and accumulation, along with all industries (e.g., manufacturing, agriculture, mining, electricity, water supply, health, education, etc.). A key indicator from the SNA is Gross Domestic Product (GDP). Indeed, within a short period of time, the coordination of economic information via the national accounts became fundamental to policy-makers in central banks, development agencies, and treasury and finance departments [22].

In general, the national accounts formula is understood as a final demand formula of income being equal to consumption plus investment plus government expenditure plus exports minus imports (i.e., $Y = C + I + G + X - M$). Currently, these accounts have been developed and successfully provide information, including intermediate consumption, output, value added, compensation of employees, employment, operating surplus, taxes and subsidies, and many other variables, to create a complete and coherent picture of macro-economic activity for countries. However, the original creator of the national accounts recognized some limitations and criticized the national accounts as well as the associated economic policies. In a speech of 1968, Robert Kennedy stated that many aspects that make life worthwhile, such as environmental assets, are not taken into consideration [4].

According to the United Nations system of national accounts, the standards for national accounts include not only stocks of manufactured (strictly, produced) assets but also stocks of environmental assets, including minerals and energy resources, timber, land, and fish. The balance sheet of the national accounts also includes the value of leases, contracts, licenses, and similar intangibles, as well as the net positions of financial assets and liabilities. This means that national accounts provide a broad coverage of assets within the accounting framework [23]. On the other hand, in reality, only a few countries provide comprehensive estimates of the complete accounting framework, including both flows and stocks [4].

However, the concern about these problems was that national accounting measures, particularly GDP, did not take the cost of the depletion and degradation of environmental assets as well as natural resources into account. The starting point for resolving this was the measurement of stocks and changes in stocks of environmental assets. Regarding this problem, several methods were developed, both within and outside of the national account community. For example, first, the measurement scope of environmental assets is broader than the System of National Accounts (SNA) and includes the usually unpriced services provided by ecosystems in addition to their value as a source of food, energy, water, and materials. Commonly, these additional services have the features of public goods, which are difficult to measure and are not included in standard measures of economic assets. Their inclusion represents a significant difference in the interpretation and scope of data on environmental assets.

Second, the concept of exchange value as applied by national accounts means that valuations should be derived using market or private discount rates and exclude measures of consumer surplus. Although the exclusion of consumer surplus is necessary for accounting purposes, it makes it impossible to account for aspects such as the intrinsic value of environmental assets. Moreover, private discount rates are also appropriate for accounting purposes, but since many environmental assets are increasingly being valued in terms of their societal value, this kind of approach might be more appropriate for policy discussion. The rates of social discounts are generally lower than private discounts, and small differences in discount rates can have large impacts on estimated values. Therefore, this treatment is important and should be recognized in standard national accounts.

Third, regarding depletion, all techniques for the valuation of environmental assets consider it necessary to deduct depletion from GDP or related measures of income. Whatever decisions are made regarding the scope of environmental assets and their valuation, the deduction of depletion may seem like a necessary step. However, the adjustment of GDP for depletion might not be viewed as an investable outcome for the measurement of environmental assets. The consistent focus on GDP as a measure of economic activity ignores the fact that it does not account for the depreciation of product assets. As a result, even within the scope of produced assets, the standard focus of national accounting has failed to account for changes in the assets that support production and income [4].

To date, the importance of building a connection between economic activity, as measured by GDP, and the exploitation of environmental assets has been a primary motivation for the development of the system of environmental–economic accounting (SEEA). The SEEA was released in 1993 in the wake of the first Rio conference and is the outcome of a transparent process involving the worldwide statistics community, economists, ecologists, geographers, other scientists, and policymakers. The SEEA, moreover, underwent several revisions in 2003, 2012 and, most recently, in 2018. In general, the measurement approach described in the SEEA is based on the SNA accounting approach. It was designed to complement and extend the accounting of the SNA through the valuation of environmental assets, the integration of physical data about the environment (e.g., water, flows of energy, and air emissions), and the recognition of environmental transactions and activities in standard economic accounts [24].

Furthermore, as an extension of the national account system, the SEEA defined the environmental assets in bio-physical terms, which must have an owner and a future income stream. This term has a broader scope than economic assets defined in the national accounts. The broader scope of environmental assets in the SEEA requires accounting in both physical and monetary terms since many environmental assets do not have an economic value as recognized in the national accounts. The SEEA, moreover, shows how physical measures of assets can be utilized to apply accounting approaches in a consistent and appropriate way. For instance, asset accounts can be compiled in terms of tons of fish and minerals, cubic meters of water and timber, and hectares of land. It is likely that accounting for the flows and stocks of environmental assets in physical terms will provide meaningful additional information for economic and environmental policy purposes [4].

Another extension to the SEEA is to include the full range of services provided by the ecosystem. This inclusion includes those services captured by individual economic units through provisioning services such as the production of food, energy, and materials, as well as those services available to society more generally (e.g., public goods such as clean water, air, recreational opportunities from national parks, etc.). Moreover, the economic valuation of environmental assets in the SEEA should be based on exchange values. This means that SEEA should exclude consumer surplus and should be based on private discount rates. Based on all these explanations, it is concluded that the important aspect of the SEEA approach is estimating the monetary value of depletion and degradation and integrating that value into the sequence of accounts that links measures of income, production, and saving in a consistent manner [25].

Regardless of the many different approaches to the valuation of environmental assets in national accounts that have been implemented in a few countries, the more fundamental issues are that there has been little demand for regular information on these values from economic analysts and policymakers who are regular users of the national account measures of economic activity. Therefore, it is crucial for economic analysts and policymakers to understand the importance of changing the values of environmental assets and widely accepting them in the main economic policy areas [4,13].

2.1.2. Green Consumerism

Environmental sustainability and deterioration are considered to be among the most important challenges facing the globe today. Regarding this, firms are encouraged to implement a green marketing strategy that offers environmentally friendly products in order to protect the environment and human health [26]. While green marketing focuses on firms' responsibility towards the environment, green consumerism encourages the consumer to cultivate environmentally friendly behavior and emphasize their role in environmental protection [27].

It is revealed that most environmental issues are caused by individuals, followed by the economy, healthcare, unemployment and crime [28]. Regarding this, individuals' consumption decisions are identified as contributing to the major impacts of environmental deterioration, as well as receiving the most major concern in various environmental studies [29,30]. Today, consumers are more aware of their consumption behavior and its effects to the environment, as well as the severity of environmental problems. As a result, people are becoming more environmentally conscious [24,28]. Following this awareness, consumers are motivated to purchase environmentally or eco-friendly products from businesses that engage in environmentally friendly practices [31,32]. This consumer practice is known as "green consumerism". It is acknowledged that consumers with a "green consumerism" perspective will give higher value to environmentally friendly products compared to mainstream products. Therefore, green consumers are willing to pay more to purchase products that are more environmentally beneficial. "Environmentally or eco-friendly" products cause less damage to the environment in their usage and manufacturing [9].

However, to increase the practice of "green consumerism", many studies have been conducted to examine the factors that affect green purchasing behavior. These factors, moreover, may be derived from the social sciences, such as psychology or sociology, including education, religion, culture, personal habits, and factors that are related to the environment, such as the economy and pollution [33]. It is also known that the major factors that influence green purchasing behavior are environmental attitudes, environmental concerns, environmental knowledge, and skepticism towards environmental claims [33]. Other factors that were also recognized to make a contribution to green purchasing behavior are personal capabilities, attitudinal, contextual factors, habits and routines [34], the perceived seriousness of environmental problems, perceived environmental responsibility, perceived effectiveness of environmental behavior, and perceived self-identity in environmental behavior [24,33].

However, despite all of the factors that are related to “green consumerism”, the most important reason to be noted is that consuming regular products can make a major contribution to the global environmental crisis, and the purchase of environmentally friendly products can lower this severe impact [35,36].

2.1.3. Fiscal Policy

Fiscal policy is defined as the management of taxation and government spending to achieve macroeconomic stability [19]. Fiscal policy refers to governments’ actions or interference in the economy to address concerns such as unemployment and economic stabilization [37,38]. During economic downturns, many governments adjust and increase fiscal expenditure priorities in order to revitalize the economy. Changes in the content of fiscal spending are commonly permanent, whereas increases in government spending are typically only temporary, meaning that fiscal spending has a major impact on the economy, both in terms of its composition and levels [39].

Moreover, fiscal policy was also utilized to solve structural long-term problems, such as expanding access to health care, improving education, reducing poverty, and especially reducing environmental problems in various countries [39]. Between 2002 and 2015, 22 Asian developing countries applied fiscal policies to reduce water and air pollution by using two tools: government expenditure and direct and indirect taxes [40]. It is acknowledged that the reallocation of government spending towards public goods can have an impact on pollution through the proximate aspects of scale, composition, and technique effects [41].

Restructuring government spending in favor of public goods increases economic growth by inducing a scale effect that in turn enhance environmental pressures, *ceteris paribus*. On the other hand, the reallocation of government spending may benefit human capital-intensive activities to the detriment of physical capital-intensive industries, which are the most polluting industries [40,42]. This triggers an output composition effect that is likely to improve environmental quality. Moreover, government expenditures on public goods may also induce a technique effect that could be environmentally friendly. The term “technique effect” refers to a reduction in the pollution–output ratio. It is also known that more technological diffusion and research and development through public goods could lead to the development and use of cleaner technologies under certain circumstances. In addition, increasing income through public goods spending can also induce an income effect, and since raising income increases the population’s demand for a cleaner environment, it may be possible to reduce pollution [39].

Another example regarding the utilization of fiscal policy for long-term problems, especially environmental problems, occurred between 2008 and 2009, when the United States, China, and several other countries used large fiscal stimulus to expand access to health care, improve education, reduce poverty, and reduce dependence on fossil fuels. This strategy may require a major shift in the composition of fiscal spending to these areas, which corresponds to public goods spending [39].

2.1.4. De-Growth Economic Model

De-growth is an economic model that proposes the attainment of self-sufficient, autonomous, and environmentally respectful companies with sufficient potential to provide for the well-being of all citizens using locally accessible resources [20]. De-growth theory emerged as a collective economic approach that aimed to cause a significant change in current consumption and production habits, so that human well-being and the survival of the planet becomes the central axis of market orientation. However, if this economic model is implemented, business objectives will be shifted from the generation of profits to the generation of environmentally and socially sustainable behaviors and practices, regenerating natural resources, society, and, ultimately, the planet [43].

Furthermore, there are several subsystems of economic practices in the de-growth context, including strategic management, operations management, financial and accounting

management, marketing, and human resource management. It is acknowledged that strategic management plays a key role in de-growth model implementation. Under this model, strategic management focuses on stakeholder integration in designing the business objectives together, rather than designing them individually [44]. This stakeholder integration has become one of the main signs of the success of these management practices [45]. In line with the de-growth economic model, stakeholder integration calls for directing business activity towards the value creation for goods and services. This value is concerned with business survival and, ultimately, planetary survival. This concept leads us to emphasize the importance of wealth and collaborative cocreation [20].

Another subsystem is operations management, which has prioritized aspects such as innovation, efficacy, quality, and efficiency as fundamental elements of management. It is known that sustainability is an important aspect in the field of operations management, and a change in this field might be unavoidable in order to achieve sustainable development [46]. In this regard, companies should be consistent in two important respects: that the transfer of waste, whether in liquid, solid, or gaseous form, does not exceed the assimilative capacity of the ecological environment and that the resources extracted from the ecological system do not exceed the capacity of the environment [47]. This consistency means that when making decisions regarding activities, organizations must consider the environment and establish a commitment to equity between what is contributed to and what is taken away from the environment in order to make a positive contribution to both economic and social welfare [20].

Furthermore, financial and accounting management is currently a key subsystem in business management and consumes a significant number of resources in a company. From the financial perspective, the application of de-growth to business management requires employing tools such as the Common Good Matrix as a core reference [48]. This matrix aims for better socially responsible financial management as it is the companies' responsibility to contribute to moving financial market activities towards the common good [20]. In the accounting field, the application of the de-growth model is not intended to change financial statements, but to ensure that financial statements are more reliable and accurate [43].

Marketing is another one of these subsystems that are essential to promoting socially and environmentally sustainable consumption by influencing the consumption habits of consumers [49]. Marketing activities, however, can have significant negative impacts on consumers. Therefore, consumers, sellers, and CSR activists could cooperate to exhibit fully responsible marketing. In addition, stakeholder marketing plays a crucial role in influencing society towards responsible consumption. This kind of marketing is also a powerful tool for producers to integrate the concept of CSR, thus ensuring that companies and stakeholders benefit from the symbiosis of society and business [43].

Lastly, human resource management is an essential subsystem to implementing an environmentally and socially responsible company position. This subsystem requires the alignment of motivation and personal capabilities with both environmental and internal pressures [50]. The job guarantee is known as the key factor within human resource management in the context of the de-growth model. The job guarantee (JG) is one of several paths to full employment, including reduced working time. The JG helps employees balance their work and free time, reducing the burden on society as well as feelings of uselessness and social stress [51].

2.2. The Sustainable Development Goals (SDGs)

The sustainable development goals (SDGs) are an agenda that was first adopted by the United Nations in September 2015. This development scheme presents an ambitious vision of transformative change towards achieving a more sustainable future by the year 2030 [52]. The SDGs include 17 comprehensive sets of goals: (1) No Poverty, (2) Zero Hunger, (3) Good Health and Well-being, (4) Quality Education, (5) Gender Equality, (6) Clean Water and Sanitation, (7) Affordable and Clean Energy, (8) Decent Work and Economic Growth, (9) Industry, Innovation and Infrastructure, (10) Reduced Inequalities,

(11) Sustainable Cities and Communities, (12) Responsible Consumption and Production, (13) Climate Action, (14) Life below Water, (15) Life on Land, (16) Peace, Justice, and Strong Institutions, and (17) Partnership for the Goals [53]. These goals are also divided into 169 targets, which are associated with each other in multiple ways to encourage sustainable development at multiple scales both nationally and internationally [54].

Compared to other initiatives, the 2030 SDGs contain a distinguishing feature that is intended to be treated as universal and indivisible. Universality means that the SDGs agenda applies to all nations and people around the world, regardless of their current level of sustainability or income challenges. The principle of indivisibility means that the implementation of the SDGs agenda should be based on integrated approaches rather than on segmented knowledge and policymaking [55].

Furthermore, numerous academics conducted studies analyzing the linkage between the 17 goals of the 2030 agenda for sustainable development from different points of view. This analysis is not only due to the interdisciplinary nature of the problem, but also to the concerns of many scientists regarding the related social and economic problems and the estimates of the planet's resource depletion [56]. As a result, the correlation can be classified into organic macro-categories [57]. For example, it is noted that reducing inequalities (SDG 10) also implies gender equality (SDG 5), just as a low emission of carbon dioxide impacts both SDG 7 and SDG 13. In this way, the 17 goals can be reduced into eight categories. Other studies classified the SDGs in only four sustainability dimensions [58] or technological fields [59], whereas other studies classified them into 15 impact categories [60].

Regarding the objectives that are related to the environment, such as climate, water quality, and life on Earth (SDG 13, SDG 15), it is recognized that they are strongly related to providing the necessary access to energy and safe drinking water (SDG 7, SDG 8), which in turn, are crucial to improving human health (SDG 3). This also aligns with future infrastructure and cities (SDG 9, SDG 11), as well as with consumption and production patterns that interact (SDG 12). The market for green technology also provides opportunities to create new jobs (SDG 8), resulting in a reduction in inequality between and within generations (SDG 10) [59].

Regardless of all the concepts and correlations, one important thing to note is that all of the SDGs and related analyses are known to have implications for resource management, improving the quality of life for many of those living in poverty across the world, as well as tackling climate change and particularly promoting environmental protection and sustainability [61].

3. Methodology

We conducted a literature review to examine the relationship between environmental economics and the SDGs in general. Then, we analyzed the potential barriers or consequences of implementing environmental economic strategies, as well as possible solutions to address these issues. This literature review is divided into three following steps. The first step is the screening process of databases, the second step involves coding and analyzing the selected data. The third step includes our results and a discussion.

3.1. The First Step: Screening Process of Databases

Step 1: To begin, we searched for data from various electronic bibliographic data sources, such as the Web of Sciences (WoS) and Scopus, using combinations of specific keywords and their synonyms. We used a broad set of keywords for environmental economics, included: "environmental economics" AND "environmental problems" AND "environmental-accounting system" OR "the SEEA" OR "national accounts" AND "green consumerism" AND "fiscal policy" AND "De-growth". The keywords for the sustainable development goals (SDGs) included: "sustainability" OR "sustainable development goals" OR "sustainable economy". We refined the databases by utilizing all available English-language materials from various sources, including journals, books, and official paper works or reports from governments or related institutions, which were published at any

time. As a result, we found 370 documents, including articles, books, and reports from governments or/and related institutions.

Thus, we deleted any duplicates, incomplete bibliographic data points, and documents published in languages other than English, as well as those with an English abstract but a different language for the rest of the text. Documents that did not have a primary focus on environmental economics or the SDGs, even if they mentioned them, were also eliminated. The number of documents decreased to 130 after 240 documents were deleted from the initial set. From the 130 documents found, after a careful reading of the overall content by one co-author, 40 documents were excluded due to a lack of relevance to the specific theme of both environmental economics and the SDGs. A total of 90 documents were selected for the final review. Following this, we conducted a backward reference search to the end of the 90 documents to reinforce the findings of our literature review. The number of documents was reduced to 81 during this phase, which we used to examine the topics of environmental economics and sustainable development goals (SDGs). Table 1 is a summary of the screening process of the databases.

Table 1. Summary of the screening process of databases.

Item	Description
Source	Journals, books, paper works or reports
Query	Topic: "environmental economics" AND "environmental problems" AND "environmental-accounting system" OR "the SEEA" OR "national accounts" AND "green consumerism" AND "fiscal policy" AND "De-growth" AND "sustainability" OR "sustainable development goals" OR "sustainable economy" Refined by: Languages—(English), Subject area—Environmental economics and sustainability, Source type—Articles, books, official papers, works or reports from governments or related institutions.
Hits	370
Papers retained after:	
- Cite selection;	200
- Title and abstract selection;	130
- Full-text selection;	90
- Backward and forward search.	81

3.2. The Second Step: Coding and Analysis Process

Continuing the process, each of the remaining articles was thoroughly understood, coded, and analyzed. After analyzing, we investigated the relationship between four strategies of environmental economics and the SDGs in general. After this, we further analyzed the potential barriers or consequences of implementing environmental economic strategies as well as the possible solutions to address these issues (Table 2).

Table 2. Results of coding process.

Article	Year	Source Type	Environmental Economics					The Sustainable Development Goals (SDGs)
			The Concept	Environmental–Economics Accounting System	Green Consumerism	Fiscal Policy	De-Growth	
Huyhn, C.M.	2020	Journal				✓		
Biswas et al.	2012	Journal				✓		
Pirmana	2020	Journal		✓				
Obst and Vardon	2014	Journal		✓				
Sachs, J.D.	2012	Journal						✓
Mio et al.	2020	Journal						✓
The United Nations	015	Report						✓
Beder	2011	Journal	✓					
Medina and Schneider	2018	Journal				✓		
Ambec and Donder	2022	Journal			✓			
Ulph and Ulph	2021	Journal	✓					
Barry Field	2017	Book	✓					
Pearce	2002	Book	✓					
Sagoff	2012	Journal	✓					
Nadeau	2015	Journal	✓					
Lele	1991	Journal						✓
Venkatachalam	2006	Journal	✓					
Kahneman and Knetsch	1992	Journal				✓		
Beder	1996	Journal				✓		
Johnson	1996	Book				✓		
Ubeda et al.	2020	Journal					✓	
Jakob and Edenhofer	2014	Journal			✓		✓	
Vardon et al.	2018	Journal		✓				
Bwanakare	2019	Book		✓				
The UN and Eaccounting	2010	Book		✓				
The UN	2003	Book		✓				
Dagher	2014	Journal			✓			
Tseng	2016	Journal			✓			
Paetz et al.	2012	Journal			✓			
Haytko and Matulich	2008	Journal			✓			
Wiedenhofer et al.	2017	Journal			✓			
Han et al.	2009	Journal			✓			
Laroche et al.	2001	Journal			✓			
Mostafa	2007	Journal			✓			
Stern	2000	Journal			✓			
Elsantil	2021	Journal			✓			
Paul et al.	2016	Journal			✓			
Pearce and Atkinson	2017	Journal						✓
Battaglini and Coate	2016	Journal				✓		
Galinato and Islam	2014	Journal				✓		
Hyunh et al.	2019	Journal				✓		
Antweiler et al.	2001	Journal				✓		
Mani and Wheeler	1998	Journal				✓		
Vazquez and Ubeda	2021	Journal					✓	
Win and Paradigm	2009	Journal					✓	
Sorman and Giampietro	2013	Journal					✓	
Corbett	2009	Journal					✓	
Latouche	2009	Book					✓	
Felber	2015	Book					✓	
Lorek andand Fuchs	2013	Journal					✓	
Gomes et al.	2012	Book					✓	
Alcott	2011	Journal					✓	
The United Nations	2018	Report						✓
Hutton et al.	2018	Journal						✓
Bennich et al.	2020	Journal						✓
Cordova andand Celone	2019	Journal						✓
Fuso Nerini	2019	Journal						✓
Muff et al.	2017	Journal						✓
Walz et al.	2017	Journal						✓

Table 2. Cont.

Article	Year	Source Type	Environmental Economics				The Sustainable Development Goals (SDGs)
			The Concept	Environmental-Economics Accounting System	Green Consumerism	Fiscal Policy	
Pedersen	2018	Journal					✓
Zhang et al.	2016	Journal					✓
Xue et al.	2021	Journal				✓	
Chay et al.	2015	Journal				✓	
Arntz	2012	Journal					✓
Wang et al.	2020	Journal			✓		
Christopher	2016	Journal					✓
Gerlagh et al.	2018	Journal				✓	
Pereira	2017	Journal				✓	
Schneider et al.	2010	Journal					✓
Infante et al.	2011	Journal					✓
Pirmana et al.	2019	Journal		✓			
Jackson et al.	2012	Book					✓
Fredriksson	2001	Journal				✓	
G. Nyilasi, H. et al.	2014	Journal			✓		
Magali, A. et al.	2011	Journal			✓		
Schneider	2010	Journal				✓	
Singh	2019	Journal					✓
Cosme et al.	2017	Journal					✓
Pellgrini and Gerlagh	2006	Journal	✓				
Ossewaarde	2020	Journal					✓
Milanovic	2016	Journal					✓

3.3. The Third Step: Results and Discussion

In this section, we present the study findings on the relationship between four strategies of environmental economics and the SDGs in general. Regarding this, we present very general information about the relationship between environmental economics and the SDGs without further investigation, especially on each target of the SDGs. Moreover, information related to potential barriers or consequences of implementing environmental economic strategies was examined and presented. We also revealed the possible solutions to address the issues of environmental economic strategy implementation and, in addition, discussed some topics for future study. The flowchart of proposed method is presented below (Figure 1).

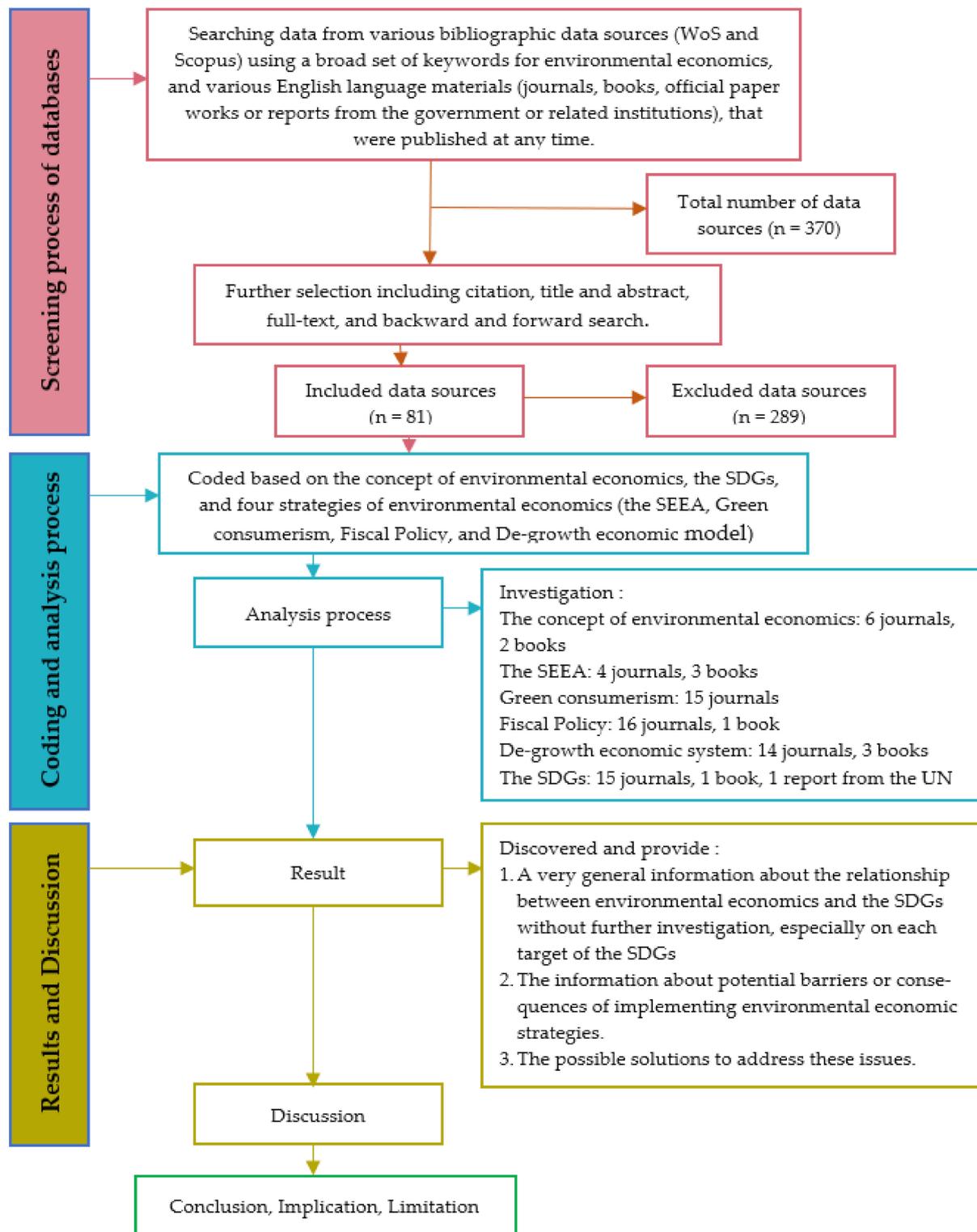


Figure 1. Flowchart 1. Proposed Method.

4. Findings

In this section, we present the relationship between four environmental economics strategies—the inclusion of natural capital in the System of National Accounts (SEEA), green consumerism, fiscal policy, and the de-growth policy—and the sustainable development goals (SDGs). Moreover, we investigate and provide information about the potential

barriers or consequences of implementing environmental economic strategies, as well as possible solutions to address these issues.

4.1. The Relationship between the Inclusion of Natural Capital in the SNA (SEEA) and the SDGs

It is widely accepted that much economic activity is dependent on natural resources and capital, which are termed “environmental assets” in the context of accounting. Therefore, it is important to include the environmental assets and their depletion and degradation into the national accounts. This inclusion also broadens the evidence basis for economic assessment and decisions on sustainability. Moreover, it is known that some environmental assets are a concern in environmental accounting systems as well as the sustainable development goals (SDGs) program. For example, by using the environmental-economic accounting system, environmental assets can be physically measured, such as tons of fish and minerals, cubic meters of water and timber, and hectares of land [4]. These assets are also known to become the targets of SDGs 14 (Life below Water) and 15 (Life on Land). The physical measurement of the resources in the water and land as well as their depletion and degradation can provide important economic information (such as the availability of resources for recent and future usage, how much these resources have been explored, what measures can be applied to address or prevent these issues, how much it costs to address these issues, etc.) and environmental policy purposes (such as the regulation of natural resource utilization, or the conservatory program for natural resources, etc.).

Another environmental asset that is included in environmental-economic accounts is the degradation of the ecosystem, in particular the loss of regulating services, such as flood protection, water purification, and air filtration. Flood protection is identified as having a relationship with the SDGs 1 (No Poverty) and 3 (Good Health and Well-being) [52]. Without the threat of flooding, humans can live in a healthy environment, allowing them to achieve good health, both physically and mentally. Moreover, people who have good physical and mental health will be able to perform better at work, which in turn, allows them to earn higher salaries. The more people who earn higher wages, the more poverty problems will be solved.

Water purification and air filtration, on the other hand, are correlated with the targets of SDG 6 (Clean Water and Sanitation), which is also related to the targets of SDG 3 (Good Health and Well-being). The lack of water purification and air filtration will cause severe environmental problems such as polluted air and water. According to the World Health Organization (WHO), air pollution kills over 7 million people per year, and nearly 90% of the world’s population breathes polluted air [1]. It was also revealed that the worst levels of air quality, particularly in developing countries, have an impact on human capital accumulation and company performance [62]. This is due to the fact that those who are skilled and qualified but sensitive to low air quality may flee the impacted locations to enjoy greater wages and a better quality of life. As a result, it is more difficult for companies in more polluted locations to recruit high-quality staff, resulting in a loss of human capital and, in the long term, a reduction in corporate performance [63]. Employees that have a better understanding and knowledge of the negative consequences of air pollution are also more sensitive to the issue [64]. This suggests that air pollution can have an influence on human well-being, which is one of the targets of SDG 3.

4.2. The Relationship between “Green Consumerism” and the SDGs

Green consumerism is one of the environmental economic strategies used to reduce the adverse environmental impacts caused by human and economic activity. Consumers with a “green consumerism” perspective are willing to give higher value and pay more for products that are more environmentally friendly. Environmentally friendly products mean less damaging product usage and manufacturing [9], which is also a key factor in reducing climate change. The beneficial effect of green consumerism on climate change is aligned with the targets of SDG 13 (Climate Action).

Furthermore, some consumers are optimistic about their capability to improve and solve environmental problems by engaging in recycling activities, reducing their consumption of electricity, and purchasing environmentally friendly products. Thus, these consumers tend to be satisfied with their social life because they may believe that they are creating good things for society. This is how “green consumerism” can enhance consumers’ well-being. Moreover, the consumption of green food is often viewed as a type of green consumerism. This habit reflects consumers’ purchase behavior toward green food products that are perceived as safe, environmentally friendly, and healthy [65]. The concerns for health and well-being are aligned with the targets of SDG 3 (Good Health and Well-being).

However, the “green” perspective is perceived not only from the consumer standpoint, but also from the supplier’s perspective. On the supply side, it is well-known that companies are under a lot of pressure to go green. Consumers, bankers, investors, and other stakeholders are urging companies to reduce their adverse environmental impacts. This is known as “Firms’ Social Responsibility” (FSR), or “Corporate Social Responsibility” (CSR) [66]. This green movement is correlated with the targets of SDG 12 (Responsible Consumption and Production).

4.3. The Relationship between Fiscal Policy and the SDGs

It is recognized that fiscal policy as the management of taxation and government expenditure is commonly used to achieve macroeconomic stability [19] and address issues such as unemployment and economic stabilization [38]. Another function of fiscal policy is to solve structural long-term problems such as expanding access to health care, improving education, reducing poverty, and in particular, addressing environmental issues in various countries [38]. In this regard, fiscal policy correlates with the targets of SDG 1 (No Poverty).

Regarding environmental problems, environmental economists argue that external costs can be internalized by adjusting the prices of goods or services. This can be carried out by means of a charge or a tax. For instance, a firm discharging waste and polluting river might be charged a fee to cover the cost of lost recreational amenity and fish life. As a result, external costs will become a factor in a polluter’s decision in the future [14]. Based on this, fiscal policy can also be used to protect life on land and water, which are targeted in SDGs 14 (Life below Water) and 15 (Life on Land).

However, if the pollution charge is equal to the cost of environmental damage, then the theory is that a company could clean up its pollution until it is cheaper to pay a charge than to reduce pollution. In the long-term, this practice can be economically efficient because the external costs to the firm will outweigh the benefits to those suffering from the impacts of the pollution. Economists believe that this measure is less optimal for the community because the polluter is better off than they would be having paid to entirely eliminate the pollution, while the community is not worse off because the damage is being compensated by the firm through tax payments to or fines from governments. The assumption of internalizing the costs is that environmental damage can be compensated for and that this is as good as, or even preferable to, preventing the damage in the first place [18]. Therefore, rather than expecting environmental taxes to fully cover the cost of environmental damage, it is better for firms to improve their technology by reducing their emissions or waste [12].

The reallocation of government expenditure on technological diffusion and research and development through public goods can stimulate the utilization of cleaner technologies. Cleaner technologies will suppress the level of pollution in water and air [39]. A healthy society, physically and mentally, is easily achievable with cleaner water and air. Moreover, it is acknowledged that raising taxes will reduce air pollution. Additionally, higher fuel taxes and a greater CO₂ sensitivity of registration taxes for new cars can reduce CO₂ emissions in 15 European Union countries. This occurred when taxes encouraged people to buy more fuel-efficient cars in the years 2001–2010 [67]. Other studies also found that CO₂ taxes may be a crucial fiscal tool for reducing air pollution, as well as promoting fiscal consolidation in Portugal. Their simulation results indicate that CO₂ taxes can align with the current climate

policy goals. This suggests that fiscal policy also aligns with the targets of SDG 13 (Climate Change) [68]. These goals, which are related to the reduction in air pollution, are related to the targets of SDG 3 (Good Health and Well-being). In addition, all of these fiscal policy schemes, through tax, government expenditure and environmental policies, illustrates a picture of responsibility in consumption and production, especially towards environmental problems, which are aligned with the targets of SDG 12 (Responsible Consumption and Production).

4.4. *The Relationship between the De-Growth Economic Model and the SDGs*

De-growth is known as one of the economic models that applies a reduction in production and consumption in order to improve human well-being and ecological conditions at both local and global levels in the short and long-term. Following this, de-growth movements succeeded in reducing the impacts of air pollution as well as climate change [69]. This proves the correlation between de-growth model goals and the targets of SDG 13 (Climate Action). As explained before, people who live without the threat of climate change, drought, flood, and famine can easily achieve a healthy life and good physical and mental health. Thus, these people have a better work performance, which allows them to earn a higher wage and live a wealthier life. In this sense, poverty issues are solved (SDG 1: No Poverty).

The practice of the de-growth model can also be seen in the agriculture sector [70]. Studies revealed that unsustainable production processes can be solved using organic farming (changes in process) and new patterns of consumption, such as following a more vegetarian diet, as well as consuming seasonal products (changes in products). Changes in processes can help to reduce waste, decrease the amount of energy used, and incorporate new energy sources. On the other hand, changes in products can help to produce goods that last longer and decrease the energy used in the process. These actions illustrate a picture of responsible consumption and production, which are aligned with the targets of SDG 12.

Furthermore, the implementation of the de-growth model is identified in the projects of Triodos Bank, a bank of Dutch origin that specializes in financing institutions, companies, and projects with high social, cultural, and environmental value. The majority of its funded projects are in the categories of education, organic farming, the cultural industry, energy efficiency, and sustainable building [20]. This is how the de-growth model aligns with the targets of SDGs 7 (Affordable and Clean Energy), 9 (Industry, Innovation, and Infrastructure), 11 (Sustainable Cities and Communities), and 12 (Responsible Consumption and Production).

Despite all the benefits of the de-growth model, which aligns with the SDGs, an important thing to note is that implementing a de-growth model does not stop a company from growing and achieving benefits. The de-growth economic model, moreover, can be applied without sacrificing profitability [20]. Table 3 is the summary of the relationship between environmental economics and the SDGs.

Table 3. Summary of the relationship between environmental economics and the SDGs.

		Environmental Economics			
		Environmental– Economics Accounting System	Green Consumerism	Fiscal Policy	De-Growth
The Sustainable Development Goals (SDGs)		✓		✓	✓
					
		✓	✓	✓	
					
					
		✓			
					✓
					
					✓
					
					✓
			✓	✓	✓
			✓	✓	✓
		✓			
		✓		✓	
					
					

4.5. The Possible Barriers or Consequences of Implementing Environmental Economics

It is acknowledged that human and economic activities can lead to various environmental problems, such as the depletion and degradation of natural resources, water and air pollution, climate change, and so on. In the long term, environmental problems can have a severe impact on human life, both physically and mentally, as well as disrupting economic stability [16]. Therefore, it is essential to implement environmental economics to reduce environmental problems and create a more sustainable society. However, the implementation of environmental economics is not without criticism. Several barriers that may arise from the implementation of environmental economics have been identified.

It is widely accepted that in the practice of environmental economics, the inclusion of environmental assets, including their changing values, in the national account is critical. This practice is known as the system of environmental–economic accounting (SEEA). The SEEA thus provides a system that can be used to monitor a significant number of the SDGs targets in a consistent and integrated manner [71]. However, despite all the benefits of SEEA utilization, not all economists or policy makers fully understand the importance of the changing values of environmental assets and widely accept them in the main economic policy areas. As a result, there has been little demand for information on these changes to be included in the SEEA [4,13]. Moreover, for many years, it has been challenging for some countries, especially developing countries, to compile various data from all of their resources, including those regarding depletion and degradation. Even though the number of countries using the SEEA program has increased, the majority of them (65% of the countries) require technical assistance in compiling and developing SEEA. This assistance is mostly derived from non-governmental and international organizations or other institutions in compiling and/or developing specific modules. In addition, only 45 out of 69 countries have consistent funding to continue compiling and publishing their accounts [24].

Furthermore, to succeed in environmental economics programs, many companies are encouraged to become “greener”. This means that companies should implement more sustainable processes in all of their production process in order to prevent environmental problems. However, becoming a “greener” company requires a lot of effort due to the many difficult requirements that should be fulfilled. For example, The Federal Acquisition Regulation governs green business movements in the United States. This regulation provides a detailed code of rules that must be fulfilled by the Environmental Protection Agency (EPA) for accessible sources and potential uses of recovered materials and associated products, as well as solid waste management services. Thus, companies would have to establish a federal agency to develop and administer affirmative procurement programs for EPA-designed products [72]. These requirements are quite difficult to fulfill, especially for infant or startup companies due to a lack of expertise, resources, funding, and technology.

It is also acknowledged that in the practice of “green movements”, several types of fraud were identified, including “greenwashing”. Greenwashing was first described by activist Jay Westerveld in 1986, when hotels began asking guests to reuse towels under the guise of a company water conservation strategy, despite the fact that this did not contribute to any significant measures addressing environmental impact issues [73]. With the increase in green movements, followed by greenwashing, a trust problem emerged whereby customers have difficulty identifying a true green activity. This phenomenon is known as “green skepticism” [74]. Regarding “greenwashing” issues, developed countries that have a greater environmental awareness have a higher level of regulation to control this problem compared to developing countries [75]. This becomes another form of issue that needs to be solved in order to protect customers from the harmful effects of the phenomenon of greenwashing.

Another barrier may arise from the implementation of fiscal policy. It is acknowledged that fiscal policy, through governments’ expenditure and taxes, can reduce environmental problems, such as air pollution and natural resources depletion, reducing poverty [39]. However, it is identified that taxes will actually increase pollution in the presence of

pollution abatement subsidies. This might happen when subsidy policy is influenced by local industry and environmental lobby groups. On the other hand, pollution abatement subsidies lower the marginal cost of the polluting firm, and therefore stimulate output. As a consequence, pollution taxes may increase pollution if the output effect of the subsidy is greater than the reduction in pollution intensity per output unit [76].

Another consequence of fiscal policy is the rise of the “shadow economy”. The shadow economy is defined as an all-market-based legal production of goods and services that is intentionally hidden from public authorities to avoid paying income, value-added or other taxes, and social security contributions. The shadow economy allows companies to avoid having to comply with some legal labor market norms, such as minimum wages, safety standards, maximum working hours, etc., and with certain administrative procedures, such as completing statistical questionnaires or other administrative forms [77]. It is known that a high level of shadow economy activities cause an increased level of polluted air due to the fact that companies can avoid environmental regulations for their underground production [2].

Lastly, a possible barrier is derived from the de-growth model. Contrary to the green-growth model, de-growth is an economic model that prevents environmental problems and achieves sustainability through anti-consumerism and social movements [1]. For academics and environmentalists, the appeal of de-growth is clear: the assumption that all growth is damaging to the environment, not only due to the problems of conceptualizing and measuring the quality of growth, but also potential environmental injustices during the transition period, where brown and green growth can co-exist [78]. The problem of de-growth is that this model does not resonate well with policy makers, especially those in poor countries with structural inequalities, where most sectors of the population need to grow out of poverty [22,79].

5. Discussion

It is undeniable that environmental economics has many benefits in preventing environmental problems and achieving sustainability. However, some barriers or consequences of the implementation of environmental economics have also been identified. It is known that “green consumerism” can stimulate the practice of market monopolization for some companies. In this case, these companies may fully control the price limit and maximize their profits, resulting in a significant increase in the price of environmentally friendly products. This issue is quite likely to occur since the requirements for becoming a green company are difficult and can only be met by a few companies. Moreover, as the trend and practice of “green movements” increase, the problems of “green washing” also increase, which causes a trust problem among customers that experience difficulties in identifying a true green policy [74]. Regarding these issues, a human awareness of the importance of green movements and the involvement of governments is crucial for regulating green movements and implementation in the industry [75].

Furthermore, in the implementation of fiscal policy, Fredriksson [76] found that the utilization of government pollution taxes in the presence of pollution abatement subsidies may increase the level of pollution. This can happen if the subsidy policy is influenced by local industry and environmental lobby groups. Therefore, governments must persuade those who will be involved, as well as ensure that there is no personal interest in making this policy. It is also important to enforce regulations against corruption, nepotism, and other illegal practices carried out by both government officials and the general public. A similar situation can also be seen in the rising number of shadow economies. It is known that governments in many countries, especially those in Asian developing countries, are seeking effective strategies to cope with the large shadow economy [2]. In this case, administrative and political corruption contribute to the growth of the shadow economy. When economic actors in the shadow economy bribe corrupt regulatory authorities, regulatory authority is further eroded. As a result, even after being detected, companies in the shadow economy will continue to cause pollution [80]. Therefore, the most appropriate solution to this

problem is the eradication of corruption [40]. However, governments' ability to eradicate corruption is determined by how thoroughly corruption laws are enforced and a public awareness of the consequences of corruption.

On the other hand, the problem with the de-growth is the controversy regarding its ability to articulate a convincing argument about its impacts on inequality and poverty. Despite the argument for quality of life, there is no other convincing information about how the most vulnerable and poorest in the world are able to improve their quality of life within a de-growing economy [81]. For example, according to the global income distribution, the poorest 5% of the population in the United States earns more than 70% of the population in most developing countries. Even while developing countries have grown five times faster than developed countries, there is still a long way to go before the entire world population achieves the same level of quality of life as the middle classes in Western countries [82]. Unsurprisingly, de-growth scholars are overwhelmingly from developed countries. To summarize, the difficulty with de-growth is identifying how it improves the quality of life of people who are most in need. In addition, since humans have become the main actors in the economy, it is also important to integrate environmental economics with other disciplines, such as psychology, sociology, biology, etc. Psychological and sociological economics aim to learn about human behavior and preferences as well as their understanding and awareness of the importance of environmental economics, whereas biological–economy or bio-economics study the biological origin of economic processes and the human activities that are associated with a limited stock of resources that are unequally appropriated and unevenly located [83].

Furthermore, the concept of bio-economics, which is also known as ecological economics, is derived from the utilization of biological processes and the implementation of the biologization of the national economy through bio-fuels, bio-technologies, and bio-materials [84]. The paradigm of bio-economic development is based on a holistic perspective that results from the interaction of biological, socio-economic, and environmental development in order to explain the coevolution of human development that ensures the provision of resources for present and future generations [84]. This emphasizes the role of humans in the relationship between interdisciplinary disciplines and environmental economics once again.

6. Conclusions, Implications, and Limitations

6.1. Conclusions

In conclusion, it is proven that environmental economics has many benefits in preventing environmental problems and achieving sustainability. This economic concept also correlates with the majority of the goals of sustainable development programs, assisting many countries in achieving these objectives. There are four strategies identified in this study that are the most utilized: The inclusion of natural capital in the System of National Accounts (SEEA), green consumerism, fiscal policy, and de-growth economic model. The SEEA is correlated with SDGs 1 (No Poverty), 3 (Good Health and Well-being), 6 (Clean Water and Sanitation), 14 (Life below Water), and 15 (Life on Land). Green consumerism aligns with SDGs 3 (Good Health and Well-being), 12 (Responsible Consumption and Production), and 13 (Climate Action). Fiscal policy is correlated with the SDGs 1 (No Poverty), 3 (Good Health and Well-being), 13 (Climate Change), 12 (Responsible Consumption and Production), 14 (Life below Water), and 15 (Life on Land). Lastly, the de-growth economic model aligns with SDGs 1 (No Poverty), 7 (Affordable and Clean Energy), 9 (Industry, Innovation, and Infrastructure), 11 (Sustainable Cities and Communities), 12 (Responsible Consumption and Production), and 13 (Climate Action).

However, there are some barriers or consequences that were also identified from the implementation of environmental economics. For example, the lack of funding for data compilation in the SEEA, inefficient pollution taxes, the shadow economy, monopolization in the green market, and the incapability of de-growth in developing countries. Regarding these problems, governments' roles are crucial to establish and strictly enforce policies

and regulations, for example: corruption regulation, tax and subsidies policies, “green” regulation, and so on. What is also important is the integration of environmental economics with other disciplines such as psychology, sociology, and biology, to learn about human behavior, preferences, and the awareness of the importance of environmental economics, as well as to understand the coevolution of human development, which is a result of the interaction of socio-economic, biological, and environmental development that ensures the provision of resources for recent and future generations.

6.2. Implication

Nowadays, it is essential to understand the importance of environmental economics as well as the consequences of environmental problems in order to achieve sustainability. This study provides information about environmental economics and the sustainable development goals (SDGs) as well as the general correlation of these two subjects. Moreover, this study also presents insights related to the potential barriers or consequences of implementing environmental economic strategies, as well as possible solutions to these issues. This study is beneficial, especially for developing countries that are just preparing for, or in the process of carrying out, the initial implementation of environmental economics; it is also beneficial for achieving the sustainable development goals. Furthermore, this study provides information that can be used or considered by the companies or governments in the making of policies and regulations.

6.3. Limitation

There are several limitations that are recognized in this study. First, only sources in English were used in this study, and there may be many sources related to environmental economics and the sustainable development goals in other languages. Second, the use of qualitative research methods is not value-free, as it requires a necessary subjective categorization process based on the researcher’s experience and knowledge. Third, there are no research tools or software utilized in this study to screen the databases. This meant that it took researchers longer to conduct the initial process of data screening. Therefore, it would be beneficial to use bibliographic applications in future studies. This tool will assist with quickly sorting and categorizing any sources related to the topic or citation, eliminating ambiguity and subjectivity in the researcher’s work, and most significantly, reducing the amount of time spent reading. Finally, future research should integrate environmental economics with other disciplines that focus on human aspects, such as psychology or sociology, since there are limited articles that correlate human aspects with environmental economics.

Author Contributions: Conceptualization, W.P.S.; methodology, W.P.S.; software, W.P.S.; validation, W.P.S., T.S.W. and C.B.I.; formal analysis, W.P.S.; investigation, W.P.S.; resources, W.P.S.; data curation, W.P.S.; writing—original draft preparation, W.P.S.; writing—review and editing, W.P.S.; visualization, W.P.S.; supervision, C.B.I. and A.D.; project administration, W.P.S. and A.H.; funding acquisition, W.P.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: We would like to thank the reviewers who gave us suggestions for the further development of this article.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Huynh, C.M. Shadow economy and air pollution in developing Asia: What is the role of fiscal policy? *Environ. Econ. Policy Stud.* **2020**, *22*, 357–381. [CrossRef]
2. Biswas, A.K.; Farzanegan, M.R.; Thum, M. Pollution, shadow economy and corruption: Theory and evidence. *Ecol. Econ.* **2012**, *75*, 114–125. [CrossRef]
3. Pirmana, V.; Alisjahbana, A.S.; Yusuf, A.A.; Hoekstra, R.; Tukker, A. Environmental costs assessment for improved environmental-economic account for Indonesia. *J. Clean. Prod.* **2020**, *280*, 124521. [CrossRef]
4. Obst, C.; Vardon, M. Recording environmental assets in the national accounts. *Oxf. Rev. Econ. Policy* **2014**, *30*, 126–144. [CrossRef]
5. Sachs, J.D. From Millennium Development Goals to Sustainable Development Goals. *Lancet* **2012**, *379*, 2206–2211. [CrossRef]
6. Mio, C.; Panfilo, S.; Blundo, B. Sustainable development goals and the strategic role of business: A systematic literature review. *Bus. Strat. Environ.* **2020**, *29*, 3220–3245. [CrossRef]
7. Beder, S. Environmental economics and ecological economics: The contribution of interdisciplinarity to understanding, influence and effectiveness. *Environ. Conserv.* **2011**, *38*, 140–150. [CrossRef]
8. Medina, L.; Schneider, F. *Shadow Economies Around the World: What Did We Learn Over the Last 20 Years?* IMF Working Papers; International Monetary Fund: Washington, DC, USA, 2018; Volume 18. [CrossRef]
9. Ambec, S.; De Donder, P. Environmental policy with green consumerism. *J. Environ. Econ. Manag.* **2021**, *111*, 102584. [CrossRef]
10. Ulph, A.; Ulph, D. Environmental policy when consumers value conformity. *J. Environ. Econ. Manag.* **2018**, *109*, 102172. [CrossRef]
11. Field, B.C.; Field, M.K. *Environmental Economics—An Introduction*, 7th ed.; McGraw-Hill Education: New York, NY, USA, 2017.
12. Pearce, D. An Intellectual History of Environmental Economics. *Annu. Rev. Energy Environ.* **2002**, *27*, 57–81. [CrossRef]
13. Sagoff, M. Environmental Economics. *Encycl. Appl. Ethics* **2012**, 97–104. [CrossRef]
14. Nadeau, R.L. The unfinished journey of ecological economics. *Ecol. Econ.* **2015**, *109*, 101–108. [CrossRef]
15. Lélé, S.M. Sustainable development: A critical review. *World Dev.* **1991**, *19*, 607–621. [CrossRef]
16. Venkatachalam, L. Environmental economics and ecological economics: Where they can converge? *Ecol. Econ.* **2007**, *61*, 550–558. [CrossRef]
17. Kahneman, D.; Knetsch, J.L. Valuing public goods: The purchase of moral satisfaction. *J. Environ. Econ. Manag.* **1992**, *22*, 57–70. [CrossRef]
18. Beder, S. Charging the earth: The promotion of price-based measures for pollution control. *Ecol. Econ.* **1996**, *16*, 51–63. [CrossRef]
19. Johnson, M. ‘Fiscal Policy’ Before Keynes’ General Theory. *SSRN Electron. J.* **2018**. [CrossRef]
20. Plaza-Úbeda, J.A.; Pérez-Valls, M.; Cespedes-Lorente, J.; Payán-Sánchez, B. The contribution of systems theory to sustainability in degrowth contexts: The role of subsystems. *Syst. Res. Behav. Sci.* **2019**, *37*, 68–81. [CrossRef]
21. Jakob, M.; Edenhofer, O. Green growth, degrowth, and the commons. *Oxf. Rev. Econ. Policy* **2014**, *30*, 447–468. [CrossRef]
22. Vardon, M.; Castaneda, J.-P.; Nagy, M.; Schenau, S. How the System of Environmental-Economic Accounting can improve environmental information systems and data quality for decision making. *Environ. Sci. Policy* **2018**, *89*, 83–92. [CrossRef]
23. System of National Accounts. *European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank Papers*; United Nations: New York, NY, USA, 2009.
24. United Nations; Ecosystem Accounting. *System of Environmental-Economic Accounting—Ecosystem Accounting*; United Nations: San Francisco, CA, USA, 2021.
25. United Nations; European Commission; International Monetary Fund; World Bank. *Integrated Environmental and Economic Accounting*; United Nations: San Francisco, CA, USA, 2003.
26. Dagher, G.K.; Itani, O. Factors influencing green purchasing behaviour: Empirical evidence from the Lebanese consumers. *J. Consum. Behav.* **2014**, *13*, 188–195. [CrossRef]
27. Tseng, C.-H. The effect of price discounts on green consumerism behavioral intentions. *J. Consum. Behav.* **2016**, *15*, 325–334. [CrossRef]
28. Paetz, A.-G.; Dütschke, E.; Fichtner, W. Smart Homes as a Means to Sustainable Energy Consumption: A Study of Consumer Perceptions. *J. Consum. Policy* **2011**, *35*, 23–41. [CrossRef]
29. Haytko, D.L.; Matulich, E. Green advertising and environmentally responsible consumer behaviors: Linkages examined. *J. Manag. Mark. Res.* **2008**, *1*, 2–11. Available online: <http://search.proquest.com/abiglobal/docview/759652267?accountid=14681%5Cnhttp://media.proquest.com/media/pq/classic/doc/2170766611/fmt/pi/rep/NONE?hl=&cit:auth=Haytko,+Diana+L;Matulich,+Erika&cit:title=Green+Advertising+and+Environmentally+Responsible+Co> (accessed on 3 January 2022).
30. Wiedenhofer, D.; Guan, D.; Liu, Z.; Meng, J.; Zhang, N.; Wei, Y.-M. Unequal household carbon footprints in China. *Nat. Clim. Chang.* **2016**, *7*, 75–80. [CrossRef]
31. Han, H.; Hsu, L.-T.J.; Lee, J.-S. Empirical investigation of the roles of attitudes toward green behaviors, overall image, gender, and age in hotel customers’ eco-friendly decision-making process. *Int. J. Hosp. Manag.* **2009**, *28*, 519–528. [CrossRef]
32. Laroche, M.; Bergeron, J.; Barbaro-Forleo, G. Targeting consumers who are willing to pay more for environmentally friendly products. *J. Consum. Mark.* **2001**, *18*, 503–520. [CrossRef]
33. Mostafa, M.M. Gender differences in Egyptian consumers’ green purchase behaviour: The effects of environmental knowledge, concern and attitude. *Int. J. Consum. Stud.* **2007**, *31*, 220–229. [CrossRef]
34. Stern, P.C. Toward a coherent theory of environmentally significant behavior. *J. Soc. Issues* **2000**, *56*, 407–424. [CrossRef]

35. Elsantil, Y. Antecedents of Green Purchasing Behavior in the Arabic Gulf. *Soc. Mark. Q.* **2021**, *27*, 133–149. [[CrossRef](#)]
36. Paul, J.; Modi, A.; Patel, J. Predicting green product consumption using theory of planned behavior and reasoned action. *J. Retail. Consum. Serv.* **2016**, *29*, 123–134. [[CrossRef](#)]
37. Pearce, D.W.; Atkinson, G.D. Capital theory and the measurement of sustainable development: An indicator of ‘weak’ sustainability. *Sustainability* **2017**, *8*, 397–402. [[CrossRef](#)]
38. Battaglini, M.; Coate, S. A Political economy theory of fiscal policy and unemployment. *J. Eur. Econ. Assoc.* **2015**, *14*, 303–337. [[CrossRef](#)]
39. López, R.; Galinato, G.I.; Islam, A. Fiscal spending and the environment: Theory and empirics. *J. Environ. Econ. Manag.* **2011**, *62*, 180–198. [[CrossRef](#)]
40. Huynh, C.M.; Nguyen, T.L. Fiscal policy and shadow economy in Asian developing countries: Does corruption matter? *Empir. Econ.* **2019**, *59*, 1745–1761. [[CrossRef](#)]
41. Antweiler, W.; Copeland, B.R.; Taylor, M.S. Is Free Trade Good for the Environment? *Am. Econ. Rev.* **2001**, *91*, 877–908. [[CrossRef](#)]
42. Mani, M.; Wheeler, D. In Search of Pollution Havens? Dirty Industry in the World Economy, 1960 to 1995. *J. Environ. Dev.* **1998**, *7*, 215–247. [[CrossRef](#)]
43. Vazquez-Brust, D.; Plaza-Úbeda, J. Green Growth Policy, De-Growth, and Sustainability: The Alternative Solution for Achieving the Balance between Both the Natural and the Economic System. *Sustainability* **2021**, *13*, 4610. [[CrossRef](#)]
44. Win, T.; Paradigm, W. The Win-Win Paradigm and Stakeholder Integration. *Bus. Strat. Environ.* **2009**, *499*, 487–499.
45. Sorman, A.H.; Giampietro, M. The energetic metabolism of societies and the degrowth paradigm: Analyzing biophysical constraints and realities. *J. Clean. Prod.* **2013**, *38*, 80–93. [[CrossRef](#)]
46. Corbett, L.M. Sustainable operations management: A typological approach. *J. Ind. Eng. Manag.* **2009**, *2*, 10–30. [[CrossRef](#)]
47. Latouche, S. *Farewell To Growth*, 1st ed.; Polity Press: Cambridge, UK, 2009.
48. Felber, C. *Change Everything—The Economy for the Common Good*, 1st ed.; Zed Books, Ltd.: London, UK, 2015.
49. Lorek, S.; Fuchs, D. Strong sustainable consumption governance—Precondition for a degrowth path? *J. Clean. Prod.* **2013**, *38*, 36–43. [[CrossRef](#)]
50. Gomez-Mejia, L.R.; Balkin, D.B.; Cardy, R.L. *Manging Human Resources*; Prentice Hall: Hoboken, NJ, USA, 2012.
51. Alcott, B. Should degrowth embrace the Job Guarantee? *J. Clean. Prod.* **2011**, *38*, 56–60. [[CrossRef](#)]
52. United Nations. *Global Indicator Framework for the Sustainable Development Goals and Targets of the 2030 Agenda for Sustainable Development*; United Nations: New York, NY, USA, 2018; pp. 1–21. Available online: https://unstats.un.org/sdgs/indicators/GlobalIndicatorFrameworkafterrefinement_Eng.pdf (accessed on 15 January 2022).
53. United Nations. *The 17 Goals of Sustainable Development Goals*; United Nations: New York, NY, USA, 2015; Available online: <https://sdgs.un.org/goals> (accessed on 15 January 2022).
54. Hutton, C.W.; Nicholls, R.J.; Lázár, A.N.; Chapman, A.; Schaafsma, M.; Salehin, M. Potential Trade-Offs between the Sustainable Development Goals in Coastal Bangladesh. *Sustainability* **2018**, *10*, 1108. [[CrossRef](#)]
55. Bennich, T.; Weitz, N.; Carlsen, H. Deciphering the scientific literature on SDG interactions: A review and reading guide. *Sci. Total Environ.* **2020**, *728*, 138405. [[CrossRef](#)] [[PubMed](#)]
56. Cordova, M.F.; Celone, A. SDGs and Innovation in the Business Context Literature Review. *Sustainability* **2019**, *11*, 7043. [[CrossRef](#)]
57. Nerini, F.F.; Sovacool, B.; Hughes, N.; Cozzi, L.; Cosgrave, E.; Howells, M.; Tavoni, M.; Tomei, J.; Zerriffi, H.; Milligan, B. Connecting climate action with other Sustainable Development Goals. *Nat. Sustain.* **2019**, *2*, 674–680. [[CrossRef](#)]
58. Muff, K.; Kapalka, A.; Dyllick, T. The Gap Frame—Translating the SDGs into relevant national grand challenges for strategic business opportunities. *Int. J. Manag. Educ.* **2017**, *15*, 363–383. [[CrossRef](#)]
59. Walz, R.; Pfaff, M.; Marscheider-Weidemann, F.; Glöser-Chahoud, S. Innovations for reaching the green sustainable development goals—Where will they come from? *Int. Econ. Econ. Policy* **2017**, *14*, 449–480. [[CrossRef](#)]
60. Pedersen, C.S. The UN Sustainable Development Goals (SDGs) are a Great Gift to Business! *Procedia Cirp* **2018**, *69*, 21–24. [[CrossRef](#)]
61. Zhang, Q.; Prouty, C.; Zimmerman, J.B.; Mihelcic, J.R. More than Target 6.3: A Systems Approach to Rethinking Sustainable Development Goals in a Resource-Scarce World. *Engineering* **2016**, *2*, 481–489. [[CrossRef](#)]
62. Xue, S.; Zhang, B.; Zhao, X. Brain drain: The impact of air pollution on firm performance. *J. Environ. Econ. Manag.* **2021**, *110*, 102546. [[CrossRef](#)]
63. Chay, K.Y.; Greenstone, M. Does Air Quality Matter? Evidence from the Housing Market. *J. Political Econ.* **2005**, *113*, 376–424. [[CrossRef](#)]
64. Arntz, M. What Attracts Human Capital? Understanding the Skill Composition of Interregional Job Matches in Germany. *Reg. Stud.* **2009**, *44*, 423–441. [[CrossRef](#)]
65. Wang, J.; Nguyen, N.; Bu, X. Exploring the Roles of Green Food Consumption and Social Trust in the Relationship between Perceived Consumer Effectiveness and Psychological Wellbeing. *Int. J. Environ. Res. Public Health* **2020**, *17*, 4676. [[CrossRef](#)]
66. Allen, M.W.; Craig, C.A. Rethinking corporate social responsibility in the age of climate change: A communication perspective. *Int. J. Corp. Soc. Responsib.* **2016**, *1*, 1. [[CrossRef](#)]
67. Gerlagh, R.; Bijgaart, I.V.D.; Nijland, H.; Michielsen, T. Fiscal Policy and CO₂ Emissions of New Passenger Cars in the EU. *Environ. Resour. Econ.* **2016**, *69*, 103–134. [[CrossRef](#)]

68. Pereira, R.M.; Pereira, A.M. The Economic and Budgetary Impact of Climate Policy in Portugal: Carbon Taxation in a Dynamic General Equilibrium Model with Endogenous Public Sector Behavior. *Environ. Resour. Econ.* **2016**, *67*, 231–259. [[CrossRef](#)]
69. Schneider, F.; Kallis, G.; Martinez-Alier, J. Crisis or opportunity? Economic degrowth for social equity and ecological sustainability. Introduction to this special issue. *J. Clean. Prod.* **2010**, *18*, 511–518. [[CrossRef](#)]
70. Infante-Amate, J.; de Molina, M.G. ‘Sustainable de-growth’ in agriculture and food: An agro-ecological perspective on Spain’s agri-food system (year 2000). *J. Clean. Prod.* **2013**, *38*, 27–35. [[CrossRef](#)]
71. Pirmana, V.; Alisjahbana, A.S.; Hoekstra, R.; Tukker, A. Implementation Barriers for a System of Environmental-Economic Accounting in Developing Countries and Its Implications for Monitoring Sustainable Development Goals. *Sustainability* **2019**, *11*, 6417. [[CrossRef](#)]
72. Jackson, S.E.; Ones, D.S.; Dilchert, S. *Managing Human Resource for Environmental Sustainability*; John Wiley & Sons: Hoboken, NJ, USA, 2012.
73. Pearson, J. Turning Point. Are We Doing the Right Thing? Leadership and Prioritisation for Public Benefit. *J. Corp. Citizsh.* **2010**, *2010*, 37–40. [[CrossRef](#)]
74. Nyilasy, G.; Gangadharbatla, H.; Paladino, A. Perceived Greenwashing: The Interactive Effects of Green Advertising and Corporate Environmental Performance on Consumer Reactions. *J. Bus. Ethics* **2013**, *125*, 693–707. [[CrossRef](#)]
75. Delmas, M.A.; Burbano, V.C. The Drivers of Greenwashing. *Calif. Manag. Rev.* **2011**, *54*, 64–87. [[CrossRef](#)]
76. Fredriksson, P.G. How Pollution Taxes may Increase Pollution and Reduce Net Revenues. *Public Choice* **2001**, *107*, 65–85. [[CrossRef](#)]
77. Schneider, F. The Influence of Public Institutions on the Shadow Economy: An Empirical Investigation for OECD Countries. *Rev. Law Econ.* **2010**, *6*, 441–468. [[CrossRef](#)]
78. Singh, N.M. Environmental justice, degrowth and post-capitalist futures. *Ecol. Econ.* **2019**, *163*, 138–142. [[CrossRef](#)]
79. Cosme, I.; Santos, R.; O’Neill, D. Assessing the degrowth discourse: A review and analysis of academic degrowth policy proposals. *J. Clean. Prod.* **2017**, *149*, 321–334. [[CrossRef](#)]
80. Pellegrini, L.; Gerlagh, R. An Empirical Contribution to the Debate. *Environ. Dev.* **2006**, *15*, 332–354. [[CrossRef](#)]
81. Ossewaarde, M.; Ossewaarde-Lowtoot, R. The EU’s Green Deal: A Third Alternative to Green Growth and Degrowth? *Sustainability* **2020**, *12*, 9825. [[CrossRef](#)]
82. Milanovic, B. *Global Inequality: A New Approach for the Age of Globalization*, 1st ed.; Belknap Press: London, UK, 2016.
83. Blažej, A.; Ambrozy, M. Some aspects of the problems of keeping sustainable development in the philosophy of Martin Heidegger. *Int. J. Multidiscip. Thought* **2013**, *3*, 385–391.
84. Vargas-Hernández, J.G. Bio-Economy at the Crossroads of Sustainable Development. In *Advanced Integrated Approaches to Environmental Economics and Policy: Emerging Research and Opportunities*; IGI Global: Hershey, PA, USA, 2019; pp. 23–48. [[CrossRef](#)]