THE TRANSITION TO SUSTAINABLE DEVELOPMENT AND THE GREEN ECONOMY

Melike TORUN
Özgür ASLAN

LIVRE DE LYON
2023

Social Sciences

THE TRANSITION TO SUSTAINABLE DEVELOPMENT AND THE GREEN ECONOMY

Melike TORUN & Özgür ASLAN

LIVRE DE LYON
Lyon 2023

THE TRANSITION TO SUSTAINABLE DEVELOPMENT AND THE GREEN ECONOMY

Melike TORUN & Özgür ASLAN

LIVRE DE LYON
Lyon 2023

The Transition to Sustainable Development and the Green Economy

Authors • Dr. Melike TORUN • Orcid: 0000-0003-4828-9379
Prof. Dr. Özgür ASLAN • Orcid: 0000-0002-8780-5463
Cover Design • Motion Graphics
Book Layout • Motion Graphics
First Published • September 2023, Lyon

ISBN: 978-2-38236-580-9

Publisher • Livre de Lyon
Address • 37 rue marietton, 69009, Lyon France
website • http://www.livredelyon.com
e-mail • livredelyon@gmail.com

CONTENTS

FIGURE AND TABLE LIST

INTRODUCTION

Since the industrial revolution, human civilization has achieved significant achievements in science and technology, resulting in material abundance. In contrast, all nations face difficulties due to environmental problems, including the depletion of the ozone layer, climate change, and declining biodiversity. With an awareness of the damage caused by environmental movements and our material connection with nature in the 1980s, governments and development agencies moved the notion of sustainable development to the forefront of the agenda. Sustainable development, climate change, economic growth, society, and environmental protection are all concepts with sociopolitical and economic underpinnings that are critical, particularly for developing nations.

The objective of sustainable development policy is long-term stability in the economy and environment. Economic, environmental, and social characteristics combined make up the three basic pillars of sustainable development, despite the fact that they each include several components. Policies and objectives for sustainable development developed within this framework are largely established with these elements in mind.

The notion of a green economy, on the other hand, is a relatively recent term that originated roughly 20 years after the United Nations Conference on Environment and Development, which focused on sustainable development. It provides alternatives to traditional economic growth and development aspects in order to lessen human effects on the environment and ensure the sustainability of civilizations and life on Earth.

Economic strategies and performance standards must be aligned with sustainable and green development. State budgets direct public income and spending in accordance with the aims and objectives. Eco-friendly budgeting protects people's well-being while managing scarce natural resources. In this scenario, firms must prioritize initiatives that promote environmental principles in order to continue the process.

There are two parts to this book study. In the first section, the terms sustainable development and sustainability—which are frequently used synonymously in the literature—are defined, and the various forms of sustainability are discussed. This section discusses the many aspects and ideas of sustainable development in depth before providing alternative sustainable development paradigms. Within the context of the decisions made at various conferences on

sustainable development, policies for implementation, and established targets, the historical development of sustainable development—whose basic definition and framework were created with the 1972 Conference—was mentioned.

The conceptual framework of the study is used to explore the topic of the green economy in relation to sustainable development. The definition of the green economy, the green agreement, the green growth, the Kuznets curve, and the stages of the green economy are provided for this reason. The benefits and drawbacks of the green economy are discussed, as well as its guiding principles and goals, in order to help readers better grasp the idea. The policies that underpin the green economy, its components, and its measurement metrics are all detailed in depth in the section's continuation.

Through this book, it is hoped to assist academics and students who are interested in sustainable development and the green economy and who now do or want to conduct studies on these issues.

CHAPTER 1

SUSTAINABLE DEVELOPMENT

The rise of climate change, natural disasters, wars, and political instability has led to a shift towards more rational and efficient resource management, focusing on sustainable development. Sustainable development is based on the "triple bottom line" concept introduced by John Elkington in the 1990s, which consists of three pillars: economic, environmental, and social sustainability. This concept balances environmental, social, and economic sustainability, but achieving complete sustainability requires respecting the interests of other pillars (Tomislav, 2018).

In addition, the triple bottom line concept focuses on accurately valuing assets and leveraging resources for efficient capital utilization. Sustainable development includes environmental stewardship and intergenerational equity. This concept has gained traction in fields like business, planning, finance, and real estate, with various journals, books, and certifications addressing sustainability in related topics (Elkington, 2004; cited in Hammer and Pivo, 2017).

Sustainable development integrates social, economic, and ecological dimensions, addressing conservation and change objectives while requiring trade-offs across multiple objectives simultaneously (Hediger, 1999). By exposing hidden social and environmental expenses connected to resource distribution and development, sustainable development strives to enhance the material circumstances for the economy and lifestyles in industrialized nations over the long term. It is a social construct that has its roots in the political-economic environment and represents interactions between individuals and institutions with various levels of power and interest. It acts as a framework for setting up economies and a filter for analyzing these interactions (Krueger et al., 2019).

From hunter-gatherer tribes to agricultural systems, sustainable development has developed through millennia to address resource scarcity and the ability of the land and resources to support human settlements. Different social circumstances, institutional structures, technological advancements, and authority characteristics have influenced the concept (Krueger et al., 2019). Regardless of disagreements and differing interpretations, the fundamental ideas

and objectives continue to be the same despite the implementation's difficulties (Tomislav, 2018).

Sustainable development emphasizes directional and progressive change, aiming to improve human conditions and the socio-ecological system without requiring indefinite energy and material consumption growth. The worldwide community has started this procedure in order to more effectively handle societal changes, highlighting the necessity of sustainable development to conserve and maintain the ecological foundation for development and habitability while enhancing both social and ecological resilience to change (Gallopín, 2003).

1.1. The Definition of Development

The development taxonomies in literature focus on structural transformation, human development, democracy and governance, and environmental sustainability (Vázquez and Sumner, 2013; Tomislav, 2018).

Development is one of the most frequently used words by economists, policymakers, international financial institutions, and politicians. According to Semasinghe (2020), development is employed mostly to express an increase in the quality of people's lives, despite the fact that it is a polysemic term with several meanings. Development was once thought of as the rise in personal, national, or domestic income. Along with the conventional economic components, it also has a wide range of social and political aspects, including democracy, liberty, self-worth, self-respect, and confidence.

The concept of development is crucial in economics as it involves logistical and engineering issues affecting human lives. Enhancing living conditions is an integral part of economic development, and the link between development and growth is both important and confusing. The well-being of a person is evaluated based on their functioning, as suggested by Adam Smith and Karl Marx. The concept of development is not unproblematic, and its underlying problems have become clearer over time through conceptual discussions and empirical work (Sen, 1988).

Due to the extended crisis that developed nations endured in the 1980s, which resulted in unequal development and economic crises, the development perspective has changed. The goal of the international community is to separate human development from economic progress. Since 1980, the idea of development has been broadened to encompass human rights, decent governance, natural resource management, and health. This growth was influenced by the 1987 Brundtland Report, the 1990 Human Development Report, and the 2000

Millennium Goals. The three sustainability aspects are highlighted in the 17 Sustainable Development Goals of 2015 (Vaggi, 2018).

1.2. Conceptual Framework of Sustainable Development

Since the industrial revolution, human civilization has made significant progress in science and technology, leading to material wealth. However, environmental issues like energy crises and climate change have hindered sustainable development (Huang and Zhu, 2017). In the 1980s, government and development organizations shifted their perspectives on the environment and development, emphasizing the importance of a wholesome environment for long-term growth. Planners and economists now recognize that economic growth that depletes natural capital often fails and that development methods that disregard essential resources like agricultural land, clean water, the coast, fisheries, forests, and soils may weaken the foundation for future growth (Pezzy, 1992).

Sustainable development emerged in the 1980s, influenced by environmental movements and the recognition of the harm caused by our material relationship to nature. The concept of scarcity emerged from the Club of Rome group's 1972 model, while Herman Daly advocated for a steady-state economy with fluctuating population growth and energy input. The International Union for the Conservation of Nature and Natural Resources published its World Conservation Strategy in 1980, urging a new global ethic based on the interrelatedness of global development and coordinated strategies for development and environmental conservation (Krueger, 2017).

According to the study of Jabareen (2008), the conceptual analysis of sustainable development identifies several concepts: natural capital, equity, eco-form, and integrated management. The framework highlights numerous environmental concepts and techniques, with a special emphasis on life quality, empowerment, freedom, the functioning of democracy, involvement, and social justice. It also addresses international issues like security, peace, trade, heritage, and hunger.

In addition, sustainable development combines development, the environment, and equity, with varying degrees of emphasis on time, development, and sustainability. For the generation of quantitative indicators, more than 500 initiatives have been launched, and indicators for sustainability are crucial for effective management and decision-making (Parris and Kates, 2003).

Sustainable development policy focuses on conserving resources for future generations and aiming for the long-term stability of the economy and environment. Policies aim to tackle environmental degradation sources while providing opportunities and incentives for economic advancement. Clean air and water are examples of public goods, and nations are implementing market-based mechanisms to internalize pollution costs and ensure long-term environmental stability (Emas, 2015).

1.2.1. The Definition of Sustainability

Economics has been concerned with sustainability for more than 200 years. Thomas Malthus foresaw a time when increases in population would outpace the capacity of the land to support food production. These restrictions were eased by the industrial revolution, which rekindled Malthusian concern. The economic perspective on sustainability is based on this revival of Malthusian concern. Appropriate definitions of sustainability are offered by the Brundtland Commission and Ger Asheim, who highlight the significance of justice and equity in the distribution of resources (Elliott, 2005).

Ecological factors played a significant role in ancient civilization's rise and fall, as well as agricultural and industrial transformations. Traditional beliefs, religious teachings, and medieval philosophies all emphasize harmony with nature, forming the basis of sustainability (Mebratu, 1998).

Sustainability emerged from the 1987 Brundtland Report, addressing the tension between human aspirations and natural limitations. It is still a debated topic, requiring policy appraisal and scientific study. To measure it effectively, separate present needs from future ones. Well-being, encompassing economic and social dimensions of the triple bottom line, and sustainability, involving environmental dimensions, can be sensible approaches. Costs and benefits should be excluded from measurement, allowing decision-makers to understand the sacrifices for increased well-being (Kuhlman and Farrington, 2010).

Sustainability and sustainable development concepts have evolved over time, but it is widely accepted that the most effective way to ensure future generations' well-being is by maintaining a large capital stock. The discussion focuses on the nature of this stock and the substitutability relationship between human-made and natural capital, leading to the emergence of "weak" and "strong" sustainability distinctions (Yeni, 2014).

1.2.2. The Types of Sustainability

Divergent interpretations of sustainability objectives and definitions hinder sustainable development by causing confusion due to disciplinary perspectives, philosophical and ethical interpretations, and dynamic models. The literature often overlooks the trade-offs between environmental preservation and economic development, leading to mutually exclusive concepts of "weak" and "strong" sustainability. These concepts are based on the ethical premise of maintaining economic production capacity or essential environmental functions, dividing economists and environmentalists and overlooking the overall challenge of sustainable development. Conflicting interpretations of sustainability objectives and definitions result from disciplinary viewpoints, philosophical and ethical interpretations, and dynamic models (Hediger, 1999).

1.2.2.1. The Weak Sustainability

When an economy's savings rate is higher than the total rate at which natural and human-made capital depreciates, that economy is said to have weak sustainability. This idea of sustainability is regarded as "weak" since natural capital is not given specific consideration. According to Pearce and Atkinson (1993), the difference between the savings rate and the depreciation rate is the poor sustainability index, which serves as an economic measure of sustainable development. If the index exceeds zero, an economy is said to be "weakly sustainable" (Gutés, 1996).

Capital is a crucial component of sustainability, divided into natural capital (Kn), human capital (Kh), and created capital (Kc). The total stock of capital is the sum of all components, with K = Kn + Kh + Kc. Current generations can use a large amount of Kn (e.g., crude oil) as long as K remains constant, with compensation provided by increased Kc (e.g., more efficient machines) or Kh (e.g., synthetic fuels). The neo-classical perspective contends that technical breakthroughs, such as the Green Revolution, which increased food production while lowering the need for land and labor, may make up for how we now exploit and misuse natural capital (Elliott, 2005).

Bebbington (2001) summarizes weak sustainability as a need to better master the natural environment and solve current problems. Sustainability can be achieved through incremental adjustments, authoritative and coercive structures, and technological development, with the primary focus on sustaining Western populations.

Sustainability consists of social, environmental, and economic aspects. Weak sustainability trades off economic aspects for environmental ones, driven by trust in technology for future generations' well-being and resource efficiency (Biely et al., 2018). This strategy disregards the need for resources from nature in underdeveloped nations, which is unfounded and unrealistic (Mazı, 2009).

Weak sustainability theorists work to strengthen institutionalization, manage the exploitation and distribution of natural resources, and develop better machinery for resource extraction and processing. This results in a fair distribution of expenses and benefits, fostering sustainable growth for the economy (Mazı, 2009).

With an emphasis on ecosystems' capacity to support human needs, a sustainability constraint is required to place certain limitations on resource-consuming economic activities. Despite this restriction, all types of capital resources would still be highly substitutable (Holden et al., 2014).

1.2.2.2. The Very Weak Sustainability

The classical economist's perspective views the economy as the relevant system, leaving nature as a sink for human-produced waste and a source of natural resources and services. This strategy, known as "very weak sustainability," emphasizes the importance of maintaining an overall level of natural and manufactured capital. Only when ecological system sustainability is necessary for human component sustainability is it considered significant (Turner, 1993; Gallopín, 2003). In cases of very weak sustainability, the decline of natural capital is offset by a rise in man-made capital, and the combined stock of the two types of capital remains stable over time (Agheli and Taghvaee, 2022; Holden et al., 2014).

This approach prioritizes economic systems while disregarding nature's role as a provider of resources, ecosystem services, and waste products. According to neoclassical economic theory, matter and energy are contained in a closed system with an infinite supply of resources and an equally infinite capacity to dispose of waste. Negative externalities result from this, including limited resources and nature's boundless capacity to ingest pollutants (Ruggerio, 2021).

1.2.2.3. The Strong Sustainability

Strong sustainability, as defined by Solow (1974, 1986), calls for an economy's generalized production capability to maintain steady consumption

per capita. It is founded on Rawls' (1971) maximin principle and Hicks' (1939) definition of income, but leaves out the crucial element of development—a starting stock of total capital sufficient to support a respectable quality of life. Economic efficiency would be included as a new benchmark for determining the limits of sustainable development if the restrictive definition of economic development in terms of consumer growth were to be expanded (Hediger, 1999).

Strong sustainability is a concept that "emphasizes the complementary nature of human and natural capital, recognizing that man-made capital cannot duplicate certain environmental functions". It emphasizes the importance of natural measures over economic profits, valuing nature's uniqueness and ensuring its preservation for current and future generations (Agheli and Taghvaee, 2022).

Although not the majority, this strategy is widespread among environmental preservation movements. Ecology regards the human economy as a component of a system of systems that interacts with its surroundings to exchange matter, energy, and information. Neoclassical theory is supplanted by the "precautionary principle," which holds that reversing the planet's increasingly prevalent trend toward environmental degradation is necessary for a system's survival (Ruggerio, 2021).

Stewardship and ecological services are the two main justifications for strong sustainability. The earlier argument makes the case that human life only exists thanks to nature's provision of necessary services, while the latter makes an ethical case that we don't have the right to infringe upon the right to life of other living things or protect their beauty and diversity for the sake of current and future generations. Although it is impossible for policymakers to stop the extinction of species, the decline of natural habitats, or the disappearance of priceless landscapes, strong sustainability enables them to evaluate their actions for their impact on natural resources and decide what impacts are acceptable (Kuhlman and Farrington, 2010).

On the other side, ecological economists contend that technical advancements are not the only means of addressing sustainability issues and that the economy shouldn't be preferred to the environment (Biely et al., 2018). They view different types of capital as complements rather than replacements, implying there shouldn't be reductions in the capital of nature, particularly in significant categories of natural capital (Elliott, 2005).

Some advocates of strong sustainability argue that conserving only the total quantity of capital is insufficient and that natural capital must also be safeguarded since certain essential natural capital can't be replaced by other forms of capital. This viewpoint is supported by aspects such as ambiguity

around ecosystem functioning, the irreversibility of some natural capital factors if disrupted, and the revulsion many individuals have against degradation of the environment (Holden et al., 2014).

In summary, strong sustainability emphasizes the significance of the relationship between humans and their environment for maintaining harmony with other species. A sustainable future may take 150- 200 years, and fundamental structural change is likely needed. Participatory, transparent, and democratic processes are essential for sustainability, with an emphasis on intragenerational equity and focusing on third-world conditions and aspirations. The nature of economic growth may need to be redefined or abandoned, raising questions about how we measure and view development (Bebbington, 2001).

1.2.2.4. The Very Strong Sustainability

A green perspective that prioritizes ecological sustainability over social and economic sustainability is known as "very strong sustainability." This perspective argues that human capital cannot replace natural resources without causing an irreversible decline in societal wellbeing. This perspective aligns with a steady-state economy, where environmental protection is the moral prerequisite for sustainability. However, many people find it unacceptable to pursue ecological sustainability without considering social and economic issues (Gallopín, 2003).

Very strong sustainability emphasizes how far human development has progressed relative to the world's carrying capacity and claims that, once this point is reached, no type of natural capital can be substituted (Holden et al., 2014). The economic view of sustainability is based on the role of capital stock and its preservation and development in the future (Hunter, 1997; Elliott, 2005).

Very strong sustainability is a stationary-state principle that necessitates restricting the scale of human and technological progress and complying with safe minimum standards. While suitable for steady-state economies, they are not suitable for sustainable development due to their insensitivity to ecosystem properties and dynamics. A strong sustainability principle for ecosystems can, however, benefit from judiciously including stationary-state requirements (Hediger, 1999).

Both weak and strong sustainability play a part in the evaluation of effects, although there is ongoing debate about whether or not they can be substituted for one another. While economists prefer weak sustainability since it allows for greater flexibility in their models, ecologists and other natural scientists

typically support strong sustainability as it emphasizes non-replaceable ecosystem functions. The social discount rate, the limit of strong sustainability, and the comparison of material advantages and intrinsic worth are the three most important factors in the evaluation of sustainability (Kuhlman and Farrington, 2010).

1.2.3. The Definition of Sustainable Development

Sustainable development has evolved over the past few decades, with various definitions and challenges. It is primarily a socioeconomic system that meets human needs and improves the overall quality of life while considering environmental restrictions (Tomislav, 2018). Sustainable development is defined by the World Commission on Environment and Development (Bruntland, 1987) as development that meets current demands without jeopardizing the capacity of future generations to fulfill their own requirements.

Diesendorf (2000) criticizes Brundtland's definition for failing to distinguish clearly between various systems of economics and for encouraging energy and material expansion at the expense of the natural environment. The environment is not directly included in the concept, but it stresses human desires and their requirements. According to Diesendorf (2000), sustainable development encompasses growth in both the economy and society that preserves and improves the environment as well as equity in society.

WB (2015) acknowledges that sustainable development must be inclusive and ecologically responsible to combat poverty, provide equal opportunity for the current population, and satisfy future generations' requirements. It is meticulously constructed to provide both short-term and long-term advantages while being resource-efficient.

Sustainable development combines economic, social, and ecological perspectives, driven by intergenerational equity and equitable growth. It aims to satisfy human needs and aspirations for a better life while addressing limitations on economic development and the environment's capacity. Environmental protection is a major objective, but sustainable development must not harm natural systems or minimize adverse impacts (Hediger, 1999).

In order to accomplish this, it is necessary to get rid of ingrained rigidities, recognize and preserve crucial knowledge and expertise basements, maintain social and natural frameworks for adjustment and renewal, and foster innovation, investigation, and social creative thinking. By focusing on these aspects, sustainable development can help create a more sustainable and equitable

world (Gallopín, 2003). On the other hand, establishing social and economic objectives in terms of sustainability is part of sustainable development, which extends further protection (Hediger, 1999).

1.2.4. The Dimensions of Sustainable Development

Franks (1996) identified three dimensions of sustainable development: (i) natural resource systems; (ii) institutional development; and (iii) appropriate management skills. The WB (2015) study focuses on economic growth, environmental protection, and social inclusion in various industries. Pawlowski (2008) suggested that sustainable development has more than three dimensions that are connected with each other. This complicated concept has an immense influence on ecologicalists, environmental organizers, economists, and activists, with its significance changing depending on the group (Redclift, 1991). Therefore, sustainable development has multiple dimensions. However, The Brundtland Commission's original definition did not distinguish between environmental, economic, and social dimensions, but it has evolved into a combination of these dimensions (Lehtonen, 2004).

1.2.4.1. The Ecological (Environmental) Dimension

The significance of ecological sustainability is implied by the fact that the health of the ecosystem and the environmental processes taking place within it are ultimately dependent on the economy and civilization (Diesendorf, 2000).

The sustainability of the environment is related to the preservation of critical environmental functions and the capability of the capital stock to support them. Environmental services are not necessarily fulfilled specifically by certain stocks of natural capital, and other forms of capital may substitute for some (Ekins et al., 2003). In addition, environmental accounting is crucial for economists interested in the environment, as it helps quantify environmental losses and costs (Redclift, 1991).

According to Agheli and Taghvaee (2022), "environmental sustainability is a political system's choice, balancing economic needs and political power. An ideal society combines economic preferences with political decisions considering environmental concerns in production and consumption". The green economy, developed by Pearce et al. (1989), is an older concept that combines deep ecology and neoliberal thinking. The initiative began in 2009 and focuses on promoting growth, with economic growth being a key goal. Decoupling is seen as a key to separating economic growth from resource input and output

during crises. The concept of a green economy has gained prominence during crises, and decoupling is seen as a key to separating economic growth from resource input and output (Biely et al., 2018).

The goal of sustainable development is to preserve ecological integrity and nature's ability to withstand the usage of resources brought on by industrial development and population increases. However, this approach may be naive and unaware of the destructive impact of industrial manufacturing and consumption in developed as well as underdeveloped countries (Mazı, 2009).

Protecting nature and the environment is essential, and UNESCO Biosphere Reserves, National Parks, and natural reserves preserve enclaves. However, protective buffer zones do not provide complete protection of natural resources, and areas without significant industrial activity are at risk from global environmental issues like the greenhouse effect, air pollution from industrial facilities, and poor water quality (Pawloski, 2008).

Indicators of ecological sustainability include the pace at which materials are used up, the amount of energy consumed, greenhouse gas emissions, the number of vehicle kilometers driven per person, the rate at which people are populating the planet, and the rate at which the land is degrading and becoming polluted (Diesendorf, 2000).

In conclusion, for a country's growth and environmental sustainability, consuming and producing renewable energy are crucial. Furthermore, renewable energy sources such as hydro, solar, and wind are abundant and replenished quickly, but non-renewable ones like coal, gas, nuclear, and oil take longer (Ghorashi and Maranlou, 2021).

1.2.4.2. The Social Dimension

The social dimension is often considered the weakest pillar of sustainable development as it lacks analytical and theoretical underpinnings. Previously, sustainable development was seen as an environmental issue, focusing on integrating environmental concerns into economic decision-making. The social perspective emphasizes the importance of social structures and human development, contrasting with the anthropocentric view (Mazı, 2009). Social sustainability is dynamic and can change over time due to external influences, such as changes in local authority service delivery or airport expansion threats (Dempsey et al., 2011).

The social environment may deteriorate as a result of variables such as living circumstances, interpersonal relationships, spirituality, conventions,

traditions, and culture. Addressing negative social phenomena in sustainable development strategies is challenging due to their complexity and underlying causes. In particular, in situations like widespread unemployment, the quest for profit and economic rationalism have fostered hostility, violence, individualistic behaviors, and social tensions. This contrast between the affluent and the poor in society is a serious issue that has an effect on the ecological aspect of sustainable development (Pawlowski, 2008).

Essential services, child care for children under 5, levels of education, life expectancy, sickness, rates of criminal activity, homeless people, and the instruction of indigenous languages are a few examples of social sustainability indicators (Diesendorf, 2000).

1.2.4.3. The Economic Dimension

Sustainable development dimensions are closely linked to legal regulations, but the connection between law and economics is weak. The free market lacks strong environmental economics, making it difficult to integrate the natural environment into market frameworks. Economic instruments and technical ones determine contemporary environmental protection policy. A true "green" GDP measure may emerge soon, but determining legal conditions is crucial (Pawlowski, 2008). The following figure describes the links between economic, social, and environmental sustainability.

Figure 1: Link of Economic, Social, and Environmental Sustainability

Source: Munasinghe, 1993.

The goals of sustainable development are to increase revenue and satisfaction while protecting natural resources and advancing social values, including fairness, welfare, and insurance for employment. It boosts production, lowers waste, and enforces environmental norms. Additionally, it emphasizes lowering emissions, reforestation, and the switch to sustainable agriculture. As the employment rate is a gauge of a nation's economy and living conditions, ensuring jobs is a top goal of sustainable development. Labor productivity—which is dependent on work happiness, health, and investing in human resources—contributes to economic growth due to human factors (Teodorescu, 2012; 2015).

Family and individual distribution of income, fundamental financial requirements, the proportion of children living in families without adults, mortgage lending and the payment of rent, and employment by the top five firms in the area are some indicators of economic sustainability (Diesendorf, 2000).

1.2.4.4. The Moral Dimension

Sustainable development is rooted in philosophical ideas like Hans Jonas' ethic of responsibility, which emphasizes the importance of a future for humanity and the quality of existence. It conserves the environment and terrain through UNESCO Biosphere Reserves, National Parks, and Nature Reserves but does not guarantee full protection of natural resources. The social aspect of sustainable development focuses on spatial order, interpersonal relationships, and the study of Jonas (1984) (Pawlowski, 2008).

The ethical foundation of sustainable development varies, with intergenerational justice aiming to reduce resource disparities among current generations. The anthropocentric goals of intra-and intergenerational justice are complemented by biophilia, an ecocentric concern for biodiversity that places a strong emphasis on conserving variation in everything from species to ecosystems (Gallopín, 2003).

1.2.4.5. The Legal Dimension

The rule of law and political stability are crucial for economic development, and effective enforcement is essential. Governments should establish sustainable growth frameworks with transparent systems, adequate enforcement, and efficient fiscal management. Local environmental officials should be legally empowered to enforce environmental standards (Erhun, 2015).

A stable political system can effectively manage environmental crises and adopt appropriate environmental protection policies, promoting sustainability and preventing degradation. However, political stability alone cannot guarantee a sustainable environment (Agheli and Taghvaee, 2022).

1.2.4.6. The Political Dimension

The association between knowledge and power in public opposition to prevailing views of the world is one of the two components of the political dimension of sustainability. The other component is the weight assigned to human action and social structure in defining environmental management procedures. Resistance in rural societies can be divided into two categories: resistance against exploitation and resistance against subjugation. Poor rural people often resist by keeping their own counsel or collaborating with powerful groups (Redclift, 1991).

Individual actions to save environments can be effective when widespread behavioral change occurs, often through collective actions. These actions can take various forms, such as incentives, facilities, restraints, or standards. Political action is required to promote, restrict, or stop particular collective activities. Nonetheless, there are few political opportunities to make significant changes that will ensure sustainable growth (Blowers et al., 2012).

The Club of Rome emphasizes the importance of increased natural resource efficiency for well-being. Technological capabilities can achieve a fourfold increase, but South Africa's implementation is challenging due to limited clean water access. The Rio Earth Summit's "Agenda 21" action program, approved in 1992, can help build sustainable development plans at the global, regional, and local levels. The viability of these techniques is determined by information, political power, and local perspective (Pawlowski, 2008).

1.2.4.7. The Epistomological Dimension

Sustainable development often lacks reference to epistemological issues such as knowledge acquisition and integration into conceptual systems. The assumption that our system of knowledge in the North is universal epistemology is insufficient, as it ignores the perspectives of other cultures and our own thinking (Redclift, 1991).

Environmental literature frequently highlights the shortcomings of scientific, reductionist thinking in comprehending and tackling problems in the environment. Instead, authors focus on value-and ethics-based arguments,

emphasizing the interaction between parts and the whole. This approach often overlooks the crucial interaction between parts and the environment, making practical implementation difficult (Mebratu, 1998).

1.2.4.8. The Network Dimension

Sustainability is investigated by Crojethovich-Martin and Perazzo-Rescia (2006) as an emerging quality that is transferred across networks and chains, growing or declining at each stage, and accumulating in various hierarchical configurations. According to their definition, fundamental sustainable units are elements of complicated systems that involve the three processes of accumulation, emergence, and transmission. This approach shares similarities with living organisms, as their structural components interrelate to create a higher-level, more complex system. The process aims to preserve conditions for sustainable change in a system with changing states (Ruggerio, 2021).

1.2.4.9. The Technical Dimension

Industrial ecology aims to transform natural systems into man-made ones by using waste as energy or raw materials. Environmental degradation has led to stricter pollution standards, cleanups, and technological changes. Cleaner production, reducing non-renewable resource use, and promoting renewables are crucial. However, imposing restrictions on raw materials and promoting alternative materials is challenging (Pawlowski, 2008).

In order to be socially, ecologically, and economically sound, sustainable policy strategies must strike a balance between intra-and intergenerational justice. This raises challenges for policymakers in creating and executing these strategies. Governments and global institutions are increasingly using policy efforts to promote the adoption of advanced technology as an illustration of long-term policy intentions (Vollebergh and Kemfert, 2005).

To achieve success in all dimensions of sustainable development, two main things should be established: (i) environmental education, which convinces people of its worth and integrates into other subjects; and (ii) integrating these dimensions for significant improvements (Pawlowski, 2008).

1.2.5. Theories of Sustainable Development

The theoretical viewpoints on sustainable development are presented in Table 1 as a framework and standpoint for justification. The term, which is utilized to achieve a number of goals in both scientific and political contexts,

is unable to be defined by an organization in particular. The justification for sustainable development is best illustrated by this uncertainty (Gallopín, 2003).

Table 1: Theoretical Background of Sustainable Development

Theory	Defining Sustainable Development's Characteristics
Biophysical Energy	Sustaining both physical and biological stocks and ecological diversity while transitioning to energy systems that have minimal negative environmental consequences would be considered a stable state with the least amount of material and energy consumption.
Ecological Engineering	Applying resiliency, self-organizing, and self-regulatory characteristicsof ecological systems for human purposes; integrating human benefits with the quality of the environment and functions through ecosystem manipulation; designing and improving solutions for engineering on the periphery of economics, ecosystems, and technology.
Ecological-Evolutionary	Preserving the adaptability of natural systems, permitting change and cycles (regular destruction), learning through the unpredictability of natural processes, preventing human dominance of food chains, promoting biotic/ecosystem/genetic variety, and ensuring balanced nutrient fluxes in ecosystems.
Equilibrium-Neoclassical	Individual objectives take precedence over collective goals, and regulation is required when disputes develop. Long-term policies emphasize market solutions, the avoidance of anthropocentric well-being, sustainable development via technologies and substitution, the optimization of environmental externalities, and the preservation of both economic and natural capital assets.
Ethical-Utopian	Recent individual values and societal aims are being stressed, while efficacy, dispersion, and scalability are being balanced. Long-term policy fosters civic (altruistic) conduct as opposed to individual (egoistic) behavior by focusing on small-scale activities and regulating negative effects.
Evolutionary-Technological	Encouraging economic diversity, co-evolutionary knowledge, and technological adaptability to deal with uncertainty and adjust to changing conditions.
Historical-Institutional	To address environmental and economic needs, integrate institutional frameworks, create long-term support for nature's interests, and use holistic solutions with a value hierarchy. This will ensure equal consideration for the environment, sectors, and future generations.

Human Ecology	Maintain a restricted size of economy and population, consume just what is necessary, maintain a modest position within the food web and biosphere of the environment, and constantly take into account the multiplier impacts caused by human behaviors, both in space and time.
Neo-Austrian-Temporal	As a component of the teleological cycle that also entails adjusting goals, avoiding irreversible patterns, sustaining organizational level, and upholding organizational organization, enhancing waste through the processes of extraction, use, manufacturing, recycling, and treatment is necessary.
Socio-Biological	Sustaining social and cultural structures that interact with ecosystems is crucial, as is integrating appreciation for the environment into culture.
Systems-Ecological	Limiting both the immediate and long-term negative impacts of humans on ecosystems, achieving an equilibrium between material inputs and outcomes for human systems, and reducing both regional and worldwide environmental stressors.
Physico-Economic	Economic growth is hampered by restrictions on material and energy circulation, the industrial metabolic process based on rules governing the material-product cycle, treatment of waste, reduction, recycling, and production of goods.

Resource: Bergh and Jeroen, 1996 cited from Gallopín, 2003.

1.2.6. Alternative Paradigms for Sustainable Development

In Schellnhuber's (1998, 1999) approach to sustainable development, the issue of environmental change on a global scale is dealt with using cybernetics. In a socio-ecological system, Schellnhuber presents many theories for the co-evolution of both human and environmental systems. The state of a system is shown as a point in a multidimensional space of states, including both ecological and human components. The trajectory of the system is established by a set of states that could involve "catastrophic domains" or areas of inaccessibility that can't be reached by purposeful or accidental actions (Gallopín, 2003). According to Gallopín (2003), these paradigms can be summarized as shown in Table 2.

Table 2. Alternative Paradigms for Sustainable Development

Equitization	The goal is to preserve options for future generations, ensuring equality in the environment and development options. This requires analyzing all possible trajectory paths and considering the socio-ecological system's dynamics. Making short-term option criteria part of the standards paradigm for sustainable development presents comparable difficulties as comparing choices lost versus alternatives gained.
Optimization	The optimum co-evolutionary trajectory throughout a certain time period is chosen in the optimization paradigm in order to maximize the utility function between humans and nature. Among the variations are maximizing mean utility and tolerating transient downsides. However, severe issues, such as analytical and political obstacles, develop. Because episodic errors can lead to catastrophic outcomes, success is dependent on complete control over the socio-ecological system. The optimization paradigm for sustainable development incorporates optimism, the need for complete information, and a coordinated volition process through generations.
Pessimization	The pessimization paradigm emphasizes adopting the precautionary principle to avert catastrophic situations and minimize harm. It eliminates intolerable control alternatives, giving management options plenty of room to move. This strategy puts less emphasis on choosing the prudent management order and more emphasis on limiting harm.
Stabilization	The stabilization paradigm emphasizes the coevolutionary attainment of a desirable state in the socio-ecological system and the management-based maintenance of it. By methodically balancing management alternatives based on the dynamics and steering mechanisms of the system, it transfers the emphasis from sustainable development to sustainability. Criteria for the chosen trajectory, such as soft-landing, or crash-halt, are required if a generalized equilibrium is present.
Standardization	Standards, principles, and development paths are the main subjects of the standardization paradigm. It does not depend on internal dynamics but rather on normative contexts. With values kept within a safe range, sustainability indicators define the system's trajectory. This strategy, however, makes the assumption that the system is steerable by statistical analysis of nearby spatial and temporal data. The inherent arbitrary nature of coevolutionary rules prompts questions regarding crucial interactions, consequences, and adverse impacts in non-linear systems.

Source: Gallopín, 2003.

In addition, according to the study of Dotsenko et al. (2021), three major theoretical and methodological paradigms exist in modern economic science: anthropocentric, biospherecentric, and noospheric. These can be summarized as follows:

(i) The anthropocentric paradigm prioritizes scientific, technical, and technological directions for long-term development while neglecting the negative environmental consequences of modern advancement.

(ii) The biospherecentric paradigm emphasizes the preservation and regeneration of the biosphere as the natural foundation for life, stability, and development. Sustainable development distinguishes itself by its ecological compatibility, economic efficacy, and social equity, all while minimizing anthropogenic stress on the biosphere. This paradigm has resulted in institutional reforms at the environmental, institutional, and national levels, and the 1992 United Nations International Conference on Environment and Development announced a "new era of economically sustainable development".

(iii) The noosphere paradigm is founded on Vernadsky's (1991) teachings on the noosphere, which is the term for the condition of the planet, the status of science, and the evolution of the biosphere. A well-planned educational system, cautious changes to Earth's ecosystem, and faster development rates are necessary for the transition. For a noosphere future, shared goals, modern technology, and life preservation are essential. Global security and peace are ensured through sustainable development, which is viewed as an anti-entropy, dialectical, and evolutionary process.

Another point of view, as observed in Dobrovolska (2018), is that the sustainable development paradigm that addressed rapid economic expansion, new technology, and environmental concerns was the primary emphasis of the first ten years of the 20th century. The second phase, which lasted from the 1990s through the middle of the 20th century, saw the paradigm of sustainable development become more established. The United Nations Conference in Rio de Janeiro in 2012 demonstrated how the transition to a "green economy" has transformed manufacturing, agriculture, and services into "green" sectors. During the 20th century, the sustainable development concept arose, bringing together the public and private sectors to address issues. Although it initially originated in the 20th century, the phrase "green economy" has not yet become widely used. The 2008 global financial crisis made it necessary to revise sustainable

development goals and offer financial tools for their realization. Although a "green" economy cannot completely substitute sustainable development, it is crucial for stability in development to have such an economy (Dobrovolska, 2018).

1.2.7. Historical Process of Sustainable Development

Multidimensional meetings have been organized throughout history with the goal of promoting sustainable development. In this direction, the main meetings that can be milestones for sustainability are summarized below.

1.2.7.1. Stockholm Conference (1972)

The first international conference to discuss environmental issues and find answers was the 1972 Stockholm Conference of the United Nations. The Stockholm Declaration and the Action Plan for the Human Environment were among the first environmental management concepts to be adopted. The Stockholm Conference emphasized the connection between global well-being, economic development, and pollution of the air, water, and oceans. The Action Plan included three main categories: (i) the Global Environmental Assessment Programme; (ii) Environmental Management Activities; and (iii) International Measures to Support Assessment and Management Activities (UN, 2023a).

The Club of Rome, a gathering of researchers and citizens in Rome, was founded as a result of the Stockholm Conference to solve the environmental catastrophe on a worldwide scale. The report highlighted that industrial society would exceed ecological limits if it continued to promote economic growth. The term "eco-development" emerged in 1978, recognizing the need for concurrent consideration of environmental and developmental ideas (Mebratu, 1998).

1.2.7.2. Brundtland Report (1987)

The United Nations World Commission on Environment and Development (UNEP) was established in 1983 by Gro Harlem Brundtland to address environmental and economic issues. The idea of sustainable development was first proposed in the "Our Common Future" report in 1987, and it has since evolved into a central idea in environmental debate. A new worldwide socio-economic strategy was launched with the publication of the Brundtland Commission report, and the idea has since been crucial for both environmental management and other human endeavors (Brundtland, 1997; Keeble, 1988).

The Brundtland report emphasized addressing existing demands without sacrificing the ability of future generations to address their own needs. The report considered the needs of the world's poor and the constraints placed on the environment's capacity to supply these requirements by technology and social structure. The report placed a strong emphasis on long-term perspectives on sustainable production and consumption patterns to ensure equal rights for future generations (Keeble, 1988; Mebratu, 1998).

The Brundtland Commission proposed a new standard for measuring development program success, focusing on an ecology-first approach to governance. The report called for a system of regulations to address environmental protection and resource management, requiring rigorous risk assessment and stakeholder participation (Krueger, 2017).

The Brundtland Report reshaped the sustainable development debate by replacing scarcity with natural capital, which includes the cost of depleting or destroying ecosystem services. The shift from resource scarcity to ecosystem integrity was based on economic systems' ability to innovate, reduce resource intensity, substitute resources, and find new sources. The Brundtland concept of sustainable development is based on growth and technological substitution, emphasizing the importance of understanding the historical context and goals of sustainable development (Krueger, 2017).

1.2.7.3. The Human Development Report (1990)

In 1990, the United Nations Development Program (UNDP) released the first Human Development Report, highlighting the global disparity in human development compared to GDP per capita. The report recommends countries focus on long, educated, comfortable, and peaceful lives for citizens rather than solely on GDP per capita expenditures. Rich countries can provide military and direct assistance to poor countries, overcoming remaining inequalities quickly and significantly. The report measures human development based on life expectancy, literacy rate, and living standard (Bhanojirao, 1991).

It emphasizes the importance of living a long, healthy life, education, access to resources, political freedom, guaranteed human rights, and personal self-respect. Development should create a conducive environment for individuals and collectives to develop their full potential and lead productive, creative lives. Balancing the formation and use of human capabilities is crucial for maximizing potential (UNDP, 1990).

1.2.7.4. Rio Conference (1992

The United Nations Conference on Environment and Development (UNCED, which took place in Rio de Janeiro from June 3–14, 1992, was primarily concerned with the effects of human socio-economic activity on the environment and the necessity of persistent action in other areas. The conference concluded that sustainable development is an attainable goal for all people and that integrating economic, social, and environmental concerns is vital for sustaining human life. Agenda 21 called for new strategies to invest in the future to achieve sustainable development (UN, 2023b. The 1992 Earth Summit resulted in the adoption of the Rio Declaration on Environment and Development, better known as Agenda 21, with the goal of promoting sustainable development and defending the environment (UN, 1992; Vaggi, 2018).

The 27 principles for sustainable development in the Rio Declaration on Environment and Development underline the rights and responsibilities of the United Nations. These principles highlight the value of cooperation between the public and private sectors, civil society, and the environment. Humans are central to sustainable development, and countries have the right to exploit their resources without harming the environment. Sustainable development calls for the abolition of poverty, the reduction of inequality, and the maintenance of minimal standards of living, with industrialized nations bearing the responsibility for resources of financial and technological nature (UNCED, 1992; Tomislav, 2018).

Governmental structures underwent a change as a result of the Rio 1992 process, including the founding of environmental ministries and agencies. It was challenging to advance an environmental perspective within established, strong agencies when the 1970s saw the emergence of these organizations. The procedure promoted improved openness in economic decision-making, the adoption of Environmental Impact Assessments more widely, and more deliberate and cooperative approaches for governmental organizations regarding environmental issues. However, the majority of these modifications remained procedural and did not result in a fundamental change in the formulation of policies (Clémençon, 2012).

1.2.7.5. World Summit for Social Development (1995)

The UN Department for Policy Coordination and Sustainable Development hosted the Social Summit, also known as the World Summit for Social Development, from March 6–12, 1995, in Copenhagen. With over 14,000 participants, the summit aimed to eradicate poverty, expand productive

employment, reduce unemployment, and promote social integration. The summit was held in response to UN member states' concerns about neglected social problems and unmanageable poverty (Shaw, 2007).

Government and state leaders vowed to pursue a vision for social progress based on respect for and consideration of the rights and dignity of all people, democracy, and mutual accountability. The framework for action includes putting people at the center of development, ensuring equity among generations, integrating economic, cultural, and social policies, promoting democracy, human dignity, social justice, solidarity, tolerance, non-violence, pluralism, and non-discrimination. Emphasizing women's empowerment, the universality of social development, and the voluntary repatriation of refugees are also emphasized (UN, 2015)).

The Social Summit is the first gathering of heads of State to explicitly address ordinary people's problems and see empowerment and integration as forces uniting countries in social development. Education, including primary, university, vocational, and re-training, is critical to empowerment. Governments, people's organizations, and the private sector must work together to promote social development in an interdependent world (Rao, 1998).

1.2.7.6. The Kyoto Protocol (1997)

The United Nations Framework Convention on Climate Change (FCCC) was established in 1994 to stabilize greenhouse gas concentrations and prevent anthropogenic interference. The 1997 Kyoto Protocol, adopted in 2005, emphasized the importance of stable atmospheric conditions and sustainable development principles. It requires industrialized countries to reduce emissions by 5.2% based on 1990 emissions by the end of 2008- 2012. By requiring Annex I Parties to adhere to legally enforceable objectives for limiting or lowering their greenhouse gas emissions, the Kyoto Protocol strengthens the Convention. It introduces three flexibility mechanisms to lower emissions targets, including (i) Joint Implementation (JI); (ii) Clean Development Mechanism (CDM); and (iii) Emissions Trading (ET), to ensure the Protocol's integrity and promote sustainable development in non-Annex I Parties (Sathaye et al., 2006).

The Kyoto Protocol aimed to achieve legally binding emission targets for industrialized countries during the commitment period of 2008- 2012. While proponents view it as a breakthrough in climate policy, opponents argue it is flawed in setting emission reduction targets (Böhringer, 2003). In the short to medium run, the latter can be considered the business-as-usual emission level,

with costs of emission abatement occurring instantly but uncertain benefits in the distant future (Böhringer and Vogt, 2003).

Ratification requires 55% of Parties' signatures, including Annex 1 countries. Technical issues, such as afforestation, reforestation, and deforestation, remain unresolved (Noble and Schloes, 2001).

1.2.7.7. The Millennium Development Goals (2000)

The third millennium began with the Millennium Summit in 2000, which gave the UN the opportunity to unveil a new development plan for the twenty-first century (UN, 2023c. The Millennium Development Goals (MDGs were developed in response to United Nations conferences focusing on gender, children, the environment, and food. The MDGs are targeted to: (i eliminate uttermost misery; (ii achieve global primary education; (iii advance the equality of women and men; (iv decrease deaths of children; (v enhance the health of mothers; (vi battle illnesses including HIV/AIDS and malaria; and (vii assure environmental sustainability (Kanbur et al., 2018. The Declaration's development-related objectives, codified in 2001, were set to be realized by 2015 (Doyle and Stiglitz, 2014. Health is emphasized in three of the eight goals, while MDG 6 addresses HIV, malaria, and tuberculosis. Gender is now a major universal goal in MDG 3, and all goals are based on developing countries' conditions, which is different from the 2015 Sustainable Development Goals (Vaggi, 2018).

The implementation plan aimed to reduce poverty, improve healthcare, conserve water resources, use renewable energy, and protect biodiversity and ecosystems. The MDGs highlighted the multi-stakeholder approach to sustainable development and the commitment of UN member states' governments to reducing global development disparities (Tomislav, 2018; UN, 2002).

1.2.7.8. World Sustainable Development Summit (Rio+10) (2002)

The World Summit on Sustainable Development, held in Johannesburg from August 26 to September 4, 2002, brought together over 20,000 participants, including governmental and non-governmental organizations, the private sector, and scientists, to address challenges since the 1992 Rio Earth Summit. At the Rio+10 conference in Johannesburg, South Africa, world leaders united to achieve a peaceful, prosperous, and just world, leading to the launch of the

Millennium Development Goals. The adoption of the MDGs shifted political will towards poverty eradication, and the Rio+20 document mandated the development of sustainable development goals, which were integrated into the United Nations Development Agenda. This transition aimed to prioritize poverty eradication and end extreme poverty within a generation. The UN Stakeholder Forum Implementation Conference (IC) was introduced to include civil society in global agreements and action plans (Carr and Norman, 2008; Erhun, 2015).

The 2002 World Summit adopted a Political Declaration and Implementation Plan focusing on water, energy, health, agriculture, and biological diversity. The plan encouraged partnerships between the public and private sectors, emphasized the need for diversification and renewable energy sources, and reaffirmed commitments against HIV/AIDS (UN, 2023d).

1.2.7.9. World Summit (2005)

Over 170 heads of state gathered in New York in 2005 for the World Summit, which was based on suggestions from Secretary-General Kofi Annan. In order to combat poverty, promote innovative development financing, and assure the long-term viability of debt, leaders committed $50 billion annually. Along with this, they agreed to adopt the Doha Work Plan and liberalize trade. The Summit Outcome Document made clear that it was the duty of each state to defend its citizens from crimes against humanity, such as genocide and ethnic cleansing. The international community, including the UN, should continue to take this obligation into account while keeping in mind international law and Charter ideals (UN, 2023e).

1.2.7.10. World Millennium Development Goals Summit (2010)

At the New York Millennium Development Goals Summit in 2010, the "Keeping the Promise: United to Achieve the Millennium Development Goals" Global Plan of Action was established. Initiatives to fight hunger, poverty, and disease were also revealed at the summit. Until 2015, heads of state and government committed more than $40 billion in aid to accelerating advances in women's and children's health. The MDGs' importance to women and children was stressed by Secretary-General Ban Ki-moon. Maternal mortality rates were to be cut in half between 1990 and 2015 as part of Millennium Development Goal 5 (UN, 2023f).

1.2.7.11. World UN Conference on Sustainable Development (Rio+20 Summit) (2012)

The 2012 UN Conference on Sustainable Development in Rio, also known as Rio+20, established practical steps for implementing sustainable development. Member states developed Sustainable Development Goals (SDGs), adopted green economy policies, and implemented a sustainable development strategy. The conference also addressed energy, food security, oceans, and cities. Over 700 voluntary commitments were announced, and new partnerships were initiated to advance sustainable development (UN, 2023g).

Three internationally obligatory contracts on biodiversity, climate change, and desertification were adopted as a result of the 1992 Earth Summit, which also caused widespread alarm, and Agenda 21 was also adopted. However, subsequent mega-conferences have failed to set the world on a sustainable development path and raised doubts about their expectations. The conference's final outcome, titled "The Future We Want", contains 283 paragraphs and is 53 pages long (Alstine et al., 2013).

The outcome document on the green economy lacks commitments and agreed actions, with concerns about trade barriers and "green protectionism". The G-77 and China continued to oppose the establishment of specific goals and a roadmap for the green economy. At the regional, national, municipal, and global scales, the content emphasizes the requirement for improved structures for institutions. The UN Environment Programme and the UN Commission on Sustainable Development are the main targets of institutional reform suggestions. The procedure for creating the Sustainable Development Goals was approved in the conclusion document, but unlike the EU's plan, it did not include a precise list of topics and deadlines (Alstine et al., 2013).

1.2.7.12. Agenda 2030: UN Sustainable Development Goals (SDGs) (2015)

In 2015, over 150 world leaders approved the Transforming Our World: The 2030 Agenda for Sustainable Development by 2030 plan at the United Nations Headquarters. The program aims to enhance quality of life, end poverty, foster prosperity, save the environment, and combat climate change. Two months later, the Paris Agreement was signed and ratified by 187 parties at the 2015 Paris Conference on Climate Change (COP21) (UN, 2023h).

For both current and future generations, Paris agreements seek to improve the environment's resiliency, productivity, and health. The chance to increase determination, achieve synergies, and reduce trade-offs must be taken advantage of by nations (Zhenmin and Espinosa, 2019).

Countries adopted the 17 Sustainable Development Goals (SDGs) to achieve the 2030 Agenda, focusing on prosperity, addressing inequalities, and protecting the environment. These objectives seek to address issues such as environmental degradation, climate change, human rights violations, and poverty (UN, 2023ı; Hajer et al., 2015).

By 2030, the SDGs aim to improve global resource efficiency, achieve equal pay, reduce youth unemployment, end child labor, protect labor rights, promote sustainable tourism, strengthen financial institutions, and develop a global youth employment strategy (Erhun, 2015). Additionally, the SDGs' discourse on sustainability places an emphasis on green technical developments, environmental regulations, and economically responsible business practices to ensure prosperity for both current and future generations (Briant Carant, 2017).

In light of national circumstances, capabilities, and degrees of development, they are integrated, resilient, worldwide, and globally applicable. The SDGs emphasize the connection between sustainable development and other economic, environmental, and social fields and address challenges faced by vulnerable nations such as Africa, the nations that are least developed, isolated islands in development, and nations with middle incomes. The aim asks for additional assistance for data collection and capacity building in Member States, as well as continuous efforts to address significant issues creating barriers to Agenda implementation adopted by the General Assembly on September 25, 2015 (UN, 2023i).

The UN document emphasizes sustainable development 85 times but does not mention "inclusive development". However, it does not mention inclusive development, despite 41 references to inclusive societies and sustainable economic growth. The document also emphasizes growth 16 times, with Target 8.4 aiming to decouple growth from environmental degradation. Sustainable growth involves social, economic, and ecological aspects, while sustained growth may reduce inequality. Goal 9 promotes sustainable industrialization and resource efficiency, but this emphasis undermines ecocentric goals (Gupta and Vegelin, 2016).

Although each of these objectives is presented as a separate objective, they are really interconnected in major ways that provide tradeoffs and

complementarity. For example, SDG 6, "Clean Water and Sanitation" has synergies with SDG 2, "Zero Hunger." Increased water usage efficiency for producing food can minimize water shortages and provide a reliable water supply, creating synergies. When agricultural needs for water conflict with those for clean water and sanitary systems, tradeoffs occur. The relationships between SDGs are, however, poorly understood, and approaches for achieving these SDGs may be ineffective if the associated benefits and tradeoffs are ignored (Wang et al., 2019). Each goal has its own goals and indicators. These are briefly summarized below.

1.2.7.12.1. End Poverty

The first SDG seeks to end severe poverty by reducing the percentage of people living in poverty. This shift from the Millennium Development Goals (MDGs) is driven by the 2013 UN document, Report on the World Social Situation: Inequality Matters. Goals 1 and 2 fall short in addressing poverty, with inflation causing worse quality of life and conditions. Goal 2 aims to reduce poverty by at least half, but achieving this target may leave some impoverished. Neoliberal policies exacerbate poverty by suppressing global produce prices and driving women farmers into poverty (Briant Carant, 2017).

By 2030, the percentage of the population below the global poverty threshold will be reduced by gender, age, work status, and geography. Implementing systems of social protection and ensuring equitable access to financial services, technological advances, land, and other resources will be necessary. Building resilience for the poor and vulnerable is crucial, and mobilizing resources from various sources, including enhanced development cooperation, is essential for poverty reduction programs and policies. To encourage increased investment in poverty reduction measures, sound policy frameworks at the national, regional, and international levels should be developed, taking gender equality into consideration (UN, 2015; UN, 2023j).

1.2.7.12.2. End Hunger

The SDGs' Goal 2 aims to eliminate hunger-based malnutrition among women and children, emphasizing the importance of meeting their needs. New targets, such as targets 4 and 5, emphasize the need for sustainable development methods, genetic diversification, and production to ensure a society's health and welfare. Resilient agricultural practices and people, planet, and profit-

based sustainability are crucial in addressing hunger-based malnutrition (Briant Carant, 2017).

By 2030, small-scale food producers will increase agricultural output and earnings by a factor of two to ensure equitable access to resources like land and job opportunities. Implementing resilient agricultural methods and sustainable food production strategies is essential. To raise agricultural productivity in developing nations, it is crucial to preserve the genetic diversity of seeds, plants, and animals by 2020 and increase funding for infrastructure, research, extension services, technological development, and gene banks (UN, 2023j).

1.2.7.12.3. Ensure Healthy Lives

Goal 3 focuses on universal healthcare, public health, and the reduction of environmental hazards. The UN urges national governments to develop committees and monitor regulations. SDG 3 emphasizes TRIPS' importance in protecting international property rights and affordable medicines and vaccines for developing countries (Briant Carant, 2017).

Additionally, the goal aims to reduce global road traffic accidents, ensure universal access to healthcare, and decrease deaths and illnesses from hazardous chemicals, air, water, and soil pollution. The goal also emphasizes implementing the World Health Organization Framework Convention on Tobacco Control, supporting vaccine research, increasing health financing, and enhancing developing countries' capacity for early warning, risk reduction, and management of national and global health risks (UN, 2023j; Tsalis et al., 2020).

1.2.7.12.4. Inclusive, Quality Education, and Lifelong Learning Opportunities

Goal 4 of the SDGs emphasizes free and equitable primary and secondary education for all, highlighting liberal feminism and Keynesianism. Target 5 aims to eliminate gender disparities in education and increase women's participation in political and other careers. Universal education promotes sustainable development, reduces violence, and promotes diversity, gender equality, and human rights (Briant Carant, 2017; Tsalis et al., 2020).

By 2030, all girls and boys should receive free, equitable, and quality education, ensuring equal access to technical, vocational, and tertiary education. This includes improving children's health, learning, and psychosocial well-being (UN, 2023j).

1.2.7.12.5. Gender Equality

Goal 5 aims to increase gender equality and empower women and girls, based on the Beijing Declaration. It aims to reduce discrimination, sexual violence, and early marriage and increase women's inclusion in leadership, politics, reproductive healthcare, and economic resources. However, the UN's unrealistic targets, lack of time-sensitive indicators, and global SDG Score Card responses make achieving goal 5 unlikely (Briant Carant, 2017). Reforms should provide women with equal rights to resources, land ownership, and property control. The text advocates for technology and sound policies for gender equality and women's empowerment (UN, 2023j).

1.2.7.12.6. Sustainable Management of Water and Sanitation

Goal 6 aims for universal access to safe and affordable drinking water, shifting from the MDGs' focus on reducing those without access (Tsalis et al., 2020). Water management should involve both public and private investment, avoiding privatization and restricting access to areas with a high return on investment (Briant Carant, 2017). This goal includes reducing pollution, dumping, hazardous chemicals, and recycling. By 2030, water-use efficiency should increase, and sustainable freshwater withdrawals and supplies should be ensured. By 2020, water-related ecosystems should be protected and restored. International cooperation and capacity-building support should be expanded in developing countries (UN, 2023j).

1.2.7.12.7. Affordable, Reliable, and Sustainable Clean Energy

By 2030, energy efficiency should double, and international cooperation should be strengthened to promote clean energy research and technology, as well as expanding infrastructure for modern and sustainable energy services in developing countries. This goal aims to ensure universal access to affordable, reliable, and sustainable energy services, increase renewable energy's share in the global energy mix, and double global energy efficiency improvement rates (UN, 2015; UN, 2023j; Tsalis et al., 2020).

1.2.7.12.8. Sustained, Inclusive, and Sustainable Economic Growth and Productive Employment

SDG 8 aims for employment opportunities and a growing economy, similar to MDG 8. It suggests increasing "Aid for Trade" in exchange for

lifting trade restrictions. However, from a "Keynesian" perspective, Agenda 21 emphasizes economic growth without compromising environmental degradation (Briant Carant, 2017). Furthermore, this goal aims for 7% GDP growth in least-developed countries, supporting job creation, entrepreneurship, creativity, innovation, resource efficiency, youth unemployment reduction, forced labor eradication, and safe working environments (UN, 2023j; Tsalis et al., 2020).

1.2.7.12.9. Resilient Infrastructure, Sustainable Industrialization, and Innovation

The goal is to construct long-term, dependable, and resilient infrastructure for economic development and human well-being, focusing on affordable and equal access. Inclusive industrialization is promoted, with a goal to double the industry's share in the least developed countries by 2030. Small-scale enterprises in developing countries should have access to financial services, integrate into value chains, and adopt clean technologies. The plan upgrades infrastructure, retrofits industries, and enhances resource efficiency. Access to information and communications technology is also increasing, with universal and affordable access to the Internet expected in the least developed countries by 2020. SDG 9 also underlines the importance of financial services, infrastructure improvements, CO_2 emissions reductions, scientific research, and technology skills for sustainable infrastructure development in developing nations (UN, 2015; UN, 2023j).

1.2.7.12.10. Reduce Inequality Within and Among Countries

Goal 10 seeks to control international financial markets and institutions to reduce inequality, while Target 1 focuses on income growth for the poorest 40% of the population, potentially increasing inequality (Briant Carant, 2017). To put it another way, the goal is to lessen inequality both inside and across nations (Tsalis et al., 2020). Additionally, through fostering social, economic, and political participation, the abolition of discriminatory legislation, and the reduction of inequities, this objective seeks to increase income growth for the poorest 40% of Americans at a faster pace than the national average. This will involve improving financial soundness indicators, increasing labor proportions of GDP, and increasing representation in international financial and economic organizations. Special consideration for poor nations and lower remittance fees are crucial (UN, 2023j).

1.2.7.12.11. Sustainable Cities and Communities

The 2030 goal aims to provide all with safe, affordable housing, basic services, upgraded slums, improved road safety, and inclusive urbanization. It also aims to reduce deaths, economic losses, and environmental impacts in cities. The goal also emphasizes reducing adverse per capita environmental impacts, such as air quality and waste management. Universal access to green spaces is crucial. National and regional development planning will be strengthened, and the least developed countries will be supported in building sustainable, resilient buildings using local materials. Civil society participation will increase, disasters will be reduced, and environmental impact will be reduced through air quality and waste management. Positive economic, social, and environmental links will be supported through integrated policies, resource management, and disaster risk reduction strategies (UN, 2015; UN, 2023j).

1.2.7.12.12. Sustainable Consumption and Production Patterns

The SDGs promote sustainable production patterns, efficient resource use, and waste management to reduce pollution (Briant Carant, 2017). The 10-Year Framework of Programs on Sustainable Consumption and Production Patterns aims to implement a 10-year framework for sustainable consumption and production patterns in all countries by 2030. The goal is to achieve sustainable management, a reduced material footprint, halving per capita global food waste, and minimizing adverse impacts on human health and the environment. The framework encourages companies to adopt sustainable practices, reduce waste generation through prevention, reduction, recycling, and reuse, and promote sustainable public procurement practices (UN, 2023j).

1.2.7.12.13. Action to Combat Climate Change and Its Impacts

Goal 13 aims to boost climate change awareness and encourage governments to implement policies to strengthen resilience before and after disasters. Traditional and indigenous knowledge is essential for mitigating disaster effects (Briant Carant, 2017). Countries should integrate climate change mitigation actions into policies, strategies, and planning and launch the Green Climate Fund to fulfill $100 billion in promises (UN, 2023j).

The Paris Agreement and the 2030 Agenda provide opportunities for constructive systemic change, ensuring a robust, fruitful, and healthy environment for generations to come. It is necessary to reform well-aligned

frameworks for planning, implementing, and monitoring, as well as to create a cohesive coalition of partners and generate creative solutions (Zhenmin and Espinosa, 2019).

1.2.7.12.14. Life Below Water for Sustainable Development

According to goal 14, in order to promote sustainable development, it is essential to protect and responsibly utilize marine resources (Tsalis et al., 2020). Therefore, it seeks to conserve coastal and marine ecosystems by 2020 and eliminate marine pollution by 2025. Addressing ocean acidification requires scientific cooperation, effective harvesting regulation, and ending overfishing, illegal fishing, and destructive practices. At least 10% of coastal and marine regions must be preserved, and fisheries subsidies should be prohibited by 2020. The objective is to improve the economic advantages of small island states and less developed nations by 2030 through sustainable marine management, aquaculture, and tourism. This involves expanding research capabilities, scientific understanding, and the dissemination of maritime technologies (UN, 2015; UN, 2023j).

1.2.7.12.15. Sustainable Life on Land by Ecosystems, Forests, and Biodiversity

In addition to combating desertification, the objective is to preserve land deterioration and support sustainable terrestrial ecological systems (Tsalis et al., 2020). A world free of land degradation is also intended to be attained by 2030, along with desertification, soil restoration, and land reclamation. Mountain ecosystems should be preserved, and efforts should be made to lessen habitat degradation, biodiversity loss, and species extinction. Encouraging a fair distribution of genetic resources and protecting terrestrial and aquatic ecosystems are crucial. By 2020, planning, development, poverty reduction initiatives, and accounting should incorporate environmental and biodiversity values (UN, 2015; UN, 2023j).

1.2.7.12.16. Promote Peaceful and Inclusive Societies for Sustainable Development

Goal 16 aims to lower mortality and violence rates worldwide, put an end to abuse of children, trafficking, exploitation, and torture, support the rule of law, fight organized crime, and lessen corruption. According to Tsalis et al. (2020), this objective aims to foster peaceful, equitable communities for sustainable

development, guarantee justice for all, and establish inclusive, accountable, and efficient institutions.

Strengthening national institutions, lowering harassment rates, and upholding nondiscriminatory legislation and regulations are essential for reducing crime, fighting terrorism, and preventing bloodshed (UN, 2023j).

1.2.7.12.17. Strengthen and Revitalize the Global Partnership for Sustainable Development

Goal 17 aims to improve the global partnership for Sustainable Development by allocating 0.7% of GDP to developing countries, with more distributed to the least developed countries. Targets 2 and 4 focus on reducing indebtedness in least developed countries through debt restructuring, while Targets 10, 11, and 12 emphasize removing trade restrictions to increase exports (Briant Carant, 2017; Tsalis et al., 2020).

The text also recommends coordinated policies to mobilize additional financial resources and address long-term debt sustainability. It supports the World Trade Organization's universal, rules-based, open, equitable, and multilateral transactions system, as well as globally adjusted tariff averages, both duty-and quota-free entry into markets, global macroeconomic stability, multi-stakeholder collaborations, data, control, and accountability. By 2020, the text aims to strengthen assistance for developing country capacity strengthening, and by 2030, it expands on current efforts to create sustainable development policies that go beyond gross domestic product and aid statistical enhancement capacity (UN, 2023j).

1.2.7.13. The Global Sustainable Development Report (2019)

The Global Sustainable Development Report (GSDR was created in 2019 to address the Rio+20 conference's "The Future We Want" and the 2030 Agenda for Sustainable Development. It aimed to strengthen the science-policy interface and inform the SDG Summit at the General Assembly (UN, 2023k).

The report, which was created by a separate group of scientists, emphasizes six main entry points for increasing transformation through the Sustainable Development Goals and targets: urban development, food systems, sustainable economies, energy decarbonization, human well-being, and worldwide environmental commons. Four levers—governance, economics and finance, individual and community action, research, and technology—are

recognized in order to achieve equilibrium between the well-being of humans and environmental and social expenses. These levers can assist in achieving both these objectives and a more sustainable future (UN, 2023l).

1.2.7.14. Stockholm +50 Summit (2022)

Stockholm+50, jointly hosted by Sweden and Kenya in 2022, aims to promote a prosperous, healthy world by exploring innovative finance and capacity development alternatives. By looking into novel finance and capacity development alternatives, it expedites pledges for a gender-sensitive, inclusive, peaceful, and sustainable future. It encourages corporate collaboration, promotes net-zero emissions, zero-pollution policies, and nature-positive economies, and drives sectors to recover from the COVID-19 pandemic (UNEP, 2021).

According to SEI and CEEW (2022), in the 50 years since the 1972 UN Conference in Stockholm, significant challenges have emerged, including climate change, ecosystem changes, and extreme inequality. To tackle these issues, transformative action and economic systems are crucial. The action gap is significant, with only one-tenth of global environmental and sustainable development targets achieved since 1972. To unlock a better future, we must accelerate change, invest in sustainable development, and redefine our relationship with nature. This can be achieved by redefining our relationship with nature, strengthening human-nature connectedness, integrating nature in cities, protecting animal welfare, increasing nature-based education, and drawing on indigenous local knowledge. Governments must support sustainability investments, incentivize private finance, and reduce sustainability risks while raising costs. Leaders can tackle structural barriers by improving policy coherence, renewing multilateralism, and creating a culture of accountable promises.

1.2.7.15. The 2023 Sustainable Development Goals Summit

The Sustainable Development Goals will be further advanced, and top-level political direction will be provided, at the 2023 SDG Summit, which is planned for September 18–19 in New York. The summit aims to address world challenges and create excitement for the 2030 Agenda (UN, 2023ı). The focus will be on facilitating science to help with this acceleration and expediting transformation through critical access points. The goals of sustainable development and the 2030 Agenda are put at risk by global catastrophes like

the COVID-19 pandemic, changes in the climate, and conflicts. These problems have negative effects on social cohesion, peace and security, the global economy, education, food security, nutrition, and health. The Sustainable Development Goals (SDGs) must be maintained immediately if progress is to be made by 2030. The UN General Assembly will host the SDG Summit in 2023, which will give political leadership, recognize developments and new problems, and inspire additional initiatives to speed up adoption (UN, 2023m).

The world's leaders have been encouraged by the Secretary-General to provide a Rescue Plan for People and Planet that includes international, national, and comprehensive engagement with domestic constituents. The 2030 Agenda will be implemented more quickly after the Summit of the Future in 2024 by building on its conclusions (UN, 2023m).

1.3. Environmental Problems Facing the World

An enormous amount of environmental damage is caused by human activity, altering the climate of the planet irreversibly, destroying stratospheric ozone, degrading topsoil, eradicating biodiversity, disrupting photosynthesis and nutrient cycles, polluting large areas of air, rivers, and oceans, and depleting artesian water reserves. Due to the potential irreversibility of these consequences, immediate action is needed to lessen the adverse effects of human activity (Diesendorf, 2000).

Environmental deterioration has been more obvious over the past 20 years as a result of rising industrial activity, consumerism, and population throughout the world. Historically, conventional pollutants, including SO_2, NOx, particulates, and CO_2, were the focus of environmental studies and regulatory control measures. Recent worries, however, have widened to include minute or dangerous air contaminants as well as globally important pollutants like CO_2. Along with increased vehicle traffic and NOx and VOC emissions, industrial processes and buildings have also contributed to new environmental issues. Pollutants, dangers, and ecological degradation occur throughout many different regions as environmental challenges (Dincer, 2000).

Many countries have prioritized the depletion of natural resources over public health and ecological sustainability, creating difficulties with the environment that have a detrimental effect on sustainable development. These issues include urbanization, habitat degradation, aquaculture, agriculture, and forestry. These problems have gotten worse, especially in metropolitan areas close to coastal systems, due to both climate change and population growth. In many countries, there is a lack of public understanding of environmental

management, and outdated environmental ethics are making environmental issues worse. To solve these problems and advance sustainable development, it is imperative to develop relevant environmental science fields, such as toxicology, evaluation of risk, remediation, and environmentally sustainable technology (Hoang et al., 2019).

Since ongoing deteriorating activities result in health, ecological, and other issues, concerns about the environment are vital for sustainable development. An important aspect of environmental effects is the use of energy resources. These constraints may be surpassed with increased energy efficiency. Since there are many options available, renewable energy sources are both more flexible and cleaner than traditional energy sources. Citizens can detect the beneficial as well as adverse effects of energy usage thanks to decentralized and regional approaches, which operate independently of national networks (Dincer, 2000).

1.3.1. Climate Change

Climate change is a significant global environmental concern that impacts various aspects of the 2030 Agenda for Sustainable Development, including ecosystem protection, health, hunger, poverty, and inequality. The frequency and destructiveness of extreme weather events are increasing, highlighting the long-lasting consequences of severe weather on people and their means of living. Climate change also affects agricultural production, energy, heat, and water availability. Although traditionally industrialized nations have been responsible for greenhouse gas emissions, the likelihood is that emerging nations will do so more (Zhenmin and Espinosa, 2019; Sathaye et al., 2006).

The greenhouse effect, often known as global warming, is a serious environmental problem that affects how much energy is used and the temperature of the Earth's surface. CO_2, along with other gases including CH4, CFCs, and ozone, is responsible for 50% of this impact (Dincer, 2000). In recent decades, with accelerating economic expansion, there has been a sharp rise in the demand for fossil fuel usage, which has increased greenhouse gas emissions (GHG) during the same period (Ansari, 2022). According to Sathiendrakumar (2003), industrial growth, farming intensively, using fossil fuels, and eradicating natural plants are the main causes of global warming.

During the twentieth century, the average quantity of emissions of greenhouse gases in the planet's atmosphere rose, owing mostly to anthropogenic causes. The rise can be attributed to a rise in the use of fossil fuels during this time period. The degree of this shift is unpredictable in the short and long

term, as is its influence on global climates, economies, and regional habitats. Renewable energy sources such as solar, wind, biomass, and hydrogen-based electricity are efficient, but they do not reduce greenhouse gas emissions (Smoot and Baxter, 2003).

If atmospheric concentrations keep increasing, Earth's temperature might increase by 2°C or perhaps 4°C over the course of the next century, which could result in a sea level rise of 30–60 cm by the end of the 21st century. Thorough analyses of the costs of carbon emissions are essential to preventing climate change. It is necessary to implement both local policies that promote rapid economic growth and international policies that facilitate the acquisition of innovative technology and resources in order to establish an equilibrium between the growth of the economy and reducing emissions (Dincer, 2000).

By implementing energy-efficient technology at a reasonable cost, switching to renewable energy sources, and encouraging the preservation, replanting, and ecologically sound management of forests, sustainable development initiatives help to mitigate the effects of climate change. Public transportation systems that are effective minimize congestion in traffic and emissions of greenhouse gases. Sustainable development and permanent emission reductions of greenhouse gases are aided by a participatory approach to managing forests, rural electricity, and water for irrigation (Sathaye et al., 2006).

Sustainable development strategies, renewable energy sources, energy efficiency, protecting forests, and conserving water are essential to reducing vulnerabilities while supporting economic development. Over-reliance on forest resources can lead to environmental deterioration and exacerbate poverty, dependence, and underdevelopment. Water shortages, cholera, and other water-borne diseases are more likely due to ice melting and flooding. Inadequate hygiene and sanitary environments facilitate infectious illness transmission, and rainfall patterns will change, causing higher temperatures and a loss of biodiversity (Sathaye et al., 2006; Tosam and Mbih, 2015).

To achieve the Paris climate change objectives, lowering greenhouse gas emissions must be given top priority throughout the post-COVID-19 era. Resources should be directed towards investments in reducing emissions, such as carbon taxes and labor-intensive activities like GHG mitigation. Climate action areas include renewable energy generation, smart grids, high-capacity batteries, carbon capture and sequestration, clean fuels, power-saving appliances, and electric vehicles (UN, 2020). Additionally, in combating climate change, the Intergovernmental Panel on Climate Change (IPCC) report took into account a variety of scenarios, such as net zero CO_2 emissions by 2050 and considerable

reductions in non-CO_2 greenhouse gas emissions, in order to reduce global warming to 1.5°C above pre-industrial levels (UN, 2023l).

1.3.2. Environmental Pollution

Environmental pollution threatens biodiversity, human health, economic growth, and environmental deterioration (Yang et al., 2022). According to Saravanan et al. (2021), the major pollutants and their toxic effects both on the environment and health are summarized as follows in Table 3.

Table 3: Harmful Consequences of Major Environmental Pollutants

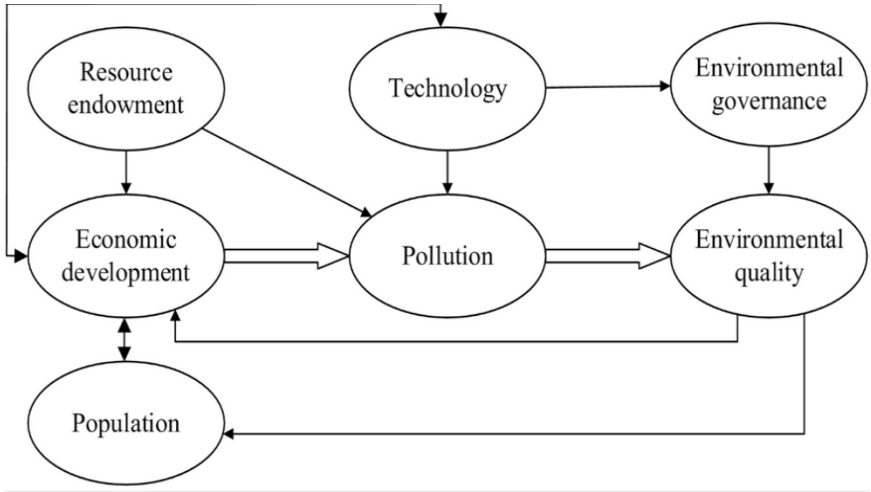
Major Environmental Pollutants	**Sources of the Pollutants**	**Harmful Consequences on Health and Environment**	
Dyes	Industrial waste from the textile, painting, paper, printing, and tanning sectors	Organ malfunction, mutagenicity, and carcinogenesis	A decrease in photosynthetic activity, an increase in BOD and COD, and a suppression of plant development overall
Heavy metals	Industrial effluents include pesticides, mining waste, and sewage sludge.	Organ dysfunction and, illnesses that cause cancer	Bioaccumulation, Plant Oxidative Stress
Oil	Industrial effluents and spills of transportation oil	Breathing issues, cancer causing neurological problems,and irritated eyes and nose	Ruins aquatic habitat and lowers water's dissolved oxygen (DO) content
Pathogenic Microorganisms	Medical wastes, sewage, and domestic waste	A negative impact on human metabolism	Decrease in the amount of dissolved oxygen (DO),
Pesticides and Herbicides	Agriculture techniques	Organ dysfunction and disturbance of the endocrine system	Biological expansion reduces biodiversity
Plastics	Packing garbage and industrial waste dumped into the ocean	Liver malfunction, lung issues, hearing loss, and a weakened immune system	Restricts aquatic creatures' ability to breathe

Source: Saravanan et al., 2021.

Especially as one of the major pollutant groups, plastics pose a significant environmental hazard due to their long-term persistence and economic interdependency. Pollution of the environment nevertheless results from the careless usage and improper disposal of plastics. The packaging sector dominates the plastics market, with advanced nano-sized polymers being proposed for drug delivery. Leaks of plastic garbage into the environment, particularly aquatic and terrestrial ecosystems, provide difficulties for waste management and endanger these ecosystems' natural cycles (Kumar et al., 2021.

By removing pollutants, technological advancement fosters growth; in contrast, the abundance of resources has an effect on economic growth. Population and environmental quality are two important migratory influences. Environmental degradation hinders economic growth as it causes polluted workplaces, expensive testing and purifying equipment, and increased operational costs.

Figure 2: Interaction Between Economic System and Environment



Source: Yang et al., 2022.

Figure 2 illustrates the interaction between the economic system and the environment, involving population, natural resources, the environment, and technology. Economic growth improves technology, changes emissions, restricts environmental governance, affects population, and pollution and governance determine environmental quality (Yang et al., 2022).

Industrial effluents and anthropogenic activities contribute to deteriorating water quality, leading to increased water pollution incidents. Major sources of water pollution include domestic, municipal, and industrial waste, which decomposes over time, contaminating ecosystems like the biosphere, lithosphere, and hydrosphere. Water pollution is also caused by dangerous compounds from sectors including mining, petrochemicals, pharmaceuticals, textiles, and petrochemicals, which pose serious health risks to people and aquatic life (Saravanan et al., 2021).

Air pollution from energy production and consumption is a worldwide and localized concern that contributes to global warming, the well-being of humans, the welfare of ecosystems, and sustainable development. The energy sector accounts for 75% of total worldwide GHG emissions, 66% of NOx emissions, and the majority of particulate matter emissions. The terrain also influences the generation and dispersion of air pollution, which is impacted by elements such as energy consumption, economic activity intensity, and meteorological circumstances (Wang et al., 2019).

As the primary source of noise pollution, aircraft noise has a substantial influence on aviation operations, producing public resistance as well as physiological and behavioral repercussions, particularly in susceptible social groups. With welfare levels rising, people living close to airports get increasingly attuned to environmental issues, which causes them to worry more and more about their well-being, health, and standard of living. In order to control and reduce aircraft noise, actions such as noise quotas and taxation, a total noise framework, noise limitation, and decreased overall noise protocols are needed. Penalties, taxation on pilots and airline operators, and economic metrics like noise taxes and charges can all be used to assess value (Ekici et al., 2022).

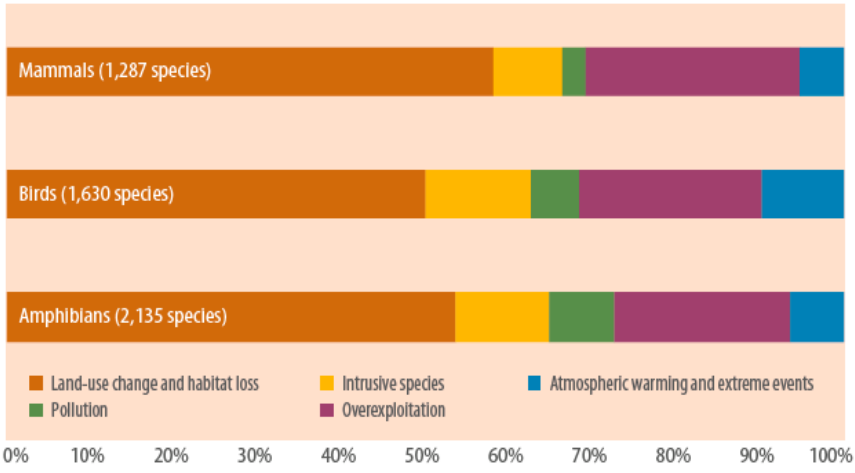
Growing resource depletion and waste production as a result of global economic growth constitute a severe threat to the environment and human health. Effective waste management is crucial for sustainable development and limiting the depletion of resources. Despite the fact that solid trash is a significant source of energy production, electronic waste (or “e-waste”) is a growing issue. Proper disposal techniques are essential to avoiding any negative impacts. E-waste is any device or piece of equipment that is powered by electricity or batteries, including laptops, portable computers, TVs, cellphones, digital audio and video discs, and many more. E-waste is one of the fastest-growing forms of pollution in the world. Recycling, reusing materials, genuine methods, and limited manufacturing are the main goals of waste management techniques (Zhang et al., 2022).

1.3.3. Biologic Diversity Loss

The notion of biodiversity highlights the key difficulties in achieving sustainable development. The fact that terms like biodiversity are frequently used to mean species, however, highlights their double-edged nature. Complicated economic, ethical, and societal challenges that might not be in line with sustainable viewpoints are factors that contribute to the loss of biodiversity. It is difficult to deal with the issue's worldwide scope, especially in biodiversity hotspots. Discipline barriers must be crossed in order to integrate complicated data and moral principles and understand resource challenges (Menzel and Bögeholz, 2009).

Three significant international environmental projects working to create a more sustainable society are the Sustainable Development Goals, the New Urban Agenda, and the Paris Agreement. In order to improve ecological values, the built environment must play a key role in reducing the loss of biodiversity. Given that biodiversity loss frequently affects both society and wildlife, a seamless interplay between the built and natural ecosystems is crucial (Opoku, 2019).

Figure 3: Factors That Contribute to Biologic Diversity Loss



Source: UN, 2020.

Land-use change and habitat loss account for more than 50% of biodiversity loss, with overexploitation being a major contributor. Overexploitation is one of the other anthropogenic reasons (UN, 2020). As shown in Figure 3, the remaining

factors are, in order, invasive species, pollution, warming of the atmosphere, and severe occurrences.

1.3.4. Stratospheric Ozone Depletion

The effectiveness with which solar UV light (240 to 320 nm) is absorbed during its transit through the atmosphere is determined by the ozone layer's thickness. Since it indicates the entire quantity of ozone in an air column running from the ground to the atmosphere's uppermost layer, this thickness is known as total column ozone (Bekki and Lefevre, 2009).

Chlorinated and brominated organic chemicals (CFCs), halons (chlorinated and brominated organic compounds), and NOx emissions all contribute to the global environmental problem of ozone, which maintains the stratosphere. UV radiation, skin cancer, and eye impairment can all be brought on by depletion. Ozone depletion is a result of both energy-related and unrelated activities. The 1987 Montreal Protocol tries to lower CFC production, and pledges were made at the 1990 London Conference. Technologies and replacement equipment free of CFCs are starting to emerge, which might result in a complete prohibition. Fair economic burden distribution is essential, particularly in emerging nations. There are ways to reduce NOx emissions and their effects (Dincer, 2000).

1.3.5. Acid Rain

Acid rain occurs from the release of SO_2 and NO_X into the atmosphere from a variety of sources, where they combine with water in the atmosphere to form acids in the raindrops (Sivaramanan, 2015).

Acid rain is a pollutant byproduct of fossil fuel burning, causing harm to ecosystems prone to high acidity. Addressing acid rain and other local air pollutants is crucial. Energy-intensive processes like electric power, heating homes, and industrial consumption contribute to acid rain, with 48% of total NOx emissions coming from the road. Transport equipment also contributes to acid rain, with three-way catalysts reducing pollutants but increasing fuel and greenhouse gas use. Recent approaches to environmental issues include renewable energy technologies, energy efficiency, cogeneration storage, coal cleaning, policy integration, recycling, process change, accelerated forestation, carbon dioxide taxation, material substitutes, public transport advancement, lifestyle changes, public awareness, and training and education (Dincer, 2000).

CHAPTER 2

THE GREEN ECONOMY

Economic development has enhanced people's living standards all across the world. However, economic expansion has come at the price of environmental deterioration (Sadiku et al., 2019). As a consequence of unfavorable antecedents including economic expansion, urbanization, and the worldwide ecological disaster brought on by the consuming culture between the end of the 19th and the first part of the 20th centuries, green thinking has become increasingly popular (Atalay and Akan, 2023).

In this process, with the acceleration of global climate change, several social and political organizations have emerged that attach importance to ecological development and oppose the unlimited use of fossil fuels. Furthermore, existing social and political organizations have become more sensitive to global climate change (Çiloğlu, 2018).

Worldwide catastrophes caused by resource mismanagement across the world have demonstrated to humanity that natural resources are not limitless (Erkan et al., 2013). As a result of this awareness, countries now have only one goal: continuing to develop while also preserving the balance of their natural resources, which will enable them to accomplish their fundamental objectives and produce outcomes that will be sustainable. In short, the view that environmentally friendly development and development policies should be established and implemented has become widespread. All global advancements are dependent on the continuation of life, which is only feasible with the presence and conservation of natural resources.

Furthermore, environmental issues arise as a result of changes in cultures' philosophical and metaphysical beliefs, according to the "Ecological World View". The proponents of this viewpoint contend that in order to solve environmental issues, people need to examine their attitudes, perceptions, emotions, cultural norms, and ways of living that lead to improper relationships with nature and establish a variety of alternatives (Özçağ and Hatunluoğlu, 2015).

Although the notion of the green economy has recently acquired significant worldwide attention, green economic strategies, particularly production and

ecological economic structures, have been studied and evaluated for several years by economists, managers, and academics (Kanianska, 2017).

In recent years, the green economy has included growth, industrial output, and consumption, as well as sustainable economic policies that are not harmful to the environment and are consistent with technological improvements. It may also be referred to as green alternatives to the existing economic paradigm, which has detrimental impacts on society and the environment (Akar, 2019). The green economy aims to explain the efficient use of all wastes produced after consumption, also known as positive externalities, in addition to the efficient use of already available resources. The concept of a green economy also takes into account the need for compensation for any harmful externalities that are produced at the conclusion of the manufacturing process. Among these harmful externalities are primarily the effects on the natural system (Kuşat, 2013).

2.1. Conceptual Framework of the Green Economy

The concept of a green economy left an impression on the conference conducted 20 years after the United Nations Conference on Environment and Development, which was defined by the concept of sustainable development and was held in Rio de Janeiro in 1992. It is a pillar of green policy, challenging conventional wisdom on economic growth and development to reduce human impact on the environment and ensure the sustainability of civilizations and life on Earth (Diniz and Bermann, 2012; Özçağ and Hatunluoğlu, 2015).

The definition of the "green economy" in the literature lacks a widely agreed-upon consensus. It has also been apparent that the notions of sustainability and the green economy are stated together and that they are two distinct ideas that complement one another. Sustainable economic growth by paying attention to the balance of nature is also achieved in line with the Sustainable Development Goals, where development should extend a sustainable increase in economic growth (Albayrak, 2023).

Reyhan (2014) asserted that the concept of the green economy emerged from a historical phenomenon. This phenomenon or event reflects two basic realities that everyone now accepts: First, the ecological crisis that we are starting to feel more and more concretely every day. Later, this ecological crisis stems from the capitalist commodity-growth economy. In another reality, humanity now lives in an irreversible production and consumption society and shapes its future according to this order. The green economy was born from the idea that the ecological crisis should be prevented in order to ensure the continuity of the

current production and consumption order. In other words, it is acknowledged that if the ecological crisis persists, an eventual irreversible economic crisis will be inevitable. Green environmentalists, on the other hand, consider it a serious contradiction to propose a growth ideology that feeds ecological problems as a remedy for ecological crises.

As the green economy phenomenon gains importance, first of all, the concept should be understood and its relationship with sustainable development should be stated. The concepts of green economy and sustainable development are related but different concepts. In terms of development, the concept of "green economy" reveals the phenomenon of "green economic model" as a new terminology in economics. The green economic model is the provision of sustainable development as a result of the use of green economic policies (Tüysüz and Öncel, 2022).

The notion of the green economy, which is an old concept dating back to the 1980s, gained popularity, especially after the 2008 global crisis. The economic stagnation caused by the 2008 global crisis in world economies and high debt levels led countries to seek alternative approaches. In this process, with the increasing concerns about the climate crisis caused by the use of high fossil fuels, the concept of a green economy has come to the fore in order to establish a more sustainable economy and future (Ağcakaya and Kaya, 2022).

According to Atalay and Akan's (2023) point of view, the green economy is based on two pillars at the center of the discussions: the first is the ways to reduce the environmental problems and resource use caused by production and consumption; the second is to increase the welfare level and to maintain the structure and functionality of ecosystems that support economic development. Environmental problems have been ongoing for years, and local solutions are insufficient due to their global scale. The green economy aims to address these issues and promote sustainable development.

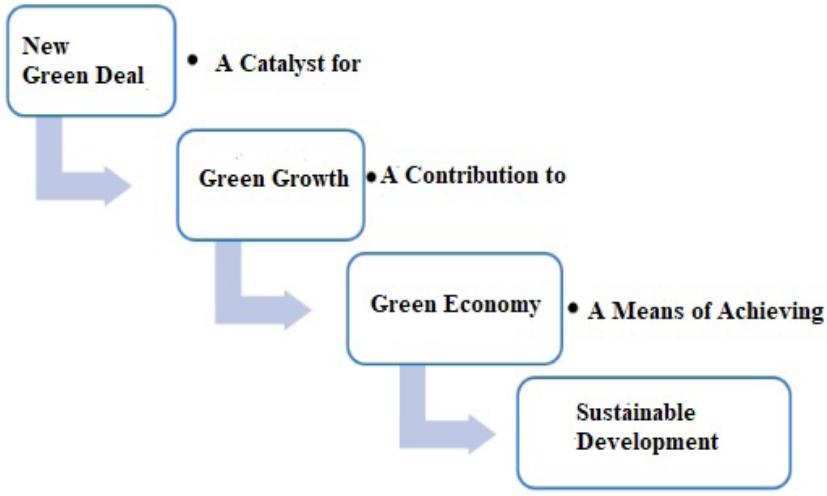
The capacity to generate clean energy is simply one aspect of the green economy. This concept also pertains to the rapidly expanding market for less-energy-intensive products, from energy-efficient lighting to organic and locally grown food, as well as to technological advancements that enable cleaner manufacturing processes (Chapple, 2008).

2.1.1. Definitions of the Green Economy

A green economy is defined by Adamowicz (2022 as an economic system that prioritizes environmentally friendly production, trade, consumption, and

benefit sharing. Al-Taai (2021) defines the green economy as a mechanism for improving human well-being and reducing environmental risks, focusing on sustainable development. Additionally, the green economy is characterized by reduced carbon emissions, efficient resource use, and social participation (Diniz and Bermann, 2012).

Figure 4: The Green Economy's Conceptual Hierarchy



Source: Georgeson et al., 2017; Adamowicz, 2022.

The green economy should coexist with other sustainable development concepts. A clearer hierarchy is defined, as represented schematically in Figure 4. However, these terms are not often used in accordance with this hierarchy (Georgeson et al., 2017). Furthermore, the green economy has been related to several economic theories, ideas, real-world strategies, and evaluation methods, according to Loiseau et al. (2016). To explain these connections and act as a heuristic for the green economy, they created a multi-layered framework. The green economy is closely connected to ecological economics, which is based on cutting-edge ideas such as industrial ecology or the circular economy, and environmental economics, which points out cleaner manufacturing and resource efficiency.

Low-carbon economy is one of the terms frequently used in the literature on the green economy. It is a proven scientific truth that the accumulation

of hazardous gases known as greenhouse gases, particularly carbon dioxide, in the atmosphere produces very catastrophic climatic changes on the planet, which endanger human survival by harming the environment. A low-carbon economy is characterized by activities producing low-carbon products or services resulting from a favorable environmental situation (Sengupta et al., 2019).

2.1.2. Green Deal

According to the European Commission (2019), the European Green Deal seeks to enhance human welfare, make Europe climate-neutral, and save natural ecosystems for the economy and planet. It is a component of the EU's growth plan to make the nation into a successful, just society with a strong economy. The Green Deal, which is a crucial component of the EU's strategy to implement the 2030 Agenda for Sustainable Development, aims to safeguard citizens from adverse environmental effects and advance equitable, inclusive economic policies that put wellbeing first (Fetting, 2020).

Table 4: Eight Key Areas of the Green Deal

- Increasing the EU's climate ambition for 2030 and 2050
- Supplying clean, affordable, secure energy
- Mobilising industry for a clean and circular economy
- Building and renovating in an energy and resource efficient way
- A zero pollution ambition for a toxic-free environment
- Preserving and restoring ecosystems and biodiversity
- Farm to Fork: a fair, healthy and environmentally friendly food system
- Accelerating the shift to sustainable and smart mobility

Source: Fetting, 2020.

The European Green Deal is a political strategy that has been organized into eight key sections with the purpose of addressing numerous policy spheres. It entails updating current laws and guidelines as well as creating new ones. The Green Deal seeks to advance sustainable growth and a more sustainable future. The Green Deal is composed of eight key areas, as shown in Table 4 (Fetting, 2020).

2.1.3. Green Growth

Green growth concerns have served as the driving force behind these initiatives in the green economy. Noticeably, the discourses fostering economic growth, development, innovation, and new economic opportunities within the green economy have been inclusive manifestations of green growth (Öztürk, 2022; Bina, 2013).

According to Allen and Clouth (2012), the Asia-Pacific region is where green growth first originated. 52 nations and stakeholders came to an agreement to support sustainable development and green growth at the Fifth Ministerial Conference on Environment and Development in 2005.

According to Adamowicz (2022), low-carbon development reduces the use of fossil fuels and greenhouse gas emissions, which in turn promotes economic growth and climatic resilience. This strategy emphasizes developing green industries and activities. Different definitions of green growth are given in Table 5 below.

Table 5: Different Definitions of Green Growth

UNESCAP	World Bank	Global Green Growth Institute
growth that emphasizes environmentally sustainable economic progress to foster low carbon, socially inclusive development.	growth that is efficient in its use of natural resources, clean in that it minimizes pollution and environmental impacts, and resilient in that it accounts for natural hazards and the role of environmental management and natural capital in preventing physical disasters.	green growth is the new revolutionary development paradigm that sustains economic growth while at the same time ensuring climatic and environmental sustainability.

Source: Allen and Clouth, 2012.

Green growth is a growth strategy created as a response to climate change, environmental damage, and the scarcity of resources. It provides more efficient use of resources, making them cleaner and more flexible without slowing

down the growth processes. Green growth is now recognized in national and international policies and supported by leading multilateral organizations. Also, green growth assumes that economic growth is capable of disconnecting completely from emissions while still utilizing resources efficiently and avoiding harmful changes in the climate and degradation of the environment (Açcı et al., 2023).

In addition, green growth has important contributions to make to the following issues (GGBP, 2014):

• Green growth boosts efficiency and productivity by utilizing resource-efficient technologies, practices, and innovations, saving resources and money compared to traditional alternatives, and enhancing competitiveness in both the long and short term.

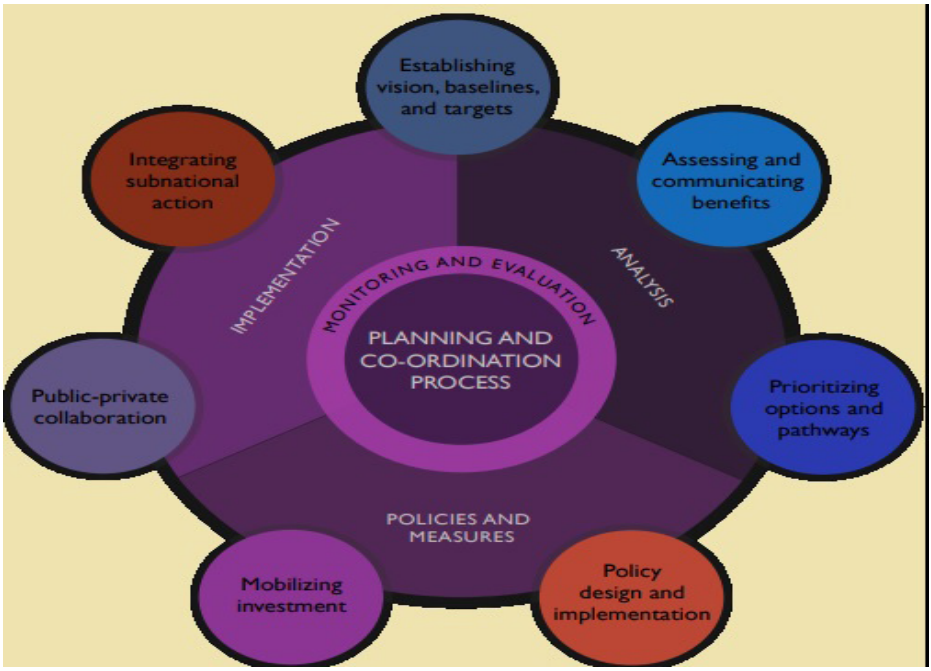
• Green growth influences industrial policies and macroeconomic targets, offering opportunities for developing new industries and markets through increased demand for green technologies and products.

• Green growth enhances society's quality of life, promotes social equality, and protects natural resources. Well-designed policies can reduce environmental degradation, benefiting the poor and those vulnerable to natural resource limits and damage.

As can be seen from Figure 5 below, governments employ nine interrelated components for planning, implementing, and monitoring green growth. These components don't operate in a linear manner, giving governments the option to deploy many aspects concurrently or at various entry points depending on the local environment (GGBP, 2014).

In this context, according to Zhang and Gu (2021, green growth is characterized at both macro and micro levels. For sustainable economic growth and the decrease of environmental problems, macro-green growth involves investments, innovation, and regulatory formulations. While specific advances and incentives may help the environment, it is still unclear how they will affect genuine development in the short run. On the other side, microgreen growth is a corporate development that emphasizes anticipated results in terms of the economy and environment over a certain time frame.

Figure 5: Green Growth Topics



Source: GGBP, 2014.

One of the emerging concepts regarding green growth (Figure 5) in recent years is the concept of "inclusive growth". The concept originated from economists' discussions about the importance of growth in general as well as its type and distribution within a population (IPPR Scotland, 2022).

The Scottish Government highlights that creating opportunity for everyone and equitably dispersing prosperity benefits are all aspects of inclusive growth (Scottish Government, 2015). Table 6 below provides definitions of inclusive growth.

Table 6: Inclusive Growth Definitions

Organisation	Definition
RSA Inclusive Growth Commission	enabling as many people as possible to contribute to and benefit from growth.
European Commission	Inclusive growth means empowering people through high levels of employment, investing in skills, fighting poverty and modernising labour markets, training and social protection systems so as to help people anticipate and manage change, and build a cohesive society.
World Economic Forum	output growth that is sustained over decades, is broad-based across economic sectors, creates productive employment opportunities for a great majority of the country's working age population, and reduces poverty.

Source: Lee, 2018.

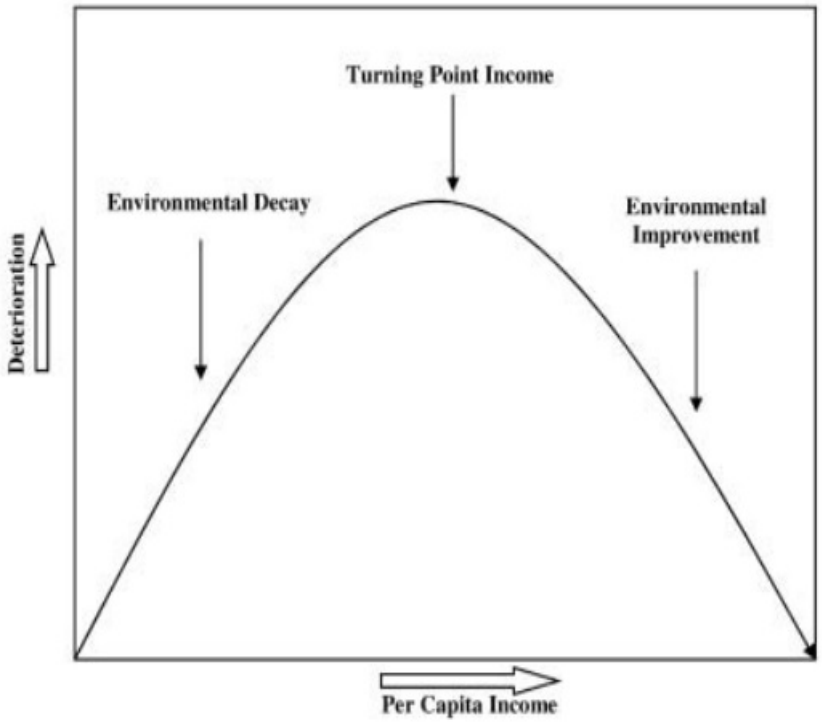
2.1.4. Environmental Kuznets Curve (EKC)

Beginning in the 1980s and becoming increasingly significant in the 1990s, the question of the connection between environmental protection and economic growth has emerged in the present. Studies conducted during this time have generally intended to ascertain the association between level of income and pollution of the environment at various economic development levels (Saraç and Yağlıkara, 2017).

The Environmental Kuznets Curve Hypothesis (EKC) is a method used to interpret the environmental damage of growth among models that relate economic growth to the environment. According to the Kuznets Curve Hypothesis, income increases in direct proportion to growth, and income increases environmental pollution. Therefore, the EKC states that economic growth and initial environmental damage will improve with later stages of growth (Atalay and Akan, 2023). Accordingly, the indicator of environmental impact is "an inverted U-shaped function of per capita income, illustrated in

Figure 6. Typically, the logarithm of the indicator is modeled as a quadratic function of the revenue logarithm" (Dasgupta et al., 2002; Stern, 2003).

Figure 6: Environmental Kuznets Curve



Source: Yandle et al., 2004.

Although the Environmental Kuznets Curve is essentially an empirical phenomenon, the majority of model estimations are not statistically robust (Stern, 2003).

Several models have been developed in the context of the Kuznets Curve. Chen et al. (2019) discuss various models for shifting economic growth away from polluting industrial economies and toward clean service economies. The Green Solow model focuses on reducing emissions through external technological breakthroughs, which result in greater energy and material consumption efficiency. According to the displacement paradigm, developed nations push or outsource polluted companies to developing regions, therefore decreasing environmental responsibilities.

2.1.5. Levels of the Green Economy

As is well known, economics is divided into two categories: macroeconomics and microeconomics. Similar to this, there are two primary categories of the green economy: the macro-green economy and the micro-green economy. A micro-green economy is one that is centered on how an institution interacts with the environment. Additionally, it is a representation of the corporate economy, which considers and assesses how the institution's surroundings are changing qualitatively as well as how environmental regulations affect that environment (Al-Taai, 2021).

Olaleye et al. (2015) highlight how crucial it is for planning authorities to incorporate micro-green economy methods to boost the local economy as well as standards of living. They advise active participation in micro-green economy project design and execution. Urban micro-green economy distribution and upkeep will be improved with the use of an efficient policy framework that allows for cooperative decision-making among all stakeholders. To better coordinate national goals and direct local efforts to offer micro-green economy networks, a more strategic approach is required at the national level.

Microeconomics, which is concerned with particular goods, consumer groups, businesses, and marketplaces, is distinguished from macroeconomics (Eaton and Sheng, 2019). This field of green economics focuses on reducing environmental issues at the national or economic level while also attempting to increase social welfare and take environmental quality preservation into account. The material and monetary assessment of environmental harm caused by public and private sector operations, as well as the assessment of environmental enhancement as a consequence of environmental policy, are covered (Al-Taai, 2021). The macro-green economy is a subsection of the green economy that deals with how sustainability affects overall economic performance, as shown in Table 7 in detail (Ocampo, 2013).

Contrarily, the "mesoeconomic green economy" dimension—which, unlike the distinction between the micro- and macro-green economies, is regarded as the procedures of change in structure that determine all processes of economic growth—is particularly important to understand in order to fully appreciate the challenges of the green economy (Ocampo, 2013).

Table 7: Functions of the Micro and Macro Green Economy

Micro Green Economy	Macro Green Economy
○Analyzing the effects of environmental protection on the organization, its objectives and profit maximization ○Making publications and making recommendations to the established organization in harmony with environmental protection organizations ○To contribute to the direction of production in accordance with the directive and instruction requirements and environmental legislation. ○Researching environmental investments that reduce environmental risks. ○To provide information about environmental protection costs, investment expenditures and the impact of environmental protection on profit and loss accounts and to analyze the environmental feasibility of projects. ○Analyzing environmental problems and future prospects for certain branches of the national economy.	○Environmental damage and environmental protection measures, and the results of those measures at the macro level. ○Developing environmental policy tools, whether local or global, and determining to what extent they can solve the existing problems. ○The impact of environmental protection and its tools on macroeconomic goals, specifically on economic growth and the level of employment. ○The impact of environmental protection and its tools on other policy goals, as the environmental policy affects transport policy, energy policy, commercial political resources... etc

Source: Al-Taai, 2021.

2.1.6. Advantages and Costs of the Green Economy

Major transformations often involve costs and benefits, making systematic analysis crucial for understanding their broad implications (Barbiroli, 2011).

Purkis (2019 claims that both the green economy and growth provide profitable investment prospects for capital owners looking for new lucrative niches. However, it is not population growth that prepares the ground for crises, but the endless growth logic of capitalism. Therefore, ecological crises and endless growth contain contradictions. Endless growth means accelerated consumption in proportion to increased capital accumulation. Given this situation, a green economy may find it difficult to address the ecological catastrophe without questioning established power structures and development ideologies.

The core rationality of the green economy is centered on the sound administration of ecosystem services, both to prevent ecological deterioration and to realize economic development and productivity. In other words, this view suggests that a rational management strategy may resolve the apparent

contradiction between the economy and the environment. Eventually, with the economic policies carried out from a Green Economy perspective, the idea of the sustainability of the current global economic order by transforming capitalism into a "green" color (green capitalism will promote a more sustainable global order (Reyhan, 2014).

Skepticism about the green economy stems from the following factors: (i national states' desire for competitiveness worldwide and geopolitical interests; (ii contemporary political policies, including powerful international organizations' advocacy of free trade; (iii economic structures such as the capitalist market and profit-driven technological growth that do not promote sustainability; (iv prevailing social impulses such as expansion and growing environmental exploitation; and (v relations of power determined by elites seeking to maintain their standing (Brand, 2012).

Table 8: Advantages of the Green Economy

- Development of new production options: new products having new functions suited to maximise their utilisation rate and value, new processes and new forms of industrial symbiosis able to achieve higher and higher levels of global performance and to continuously reduce the unit incidence of the amount and cost for energy and materials in the whole production cycle and, at the same time, the amount of emissions and wastes.
- Development and maturation of new technologies in all fields of activity, giving rise to a wide range of equivalent solutions able to satisfy more appropriately the local and global needs and aims (foodstuffs included).
- Easy, eco-compatible and economic end-of-life of goods (disassembling, recovering, recycling).
- Improvement of enterprises' competitiveness through the qualification achieved with adoption of sustainable management criteria.
- Restoration of original environmental balances.
- Redistribution of wealth between industrialised and non-industrialised countries.
- Great improvement of the quality of life in the sustainable cities, starting from the quality of air, water, living standards, quality and safety of mobility.
- Reduction of mobility time to work and for other personal needs, reduction of transportation costs, increased resource productivity, reduction of pollution connected to new material and energy-intensive, long-life transportation means and increase in safety
- Increase overall resource productivity, and reduce the demand for energy and other natural resources.
- Reduction in fossil fuel dependency
- Improvement in economic growth, productivity and competitiveness
- Accelerated innovation, through correction of market failures in knowledge
- Reduction of environment induced health problems and risks
- Improved access to environmental services and amenities

Source: Barbiroli, 2011; Loiseau et al., 2016.

There are some advantages (shown in Table 8 and costs (shown in Table 9 to a country's transition to the green economy. In fact, the emergence of environmentally compatible economic goods, a high increase in the quality of life in sustainable cities, and a decrease in the demand for energy and other natural resources are the important advantages of the green economy. It is claimed that the green economy, which has evolved to analyze the impacts of production and consumption activities on the environment, may be effective in directing decision-making processes in terms of indicators and in developing economic policies as well as sustainable development indicators. In addition to these benefits, there are some drawbacks as well, such as rising energy and mineral resource prices, rising manufacturing costs and market prices for durable goods, rising unemployment in large-scale enterprises, and falling purchasing power (Özen et al., 2015).

Table 9: Cost of the Green Economy

• High prices for energy and mineral resources. High prices for agro-food and agro-industrial resources.
• High investment costs for the development of new technologies in all fields.
• Production cost and market price increases of durable goods, having sustainable features (functions to increase their use intensity and durability).
• Deep modification of the hierarchy of goods and in branches of economic activity (industry and service sector).
• Reduction of produced volumes by enterprises and of their mission, nature, size and relations. Increased unemployment levels.
• Probable decrease of global and per-capita wealth in industrialised countries. Reduction of average buying power of families.
• Enormous costs for transforming cities and metropolitan areas to achieve sustainable living and working places.
• Enormous investment costs to invent and produce new transportation and accessibility systems that are low material intensive, energy efficient, fast and safe, ecologically sound and economically advantageous

Source: Barbiroli, 2011.

New employment arising from the green economy is a significant advance from both an economic and social standpoint. However, what is essential to remember is that attention is placed on conserving and not destroying natural resources while guaranteeing economic progress. The process of moving toward

a green economy might be characterized as quite challenging. The relatively high initial investment expenditures for the shift to a green economy are not anticipated to be covered, particularly by developing and underdeveloped countries (Yılmaz, 2021).

2.1.7. Objectives of the Green Economy

Countries can achieve economic growth by making unrestricted use of their natural resources. However, as a result of such an economic development paradigm, future generations would inherit a country devoid of both natural resources and natural life. The best way to avert this dire situation is through a green economy (Şahin, 2018).

In order to remove obstacles to the growth of the green economy, Al-Taai (2021) underlines the necessity of changing laws and policies. To promote the sustainability of human and physical growth, this necessitates significant adjustments to business practices and the environment.

The shift to the green economy seeks to combine economic development with environmental sustainability in order to enhance environmental quality and social inclusion. Increased investment and economic expansion are two ways to accomplish this goal. In addition, the aim is to reduce or eliminate harmful externalities between environmental issues and economic progress. Essential economic growth measures, such as gross domestic product indicators, should be adjusted to take into account adverse consequences like resource depletion and ecological degradation (Özçağ and Hatunluoğlu, 2015).

The green economy emerges as a method used to ensure sustainable development. The concept of the green economy refers to both the effective use of existing resources and the waste generated after the resources are used. Therefore, it is aimed at increasing the formation of positive externalities by reducing negative externalities in production with the green economy (Koyuncu and Karabulut, 2021).

Al-Taai (2021) emphasizes the green economy's critical contribution to employment, human resources, and investment, as well as its role in reducing poverty and advancing social equality. This long-term strategy seeks to end crises, achieve economic recovery, and offer all people access to sustainable employment possibilities.

2.1.8. Principles of the Green Economy

It is obvious that if a framework for developing globally applicable indicators is to be created, it must be founded on the general green economy

concepts rather than particular laws and forces (Nahman et al., 2016). In the international literature, many principles are used to evaluate the green economy. These formulated principles emphasize different aspects of the green economy (Vukovic et al., 2018).

A brief list of the top eleven green economy principles is provided in the table below (Rede and Ingle, 2022). In general, most researchers similarly view the green economy as "a way to achieve sustainable development". It can be noted that the two most common principles identified are related to the social dimension, namely, the green economy's need to create jobs and promote good governance through inclusiveness, accountability, and transparency.

Nahman et al. (2016) conducted another study to identify the green economy's guiding concepts and standards. The researchers identified 12 principles and connected the criteria in accordance with them, as shown in Table 10 below.

Table 10: The Green Economy Principles

Principles
The green economy is a means for achieving sustainable development
The green economy measures progress beyond GDP using appropriate indicators/metrics
The green economy respects planetary boundaries, ecological limits and scarcity (absolute decoupling)
The green economy requires good governance (inclusive; democratic; participatory; accountable; transparent; and stable) and uses integrated environmental, social and economic decision-making
The green economy internalises externalities; stimulates green investment and innovation; and incentivises sustainable behaviour and lifestyles
The green economy invests in greening economic activity and infrastructure
The green economy is resource and energy efficient
The green economy is low carbon, low emissions and zero waste
The green economy protects biodiversity and ecosystems
The green economy delivers poverty reduction, well-being, livelihoods, social protection and access to essential services
The green economy should create decent work and green jobs
The green economy is equitable, fair and just between and within countries and between generations

Source: Nahman et al., 2016; UNDESA, 2013; Rede and Ingle, 2022.

2.2. The Green Economy Elements

This subsection examines green jobs, innovation, leadership, products, and marketing as elements of the green economy, attracting researchers' attention in the literature.

2.2.1. Green Jobs

While the green economy strategy attempts to reduce and eliminate threats like climate change, water scarcity, and ecological losses, it also provides the path for the emergence of new occupations and economic activity. The new fields of activity, which are referred to as "brown jobs" and which are expected to replace many occupational groups that pose various risks to the environment, are called "green jobs" (Özçağ and Hatunluoğlu, 2015).

The ILO defines "green jobs" as decent occupations that help to preserve, improve, or restore the environment. These positions are available in both established industries like manufacturing, construction, and agriculture as well as in developing green industries like renewable energy (ILO, 2022).

According to UNEP (2008), "green jobs" are occupations in the agricultural, industrial, building, installation, and maintenance industries that make a substantial contribution to maintaining or improving environmental quality. These positions contribute to preserving ecosystems and biodiversity, cutting down on energy, material, and water use, decarbonizing the economy, and producing the least amount of waste and pollution possible. The labor movement's demands for fair pay, safe places to work, and rights for workers, such as the ability to form unions, must also be met by green jobs.

According to Azazi and Uzma (2022), "green jobs" are ones that promote sustainable development, lessen environmental harm, provide fair working conditions, offer possibilities for professional advancement, and address occupational safety and health.

In addition to this, Özçağ and Hatunluoğlu (2015) asserted that investments in eco-friendly products and services will require the purchase of new machinery and infrastructure, increasing the need for labor and opening up new eco-friendly employment possibilities. Due to relationships across industries, growing industries and entrepreneurs will be the primary drivers of green sector growth. This opens up job prospects in industries that produce inputs for green sectors, including steel, cement, steel manufacturing, insulation materials, and carbon.

Green jobs are decent occupations that help protect or restore the environment in established green industries like efficiency in energy use and renewable energy, as well as growing green industries like manufacturing and construction. The advantages of green jobs are shown in Table 11 below. Another essential definition of a green job is a high-paying occupation that makes a contribution to the protection or enhancement of the environment. Green-collar jobs, like conventional blue-collar jobs, offer prospects for skill and wage growth as well as a spectrum from entry-level, low-skill roles to higher-skill, higher-paying ones (Azazi and Uzma, 2022).

Table 11: The Advantages of Green Jobs

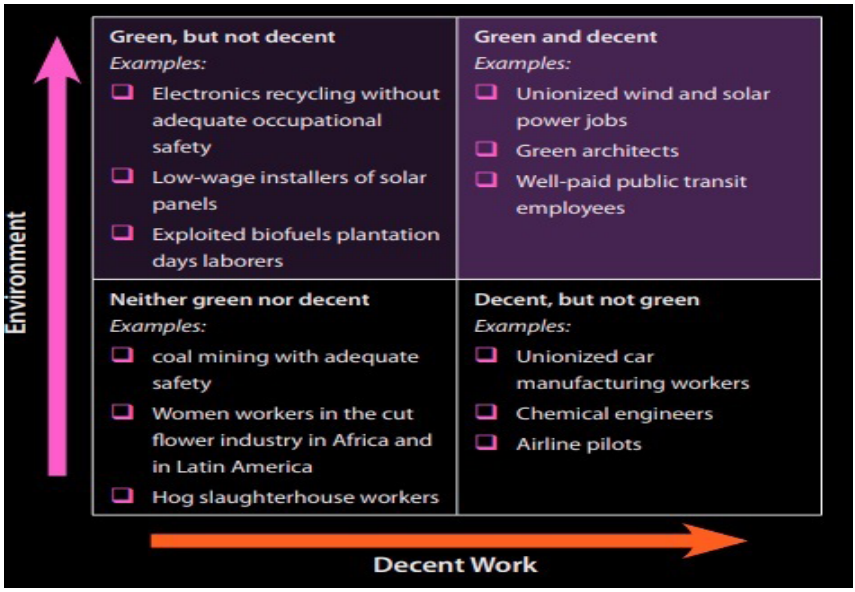
✓Improving the efficient use of energy and raw materials
✓Limiting greenhouse gas emissions
✓Minimizing waste and pollution
✓Protecting and restoring ecosystems and biodiversity
✓Contributing to adaptation to the effects of climate change.

Source: ILO, 2022.

Jobs in the green economy can be found in any of the three "eco-activities" sectors, as well as in ancillary activities and even other industries. They can be divided into two groups (ILO, 2022):

- **Green jobs**: Green jobs are occupations that measure, prevent, regulate, and repair environmental harm via the use of their knowledge and abilities. As a result, they are closely related to sustainability in both the environment and the economy. A national park ranger, a water quality monitoring specialist, and a garbage sorting specialist are a few examples of green jobs.
- **Greening jobs**: These are professions whose purpose is not environmental but which integrate new "skills blocks" to take into account in a significant and quantifiable way the environmental dimension in the business gesture. Some examples: farmer in organic production; lumberjack in eco-managed forests; plumber installing heat pumps; mason in bioclimatic construction.

Figure 7: Green and Decent Jobs



Source: UNEP, 2008.

However, there is a wide variety in the particular kind and quality of occupations all around the world. Despite the aim for a single worldwide standard in the future, this may not be feasible. Even though disparities in earnings and other factors have been accepted as inevitable, certain standards must be maintained. People's means of subsistence, rights, and feelings of respect are directly related to their employment. Equal hope must be offered by the occupations held by both the employer and the environment. A job that is destructive, unfair, or unable to offer a decent wage is not likely to be referred to as green (UNEP, 2008). The distinction between green and decent jobs is detailed in Figure 7 above.

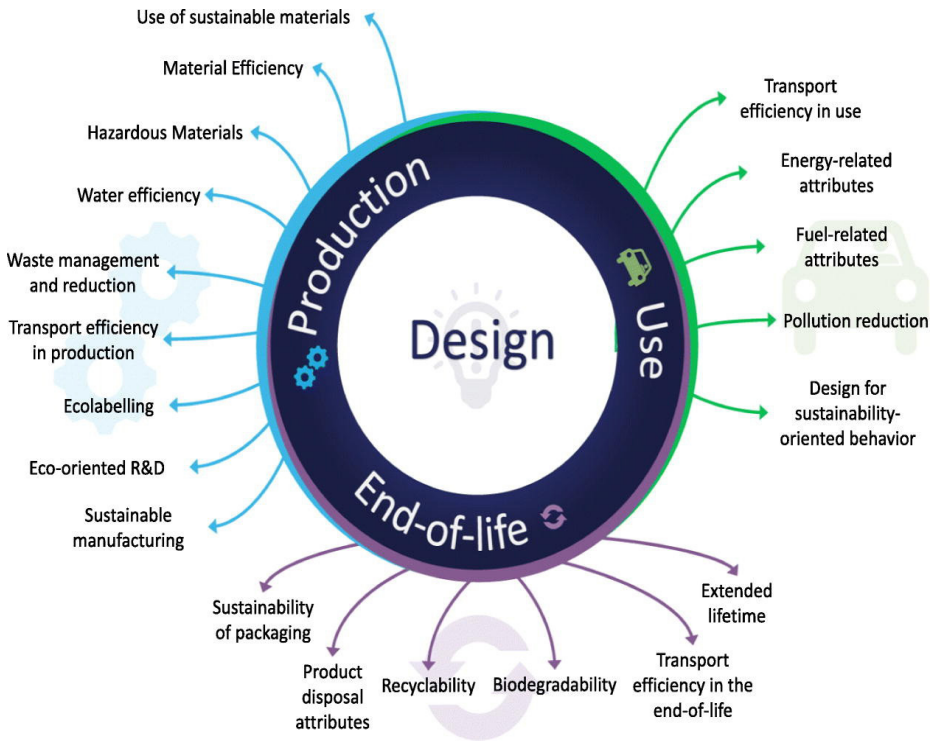
2.2.2. Green Products

Green products minimize environmental impact throughout their life cycle, considering technological and scientific status, ensuring a product's sustainability, and minimizing direct and indirect environmental impacts (Sdrolia and Zarotiadis, 2019).

The green product is considered one of the most important factors contributing to development and growth. Green products are goods and

services purchased by conscious consumers for environmental sustainability and better living standards. In other words, a green product is described as an environmentally sensitive product. Green products can be recycled by reusing harmless materials through decomposition when their use is terminated (Sarıcı and Erikli, 2022).

Figure 8: Green Product Attributes



Source: Marcon et al., 2022.

The lifespan of green product features and how they relate to customer preferences are not yet covered in the literature on green products. Environmentally sustainable qualities are common and connected to production efficiency, as shown by Figure 8 above, which represents the manufacturing life cycle stage. Since these are shown before consumption, consumers are less likely to notice these qualities. During the usage phase, these characteristics are increasingly dependent on customer behavior and technological advancements that limit consumption. End-of-life characteristics are more closely associated

with the post-consumer phase and rely more on outside actors to achieve their worth (Marcon et al., 2022).

2.2.3. Green Marketing

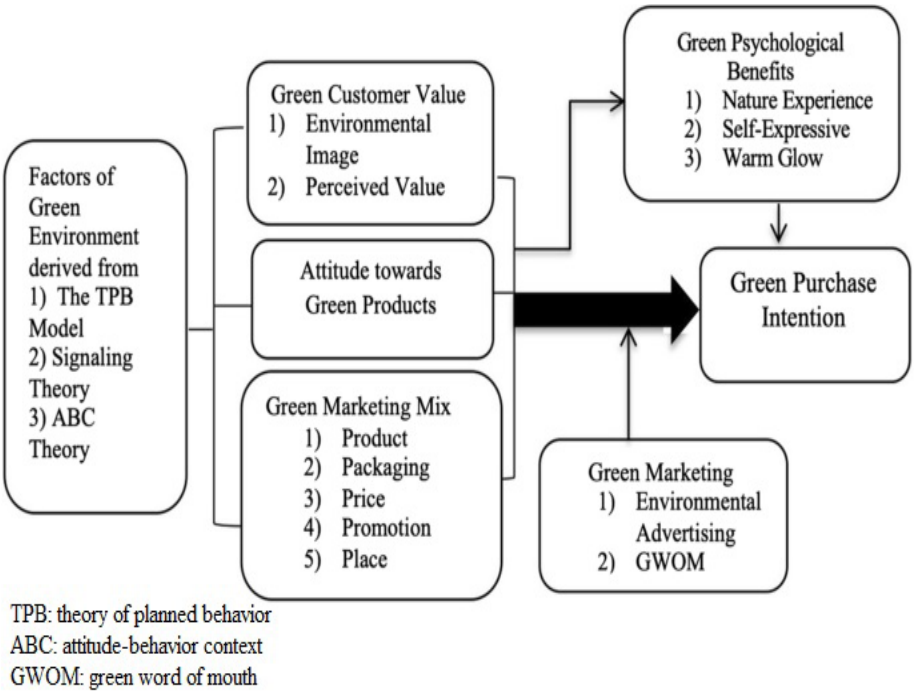
Green marketing is a holistic management process that addresses customers and society's needs in a profitable and sustainable manner. It involves developing and promoting environmentally safe products, minimizing negative effects on the environment, and improving their quality. This approach is supported by Peattie and Charter (2003) and the AMA (2023).

Green marketing involves ecological, environmental, and sustainable phases. Ecological marketing, environmental marketing, and sustainable marketing are the three stages in the development of green marketing. **Environmental marketing** seeks to mitigate environmental damage by leveraging green customer demand and prospects for competitive advantage, whereas **ecological marketing** emphasizes reducing dependency on hazardous products. In order to build a sustainable economy, **sustainable marketing** takes a bold strategy that aims to cover all environmental costs associated with production and consumption (Peattie, 2001). The phrase "sustainable development" became popular in the 1990s and the beginning of the 2000s, and it is defined as satisfying current demands without compromising the capacity of subsequent generations to fulfill their own needs (Surya and Banu, 2014).

Since the 1970s, there has been a growing body of literature devoted to the concept of green marketing. Green marketing, on the other hand, failed to gain popularity until the 1980s, when a rise in environmental awareness sparked a need for greener goods and services. Manufacturers have labeled hundreds of new items as "eco-friendly" in response to consumer demand, stating that these products are compostable, recyclable, and efficient in terms of energy (Kadyan and Kadyan, 2011).

Companies that consider the environment while producing novel and better products and services grow into new markets, boost their capacity to sustain profits via sales, and get an edge against companies that aren't concerned about the environment. Green marketing offers several benefits, including sustained long-term growth, profitability, cost savings, environmental marketing, market access to new markets, competitive advantage, and employee pride in working for environmentally responsible companies. This approach also helps companies gain a competitive advantage and attracts employees who feel proud and responsible for their environmentally friendly practices (Surya and Banu, 2014).

Figure 9: Green Marketing Framework



Source: Ahmed et al., 2023.

Green purchase intention is the resulting variable, whereas green customer value, perspective on green products, and the green marketing mix are employed as independent factors from prior literature. In addition to the direct correlation between the variables, "psychological benefits" is used as a tool, and "green marketing" is used as a moderator in the modified conceptual framework. The conceptual framework thus exemplifies the broad goals, significance, and novelty of this investigation, which first assesses the relationship between the green attitude, the green customer value, the green marketing mix, and the green purchasing, and then discovers the mediation function of psychological advantages (nature experience). The conceptual and theoretical framework is illustrated in Figure 9 below (Ahmed et al., 2023).

2.2.4. Green Innovation

Green innovation has become a crucial strategic tool for the green economy as strict regulations and environmentalalism have transformed competition.

This has resulted in the rise of environmental sustainability approaches and procedures, especially green innovation. Companies are using the green agenda as a catalyst to achieve a business model based on green innovation as consumers increasingly recognize the importance of sustainability (Guinot et al., 2022).

Additionally, interest in green innovation has also increased significantly in the management literature in the last two decades. Product and process innovation are both components of green innovation. It includes advancements in product development and production procedures that conserve energy, cut down on waste, decrease pollution, and lessen an organization's detrimental effects on the environment (Tang et al., 2018).

Green innovation is defined by Chen et al. (2006) as either software or hardware innovation relating to environmentally friendly goods or procedures, with an emphasis on energy conservation, pollution avoidance, recycling of waste, environmentally friendly designs for goods, and corporate management of the environment.

On the other hand, the literature illustrates a number of ideas that include green innovation in addition to sustainable ecological and environmental innovation, with slight differences. In terms of contents, they appear to cover the same ground and are virtually interchangeable. Nevertheless, Table 12 below outlines six key points from several definitions (Schiederig et al., 2011).

Table 12: Six Key Points with Various Definitions

- Innovation object: Product, process, service, method
- Market orientation: Satisfy needs/ be competitive on the market
- Environmental aspect: Reduce negative impact
- Phase: Full life cycle must be considered (for material flow reduction)
- Impulse: Intention for reduction may be economical or ecological
- Level: Setting a new innovation/ green standard to the firm.

Source: Schiederig et al., 2011.

According to Sadiku et al. (2019), assisting developing nations in their efforts to enhance green technology through research and development encourages creativity and technological advancement. Successful inventions are more likely to occur in economies that are experiencing rapid growth.

2.2.5. Green Leadership

Powerful, well-respected, and influential people in leadership positions serve as role models for their staff by acting in a way that promotes the environment and encourages others to do likewise. This inspires them to engage in eco-friendly activities (Khan, 2022).

Green leadership is based on an individual's stance on environmental issues and their capacity to persuade others. It includes environmental policy and employee conduct within a company. In order to ensure that these policies are implemented and supported by the organization's members, a good green leader should encourage member engagement in them. The promotion of sustainable practices and favorable environmental effects depend heavily on green leadership (Jatana, 2023).

According to Ali (2019), "green leadership is an international strategy for protecting the environment that emphasizes resiliency for sustainable development and the mitigation of climate change. Principals must actively participate in programs that emphasize biodiversity while setting an example of green leadership. Green leadership entails leaders encouraging followers to exceed expectations and accomplish environmental objectives, thereby improving the efficiency of the environment (Khan, 2022).

As stated by Gultom (2022), green leadership entails leaders convincing workers and gathering organizations in order to attain long-term ecological sustainability. It focuses on (i) inspiring a common environmental vision, (ii) implementing an environmental management strategy, (iii) developing relationships with stakeholders, and (iv) fostering education about the environment through encouraging employees to participate in environmental managerial tasks.

2.2.6. Green Energy

Energy as a concept and the availability of green, sustainable energy sources have always been major global concerns (Uslu, 2016). The importance of green energy in ecological strategies lies in its impact on businesses in three vital areas: social, economic, and environmental. Coal, natural gas, and oil are all conventional energy sources that power economic growth but also have an effect on the environment and public health (Algburi, 2015).

Green energy is defined by Kalyani et al. (2015) as sources of renewable energy with a low environmental effect and a minor contribution to climate

change. Examples of alternative energy sources that are advertised as having little effect on climate change include geothermal, solar, wind, and hydroelectric power.

According to Most et al. (2020), increasing green energy adoption globally is necessary for achieving sustainability in developed as well as developing countries. Dincer and Rosen (2005) outlined the three primary explanations for employing green energy as a crucial instrument for sustainable development. The following includes:

- Green energy is less detrimental to the environment than traditional energy sources.
- The nature of green energy means that it is an inexhaustible resource.
- For the generation of green energy, as indicated, less time and smaller equipment could be required.

2.3. The Green Economy Policies

Harmonizing economic policies and performance metrics with the goal of sustainable and green development is crucial, as is providing support for pertinent studies by using the best and most effective comprehensive green economy practices as an example and identifying financial mechanisms that are in line with green economy principles.

Through budgets, states shape public revenues and expenditures in line with the goals and targets they set. To guarantee sustainable development, it is crucial to develop budget policies that reflect the green economy and align with green goals. Ensuring the welfare of people while managing limited natural resources with environmentally friendly budgeting is of great importance within the scope of sustainability principles. Eco-friendly budgeting goes by various names, such as green budget, ecological budget, and environmental budget (Ağcakaya and Kaya, 2022).

The green economy approach, in principle, refers to a structuring parallel to all economic policies related to sustainable development (UN, 2010). In accordance with UNEP (2008), government policies are crucial for providing funding for green projects, setting broad goals and standards beyond the time periods common in the business world, presenting facilities that the private sector can't or won't generate, and maintaining equal opportunities for all actors. The policies that the government can implement for the green economy

can be assessed in broad terms as follows (UNEP, 2008; Kuşat, 2013; Yalçın, 2016; Hainnaux and Seegmuller, 2022; UN, 2010; Peters, 2012; Ağcakaya and Kaya, 2022):

Tax Policy and Ecological Tax Reforms: By switching the tax base from "good" to "bad" factors of production, ecological tax changes seek to reduce negative environmental impacts and boost employment. Environmentally-based taxes, incentives, and public expenditures for environmental protection are of great importance within the national-based fiscal policies to be implemented in the transition to a green economy. Taxes used to ensure environmental efficiency are commonly known as "pollution taxes". They attract attention as countervailing taxes levied on businesses that consume the environment by virtue of their economic activity. In order to implement this taxation, a higher tax rate is often levied on those who harm the environment more, and a lower tax rate is typically levied to those who harm it less.

In addition, similar taxes are collected not only from institutions and organizations engaged in economic activity but also from households that consume the environment while continuing their daily lives. Pollution taxes may encourage firms to use less polluting technologies as they will direct them to the least costly production processes. Instead of paying taxes, the firm, which is subject to environmental taxes, can concentrate on initiatives that recycle garbage. Consequently, the execution of environmental protection policies benefits from the imposition of pollution taxes.

Policymakers should take into account that pollution taxes affect people in a heterogeneous way. Implementation of a progressive recycling plan is of great importance when implementing environmental fiscal policies, as poor individuals are more affected. Quantifying the extent to which polluting goods and services are necessary for certain categories of people is important as it shapes the effectiveness and equity impact of such policies.

Getting Prices Right: Pricing products and services fairly, including the elimination of subsidies, the valuation of natural resources, and the imposition of taxes on environmentally harmful items (also known as environmental "bads"), is necessary for the purpose of internalizing externalities, encouraging sustainable consumption, and motivating corporate decisions.

Public Investment: Ensuring that public funds are directed towards the construction of environmentally friendly infrastructure, including energy-efficient building upgrades, public transportation, renewable energy, etc. On the

other hand, restoring, maintaining, and improving the natural capital stock as much as possible.

R&D: Reducing support for fossil fuels and nuclear power while increasing financing for efficiency and renewable energy technology is crucial. With the objective to partially offset private underinvestment in pre-commercial research and development and partially promote funding for important sectors with potentially significant dynamic economies of scale, increase targeted public assistance for R&D on ecologically friendly technology.

Tariff Enforcement and Protections: By lowering or removing import taxes on equipment and capital goods used in environmentally friendly projects and energy, governments may encourage the growth of the green economy. Enterprises can lower their investment costs by taking advantage of tariff breaks and exclusions. In a vast number of developing countries, tariff exemptions and reductions for energy-efficient products and renewable energy technology have been put into place over the last several years. Alternatively, governments might raise import tariffs to shield the market for green energy and energy-efficient products from rival imports.

Emission Trading: In this system, the state imposes a limit on pollution and distributes the right to pollute to companies within these limits. These rights, called emission permits, are set below the current emission level. Permits are traded between companies that have the right to pollute (permi) and companies that need polluting permits.

Carbon Markets: Addressing the current flaws in innovations connected to carbon trading, like the Clean Development Mechanism, and making sure they develop into appropriate and dependable sources of funding for green projects and jobs are crucial policy instruments.

Targets and Mandates: Promoting greener technology, goods, and services—and therefore green employment—requires the best possible use of regulatory powers. This strategy contains goals for the development of renewable energy as well as land use regulations, building rules, and energy efficiency requirements.

Energy Alternatives: In this regard, the importance of creative policies, such as supply regulations that provide access to the power grid at set rates, is crucial in removing obstacles to the growth of renewable energy sources.

Eco-labels: When items are believed to be less harmful to the environment than competing products during the manufacture and usage phases, eco-labels are affixed to them. Adopting eco-labels for all consumer goods is crucial to

ensuring that customers receive access to the information they need to make informed purchases.

Subsidies: Subsidies that can be used to ensure environmental efficiency work in the opposite way of the working principle of pollution taxes. However, they can still be considered an alternative to polluting taxes.

International Aid: In order to succeed, national and multinational development assistance organizations must refocus their efforts on avoiding fossil fuels and massive hydropower projects and toward more environmentally friendly options.

Social Policies: Social policies should be adopted to reconcile the social objectives of the green economy with existing or proposed economic policies.

As a crucial green economy policy, tax policies for various countries are detailed in Table 13.

Table 13: Taxes and Tax Incentives for the Green Economy

Country	Tax Policy
Denmark	The carbon tax has been in place since 1992. Tax incentives are applied in order to set a cap on the carbon dioxide emissions of businesses and to implement similar sustainable practices (e.g., incentive taxes used to encourage energy savings agreements). SO_2 and NOx taxes are applied. A green owner tax is applied to encourage the use of small and eenergy-efficient vehicles. Various water taxes are applied for water consumption.
Germany	Energy taxes are collected from products such as natural gas, gasoline, and diesel. Entrepreneurs and small-scale businesses that generate at least 10 percent of their electricity from renewable energy equipment are entitled to a reduction in taxes on inputs. There is a right to a tax refund on the purchase of equipment for renewable energy sources. In the purchase of a renewable energy source, the purchase price is depreciated gradually over a period of years, and a tax advantage is obtained. It is completely tax-free if electricity is generated only from renewable energy sources.

Sweden	Energy taxes are levied on many fuels used for transportation and heating. Renewable fuels, on the other hand, have reduced tax rates or are completely tax-free. Tax incentives are applied to encourage the production and use of renewable fuels. The energy tax exemption applies to non-commercial generators generating electricity from wind. A vehicle tax calculated based on CO_2 emissions is applied. Polluting activities are taxed.
Spain	A one-time registration tax is collected from the vehicles according to their engine dimensions. The central government and local governments apply taxes and tax penalties related to pollution in all environmental sectors. In order to promote effective water usage, water consumption is taxed based on how much is used as well as the quantity and quality of water released.
England	An environmental tax called the CCL (Climate Change Levy) is collected on electricity, gas, solid fuels, and LPG. When businesses purchase energy-efficient, low- or zero-carbon technology, they can benefit from a capital investment discount. A discounted VAT rate is applied to the supply of energy-efficient materials and assembly processes. There is an annual car tax based on CO_2 emissions and fuel type. There is a vehicle excise tax for vehicles (calculated based on CO_2 per km). The plastic packaging tax applies to plastic packaging containing less than thirty percent recycled plastic
France	Polluting activities such as waste, washing powder, leaching materials, and biofuels are taxed at a rate per pollutant. Municipalities tax drinking water. A discounted VAT is applied to purchases of rainwater recovery systems. Vehicles are taxed according to their CO_2 emissions. Buildings with the Low Energy Consumption label are partially or completely exempt from property tax.

Source: Ağcakaya and Kaya, 2022.

It is more crucial to maintain the green economic process than to initiate it in emerging nations. To achieve this, it is feasible to group what can be done and the steps to be followed under a few headings (Kuşat, 2013):

What to expect from the state:

- Ensuring that environmental problems are no longer a government policy and are accepted as a state policy,
- Providing investment incentives to protect the environment and controlling the effectiveness of these incentives,
- Supporting clusters that respect environmental values: Organizing training programs to raise the awareness of enterprises to gain corporate identity, and thus increasing the importance to be given to the environment,
- Ensuring joint action on the environment with other states.

What to expect from businesses:

- In particular, institutionalized enterprises focus on projects that emphasize environmental values in their social responsibility projects and announce these projects to the public through the media,
- Businesses that come to the forefront with their R&D-oriented studies give priority to studies for innovative activities that take the environment into account,
- Businesses that have completed the institutionalization process support businesses that have not completed this process by supporting all kinds of projects that support the environment.

What to Expect from International Organizations:

- Demonstrating the necessary investment power in order to prevent environmental decisions from being only on paper,
- Increasing the aid of international financial institutions in the form of grants to countries that are truly positive for the environment,
- Ensuring that organizations approaching the sustainability of the environment from different perspectives unite for the same common purpose.

2.4. Measurement of the Green Economy

An indicator is a tool that offers an indication and is frequently utilized to describe a certain condition and/or provide an order of magnitude. Indicators offer data on the historical and current state of a system, highlighting trends and the relationships that cause changes in one component to affect another (UNEP, 2014).

Currently used indices focus on environmental or economic issues, making them insufficient for encompassing all dimensions of the green economy (Al, 2019). Indeed, academics dispute the measurement of gross domestic product (GDP) for failing to account for the detrimental effects of economic activity on the environment and resources of nature (Yalçın, 2016).

According to critics, the gross national/domestic product (GDP/GNP) model ignores environmental and natural resource consequences. New assessment methodologies and sustainability metrics for development and income distribution indicators in the green economy transition are required to support environmental goals. These indicators aid in determining the influence of economic activity on environmental and social well-being (Al, 2019).

2.4.1. Measurement Framework for Green Economy Progress (GEP)

The UNEP's Green Economy Progress Indicators Framework is based on an integrated policymaking approach developed in 2009 (UNEP, 2015). The framework for green economy development indicators has four purposes. The framework for green economy progress indicators aims to (i) assess progress toward the 2030 DGs, (ii) regulate advancements in areas of priority regarding national targets, (iii) present policymakers with instruments to promote greater transparency and develop regulations to promote the shift to an inclusive green economy, and (iv) determine and evaluate green economy initiatives throughout nation-states (PAGE, 2017).

2.4.2. The System of Environmental-Economic Accounting (SEEA)

The 1993 Handbook of National Accounting: Integrated Environmental and Economic Accounting (EEA 1993) and the 2003 Handbook of National Accounting: Integrated Environmental and Economic Accounting are the two versions of the ystem of Environmental-Economic Accounting on which the ystem of Environmental-Economic Accounting Central Framework is based. The framework's objective is to comprehend how the economy and the

environment are related, to define stocks and trends with regard to environmental assets, and to include data describing the links between them in official statistics (Herrero et al., 2019).

2.4.3. The Index of Sustainable Economic Welfare (ISEW)

The Integrated Economic Development Index (IEW) was developed by Daly and Cobb (1989) as an alternative measure for GDP, incorporating other economic variables and factors that aren't taken into account in traditional national accounts, like social and environmental variables (Chelli et al., 2013; Cobb and Daly, 1989).

2.4.4. The Genuine Progress Indicator (GPI)

The Genuine Progress Indicator, developed by the Center for ustainable Economics and the Institute for Policy tudies, is utilized in numerous U states to improve GDP and serve as a more accurate indicator of economic health. The Genuine Progress Indicator is connected to the Index of ustainable Economic Well-Being (IEW). Herrero et al. (2019) asserted that by examining consumer spending, crime costs, environmental damage, and lost leisure time, the index gauges the health of a nation's economy. Durable goods are also included in the equation to take into consideration the value of a nation's public infrastructure.

2.4.5. The Adjusted Net Savings (ANS)

Formerly known as "genuine saving" the term "adjusted net saving" now denotes a broader definition of savings that includes all forms of capital, including human capital, natural capital, social capital, stock of knowledge, and others, all of which have economic worth (Gnegne, 2009). The goal of adjusted net savings is to evaluate the sustainability of an economy using the ideas of extended national accounts. It is determined by increasing the standard savings by the amounts of human capital, environmental capital, and fixed capital (Herrero et al., 2019).

2.4.6. The Green Growth Indicators

Governments that adopt policies aimed at fostering green growth must manage and regulate innovation and investment that foster growth and open up new economic possibilities. The green growth indicators were developed by the

Organization for Economic Cooperation and Development (OECD). The latest edition, the 2017 index, places greater emphasis on the role of policy action, with enriched discussions on environmental taxes and subsidies, technology and innovation, and international financial flows (OECD, 2017; Herrero et al., 2019).

2.4.7. The Yale Environmental Performance Index (EPI)

Yale (Center for Environmental Law and Policy) and Columbia University collaborated to develop the Yale Environmental Performance Index (Herrero et al., 2020). The Yale Environmental Performance Index uses 40 indicators from 11 different issue areas to provide a comprehensive overview of sustainability. It provides a national indication of the proximity of 180 nations to environmental policy objectives by ranking them according to their achievements on climate change, the well-being of the environment, and ecosystem health. The index identifies nations with the best and worst environmental performance and provides helpful advice for those nations pursuing a sustainable future (Wolf et al., 2022).

2.4.8. The Low Carbon Competitiveness Index (LCCI)

The Climate Institute, with assistance from Vivid Economics, analyzes the Low Carbon Competitiveness Index. It was first published in 2009, with the last edition in 2013 (Herrero et al., 2019). According to The Climate Institute and Vivid Economics (2013), low carbon competitiveness refers to a nation's capacity to produce material prosperity for its citizens in a carbon-constrained future. The ability to offer material wealth is improved in nations with increased carbon productivity, as measured by GNP per unit of emissions. Implementing statistical modeling, the Low Carbon Competitiveness indicator integrates numerous factors into a single performance indicator. The index is constructed using 19 factors that are split into three groups (Herrero et al., 2019).

2.4.9. The Global Sustainable Competitiveness Index (GSCI)

The World Economic Forum has been studying the relationship between sustainability and competitiveness since 2011, leading to the Global Sustainable Competitiveness Index (GSCI). This index measures an economy's productivity in terms of environmental management and social sustainability. Based on 109 quantifiable indicators of performance categorized into five sustainable

competitiveness pillars, the GSCI measures global competitiveness. The datasets are assessed on both the indicator's present levels and its most recent developments to indicate both its current state and its potential for improvement (Balkyte and Tvaronaviciene, 2014; Herrero et al., 2019).

2.4.10. The Global Green Economy Index (GGEI)

The organization called Dual Citizen has been calculating the Global Green Economy Index for all countries globally every two years since 2010 and sharing it with the public. It examines the progress in each indicator since 2005 and how each nation is performing now compared to what is required to meet the world's sustainability objectives (Dual Citizen, 2023). This index covers twenty variables in the fields of climate change, industry efficiency, investment, and the environment (Al, 2019; Herrero et al., 2019).

2.4.11. The Human Green Development Index (HGDI)

Twelve indicators that address development's economic, social, and environmental facets comprise the Human Green Development Index (HGDI). Six indicators indicate the sources and the environment, including CO_2 emissions, endangered species, forest area, land protected area, main energy consumption, and PM10 (less than 10 micron-diameter particles). The remaining six indicators cover social and economic aspects, such as individuals under the required energy from food consumption requirements, income, longevity, educational achievement, and access to enhanced sanitization and drinking water infrastructure. The geometric mean of these measurements determines the final value of the HGDI (Jin et al., 2020; Herrero et al., 2019).

2.4.12. The Inclusive Wealth Index (IWI)

The United Nations University (UNU) and the United Nations Environment Program (UNEP) originally developed the Inclusive Wealth Index (IWI) in 2012 with the intention of tracking changes in the global wealth of countries. The index surpasses conventional wealth assessment techniques such as gross domestic product by measuring a nation's human, natural, physical, and social resources (Managi et al., 2023). The inclusive wealth index evaluates each nation's production base in detail to determine how wealthy it is. Beyond the 20 years between 1990 and 2010, this indicator has been generated for 140 different nations (Herrero et al., 2019; Managi et al., 2023).

2.4.13. The Green Economy Index (GEI)

The Green Economy Index (GEI), developed by Nahman et al. (2016), is a 26-item index based on green economic principles and criteria for both developed and developing countries. It helps compare a country's performance over time and against others, allowing for divergence and tracking progress over time. The index aims to identify and address specific areas of concern and track progress over time.

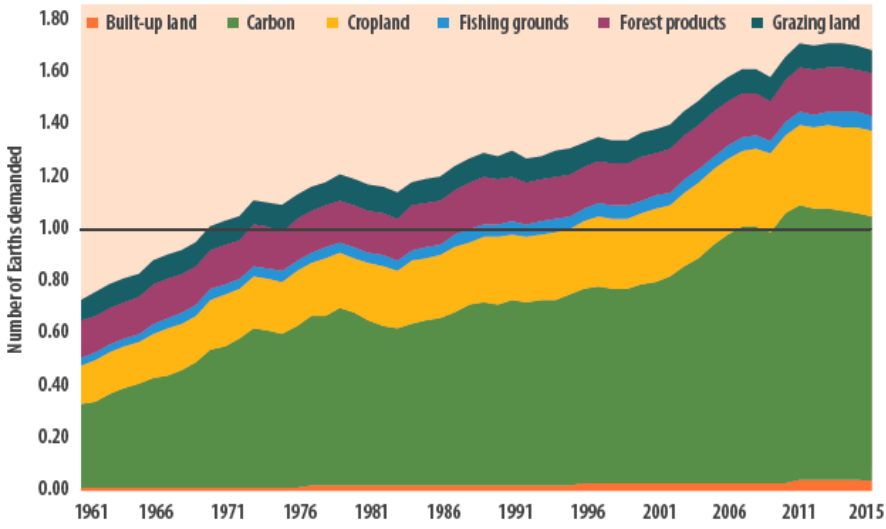
2.4.14. The Extractives Dependence Index (EDI)

The fact that resource-rich countries continue to rely on the sale of oil, minerals, and gas to generate export revenue and pay taxes raises questions about the long-term sustainability of development in those countries. The degree of dependence on materials that are not renewable and their sources must be evaluated in order to identify the most effective diversification policy (Hailu ve Kipgen, 2017). The Extractives Dependence Index is a measure that tracks a country's reliance on resources over time by taking into account the percentage of mine revenues in total export revenues, mine revenues in total financial revenue, and the value added of mine revenue in GDP. The index scores range from zero (extremely low reliance) to 100 (remarkably high reliance) and are comprised of three indicators: (i) the extractive industry's proportion of total export profits; (ii) the extractive industry's part of total fiscal revenue; and (iii) the extractive industry's value contributed to GDP (Hailu ve Kipgen, 2017; Benalcazar et al., 2019).

2.4.15. The Ecological Footprint

The ecological footprint is a metric that assesses the demand for natural resources throughout the world by contrasting consumption with the amount of bioproductive land and ocean space that is currently available. It seeks to demonstrate a possible sustainability threshold overshoot. The ecological footprint is currently used to measure organizational and business performance regarding the environment and sustainability of products. The ecological footprint was originally intended to examine the environmental consequences of nations, people, or communities (Wiedmann and Barrett, 2010). The ecological footprint from 1961 to 2015 can be illustrated in Figure 10 below.

Figure 10: Ecological footprint from 1961 to 2015



Source: (UN, 2020).

Pre-COVID-19 trends in sustainable consumption and production have been contrasting with the goals for SDG 12. This is due to the increasing pressure on land, water, and biodiversity due to increased global material consumption and production volumes. The ecological footprint now exceeds Earth's biophysical capacity by 1.8 times. The composition of consumption and waste has also become more ominous, with plastic production increasing from 1.7 million tons in 1950 to 322 million tons by 2015. Non-biodegradable plastics are contaminating land, air, and water, leading to the spread of islands of plastic floating in the oceans. Animals also ingest plastic debris and microparticles, which enter the human food chain and bloodstream, causing carcinogenic consequences (UN, 2020).

REFERENCES

Açcı, Y., Akarsu, G. and Cafrı, R. (2023). Döngüsel Ekonomi ve Yeşil Büyüme Çerçevesinde Sürdürülebilir Kalkınma Göstergelerinin Ekonomik Büyüme Üzerine Etkisi: Seçilmiş AB Ülkelerinden Ampirik Kanıtlar, *Verimlilik Dergisi, Döngüsel Ekonomi ve Sürdürülebilirlik Özel Sayısı*, 53-67.

Adamowicz, M. (2022). Green Deal, Green Growth and Green Economy as a Means of Support for Attaining the Sustainable Development Goals, *Sustainability*, 14.

Agheli, L., and Taghvaee, V. M. (2022). Political stability effect on environment and weak sustainability in Asian countries, *Sustainability Analytics and Modelin*g, 2.

Ağcakaya, S. and Kaya, I. (2022). Sürdürülebilir Kalkınma ve Yeşil Ekonomi Perspektifinden Yeşil Maliye Politikaları Uygulamaları, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 31(2), 514-527.

Ahmed, R.R., Streimikiene, D., Qadir, H. et al. (2023). Effect of green marketing mix, green customer value, and attitude on green purchase intention: evidence from the USA., *Environ Sci Pollut Res*, 30, 11473–11495.

Akar, S. (2019). Durumsallık Teorisi Açısından Yeni Ekonomi ve Yeşil Ekonomi: Franchising Stratejisi Üzerine Bir İnceleme, *Ekonomi İşletme ve Yönetim Dergisi*, 3(2), 176-207.

Al, İ. (2019). Sürdürülebilir Kalkınma Ve Yeşil Ekonomi: Türkiye İçin Bir Endeks Önerisi, *Hitit Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 12(1), 112-124.

Albayrak, G. (2023). Yeşil Ekonomi Alanında Yazında Yayınlanmış Makalelerin Bibliyometrik Analizi, *Dicle Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (32(Dicle Üniversitesi'nin 50. Yılına Özel 50 Makale)), 347-367.

Algburi, S. (2015). Green Energy-An Introduction, In book: *Energy Science and Technology Opportunities and Challenges*, Ed. 1, Stadium Press LLC, USA, Ed. Prasad, R., Shivakumar, Sharma C. U., 316-340.

Ali, W. (2019). Green Leadership as an Emerging Style for Addressing Climate Change Issues in Schools, *Journal of Social Sciences*, 15, 58-68.

Allen, C., and Clouth, S. (2012). *A Guidebook to The Green Economy*, UNDESA.

Alstine V. J., Afionis, S., and Doran, P. (2013). The UN Conference on Sustainable Development (Rio+ 20): A sign of the times or 'ecology as spectacle'?, *Environmental Politics*, 22(2), 333-338.

Al-Taai, S. (2021). Green economy and sustainable development. *IOP Conference Series: Earth and Environmental Science*. 779.

AMA (2023). *Green Marketing*, https://www.ama.org/.

Ansari, M. A. (2022). Re-visiting the Environmental Kuznets curve for ASEAN: A comparison between ecological footprint and carbon dioxide emissions, *Renewable and Sustainable Energy Reviews*, 168, 112867.

Atalay Çay A, Akan Y. (2023). The Validity of the Environmental Kuznets Curve Hypothesis on Green Economy Indicators of OECD Countries, *Trends in Business and Economics*, 37(1), 57-67.

Azazi, H. and Uzma, O. (2022). Türkiye'de Yeşil Ekonomi, Yeşil İşler ve Yeşil İstihdam, *Biga İktisadi ve İdari Bilimler Fakültesi Dergisi*, 3(2), 93-100.

Balkyte, A. and Tvaronaviciene, M. (2014). Composing Sustainable Competitiveness Index: Practice And Discussions, *Conference: The 8th International Scientific Conference "Business and Management 2014*.

Barbiroli, G. (2011). Economic consequences of the transition process toward green and sustainable economies: Costs and advantages, *International Journal of Sustainable Development and World Ecology*, 18, 17-27.

Bebbington, J. (2001, June). Sustainable development: a review of the international development, business and accounting literature. *In Accounting Forum* (Vol. 25, No. 2, pp. 128-157). Taylor & Francis.

Bekki, S., and Lefevre, F. (2009). Stratospheric ozone: History and concepts and interactions with climate, *In EPJ Web of Conferences*, 1, 113-136.

Benalcazar, P., Orozco, L. F., and Kamiński, J. (2019). Resource dependence in Ecuador: An extractives dependence index analysis, *Gospodarka Surowcami Mineralnymi-Mineral Resources Management*, 49-62.

Bergh, van den and Jeroen, C.J.M. (1996). Sustainable Development and Management, *Ecological Economics and Sustainable Development: Theory, Methods and Applications*, 53-79, Cheltenham, U.K., Edward Elgar Publishing.

Bhanojirao, V. V. (1991). Human development report 1990: review and assessment, *World Developmen*t, 19(10), 1451-1460.

Biely, K., Maes, D., and Van Passel, S. (2018). The idea of weak sustainability is illegitimate. Environment, *Development and Sustainability*, 20, 223-232.

Bina, O. (2013). The Green Economy and Sustainable Development: An Uneasy Balance?, *Environment and Planning C: Politics and Space*, 31(6), 1023-1047.

Blowers, A., Boersema, J., and Martin, A. (2012). Is sustainable development sustainable?, *Journal of Integrative Environmental Sciences*, 9(1), 1-8.

Böhringer, C. (2003). The Kyoto protocol: a review and perspectives, *Oxford Review of Economic Policy*, 19(3), 451-466.

Böhringer, C. and Vogt, C. (2003). Economic and environmental impacts of the Kyoto Protocol, *Canadian Journal of Economics/Revue canadienne d'*économique, 36(2), 475-496.

Brand, U. (2012). Green Economy-the Next Oxymoron? No Lessons Learned from Failures of Implementing Sustainable Development. *GAIA-Ecological Perspectives for Science and Society*, 21, 28-32.

Briant Carant, J. (2017). Unheard voices: A critical discourse analysis of the Millennium Development Goals' evolution into the Sustainable Development Goals, *Third World Quarterl*y, 38(1), 16-41.

Bruntland, G. H. (1987). Our Common Future- Call for action. *Environmental Conservation*, 14 (4), 291-294.

Carr, D. L., and Norman, E. S. (2008). Global civil society? The Johannesburg world summit on sustainable development, *Geoforum*, 39(1), 358-371.

Chapple, K. (2008). *Defining the Green Economy: A Primer on Green Economic Development*, University of California Center for Community Innovation.

Chelli, F. M., Ciommi, M. and Gigliarano C. (2013). The Index of Sustainable Economic Welfare: A Comparison of Two Italian Regions, *Procedia - Social and Behavioral Sciences,* 81, 443-448,

Chen, J., Hu, T. E. and Tulder R. (2019). Is the Environmental Kuznets Curve Still Valid: A Perspective of Wicked Problems, *Sustainability*, 11(17).

Chen, Y.S., Lai, S. B. and Wen, C.T. (2006). The Influence of Green Innovation Performance on Corporate Advantage in Taiwan. *J Bus Ethics*, 67, 331-339.

Clémençon, R. (2012). From Rio 1992 to Rio 2012 and beyond: Revisiting the role of trade rules and financial transfers for sustainable development, *The Journal of Environment & Development*, 21(1), 5-14.

Cobb, J. B. and Daly H. E. (1989). *For The Common Good: Redirecting The Economy Towards Community, The Environment, And A Sustainable Future*. Beacon Press, Boston. 482 pp.

Crojethovich Martín, AD and Rescia Perazzo, AJ (2006). Organización y sostenibilidad en un sistema urbano socio-ecológico y complejo, *Revista Internacional de Tecnología, Sostenibilidad y Humanismo*, 1, 103-121.

Çiloğlu, T. (2018). Yeşil Ekonomi ve Küreselleşme: Karşılıklı Etkileşim Ve Dönüşümsel Süreç, İzmir *Katip Çelebi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergis*i, 1 (1), 42-48.

Dasgupta, S., Laplante, B., Wang, H., and Wheeler, D. (2002). Confronting the Environmental Kuznets Curve, *The Journal of Economic Perspectives*, 16(1), 147-168.

Dempsey, N., Bramley, G., Power, S. and Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. *SustainableDevelopment*, *19*(5), 289-300.

Diesendorf, M. (2000). Sustainability and sustainable development, *Sustainability: The Corporate Challenge of the 21st Century*, 2, 19-37.

Dincer, I. (2000). Renewable energy and sustainable development: a crucial review. Renewable and sustainable energy reviews, 4(2), 157-175.

Dincer, I. and Rosen, M.A. (2005). Thermodynamic aspects of renewables and sustainable development, *Renewable and Sustainable Energy Reviews*, 9, 169-189.

Diniz, E. and Bermann, C. (2012). Green Economy and Sustainability, *Estudos Avancados*, 26. 323-329.

Dobrovolska, O. (2018). Contemporary paradigm of sustainable development: the evolution of formation and development. Environmental economics, (9, Iss. 1), 69-82.

Dotsenko, E. Y., Ezdina, N. P., Khasanova, A. S., and Khasanov, M. I. (2021). Modern paradigms of Sustainable Development: Advantages and Disadvantages, *E3S Web of Conferences-EDP Sciences*, 247, 01069.

Doyle, M. W., and Stiglitz, J. E. (2014). Eliminating extreme inequality: A sustainable development goal, 2015–2030, *Ethics & International Affairs*, 28(1), 5-13.

Dual Citizen (2023). *Global Green Economy Index (GGEI)*, https://dualcitizeninc.com/global-green-economy-index/#introduction.

Eaton, D. and Sheng, F. (2019). *Inclusive Green Economy: Policies and Practice*, Dubai, Shanghai: Zayed International Foundation for the Environment & Tongji University.

Ekici, F., Orhan, G., Gümüş, Ö., and Bahce, A. B. (2022). A policy on the externality problem and solution suggestions in air transportation: The environment and sustainability, *Energy*, 258, 124827.

Ekins, P., Simon, S., Deutsch, L., Folke, C. and De Groot, R. (2003). A framework for the practical application of the concepts of critical natural capital and strong sustainability, *Ecological Economics*, 44(2-3), 165-185.

Elkington, J. (2004). Enter the triple bottom line. In A. Henriques & J. Richardson (Eds.), *The triple bottom line: Does it all add up?*, London, England: Earthscan, 1-16.

Elliott, S. R. (2005). Sustainability: an economic perspective, *Resources, Conservation and Recycling*, 44(3), 263-277.

Emas, R. (2015). The concept of sustainable development: definition and defining principles, *Brief for GSDR*-2015, 10-13140.

Erhun, M. O. (2015). A sustainable approach to economic development in Nigeria: a legal perspective, *Journal of Economics and Sustainable Development*, 6(14), 1-6.

Erkan, Ç., Tutar, F., Tutar, E. and Eren, M. V. (2013). Yeşil Ekonomi Ve Turizm, *Organizasyon ve Yönetim Bilimleri Dergisi*, 5(1), 62-72.

European Commission (2019). *What is the European Green Deal?* file:///C:/Users/dgl/Downloads/What_is_the_European_Green_Deal_en.pdf.pdf.

Fetting, C. (2020). *The European Green Deal*, ESDN Report, December 2020, ESDN Office, Vienna.

Franks, T. R. (1996). Managing sustainable development: Definitions, paradigms, and dimensions. *Sustainable Development,* 4(2), 53-60.

Gallopín, G. C. (2003). *A Systems Approach To Sustainability And Sustainable Development*, ECLAC.

Georgeson, L., Maslin, M., and Poessinouw, M. (2017). The global green economy: a review of concepts, definitions, measurement methodologies and their interactions, *Geography and Environment*, 4(1).

GGBP (2014). *Green Growth in Practice Lessons from Country Experiences*, GGBP Publications.

Ghorashi, A. H., and Maranlou, H. (2021). Essential infrastructures and relevant policies for renewable energy developments in oil-rich developing countries: Case of Iran, *Renewable and Sustainable Energy Reviews*, 141, 110839.

Gnegne, Y. (2009). Adjusted net saving and welfare change, *Ecological Economics*, 68, 1127-1139.

Guinot, J., Barghouti, Z. and Chiva, R. (2022). Understanding Green Innovation: A Conceptual Framework, *Sustainability*, 14, 5787. https://doi.org/10.3390/ su14105787

Gultom, M. (2022). Green Leadership as a Model of Effective Leadership in Hospital Management in the New Normal Era, *Int. Res. Crit. Inst.-J. (BIRCI-J.),* 5, 19900-19910.

Gupta, J. and Vegelin, C. (2016). Sustainable development goals and inclusive development. International environmental agreements*: Politics, law and economics*, 16, 433-448.

Gutés, M. C. (1996). The Concept Of Weak Sustainability, *Ecological Economics*, 17(3), 147-156.

Hailu, D. and Kipgen C. (2017). The Extractives Dependence Index (EDI), *Resources Policy*, 51, 251-264.

Hainnaux C. and Seegmuller T. (2022). Pollution versus Inequality: Tradeoffs for Fiscal Policy. *HAL Openscience*.

Hajer, M., Nilsson, M., Raworth, K., Bakker, P., Berkhout, F., De Boer, Y., ... and Kok, M. (2015). Beyond cockpit-ism: Four insights to enhance the transformative potential of the sustainable development goals, *Sustainability*, 7(2), 1651-1660.

Hajian, M. and Kashani, S. J. (2021). Evolution of the concept of sustainability. From Brundtland Report to sustainable development goals. In *Sustainable Resource Management,* Elsevier, 1-24.

Hammer, J. and Pivo, G. (2017). The triple bottom line and sustainable economic development theory and practice, *Economic Development Quarterly*, 31(1), 25-36.

Hediger, W. (1999). Reconciling "weak" and "strong" sustainability, *International Journal of Social Economics*, 26(7/8/9), 1120-1144.

Herrero C., Pineda, J., Villar, A and Zambrano E. (2019). Green economy measurements and indicators. In: Eaton D, Sheng F, editors. *Inclusive Green Economy: Policies and Practice*, Dubai, Shanghai: Zayed International Foundation for the Environment & Tongji University.

Herrero, C., Pineda, J., Villar, A. and Zambrano, E. (2020). Tracking progress towards accessible, green and efficient energy: The Inclusive Green Energy index, *Applied Energy*, 279.

Hicks, J. R. (1939). The foundations of welfare economics. *The economic journal,* 49(196), 696-712.

Hoang, T. C., Black, M. C., Knuteson, S. L., and Roberts, A. P. (2019). Environmental pollution, management, and sustainable development: Strategies for Vietnam and other developing countries. *Environmental management*, 63, 433-436.

Holden, E., Linnerud, K., and Banister, D. (2014). Sustainable development: Our common future revisited, *Global Environmental Change*, 26, 130-139.

Huang, X. and Zhu, W. (2017). Chinese corporations' conception of sustainable development: an innovative view of corpus analysis. *Chinese Management Studies*, 11(1), 180-190.

Hunter, C. (1997). Sustainable tourism as an adaptive paradigm. *Annals of Tourism Rresearch*, 24(4), 850-867.

ILO (2022). *How to work in the green economy? Guide for young people, job seekers and those who support them*, ILO.

IPPR Scotland (2022). *Inclusive Growth: what does it look like?*, https://www.gov.scot/publications/inclusive-growth-look/documents/.

Jabareen, Y. (2008). A new conceptual framework for sustainable development, *Environment, Development And Sustainability*, 10, 179-192.

Jatana, A. (2023). Green Leadership and Environmental Policies Support. *Research Square*.

Jin, H., Qian, X., Chin, T. and Zhang, H. (2020). A Global Assessment of Sustainable Development Based on Modification of the Human Development Index via the Entropy Method, *Sustainability*, *12*, 3251.

Jonas, H. (1984). *The Imperative of Responsibility. In Search of an Ethics for the Technological Age*, University of Chicago Press: Chicago, IL.

Kadyan, J. S. and Kadyan, S. (2011). Green Marketing: Concepts & Applications, *Global Journal of Business Management*, 5, 71-76.

Kalyani, V., Dudy, M. and Pareek, S. (2015). Green Energy: The Need of The World, *Journal of Management Engineering and Information Technology*, 2, 2394-8124.

Kanbur, R., Patel, E., and Stiglitz, J. (2018). Sustainable development goals and measurement of economic and social progress, *For good measure: Advancing research on well-being metrics beyond GDP*, 33.

Kanianska, R. (2017). *Green Growth and Green Economy*. Banská Bystrica.

Keeble, B. R. (1988). The Brundtland report: "Our common future". *Medicine and war,* 4(1), 17-25.

Khan, A. N. (2022). Is green leadership associated with employees' green behavior? Role of green human resource management, *Journal of Environmental Planning and Managemen*t, 66(9), 1962-1982.

Koyuncu T. and Karabulut T. (2021). Türkiye'de Sürdürülebilir Kalkınma Ve Yeşil Ekonomi Açısından Yenilenebilir Enerji: Ampirik Bir Çalışma, *Uluslararası Yönetim İktisat ve İşletme Dergisi*, 17(2), 466-482.

Krueger, R. (2017). Sustainable Development. *The International Encylopedia of Geography*, Edited by Douglas Richardson, Noel Castree, Michael F. Goodchild, Audrey Kobayashi, Weidong Liu, and Richard A. Marston, John Wiley & Sons, Ltd.

Kuhlman, T., and Farrington, J. (2010). What is sustainability?, *Sustainability*, 2(11), 3436-3448.

Kumar, R., Verma, A., Shome, A., Sinha, R., Sinha, S., Jha, P. K., ... and Vara Prasad, P. V. (2021). Impacts of plastic pollution on ecosystem services, sustainable development goals, and need to focus on circular economy and policy interventions, *Sustainability*, 13(17), 9963.

Kuşat, N. (2013). Yeşil Sürdürülebilirlik İçin Yeşil Ekonomi: Avantaj Ve Dezavantajları–Türkiye İncelemesi, *Yaşar Üniversitesi E-Dergisi*, 8(29), 4896-4916.

Lee N. (2018). Inclusive Growth in Cities: a sympathetic critique, *Working paper 25*, LSE International Inequalities Institute

Lehtonen, M. (2004). The environmental–social interface of sustainable development: capabilities, social capital, institutions. *Ecological Economics*, 49(2), 199-214.

Loiseaua, E., Saikku, L., Antikainen, R., Droste, N., Hansjürgens, B., Pitkänen, K., Leskinen, P., Kuikman, P. and Thomsen, M. (2016). Green Economy and related concepts: an overview, *Journal of Cleaner Production*, (139), 361-371.

Managi, S., Bhattacharya A. and Bhattacharya, T. (2023). Inclusive Wealth Index: A Comprehensive Measure of LiFE Towards 'Net Zero'", *T20 Policy Brief*, May 2023.

Marcon A., José L. D. Ribeiro, Maria R. Dangelico, Janine Fleith de Medeiros et al. (2022). Exploring green product attributes and their effect on consumer behaviour: A systematic review, *Sustainable Production and Consumption*, 32, 76-91.

Mazı, F. (2009). Understanding Sustainable Development: Ambiguity and Conflict. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, (23).

Mebratu, D. (1998). Sustainability and sustainable development: historical and conceptual review, *Environmental Impact Assessment Review*, 18(6), 493-520.

Menzel, S. and Bögeholz, S. (2009). The loss of biodiversity as a challenge for sustainable development: How do pupils in Chile and Germany perceive resource dilemmas?, *Research in Science Education*, 39, 429-447.

Most, A. A., Harun, M. B. and Alam, M. (2020). *Green Energy and Sustainable Development*, HAL Open Science, 1-11.

Munasinghe, M. (1993). *Environmental economics and sustainable development (Vol. 3)*, World Bank Publications.

Nahman, A., Mahumani, B.K. and J. de Lange, W. (2016). *Beyond GDP: Towards a Green Economy Index*, Development Southern Africa, DOI: 10.1080/0376835X.2015.1120649

Noble, I. and Scholes, R. J. (2001). Sinks and the Kyoto protocol, *Climate Policy*, 1(1), 5-25.

Ocampo, J. A. (2013). The macro-and mesoeconomics of the green economy. In *Getting Development Right: Structural Transformation, Inclusion, and Sustainability in the Post-Crisis Era* (pp. 153-172). New York: Palgrave Macmillan US.

OECD (2017). *Green Growth Indicators 2017*, OECD Publications

Olaleye D. O., Abegunde A. A. and Ebehikhalu, N. (2015). Prospects and Challenges of Cities Micro Green Economy: A Study of Horticulture Practices in Lagos, Nigeria, *Global Journal of Human-Social Science*, 15.

Opoku, A. (2019). Biodiversity and the built environment: Implications for the Sustainable Development Goals (SDGs), *Resources, conservation and recycling*, 141, 1-7.

Özçağ, Y. D. D. M. and Hotunluoğlu, Y. D. D. H. (2015). Kalkınma Anlayışında Yeni Bir Boyut: Yeşil Ekonomi, *Manisa Celal Bayar Üniversitesi Sosyal Bilimler Dergisi*, 13(2), 303-324.

Özen, A., Şaşmaz, M. Ü. and Bahtiyar, E. (2015). Türkiye'de Yeşil Ekonomi Açısından Yenilenebilir Bir Enerji Kaynağı: Rüzgar Enerjisi, *Karamanoğlu Mehmetbey Üniversitesi Sosyal Ve Ekonomik Araştırmalar Dergisi*, (1), 85-93.

Öztürk, S. P. (2022). The Green Economy and Environmental Upgrading in Turkey: A Situation Analysis, *Journal of Entrepreneurship and Innovation Management*, 11(1), 80-104.

PAGE (2017), *The Green Economy Progress Measurement Framework – Methodology*, PAGE.

Parris, T. M. and Kates, R. W. (2003). Characterizing and measuring sustainable development, *Annual Review of environment and resources*, 28(1), 559-586.

Pawłowski, A. (2008). How many dimensions does sustainable development have?. *Sustainable development*, *16*(2), 81-90.

Pearce, D. W. and Atkinson, G. D. (1993). Capital theory and the measurement of sustainable development: an indicator of "weak" sustainability, *Ecological economics*, 8(2), 103-108.

Pearce, D., Markandya, A. and Barbier, E. B. (1989). *Blueprint for a green economy*. London: Earthscan.

Peattie, K. (2001). Towards sustainability: The third age of green marketing, *The Marketing Review*, 2(2), 129-146.

Peattie, K. and Charter, M. (2003). Green Marketing. In M. J. Baker (Ed.), *e Marketing Book*, Oxford: Butterworth-Heinemann. p. 726-756.

Peters, S. (2012). *The Role of Green Fiscal Mechanisms in Developing Countries: Lessons Learned*, InterAmerican Development Bank Technical Notes.

Pezzey, J. (1992). *Sustainable development concepts*, World Bank, 1(1), 45.

Purkis, S. (2019). Can The Green Economy Be A Solutıon For The Ecologıcal Crısis?, *Ekonomi ve Yönetim Araştırmaları Dergis*i, 8 (2), 1-19.

Rao, D. B. (1998). *World Summit for Social Development*, Discovery Publishing House.

Rawls, J. (1971). A Theory offustice (*Harvard UniversityPress, Cambridge, MA*).

Redclift, M. (1991). The multiple dimensions of sustainable development, *Geography*, 36-42.

Rede G. D. and Ingle S. G (2022). Green Economy: A Review Article, *Agriculture and Food: E-Newsletter*, 4(1) January.

Reyhan, S. A. (2014). Sürdürülebilir Üretim-Tüketim Politikaları Çerçevesinde "Yeşil Ekonomi" Üzerine Bir Değerlendirme, *Memleket Siyaset Yönetim*, 9 (22), 327-347.

Ruggerio, C. A. (2021). Sustainability and sustainable development: A review of principles and definitions, *Science of the Total Environment*, 786, 147481.

Sadiku, M. N. O., Shumon A. and Sarhan, M. M. (2019). Green Growth, *SSRG International Journal of Economics and Management Studies*, 6(2), 82-84.

Saraç, Ş. and Yağlıkara, A. (2017). Environmental Kuznets Curve: The Evidence from BSEC Countries, *Ege Academic Review*, 17(2) , 255-264.

Saravanan, A., Kumar, P. S., Jeevanantham, S., Karishma, S., Tajsabreen, B., Yaashikaa, P. R., and Reshma, B. (2021). Effective water/wastewater treatment

methodologies for toxic pollutants removal: Processes and applications towards sustainable development, *Chemosphere*, 280, 130595.

Sarıcı, R. and Erikli, S. (2022). Yeşil Ürün, Yeşil Ekonomi, Yeşil Üretim ve Sürdürülebilirlik Kapsamında Yapılan Araştırmalara Yönelik İçerik Analizi, *Ankara Hacı Bayram Veli Üniversitesi Turizm Fakültesi Dergisi*, 25 (1), 98-119.

Sathaye, J., Shukla, P. R. and Ravindranath, N. H. (2006). Climate change, sustainable development and India: Global and national concerns, *Current Science*, 314-325.

Sathiendrakumar, R. (2003). Greenhouse emission reduction and sustainable development, *International Journal of Social Economics*, 30(12), 1233-1248.

Schellnhuber, H. J. (1999). 'Earth system'analysis and the second Copernican revolution. *Nature*, 402(Suppl 6761), C19-C23.

Schiederig, T., Tietze, F. and Herstatt, C. (2011). What is green Innovation? A quantitative literature review, *Working Paper*, No. 63, Hamburg University of Technology (TUHH), Institute for Technology and Innovation Management (TIM), Hamburg.

Schullnhuber, H. J. (1998). Earth System Analysis. The Scope of the Challenge. Earth System Analysis: *Integrating Science for Sustainability*, Springer, Berlin.

Scottish Government (2015). *Scotland's Economic Strategy*, https://www.gov.scot/publications/scotlands-economic-strategy/.

Sdrolia, E. and Zarotiadis, G. (2018). A Comprehensıve Revıew For Green Product Term: From Defınıtıon To Evaluatıon, *Journal of Economic Surveys*, 33.

SEI and CEEW, 2022, "Stockholm+50 Unlocking a Better Future", *Stockholm Environment Institute*, https://www.stockholm50.report/summary-for-policymakers.pdf (Accessed at, 25.06.2023)

Semasinghe, W. (2020). Development, what does it really mean?, *Acta Politica*, 49. 51-59.

Sen, A. (1988). *The Concept of Development*, Handbook of development economics, 1, 9-26.

Sengupta, P., Choudhury, B., Mitra, S. and Agrawal, K. (2019). Low Carbon Economy for Sustainable Development, In book: *Reference Module in Materials Science and Materials Engineering*.

Shaw, D. J. (2007). *World summit for social development, 1995. In World Food Security: A History since 1945*, London: Palgrave Macmillan UK, 328-333.

Sivaramanan, S. (2015). Acid rain, causes, effect and control strategies, *Central Environmental Authority*, Battaramulla, 1.

Smoot, L. D. and Baxter, L. L. (2003). Fossil Fuel Power Stations—Coal Utilization. In R. A. Meyers (Ed.), *Encyclopedia of Physical Science and Technology (Third Edition)*, Academic Press, 121–144.

Solow, R.M. (1974), Intergenerational equity and exhaustible resources, Review of Economic Studies, *Symposium on the Economics of Exhaustible Resources*, 29-45.

Solow, R.M. (1986). On the intergenerational allocation of natural resources, *Scandinavian Journal of Economics*, 88(1), 141-149.

Stern, D. I. (2003). The Environmental Kuznets Curve, *International Society for Ecological Economics Internet Encyclopaedia of Ecological Economics*, Department of Economics, Rensselear Polytechnic Institute, USA.

Surya, R., and Banu, P.V. (2014). Introduction to Green Marketing, *SSRG International Journal of Economics and Management Studies*, 1,1-4.

Şahin, D. K. (2018). Yeşil Ekonomi Ve Sürdürülebilir Büyüme İlişkisi: Avrupa Birliği Ülkeleri İçin Ampirik Analiz, *Kafkas Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 9(18), 561-573.

Tang, M., Walsh, G., Lerner, D., Fitza, M. and Li, Q. (2018). Green Innovation, Managerial Concern and Firm Performance: An Empirical Study, *Business Strategy and the Environment*, 27, 39-51.

Teodorescu, A. M. (2012). Links Between The Pillars Of Sustainable Development. Annals of the University of Craiova, *Economic Sciences Series*, 1.

Teodorescu, A. M. (2015). Sustainable development, a multidimensional concept. *Annals-Economy Series*, 82-86.

The Climate Institute and Vivid Economics (2013). *G20 low carbon competitiveness index: 2013 update*, Vivid Economics, London.

Tomislav, K. (2018). The concept of sustainable development: From its beginning to the contemporary issues, *Zagreb International Review of Economics & Business*, 21(1), 67-94.

Tosam, M. J. and Mbih, R. A. (2015). Climate change, health, and sustainable development, *Environment, Development And Sustainability*, 17, 787-800.

Tsalis, T. A., Malamateniou, K. E., Koulouriotis, D. and Nikolaou, I. E. (2020). "New challenges for corporate sustainability reporting: United Nations' 2030 Agenda for sustainable development and the sustainable development

goals". *Corporate Social Responsibility and Environmental Management*, 27(4), 1617-1629.

Turner, R. K. (1993). Sustainable environmental economics and management: principles and practice. *Belhaven Press*.

Tüysüz. Ş. and Öncel, A. (2022). Türkiye'de yeşil ekonomi açısından sürdürülebilir enerji kaynaklarının SWOT analizi, İktisadi İdari ve Siyasal Araştırmalar Dergisi, 7(19), 644-661.

UN (1992). *Earth Summit: Press Summary of Agenda 21*, Department of Public Information, United Nations: New York, NY, USA.

UN (2010). *Progress to date and remaining gaps in the implementation of the outcomes of the major summits in the area of sustainable development, as well as an analysis of the themes of the conference*. Report for the Preparatory Committee for the United Nations Conference on Sustainable Development. New York: United Nations.

UN (2015). *Resolution adopted by the General Assembly on 25 September 2015*, General Assembly, https://documents-dds-ny.un.org/doc/UNDOC/GEN/N15/291/89/PDF/N1529189.pdf?OpenElemen (Accessed at, 27.06.2023)

UN (2020). *Sustainable Development Outlook 2020: Achieving SDGs in the wake of COVID-19: Scenarios for policymakers*, Department of Economics and Social Affairs, https://sdgs.un.org/sites/default/files/2020-07/SDO2020_Book.pdf (Accessed at, 10.06.2023)

UN (2023a). *United Nations Conference on the Human Environment*, 5-16 June 1972, Stockholm, Conferences / Environment and sustainable development,https://www.un.org/en/conferences/environment/stockholm1972 (Accessed at, 25.06.2023)

UN (2023b). *United Nations Conference on Environment and Development*, Rio de Janerio, Brazil, 3-13 June 1992, Conferences /Environment and sustainable development, https://www.un.org/en/conferences/environment/rio1992 (Accessed at, 25.06.2023)

UN (2023c). *Millennium Summit*, 6-8 September 2000, New York, Conferences /Environment and sustainable development, https://www.un.org/en/conferences/environment/newyork2000 (Accessed at, 25.06.2023)

UN (2023d). *World Summit on Sustainable Development*, 26 August-4 September 2002, Johannesburg", Conferences /Environment and sustainable development, https://www.un.org/en/conferences/environment/johannesburg2002 (Accessed at, 25.06.2023)

UN (2023e). *World Summit*, 14-16 September 2005, New York, Conferences /Environment and sustainable development, https://www.un.org/en/conferences/environment/newyork2005 (Accessed at, 25.06.2023)

UN (2023f). *Millennium Development Goals Summit*, September 20-22,2010, Newyork", Conferences /Environment and sustainable development, https://www.un.org/en/conferences/environment/newyork2010 (Accessed at, 25.06.2023)

UN (2023g). *United Nations Conference on Sustainable Development*, 20-22 June 2012, Rio de Janeiro", Conferences /Environment and sustainable development, https://www.un.org/en/conferences/environment/rio2012 (Accessed at, 25.06.2023)

UN (2023h). *United Nations Summit on Sustainable Development*, 25-27 September 2015, New York", Conferences /Environment and sustainable development, https://www.un.org/en/conferences/environment/newyork2015 (Accessed at, 25.06.2023)

UN (2023ı). *SDG Summit 2023,18-19 September 2023, New York*, https://www.un.org/en/conferences/SDGSummit2023 (Accessed at, 25.06.2023)

UN (2023i). *Transforming our world: the 2030 Agenda for Sustainable Development*, Department of Economic and Social Affairs: Sustainable Development, https://sdgs.un.org/2030agenda (Accessed at, 27.06.2023)

UN (2023j). *Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*, https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%202023%20refinement_Eng.pdf (Accessed at, 27.06.2023)

UN (2023k). *Global Sustainable Development Report (GSDR) 2023*, Department of Economic and Social Affairs: Sustainable Development, https://sdgs.un.org/gsdr/gsdr2023 (Accessed at, 27.06.2023)

UN (2023l). *Global Sustainable Development Report (GSDR) 2019*, Department of Economic and Social Affairs: Sustainable Development, https://sdgs.un.org/gsdr/gsdr2019 (Accessed at, 27.06.2023)

UN (2023m). *High-Level Political Forum On Sustainable Development*, Under The Auspices of The General Assembly, 18-19 September 2023, United Nations Headquarters-New York, https://hlpf.un.org/sites/default/files/2023-07/SDG%20Summit%20Programme.pdf?_gl=1*1xz0ap9*_ga*MjA2MTczMDg-zMS4xNjc4MzY1OTkw*_ga_TK9BQL5X7Z*MTY5MDExODQ1MC4xMy-4wLjE2OTAxMTg0NTAuMC4wLjA (Accessed at, 27.06.2023)

UN (2002). *Report of the World Summit on Sustainable Development, Johannesburg; Rio +10*, Retrieved November 4, 2015, from http://www.unmillenniumproject.org/documents/131302_wssd_report_reissued.pdf.

UNCED (1992). *Rio Declaration on Environment and Development 1992*, Retrieved November 3, 2015, from http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm.

UNDESA (2013). *A Guidebook to the Green Economy Issue 2: exploring green economy principles,* UNDESA.

UNDP (1990). *Human Development Report 1990: Concept and Measurement of Human Development*. New York.

UNEP (2008). *Green Jobs: TowardsDecent in a Sustainable, LowCarbon World*, UNEP.

UNEP (2014). *Using Indicators for Green Economy Policymaking*, UNEP.

UNEP (2015). *Indicators for Green Economy Policymaking – A Synthesis Report of Studies in Ghana, Mauritius and Uruguay. Geneva: UN Environment*, UNEP.

UNEP (2021). *Stockholm+50: A Healthy Planet for The Prosperity of All-Our Responsibility, Our Opportunity*, 2-3 June 2022 United Nations Environment Programme, https://wedocs.unep.org/bitstream/handle/20.500.11822/37743/SAP.pdf?sequence=3&isAllowed=y (Accessed at, 25.06.2023)

Uslu, Y. D. (2016). Türkiye'de Yeşil Enerji, *Kastamonu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 12(2 , 384-392.

Vaggi, G. (2018). Towards a Broader Definition of Development. In *Development: The Re-Balancing of Economic Powers,* Cham: Springer International Publishing, 25-49.

Vázquez, S. T. and Andy, S. (2013) Revisiting the Meaning of Development: A Multidimensional Taxonomy of Developing Countries, *The Journal of Development Studies*, 49:12, 1728-1745, DOI: 10.1080/00220388.2013.822071

Vernadsky, V. I. (1991). *Scientific Thought as a Planetary Phenomenon*, Moscow: Nauka. In Russian.

Vollebergh, H. R. and Kemfert, C. (2005). The role of technological change for a sustainable development, *Ecological Economics*, 54(2-3), 133-147.

Vukovic, N., Larionova, V. and Biryulina, V. (2018). The principles of the green economy in the context of agglomeration: evidence from Big Ekaterinburg, *IOP Conference Series: Earth and Environmental Science*.

Wang, X. C., Klemeš, J. J., Dong, X., Fan, W., Xu, Z., Wang, Y., & Varbanov, P. S. (2019). Air pollution terrain nexus: A review considering energy

generation and consumption, *Renewable and Sustainable Energy Reviews*, 105, 71-85.

WB (2015). Bonds for Sustainable Development, *Investor Newsletter*, Available at: https://thedocs.worldbank.org/en/doc/770351529080670295-034002 2018 /original/ Worl dBankInvestorNewsletter.pdf

Wiedmann, T., and Barrett, J. (2010). A review of the ecological footprint indicator—perceptions and methods, *Sustainability*, 2(6), 1645-1693.

Yalçın, A. Z. (2016). Sürdürülebilir Kalkınma İçin Yeşil Ekonomi Düşüncesi Ve Mali Politikalar, Çankırı Karatekin Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 6(1), 749-775.

Yandle, B., Bhattarai, M. and Vijayaraghavan, M. (2004). Environmental Kuznets Curves: A Review of Findings, Methods, and Policy Implications. *PERC*, 2.

Yang, F., Yuan, H. and Yi, N. (2022). Natural resources, environment and the sustainable development, *Urban Climate*, 42, 101111.

Yeni, O. (2014). Sürdürülebilirlik Ve Sürdürülebilir Kalkınma: Bir Yazın Taraması, *Gazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 16 (3), 181-208.

Yılmaz, M. (2021). Akıllı Kent Uygulamalarının Yeşil Ekonomi Açısından Değerlendirilmesi, *Van Yüzüncü Yıl Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 6(12), 228-239.

Zhang, W. and Gu, F. (2021). Towards Micro-Level Green Growth: A Framework to Recognize Corporate Growth Status, Path and Adopt Eco-Innovations, *Sustainability*, 13.

Zhang, Z., Malik, M. Z., Khan, A., Ali, N., Malik, S. and Bilal, M. (2022). Environmental impacts of hazardous waste, and management strategies to reconcile circular economy and eco-sustainability, *Science of The Total Environment*, 807, 150856.

Zhenmin, L. and Espinosa, P. (2019). Tackling climate change to accelerate sustainable development, *Nature Climate Change*, 9(7), 494-496.