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The Kuznets Curve for the Sustainable Environment and Economic Growth- **Greening Growth: Towards Green Economy**

Dr. Mukesh Kumar Mishra

ABSTRACT:

This paper examines different strategies for the protection of the global climate, the environment and Green Growth mechanism for natural resources and scrutinizes the extent to which they meet the transformative requirements of the Paris Climate Agreement and the 2030 Agenda. It analyses the interactions between relevant institutions of global and multi-level environmental governance. It focuses on the legitimacy of respective green mechanisms and their effects on ecosystems and human welfare. It requires that keeping in mind The Kuznets Curves Model Mechanism and reform further to develop the global economic governance system and restructure incentive systems at national level. Crises like COVID-19 show the urgency to promote necessary transformations for our society to survive in the 21st century. It can be a good reminder that in any breakdown, there is always a chance for breakthrough. Pollution and greenhouse gas emissions have fallen across continents as countries try to contain the spread of the new coronavirus. The green economy aims to achieve economic growth and development without an adverse effect on the environment. The environmental Kuznets curve (EKC) hypothesis explains the relationship between economic activity and environmental degradation. Therefore, environmental conservation policies, technological advancement and modern industrial policies are required to make the economic growth of the countries effective in reducing CO₂ emissions. There is need for international collaboration among developing and developed countries for fostering green economy and sustainability. We need green growth because risks to development are rising as growth continues to erode natural capital, through the tools of Sustainable Development.

Keywords; EKC, Sustainable Development, Green Growth, Green Economy,
JEL Codes: Q56, Q57



Figure Source: Deutsches Institut für Entwicklungspolitik (DIE)

1. INTRODUCTION

The Environmental Kuznets Curve is used to graph the idea that as an economy develops, market forces begin to increase and economic inequality decreases. More specifically that as the economy grows, initially the environment suffers but eventually the relationship between the environment and the society improves. The Environmental Kuznets Curve (EKC); i.e. an inverted U-shaped PIR (Pollution Income Relationship), accordingly economic growth has been promoted as a method of improving the environment. However EKC exists for a certain conditions when policy measures are taken.

The environmental Kuznets curve is a hypothesized relationship between various indicators of environmental degradation and income per capita. In the early stages of economic growth degradation and pollution increase, but beyond some level of income per capita (which will vary for different indicators) the trend reverses, so that at high-income levels economic growth leads to environmental improvement. This implies that the environmental impact indicator is an inverted U-shaped function of income per capita. Typically the logarithm of the indicator is modeled as a quadratic function of the logarithm of income¹



The green economy aims to achieve economic growth and development without an adverse effect on the environment. The environmental Kuznets curve (EKC) hypothesis explains the relationship between economic activity and environmental degradation. OECD defined green growth as ‘Fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies’.

¹ *International Society for Ecological Economics*

The World Bank defined green growth as ‘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. And this growth needs to be inclusive.

The EKC hypothesis has been the dominant theory explaining the link between economic growth and environmental degradation since the early 1990s. The EKC hypothesis argues that there is an inverted U-shaped relationship between economic activity and environmental degradation. Degradation and pollution are high in the early stages of economic growth, but, beyond a certain level of income per capita, the trend reverses, so economic growth leads to environmental improvement at high income levels.

Literature review

This section concerns the theoretical literature on the economic hypothesis, developed by Kuznets in 1955, the historical background of the EKC hypothesis and its meaning. The theoretical literature has also discussed international agreements on the environment and Green Economy.

1.1. Theoretical Background

The EKC concept emerged in the early 1990s with Grossman and Krueger’s (1991) pathbreaking study of the potential impacts of NAFTA and Shafik and Bandyopadhyay’s (1992) background study for the 1992 World Development Report. However, the idea that economic growth is necessary in order for environmental quality to be maintained or improved is an essential part of the sustainable development argument promulgated by the World Commission on Environment and Development (1987) in Our Common Future.



Simon Kuznets

Simon Kuznets was born on April 30th, 1901. He received the Sveriges Riksbank Prize in Economic Sciences (which everyone calls the Nobel Prize in Economics) in 1971 "for his empirically founded interpretation of economic growth which has led to new and deepened insight into the economic and social structure and process of development."²

The Environmental Kuznets Curve (EKC) provides an analytical framework to examine how economies deal with environmental issues. It postulates an inverted-U relationship between pollution and economic development; at early stages of development, environmental quality deteriorates as per capita income increases, while at higher levels of development, environmental degradation is seen to decrease as per capita income increases further.

² <https://www.adamsmith.org/blog/simon-kuznets-and-his-curve>

Dasgupta and others (2002), however, point out that the conventional EKC has been challenged by numerous critics: the critics that have taken a negative view claim that the curve will rise to a horizontal line denoting maximum existing pollution levels, as globalization promotes a “race to the bottom” in environmental standards (the scenario of Race to the Bottom), whereas the optimistic critique suggests that the level of the curve drops and shifts to the left as growth generates less pollution in the early stages of industrialization and pollution begins falling at lower income levels (the scenario of Revised EKC). Both of these schools of thought, however, have not been supported with much empirical research.

The EKC is named for Kuznets (1955) who hypothesized income inequality first rises and then falls as economic development proceeds.

What Is EKC?

The environmental patterns has been called Environmental Kuznets Curve (EKC) due to the similarity with the relationship between the level of inequality and per capita income considered by Kuznets (1955) in his presidential address entitled by “Economic Growth and Income Inequality”. He hypothesized an inverted -U- income – inequality relationship that when per capita income increases, the inequality also increase until at a certain point “income turning point” after, the inequality starts to decrease while the per capita income keeps increasing. A resemblance of this theory was noted by Grossman and Kruger (1991) through their empirical study. They tested the validity of the EKC hypothesis and found that there was an inverse-U-shaped relationship between economic growth and environmental degradation. The EKC hypothesis assumes that there exists an Inverse-U-Shaped relationship between economic activities, usually measured in terms of ‘Income per Capita’, and the environmental quality, measured by environmental indicators such as per capita CO2 emission. That is to say, at the first stage of economic growth, environmental degradation would increase with an increase in per capita income, but would begin to decrease as a rise in per capita income passes beyond the income turning point.

As societies become wealthier, concerns shift from economic growth to environmental protection. The environmental Kuznet’s curve (EKC) models this phenomenon. Environmental degradation increases as per capita income increases until a turning point at which the environment improves although per capita income continues to increase.

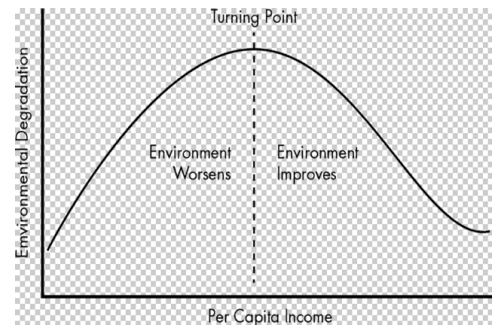
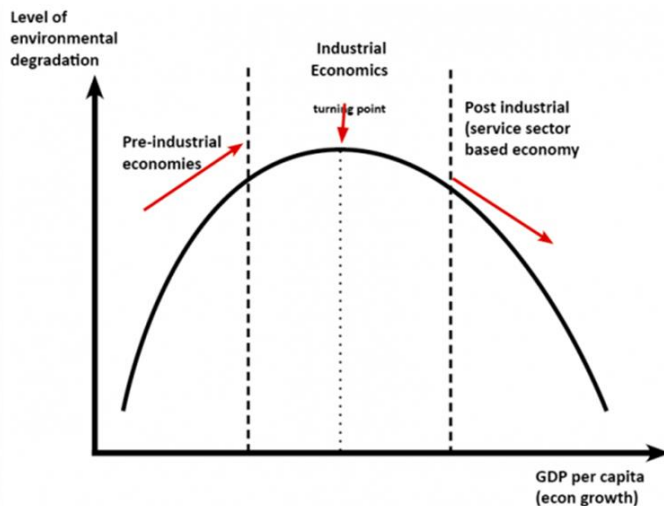


Figure shows the inverse U-shaped graphical representation of the hypothesis. The dependent variable is environmental degradation, which is proxied by any pollutants (air, water and land or soil pollution) or deforestation. The dependent variable is per capita income.

So the EKC hypothesis illustrates that as a country develops its industry, the environmental degradation increases accordingly to it, and start decreasing after reaching a certain level of economic progress (Figure 1). Its implicitly suggests that environmental damage is unavoidable in the first phase of economic development. Panyotou (2003) suggested several reasons for the inversion of pollution patterns. First, the turning point for pollution is the result of more affluent and progressive communities placing greater value on cleaner environment and thus putting into place institutional and noninstitutional measures to affect this. Second, pollution increases, at the early phase of country's industrialization, due to rudimentary, inefficient and pollution generating industries appearing on the industrial arena. When industrialization starts to achieve more advanced levels until it is sufficiently advanced, the pollution will stop increasing anymore. Rather, it will start to take a U-turn. Moreover, service industries will gain prominence causing a further reduction in pollution.

The relationship between economic activities and environmental degradation is not only direct but can also be indirect through trade. According to Sobrinho, some economists believe that free trade brings economic growth and that economic growth, in turn, helps to protect the environment from damage through raised incomes³.

1.2. The Econometric Relationships

Basically, the EKC focuses on the relationship between income and environmental factors. In general form, the EKC hypothesis is formulated as follows

$$E = f(y, y^2, y^3, Z)$$

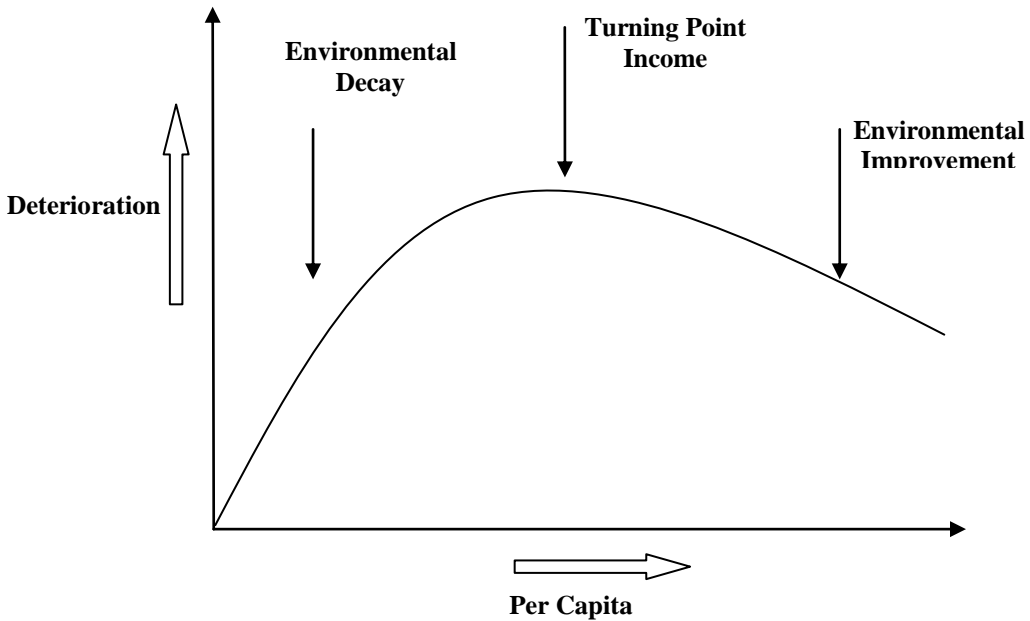
In this formulation, E denotes the environmental indicator, Y denotes income and Z denotes an explanatory variable which is supposed to cause environmental degradation.

The standard EKC model takes the following,

$$z_{it} = \beta_0 + \beta_1 y_{it} + \beta_2 y_{it}^2 + \beta_3 y_{it}^3 + \beta \cdot X_{it} + \varepsilon_{it}$$

Where: emissions per capita z_{it} in locality i , at time t , coefficients β_i , independent variable average GDP per capita y_{it} , other explaining factors X_{it} and error term ε_{it} (Grossman & Krueger, 1995)

³ <https://www.tandfonline.com/doi/full/10.1080/00207233.2019.1695445>

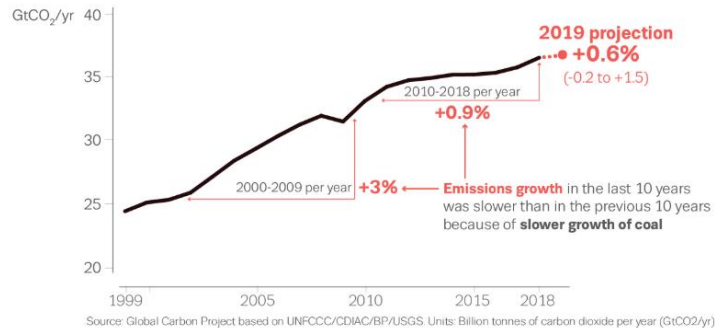


It states that the environment begins to improve with the growth of GDP per capita, as e.g. better technologies start to be used after some level of welfare had been reached. Despite the economic downturn, most of the companies is with staying on the broad trends of "climate change, demographic change, urbanization and globalization.

As IBM Green Horizons Project, is a global initiative to help improve humanity's relationship with the environment, supporting cleaner air and increasing the use of renewable energy.



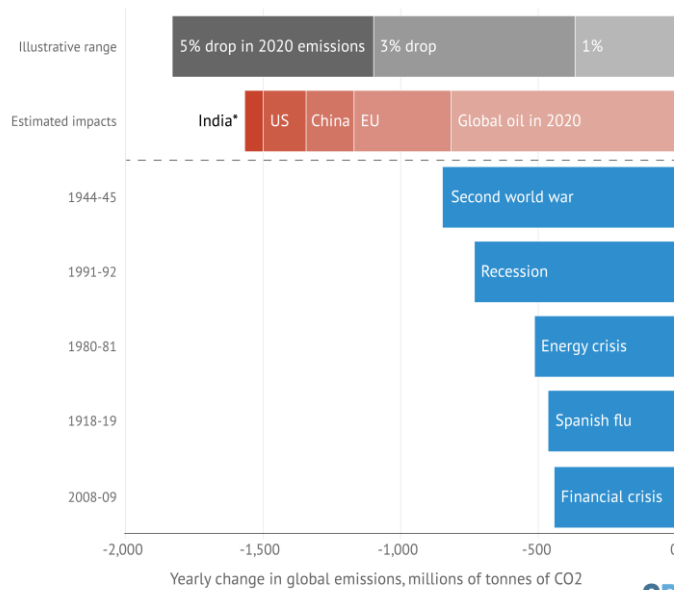
The sustainable use of renewable energy is a key requirement. Companies that are active in this area make an important contribution to the future viability of our planet. 72% of corporations are actively pursuing sustainable operations using clean energy. Corporate energy buyers and sustainability managers are under more pressure than ever to navigate these areas due to customer pressure, risk mitigation against future energy prices and a desire to lower overall energy spend. To achieve these goals, a diversified energy strategy is key for commercial and industrial buyers in today's evolving energy landscape⁴



Climate scientists had warned world governments that global emissions must start dropping by 2020 to avoid the worst impacts of climate change.

Coronavirus could trigger the largest ever annual fall in CO2 emissions

Pre-crisis GDP estimates suggested CO2 would rise by more than 1% in 2020 (470MtCO₂)



Source: Carbon Brief

⁴ Schneider Electric

Accenture's Carbon Reduction Journey

Since setting Accenture's initial carbon target, they have reduced their carbon emissions per employee by more than 52 percent against our 2007 baseline. Hover over the bars in the chart to view a percentage breakdown of our carbon emissions by year. Accenture is largest professional services company to have a goal aligning with the Science Based Targets Initiative. Their target aims to reduce absolute greenhouse gas emissions by 11% against our 2016 baseline by 2025, including a commitment to reduce scope 1 and 2 emissions by 65%, and a 40% per unit of revenue intensity reduction for scope 1, 2 and 3 emissions over the same time period.

Accenture worked with key stakeholders to define the environmental journey. In December 2018, they announced new Science-Based Target, approved by the Science-Based Targets Initiative, to reduce absolute greenhouse emissions 11 percent by 2025 against our 2016 baseline. To meet their target, they will work to develop responsible solutions for further sustainable growth and intensify focus on the efficiency of our business operations. This includes reducing energy use and switching to renewable forms of power, as well as addressing air travel impact and supply chain sustainability⁵

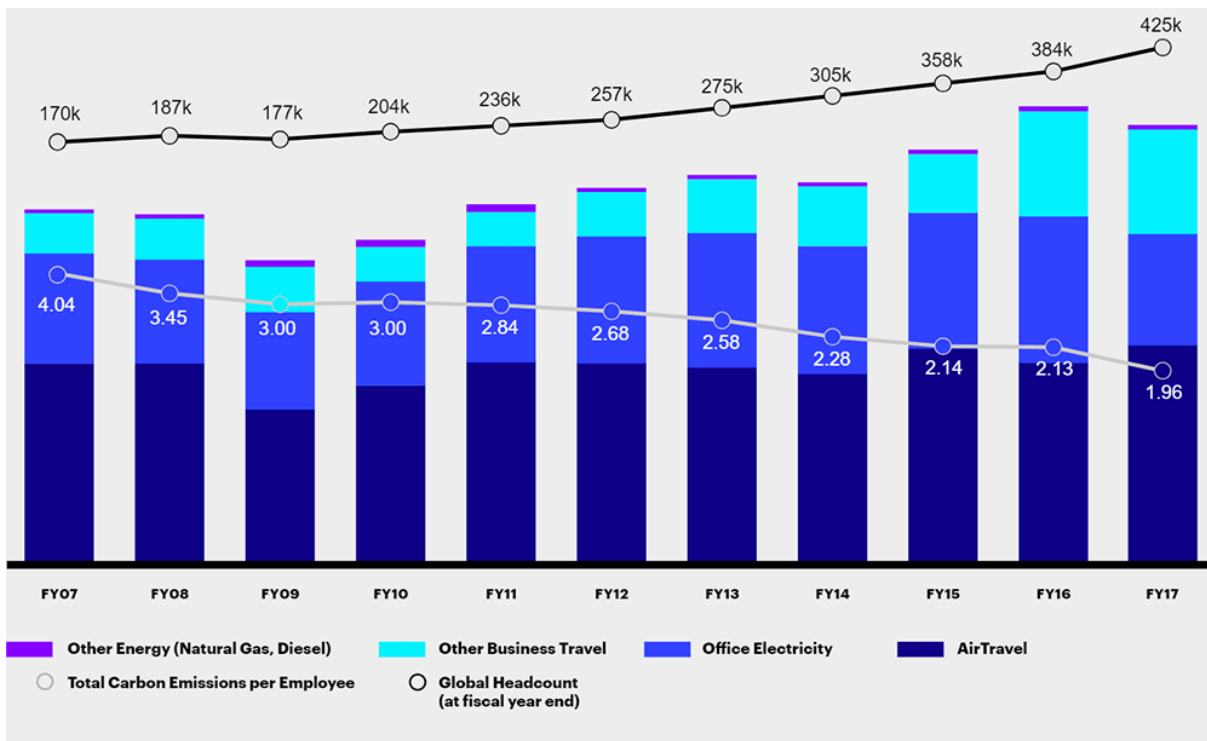


Figure Source: Accenture

⁵ Accenture

2

Sustainable Environment and Economic Growth- **Greening Growth: Towards Green Economy**



Climate change, increasingly scarce and polluted water resources, loss of biodiversity and the degradation of ecosystems and land resources pose risks to humanity as a whole and the poor in particular. A transformation to sustainability is needed to avoid tipping points of the earth system at global and regional levels. In order to prevent environmental disasters of global proportions, we need to radically reduce toxic emissions and consumption of non-renewable resources within the space of a few decades.

There is need for international collaboration among developing and developed countries for fostering green economy and sustainability. Despite of high awareness on climate change, even the developed countries are underperforming with respect to the environmental footprint of their activities. Furthermore, countries having cheap labour tend to attract global investment. The discourse of “green growth” has recently gained ground in environmental governance deliberations and policy proposals. It is presented as a fresh and innovative agenda centered on the deployment of engineering sophistication, managerial acumen, and market mechanisms to redress the environmental and social derelictions of the existing development model⁶. Strategies to achieve greener growth are needed. If we want to make sure that the progress in living standards we have seen these past fifty years does not grind to a halt, we have to find new ways of producing and consuming things, and even redefine what we mean by progress and how we measure it.

The modern economy was created thanks to innovation and thrives on it, and in turn the economy encourages new ways of doing things and the invention of new products. That will continue to be the case. Non-technological changes and innovation such as new business models, work patterns, city planning or transportation arrangements will also be instrumental in driving green growth. No government has all the technological, scientific, financial and other resources needed to implement green growth alone. The challenges are global, and recently we have seen encouraging international efforts to tackle environmental issues collectively, including the path-breaking Cancun agreements to address climate change⁷.

⁶ Green Growth: Political Ideology, Political Economy and the Policy Alternatives, Gareth Dale, Manu V. Mathai, Jose Puppim de Oliveira, 2016

⁷ The OECD Green Growth Strategy

2.1. Green Growth and its need

“Green growth is about fostering economic growth and development while ensuring that the natural assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyze investment and innovation which will underpin sustained growth and give rise to new economic opportunities”⁸. *Towards Green Growth: Monitoring Progress, 2011*



Figure Source: OECD

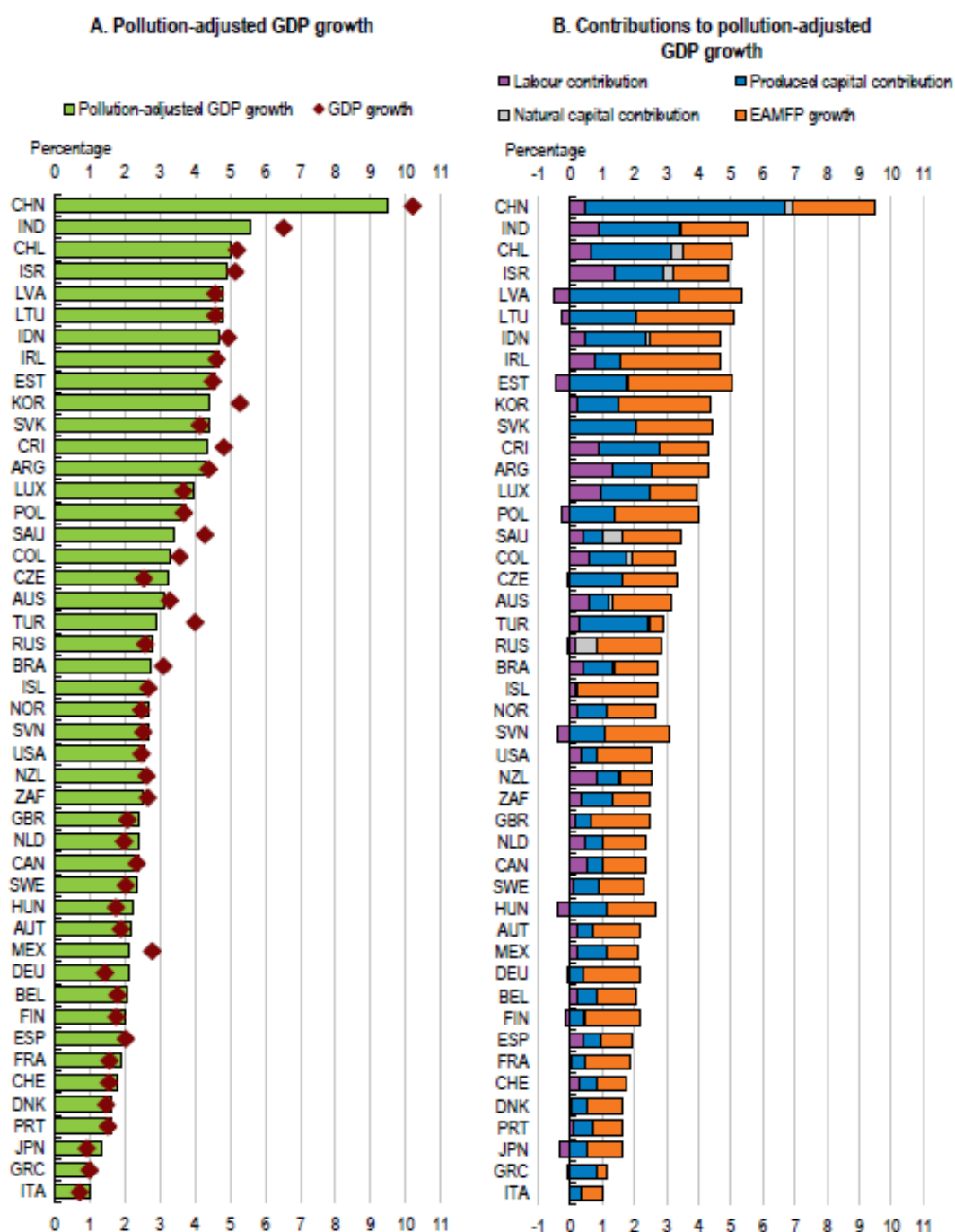
Green growth means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. To do this, it must catalyze investment and innovation which will underpin sustained growth and give rise to new economic opportunities. We need green growth because risks to development are rising as growth continues to erode natural capital. If left unchecked, this would mean increased water scarcity, worsening resource bottlenecks, greater pollution, climate change, and unrecoverable biodiversity loss. Notions of ecological responsibility and business responsibility are more similar than most people think. Both reject waste and profligacy; both embrace the notion of responsible stewardship and investment of assets in order to reap greater returns in the long term. And while there's no question that environmental and economic agendas frequently clash, there is equal room to apply innovation to advance both agendas concurrently⁹.

⁸ OECD

⁹ IBM


Figure 2.1. The sources of growth: accounting for the environment*

Total economy, long-term average growth rates, circa 1991-2013



1. EAMFP stands for environmentally-adjusted multi factor productivity. The coverage of environmental services remains partial, currently limited to subsoil assets on the input side ("natural capital") and air emissions as undesirable output. In panel B, negative values mean that the contribution of natural capital (effectively subsoil asset extraction) to output growth has been decreasing.

Source: OECD (2017), Green Growth Indicators 2017.

StatLink  <http://dx.doi.org/10.1787/888933680210>

A clean and healthy environment is essential for supporting economic activity and well-being in the long-term. Practically every economic and leisure activity – as well as life itself - has broadly-defined environment as a key input and could not exist without it. However, the relationship between the environment and GDP growth per se is more complex. For example, from the above contributions to GDP growth in OECD and large emerging market economies (Argentina, Brazil, Russia, India, Indonesia, China and South Africa) over the past two decades, the main source has been multifactor productivity growth, followed by capital deepening¹⁰. A framework developed at the OECD allows evaluating the sources of growth in a broader sense - adjusting growth outcomes for “bad” outputs air emissions (greenhouse gasses and air pollutants) and calculating the contribution of subsoil asset use – that is, distinguishing to what extent classically measured growth has been higher (lower) due to increased pollution or increased exploitation of natural subsoil assets. Still, the adjustment for emissions is sizeably negative only for China, India, Korea, Costa Rica, Turkey and Mexico, indicating a significant part of growth in these countries was achieved at the expense of the environment. This adjustment is negligible for other countries or even positive in countries where the pollution performance improved. In Russia, Chile, China, Israel, China and Australia a considerable share of GDP growth was owed to increased subsoil resource extraction.

2.2. Sustainable Development and Green Growth

“Sustainable development provides an important context for green growth”.

The 1980s brought recognition of a new dimension to environmental pollution: the degradation of the global commons. The global commons are areas of the planet, such as oceans and the Earth’s atmosphere, which are shared by all the world’s population. Soil erosion, deforestation, and water pollution are more than local problems; they are transnational as well. Not only does the cutting down of forests lead to local soil erosion but also to reduced rainfall caused by deforestation that contributes to regional droughts, as in Saharan Africa, and to global warming. The jury is still out as to whether reduction in our consumption of fossil fuels would significantly slow down the process. Nevertheless none of us would wish by our actions to contaminate the atmosphere in such a way as to risk life on Earth. At the opening of the twenty-first century, climate change and sustainable development have become international priorities¹¹

Sustainable development means that in the interests of its own survival, the human species must not leave a larger footprint on the environment than the ecosystem can successfully accommodate without breaking down.

Sustainable development Theory

Sustainable development theory evolved from the development theory, a concept which did not exist until the 1940s and which found its most enduring expression in W. W. Rostow’s book, *The Stages of Economic Growth: A Non-Communist Manifesto*, published in 1960. Rostow posited that economic growth went through a series of well-defined stages, starting with traditional society through development takeoff, economic maturity, and high consumption. At first the focus of development was on industry and agriculture with the goal of improving living standards. In the late 1970s Paul Streeten and others advocated a focus on basic needs, such as education, sanitation, health care, employment. Growing awareness of the unevenness of the development process, the gap between rich and poor within and between countries, and the realization that development was putting inordinate demands on local

¹⁰ OECD

¹¹ Duncan, W.R. (2000). *World Politics in the 21st Century*, Boston, NY, HMH Publishing Company

ecosystems and the global environment called for a new approach to development. By the mid-1980s scholars were questioning whether Earth's ecosystem would survive the increased strains on its resources, if all nations reached satisfactory levels of GDP by, say, 2050. When the UN World Commission on Environment and Development published its report, *Our Common Future*, it sought to address the problem of competing environmental and developmental goals by formulating a definition of sustainable development. In her forward to the report, Gro Harlem Brundtland, prime minister of Norway and chair of the commission, defined *sustainable development* as development that "meets the needs of the present without compromising the ability of future generation to meet theirs"¹².

While a definitive definition of sustainable development does not exist, a definition has emerged around three important features:

Economic: An economically sustainable system provides goods and services on a continuing basis equitably to all Earth's citizens.

Environmental: An environmentally sustainable system maintains a stable resource base, avoiding both the depletion of nonrenewable resources and the over-exploitation of renewable resource systems. An environmentally sustainable system further ensures the continuation of biodiversity, atmospheric stability, and clean watersheds.

Social: A socially sustainable system ends the imbalance between rich and poor, provides adequate social services, and promotes gender equality, and political accountability and participation¹³

The world economy is undergoing a "paradigm shift" toward sustainability and green technologies, "Growth and jobs in the future will increasingly come from these technologies," "More industrialization and more growth will arise from the current crisis. And the color of this industrialization will be green."

Growth Strategy leverages the substantial body of analysis and policy effort that has flowed from the 1992 Rio Earth Summit. It develops a clear and focused agenda for delivering on a number of Rio's key aspirations. Green growth is a subset of sustainable development, entailing an operational policy agenda that can help achieve concrete, measurable progress at the interface of the economy and the environment. It provides a strong focus on fostering the necessary conditions for innovation, investment and competition that can give rise to new sources of economic growth, consistent with resilient ecosystems. Green growth strategies need to pay specific attention to many of the social issues and equity concerns that can arise as a direct result of greening the economy – both at the national and international level. To achieve this they should be implemented in parallel with initiatives centering on the broader social pillar of sustainable development.

2.3. Some Green Environment of Top Companies (Fostering Green Economy and Green Growth):

All of top organization and industries have a single shared responsibility to protect the environment. Many companies are doing their part by making sustainability goals a priority in their operations.

¹² Duncan, W.R. (2000). *World Politics in the 21st Century*, Boston, NY, HMH Publishing Company

¹³ Johan Holmberg, ed., *Making Development Sustainable: Redefining Institutions Policy and Economics* (International Institute for Environment and Development Washington, D.C.: Island Press, 1992), chap. 1; and David Reed, ed., *Structural Adjustment, the Environment and Sustainable Development* (London: Earthscan Publications, 1996),

IBM and the Green Environment



IBM is committed to environmental leadership in all of its business activities, from its operations to the design of its products and use of its technology. IBM's corporate policy on environmental affairs, first issued in 1971, is supported by the company's global environmental management system, which is the key element of the company's efforts to achieve results consistent with environmental leadership and ensures the company is vigilant in protecting the environment across all of its operations worldwide.

Environmental management in the supply chain



IBM established environmental requirements for its supply chain in 1972 and expanded them over the years. In 2010, IBM announced that all 28,000 of its suppliers were required to implement an environmental and social management system, set environmental goals and disclose their performance. "Our overall interest is to systemize environmental management and sustainability across our global supply chain so it helps our suppliers build their own capability in a way that's not only good for the environment but their business,".

Siemens and the Green Environment



Siemens commitment to this partnership is a sign that the private sector is taking local energy schemes seriously and can help local government to play its part in meeting our ambition of net-zero emissions.



Siemens Partners With UK100 To Develop £100bn Green Energy Pipeline. Siemens has recently announced a new partnership with UK100 (the network of mayors and council leaders) aimed to help bring forward green energy projects worth over £100bn¹⁴

Siemens' EnergyIP Energy Efficiency Analytics

Optimize the energy use through Siemens' EnergyIP Energy Efficiency Analytics (EEA), a cloud-based solution for big data collection, processing, and analytics. Reduce CO2 emissions, boost operations, and strategically approach complex tariffs – regardless of industry. It realizes the additional monetary and CO2 savings through reduced energy and maintenance costs, and Increase process performance through benchmarking and continuous optimization¹⁵.

¹⁴ <https://www.intelligentliving.co/siemens-partners-uk100-develop-100bn-green-energy/>

¹⁵ Siemens

Schneider Electric and green Environment



Schneider Electric has developed an integrated offer of technologies and solutions supporting the transition to a more electric, digital, decarbonized, and decentralized energy. The Group is engaged to invest EUR10 billion in innovations and R&D for sustainable development between 2015 and 2025.

Schneider Electric is committed to carbon neutrality for its sites and its ecosystem by 2030. On its scopes 1 & 2, the Group targets a 53% absolute CO2 reduction by 2050 compared to 2015, and is committed to develop science-based targets by end-2018.

Since 2015, Schneider Electric has been deploying the Schneider ecoDesign Way™. This method allows placing on the market products offering greater maintainability, reparability, capacity for retrofitting, and reprocessing at the end of the life cycle. At the site level, the Group commits towards zero waste to landfill¹⁶.

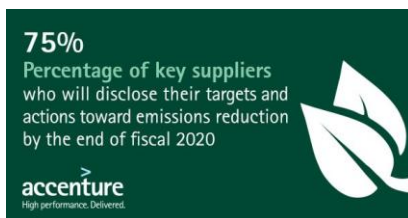
ITC and Green Environment



ITC is the only company in the world of comparable dimensions to be carbon, water and solid waste recycling positive. Committed to creating enduring value for the nation, ITC has created unique business models that seek to synergise the building of economic, environmental and social capital as a unified strategy.

ITC's commitment to sustainability is manifest in the waste management practices implemented in its operations to ensure resource conservation, minimum waste generation and maximum recycling.

Accenture and Green Environment



Accenture worked with key stakeholders to define the environmental journey. In December 2018, they announced new Science-Based Target, approved by the Science-Based Targets Initiative, to reduce absolute greenhouse emissions. Through innovative solutions, advanced analytics and the power of artificial intelligence (AI), Accenture is working with clients to reach their sustainability goals and vision of a greener planet. And they are achieving significant energy savings, too.

The overarching goal of a framework for green growth is to establish incentives or institutions that increase well-being by: improving resource management and boosting productivity; encouraging economic activity to take place where it is of best advantage to society over the long-term; leading to new ways of meeting the above two objectives, i.e. innovation.

¹⁶ Schneider Electric

The Economics of Ecosystems and Biodiversity (TEEB) is a global initiative focused on “making nature’s values visible”. Its principal objective is to mainstream the values of biodiversity and ecosystem services into decision-making at all levels. It aims to achieve this goal by following a structured approach to valuation that helps decision-makers recognize the wide range of benefits provided by ecosystems and biodiversity, demonstrate their values in economic terms and, where appropriate, suggest how to capture those values in decision-making¹⁷.

2.4. Why does Green Economy matter?

A green economy is characterized by low carbon emissions, resource efficiency and social inclusiveness. A green economy stimulates growth and employment through increased public and private investments in renewable energy, which, for example, enhances resource efficiency and prevents environmental degradation. Renewable energy is a strategic policy choice that would contribute to a competitive, innovative and sustainable economy, yielding significant social and environmental benefits. Setting clear and ambitious targets for renewable energy, as well as a proactive regulatory and incentive framework aimed at boosting clean technology investments and adoption, can give rise to new industries, open new market possibilities, stimulate innovation and entrepreneurship, and generate employment¹⁸

The global economy is on an unsustainable path. Since the industrial revolution, the world economy has grown at the expense of the environment. Natural resources have been exploited without allowing stocks to regenerate, pollutants have accumulated in the biosphere, ecosystems have been degraded severely and biodiversity has been lost at an alarming rate. Through product and process innovations, resource efficiency is increasing worldwide. Global warming is the most pronounced threat to human development and the environment. The International Panel on Climate Change predicts that if we continue to manage our economies in the same way, global mean surface temperature will increase by 3.7°C to 4.8°C by 2100 compared to the average for 1850 to 1900 (IPCC 2014). Melting of polar ice and thawing of permafrost soils are two dangerous accelerators of global environmental change. But there are other big threats to the Earth System calling for urgent action including loss of biodiversity, ozone depletion, ocean acidification, water shortage, soil degradation, accumulation of nitrogen in aquatic ecosystems and the accumulation of chemical waste and plastics.

These fundamental threats to humanity need to be taken into account when thinking about further growth and structural change of economies. The way economic transactions are currently organized largely ignores the social cost of resource depletion and pollution. Natural capital embodied in fertile soils, fresh water, clean air and productive ecosystems is being wasted. This waste undermines the basis for future economic development and jeopardizes the progress made on social welfare. Therefore, we need to recognize environmental sustainability as fundamental to the production process.

A green economy is increasingly accepted as a key driver in tackling climate change, poverty, pollution, health and any number of critical goals to improve life for this planet and its people. An inclusive green economy is one that improves human well-being and builds social equity while reducing environmental risks and scarcities. An inclusive green economy is an alternative to today's dominant economic model, which exacerbates inequalities, encourages waste, triggers resource scarcities, and generates widespread threats to the environment and human health.

¹⁷ UNEP

¹⁸ <https://www.weforum.org/agenda/2012/08/creating-a-green-economy-in-tunisia/>

Over the past decade, the concept of the green economy has emerged as a strategic priority for many governments. By transforming their economies into drivers of sustainability, these countries will be primed to take on the major challenges of the 21st century – from urbanization and resource scarcity to climate change and economic volatility¹⁹.

2.5 Greening Growth: Towards Green Economy

Following is the important ways of (fostering) Greening growth towards green economy and green growth have been analyzed with respect to political, social and economic aspects.

Policies play the key role in improving local and global sustainability. Politicians commitment for green economy and green growth: The politicians can establish green growth strategies, and support the green growth as well as green economy with the help of their commitment. Greening the growth path of an economy depends on policy and institutional settings, level of development, resource endowments and particular environmental pressure points. Advanced, emerging, and developing countries face different challenges and opportunities in greening growth, as will countries with differing economic and political circumstances. There are, on the other hand, common considerations that need to be addressed in all settings. And in every case, policy action requires looking across a very wide range of policies, not just traditionally “green” policies.

New technologies may find it hard to compete with existing technologies, establish a place in the market and scale up, in particular in markets such as energy and transport, where existing technologies dominate. Investment in relevant research and temporary support for the development and commercialization of green technologies may be needed in certain cases. Barriers to trade and investment can place a serious brake on the development and diffusion of green technologies. Reducing these barriers and providing effective protection and enforcement of intellectual property rights (IPRs) are essential to encourage the development and diffusion of technologies and the facilitation of foreign direct investment and licensing. Multilateral action will also be needed to facilitate access to green technologies for the least developed countries.

Changing current patterns of growth, consumer habits, technology, and infrastructure is a long term project and we will have to live with the consequences of past decisions for a long time. This “path dependency” is likely to intensify systemic environmental risks even if we were to get policy settings right relatively swiftly. Green growth strategies therefore need to be flexible enough to take advantage of new technologies and unexpected opportunities and be able to abandon one approach if a better one becomes available. Efficient resource use and management is a core goal of economic policy and many fiscal and regulatory interventions that are not normally associated with a “green” agenda will be involved in green growth²⁰

¹⁹ *UNEP*

²⁰ *Towards Green Growth, 2011, OECD.*

CONCLUSION

Climate change, increasingly scarce and polluted water resources, loss of biodiversity and the degradation of ecosystems and land resources pose risks to humanity as a whole and the poor in particular. A transformation to sustainability is needed to avoid tipping points of the earth system at global and regional levels. This paper examines different strategies for the protection of the global climate, the environment and Green Growth mechanism for natural resources and scrutinizes the extent to which they meet the transformative requirements of the Paris Climate Agreement and the 2030 Agenda. It analyses the interactions between relevant institutions of global and multi-level environmental governance. It focuses on the legitimacy of respective green mechanisms and their effects on ecosystems and human welfare.

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Green economy and green growth need to be fostered as both of them are needed for a Sustainable Development. Political, social and economic aspects of sustainability need to be considered for achieving green growth and green economy. In order to prevent environmental disasters of global proportions, we need to radically reduce toxic emissions and consumption of non-renewable resources within the space of a few decades. This poses an enormous challenge to the financial and the real economy. It requires that keeping in mind The Kuznets Curves Model Mechanism and reform further to develop the global economic governance system and restructure incentive systems at national level.

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