Evaluating Sustainable Frameworks and the Interrelationality of the Sustainable Development Goals

Lawrence Stephen Early IV
1Yale University

Abstract

Sustainable development in the 21st century has utilized an array of metrics to evaluate the success of cities and nations in three conventionally defined pillars of sustainability: social, economic and environmental. Inspired by Elkington’s Triple Bottom Line, the success of nations dedicated to sustainable development has been characterized by targets achieved within these pillars, as most recently and cohesively defined by the United Nations Sustainable Development Goals (SDGs). The paper argues that these pillars (a) fail to successfully bridge the gap between sustainable targets and the principles guiding sustainability; (b) engenders the consequence of preferential “weight” being attributed unevenly between the three dimensions; and further that the goal framework (c) exhibits unique interrelationships that, when characterized, may better directly address the aligned challenges. The improvement upon this 3-pillar understanding is paramount to successfully planning sustainable development practices with the aim of long-term impact. This is emphasized by the analysis of the United Nations SDGs, the dominant framework guiding modern sustainable progress. These lines of reasoning will contribute to more successful sustainable development and policy-making.

Background Information

Sustainability and Sustainability Indices

Sustainability has become increasingly important to communities globally, as concern rises over the survival and effectiveness of resources, infrastructure, policies, and economies in the midst of climate change, overconsumption, and an overextended global population. Since its popularization from its policy-based origins in the 1987 Brundtland Report, the term “sustainability” has been cast into a wide scope of meaning, transforming from its prominently eco-environmental focus of development in relation to the environment, to an extended context encompassing three pillars: the social, economic, and environmental.1

The UN Sustainable Development Goals (SDGs)

Developed in 2015 to build upon the agenda and progress of the Millenium Development Goals of

2000, the United Nations formed 17 goals and an expansive host of 169 targets and a quantitative set of 200+ indicators for the success of the goals that will meet the 2030 Sustainable Development Agenda. Uniquely from the prior conference treaties, agreements and conclusive reports, the UN Sustainable Development goals that arose from the NY summit and were ratified in January of 2016 also established distinct responsibilities for the developed nations to prioritize sustainability and partnership in communication with “developing countries.” The UN also introduced five broader themes: Prosperity, People, Planet, Peace, and Partnership, and six subcategories known as the “six transformations” (depicted below). Similarly however, the goals set a timeline for the benchmarks to be improved upon within a fifteen year timeframe.

Discerning the success of these goals is difficult, as they represent the current framework for international sustainability and the conclusion of the UN SDGs will be reached in 2030. This framework has been the most extensively used in policy, research, organization, institutional planning, and corporation models. It has significantly influenced the generations of the 21st century, and solidified that one of the crucial roles of the frameworks and indices is to serve as a talking point for critical conversation and introducing sustainability as a tangible platform in institutional bodies. In terms of concrete performance, the countries are not on track to meet the majority of the goals, and some trends have appeared to be negative as opposed to positive. While certain targets may fall and rise, it still is unclear how the holistic trends of sustainability have changed. Since 2016, progress reports have been generated annually ranking each country's performance on the 17 goals, and the UN developed an SDG tracker to demonstrate and list the progress on the goals in 2018.

Evaluating the Relationships and Prioritization of Goals with the UN SDGs

One of the challenges with the current metrics and indices that rank the “sustainable development” of cities is that the goals that countries operate within have been known to conflict with each other in ways that are mutually destructive, known as trade-offs. An additional caveat of the goals is that concrete measures have not been fully established to characterize and track progress with the goals in a systematic way. The 2019 report of the UN Secretary General noted that “the availability of timely, disaggregated data across all countries and all targets and indicators to inform the present report remains a challenge.” This raises the

---

4 “Measuring Progress towards the Sustainable Development Goals - SDG Tracker.” Our World in Data, sdg-tracker.org/
possibility that establishing infrastructural progress in one aspect, goal, or pillar of sustainability will lead to a decline in the improvement of another, and there is insignificant empirical research into all of the interactions that occur between the goals to fully understand and avoid this challenge. The fact that this challenge exists would indicate that there is further opportunity for exploration in developing clearer pathways to holistic sustainable growth.

In order to evaluate this, the current rankings of countries with a range of performance ranking were evaluated on both their success in achieving their goals and the time series to which they’ve prioritized them, with the aim of elucidating the relationship between goal prioritization, sustainability, and the challenges with mutually destructive trade-offs or synergistic goal alignment.

**Methods**

Experimental analysis of the relationships between key countries and UN SDGs were modeled using the Gephi (Version 0.9.2) networks visualization tool. Using the Sustainable Development Goals index report data from 2019⁶ (as this is the report with both time series formatting and the most recent history of improvement of the goals), relationships between the goal rankings were evaluated via both the goal achievement ranking - a measure of the level of success in achievement of a goal- and the goal time series data, a measure of a country’s rate of improvement on a given goal. Weight was ascribed to each of the countries’ relationships via distance sum correlation, and for the first iteration of this experiment the top 50 countries (as ranked by their overall index score) were considered, along with 8 additional countries that represented countries with high sustainability concerns. ForceAtlas2 directed graphs were generated, and modularity tests were conducted via the Louvain algorithm and compared with other statistical measures to indicate country similarity between the achievement and prioritization of different goals, which is subsequently visualized in the results. After this iteration, a second iteration was conducted by modeling the relationship of all 162 countries, with the limitation that not all goal data (especially time series data) was available to compare. It was noted that Goal 12, Responsible Consumption and Production, did not have time series data. Furthermore, the indicators upon which the data was generated appeared to be limited in some cases. Each nation was modeled with their relationships per individual goals to indicate any trends in the behavior of the modularity-defined classes, and all Gephi figures not included in the results, were included in the appendix.

---

Results and Analysis

Patterns in International Progress

The first graph in Figure 4 visualizes the dataset of Goal Achievement “ranking” for 58 countries within 2019, in accordance with the ranks of “goal achieved; challenges remain; significant challenges remain; and major challenges remain”. The second graph indicates the time-series relationships between 58 countries in terms of their rate of improvement within the goals, ranked in accordance to “on track or maintaining achievement of a goal; moderately increasing towards achievement of goal; stagnating; or decreasing in improvement of a goal”. Each graph has a scalar factor (of 1000 and 2500) for the edge thickness based on the edge weight between two nodes, which qualitatively appears as the variation in thread thickness between countries if the relationships between countries on their overall goal achievement and prioritization is similar (or thinness if dissimilar).

This first survey of the countries showed similarity in the modularity classes formed at the same resolution. The clusters of countries had some interesting relationships that did not always overlap with overall SDG index ranking. There was also a distinction, shown in Figure 4 between the similarity in how countries ranked in goal achievement and how they ranked in the time series performance trend. In other words, countries who performed similarly did not completely prioritize the goals similarly.

**Figure 4.** a) Goal Achievement Ranking at 2500 weighted scale, b) Time Series Modularity Visualization of 58 Countries at 1000 weighted scale
Figure 5. a) Goal Achievement Status Modularity Visualization of 162 Countries b) Time Series Modularity Visualization of 162 Ranked Countries

The second iteration of the Gephi visualization represents the dataset of Goal Achievement ranking, and the Time Series ranking, of 162 countries from the 2019 SDG report index data, in Figure 5. While scaling up from the first iteration, the trends noted in Figure 4 also arose when looking at the entire dataset of all ranked countries in 2019. The modularity clusters, as defined, do exhibit similarity in the ranking within the goals in relation to their ranking in achievement among the categories. This supports the suggestion that at the foremost, countries that perform similarly, have similar achievement or challenges within the goals. At the same time however, the ways in which the goals are prioritized do seem to vary in a more inconsistent model to the goal achievement and overall SDG index ranking, as pointed from the modularity-defined clusters of the time series figure.

A trend in regionality was also noted in the level of achievement of goals and prioritization-pointing to the possibility that countries in similar regions have a likelihood of having similar sustainability challenges, and less similarly but still apparent in the past four years of data, acting on them in a similar fashion. One example of this is the apparent edge correlation between the two clusters in Figure 5a that contain the majority of the African countries, and the cluster (orange) in Figure 5b that also consisted primarily of African countries. A similar trend was seen with Middle Eastern nations, and European countries - the continent that comprises the highest-ranked percentile of the index - in both Figure 5a and 5b. When looking at these figures, it is interesting to note that the United States was most correlated with Israel, Cuba, Lithuania and Latvia in the goal achievement network, countries that had overall index scores both lower (Israel, Cuba) and higher (Lithuania). The United States was also most correlated with the majority-European cluster in how it prioritized the challenges.

The indication from the 2019 Report is that the majority of the countries have exhibited some progression towards the advancement of the SDGs, with much of this progress being classified as
moderate (indicated by the yellow), and thereby why the majority of countries are also considered to *not* be on track to satisfy the Agenda of 2030.

**Goal 1: No Poverty**

*No Poverty* aims to tackle extreme poverty (measured as those living on less than $1.90 a day), unemployment, socioeconomic vulnerability that results from disaster by boosting social protections, mobilization of pro-poor development resources, etc. The goal has 7 targets and 14 indicators.

As of 2019, the majority of the developed world has achieved this goal or addressed major challenges, and 68.09% of countries have improved upon this SDG when compared to previous years. That being said, the high-risk countries for extreme poverty have not significantly improved, and numerous countries have stagnated or worsened, such as Venezuela, Brazil, and Honduras. This deceleration, according to the UN SDG tracker, indicates that the target of less than 3 percent of the world living in extreme poverty is not on track to be achieved. Many of the highest-ranked countries do appear to have prioritized this goal and exhibited degrees of success in achieving it (Denmark, Norway, Sweden, France). Even a number of low-scoring countries have shown promise in improving this goal, such as the Russian Federation, India, and El Salvador.

**Goal 2: Zero Hunger**

The aim to end hunger is monitored by the prevalence of malnourishment and food insecurity around the globe. The UNDP ties this to nutritious food access, clean water and sanitation. Zero Hunger has 8 targets and 13 indicators.

As of 2019, the majority of the developed world has achieved this goal or addressed major challenges, and 68.09% of countries have improved upon this SDG when compared to previous years. That being said, the high-risk countries for extreme poverty have not significantly improved, and numerous countries have stagnated or worsened, such as
Global hunger is on the rise, and while many countries are working on this goal, the rates of hunger have increased since 2015, due to a number of factors, such as a decline in global agriculture, sustainable infrastructure for small farmers, and climate. Thereby, no country is close to achieving the goals, although the improvement observed in Goal 1 may be linked to the improvement in Goal 2 over time. The majority of the countries in the cluster with the high-performing European countries have been either ranked as “significant challenges remain”, depicted by orange or “major challenges remain” depicted by red. The countries with the 7 highest overall SDG index scores all have a goal achievement ranking status of “significant challenges remain,” although most of the world, including major countries that perform highly overall also have major challenges with hunger (Norway, Netherlands, Spain), the United States included. Considering the time series data, 61.35% of countries have improved (indicated by yellow), although no country has improved at a rate that signifies the goal’s achievement by 2030.

**Goal 3: Good Health and Wellbeing**

Defined by the UN, this goal encompasses many components, including improving life expectancy, reducing maternal and child mortality rates, eradicating disease and minimizing the burden of disease and healthcare, among others. Goal 3 has 13 targets and 28 indicators.

![Figure 8. a) Goal Achievement Ranking and b) Time Series Study of 58 Countries for Goal 3](image)

Many of the aspects of Health and Wellbeing have been improved, including increasing life expectancy and reducing maternal and child mortality rates. A number of diseases such as polio, malaria, and HIV/AIDS have been on the decline. The high-performing European cluster is the most on track to achieving the goal by 2030, although some countries, such as the United States (one of the lowest performing) are still also not on track to achieve SDG 3. Only 12.88% of the ranked countries are on track to meet the goal by 2030, with 68.1% showing moderate improvement and 79.14% of countries having major or significant challenges remaining.
**Goal 4: Quality Education**

Quality Education encompasses literacy rates, proportion of populations in Pre-primary, Primary, Secondary and Tertiary schooling, and increased access to education for women. The UN has defined 10 targets and 11 indicators for SDG 4.

![Goal 4 Graph](image)

**Figure 9. Goal Achievement Ranking and Time Series Study of 58 Countries for Goal 4**

Educational access is improving significantly throughout the globe, although 56.44% of all ranked countries have major or significant challenges remaining. In contrast to the performance, many countries are on track to achieve SDG 4 by 2030, and this progress is fairly regionally distributed. The majority of countries in the European cluster are on track to meet the goal, and so are a number of countries such as Fiji, Bahrain, Namibia, Uzbekistan, etc.

**Goal 6: Clean Water and Sanitation**

Clean water and sanitation defines clean water as a basic human need, that increased accessibility is required in order to achieve. This includes the development of efficient water-use systems, affordable, drinking water, hygienic improvement, ambient water quality improvement, wastewater management, and the restoration of water-related ecosystems. There are 8 targets and 11 indicators for SDG 6.

![Goal 6 Graph](image)

**Figure 11. a) Goal Achievement Ranking and b) Time Series Study of 58 Countries for Goal 6**

No country has exhibited achievement of SDG 6, while 79.75% of the ranked countries have demonstrated significant or major challenges.
remaining. 59.51% of the ranked countries have improved, and 28.22% of the countries have improved at a rate that is on track for 2030. From the UN-Water generated Executive Summary, SDG 6 is a foundational goal that heavily impacts the remaining SDGs, particularly being linked to challenges with poverty, sustainable cities, and peace.⁷

**Goal 7: Affordable and Clean Energy**

Affordable and Clean Energy encompasses the aim for universal energy access, the rise and support of clean fuels, renewable energy infrastructure and energy efficiency, and investment in clean energy. There are 5 targets and 6 indicators for SDG 7.

Approximately 10% of the ranked countries have demonstrated achievement of SDG 7, and 50.92% have significant or major challenges remaining. The majority of the highest-performing nations are within the European-nation cluster, which includes the Maldives and Singapore, and the remaining nations are Uruguay, Costa Rica, Brazil and Armenia. 66.87% of the ranked countries have improved, 23.93% of the countries have improved at a rate that is on track for 2030, with progress being distributed throughout much of the globe. The number of individuals without electricity access has declined by approximately 16% between 2019 and 2016, although an estimated 8% of the global population is projected to remain without electricity access in 2030, 90% of them in sub-Saharan Africa.⁸

**Goal 8: Decent Work and Economic Growth**

Decent Work and Economic Growth aims to promote sustainable economies, increasing per capita economic growth, national productivity, technology and innovation, employment, and resource efficiency. There are 12 defined targets and 17 indicators for SDG 8.

---


Cuba and China are the only nations that have demonstrated achievement in goal 8, both nations that have experienced economic transformation over the previous decades. 76.07% of the ranked countries have significant or major challenges remaining, with the majority of the European cluster primarily being characterized with some challenges or significant challenges. 68.71% of the countries have made progress on this goal in 2019, and 38.04% of countries have improved at a rate on track to meet SDG 8 by 2030. Sustained high real GDP, labour productivity, and youth unemployment (disproportionately affecting female youth) are among the key challenges with SDG 8 that affect many countries. Child labor in both hazardous and non-hazardous work has been on the decline, and financial access in underserved regions has improved, with the expanded implementation of ATMs.9 The global economy, while still growing, has slowed in 2019.10

**Goal 13: Climate Action**

Climate Action seeks to combat climate change, reduce and eradicate its impacts, and create solutions for infrastructure and economies that can reduce climate-impact emissions (namely CO₂ and greenhouse gases). The UN has 5 defined targets and 8 indicators for SDG 13, which includes a far range of indicators, such as natural disaster-related rates of injury, mortality and displacement, integration of climate change in national policy, and climate change education in curricula.

---


10 “Goal 8 ..: Sustainable Development Knowledge Platform.” United Nations
Figure 16. Goal Achievement Ranking and Time Series Study of 58 Countries for Goal 13

61.35% of countries have improved on this goal, and 50.92% of countries have made significant enough progress to be on track by 2030, but of the 61.35% the highest-ranking countries are excluded. Only 8% of countries exhibit successful achievement of this goal, and the majority of these countries are from the African clusters. Concerning which ways the sustainable development goals are prioritized, the highest-performing countries do not consistently show high improvement (indicated by green) in the SDGs, indicating that this is less correlative between regions or high-performing countries than Goal 1.

Goal 14: Life Below Water

Life Below Water is the goal that addresses conservation and sustainable use of oceanic, sea and marine resources, which cover three quarters of the planet. The goal encompasses reduction of marine pollution, overfishing, ocean acidification, and the improvement of fish and marine life populations, sustainable fishing, ecosystems, and marine and coastal areas. The UN has defined 10 targets and 10 indicators for SDG 14.

Figure 17. Goal Achievement Ranking and Time Series Study of 58 Countries for Goal 14

No countries have achieved this goal, and 63.80% have demonstrated significant or major challenges remaining. 34.97% of ranked countries exhibit improvement in SDG 14, and Colombia and Ecuador are the only countries to have exhibited
improvement at a rate to achieve the goal by 2030. The ecosystemic relevance of oceans cannot be overstated, as it is the largest ecosystem on Earth, and consequently has numerous impacts on the other SDGs, most dominantly climate change. Marine-protected areas have been on the incline, up to 13.2% in 2017 from 1.7% in 2000, although overfishing still threatens nearly ⅓ of global fish stocks. Eutrophication and ocean acidification, still require global coalitions to adequately address, as their impact has not been curbed significantly.¹¹

**Goal 15: Life on Land**

Life on Land encompasses the aim to improve sustainably manage forests, land degradation, and biodiversity loss. As forests cover approximately 30% of the Earth’s surface, they are important harbors of combating climate change, providing shelter and food security, protecting biodiversity, and providing homes for indigenous peoples. The UN has defined 12 targets and 14 indicators for SDG 15.

¹¹“Goal 14: Conserve and Sustainably Use the Oceans, Seas and Marine Resources for Sustainable Development - SDG Indicators.” United Nations

---

¹²Rice, Michael. “Analysis of the UN's Review of Progress on SDG 15 'Life on Land’.” Both ENDS
Goal 16: Peace, Justice and Strong Institutions

Peace, Justice and Strong Institutions aims to promote inclusive and peaceful society at national and international levels. The goal encompasses the reduction of war, eradication of terrorism, limiting military spending, nuclear weapons, domestic crime rates and international challenges such as trafficking and violence against children. The UN has defined 12 targets and 23 indicators for SDG 16.

Figure 19. Goal Achievement Ranking and Time Series Study of 58 Countries for Goal 16

Three countries have achieved this goal (Austria, Iceland, and Denmark), and 85.27% of countries have significant or major challenges remaining. 40.49% of the ranked countries exhibit improvement for SDG 16, 7.36% of countries on track to meet the goal by 2030. Of the 7.36% the majority were in the cluster dominated by European nations, the nation of Georgia withstanding. Low levels of domestic and international peace, along with weaker unaccountable institutions are considered to fundamentally hinder the advancement of sustainable development. An audit of the available data pointed that much of the empirical data related to the indicators and targets of Goal 16 were unavailable or limited in range, only provided for some nations.\(^1\)

Goal 17: Partnership for the Goals

Global partnership is a goal that encompasses multi-stakeholder partnerships and commitments, inclusive finance, capacity building, technological infrastructure, and policies for trade and sustainable development, with aim of international cooperation, in official development assistance (ODA). The UN has defined 19 targets and 25 indicators for SDG 17.

There are significant challenges with trade, digital access, ODA and investment in financing development. As it stands, 5.52% of countries have achieved the goal, 38.65% have some challenges remaining, 17.17% of the countries ranked exhibit improvement in SDG 17, and 6.13% on track to achieve the goal by 2030. There was a 2.7 per cent decrease in net ODA flows between 2018 and 2017, and this has furthered decline from the data of 2019.\textsuperscript{14}

\textbf{Trade-Offs: Directed Nature of the Three Pillars}

Of the traditionally defined pillars of societal, environmental, and economic, the social pillar appears to be the most-treated of the sustainable development goals, and most pertinent of note, by the highest-performing countries. Evaluating each of the goals, and nations, and how they are related draws the point that the most success has been observed within SDG 1, with high trends in improvement for SDG 3, SDG 4, and SDG 8. This appearance of prioritization in the direction of the social and economic pillars is a trend that has been highlighted by previous research, such as in the study of spatial distribution of European nations development, where it was concluded that the dominant factors of development were those labelled as “socioeconomic”, such that the development indicators appeared to under-represent “ecological (biosphere) well-being.”\textsuperscript{15} The 2019 SDG report and the visualization of this research seem to similarly reflect the trend observed by Shaker in current nations’ performance and prioritization of goals, especially highlighted by the \textbf{majority of high-performing countries} performing drastically poorly (and having incomplete data) on SDG 13, 14, and 15, the dominant goals related to environmental wellbeing. Previously, the UNDP had advocated for a strategy of prioritization that proposed the countries work first on

\textsuperscript{14}“Net ODA Received (% of GNI).” Data, The World Bank, data.worldbank.org/indicator/DT.ODA.ODAT.GN.ZS.

the goals they performed the worst in. While this methodology of addressing the challenges is reasonable, the directed nature of the socioeconomic pillars (and more explicitly, the lack of direction in the environmental pillar) may indicate that this direction has either not occurred successfully, or that the method itself is not successful.

**Interrelationships of the Goals**

There are trends in the similarity of treatment with the goals, although conclusions about the overarching relationship of goals with respect to each other, from this data, are only preliminary connections without bi- and multivariate regression analyses, and further evaluation of the quantifiable data provided that pertain to the SDGs is necessary, to extend beyond the scope of this initial paper. Strides toward understanding the interrelated nature of the goals have been made, such as with the recent regression analyses linking gender equality, poverty, and environmental performance with hunger in another paper. In addition, links between SDG 15 and climate change, hunger, gender inequality, and poverty have been documented as well. There have also been analyses linking hunger, poverty, and environmental performance to water security. In the network models, the treatment of SDG 1, 2, 5 and 13-15 are all fairly different in degrees of being on track to meet the goal by 2030 and the current status of each goal per nation, which may indicate gaps in these linkages. Overall, this avenue of research has recently become more prevalent in discussion, although the lack of extensive characterization, availability, and accessible presentation of the data has still made progress difficult. It was observed that even the indicator data presented on the SDG tracker site was, in the case of some nations limited to data points generated from the 2000’s, over a decade prior. This indicator data is essential to creating proper depictions of each of the goals with relation to each other. At the point at which these goals, targets, and indicators are more adequately characterized in a way that is accessible and inclusive to all nations, it may become more possible to distinguish “upstream” vs. “downstream” relationships, which would be a massive transformation of the goals from correlativity to causality, and thereby streamline the policy planning and development progress that the UN has advocated for.

**Conclusions**

To conclude, as it stands, none of the world is on track to meet the UN SDGs by 2030, although many important steps have been taken in the reach for global sustainable development. That has become clear by the data reports generated by the UN SDG reports Sustainable Development Goals (SDGs).” Journal of Sustainable Development, 28 Nov. 2019

16 “SDGIntegration.” SDG Integration, United Nations Development Programme, sgdintegration.undp.org/


and the visualizations generated in this paper. The highest-performing countries exhibit similar lack of treatment to the “environmental pillar”, and while SDG 16 and SDG 17 are also severely low-performing, the “social and economic” pillars exhibit the highest improvement trends and current success. However, the pillars traditionally used to define this progress and development: economic welfare, social equity, and environmental quality, fail to properly link the interrelated challenges together, because these challenges “will likely never be distributed evenly over space,” even as our understanding of these issues is primarily understood by the indicators we have predicated upon them. Additionally, as research has demonstrated, the geographical nature of the progress and prioritization of goals, along with an apparent leaning towards the dimension of the theorized social pillar, is important information for governing actors to understand as it sets the stage for new directions in the progress towards the 2030 agenda. In the future, applied research and practice, moving away from the theoretical nature of the frameworks that has primarily existed, will be essential to driving progress in each of these sectors, and as other research has alluded, it may be more beneficial to also incorporate improvements upon the frameworks as opposed to generating new frameworks and indicators in an already oversaturated space. In 2015, Shaker pointed that “investigate the use of holistic measure of development” that is accurate and easily calculable. Five years later, the challenge remains to design measures that are holistic in nature, easily demonstrable and quantifiable, with the aim to include all nations and their progress consistently and effectively. These development metrics, designed at the national level should also trickle down to the management of sub-regions and local institutions, organizations and corporations. Allowing this form of growth may create better aligned paths to sustainable development.

**Researcher’s Note:**
The work of this paper was to visualize and consider trends from the 2019 SDG report, and sustainable frameworks overall. The researcher is continuing work on visualization and analysis of these relationships over the coming months and intends to release an additional paper focusing more closely on some of the gaps pointed out within this initial research. Better parsing data for the indicators (which will allow for closer goal-visualization), incorporating regression studies for all of the goals, and evaluating why trends may exist in certain regions are all future goals of the researcher.

---

Sources


“Goal 12: Responsible Consumption and Production - SDG Tracker.” Our World in Data, sdg-tracker.org/sustainable-consumption-production.


“Measuring Progress towards the Sustainable Development Goals - SDG Tracker.” Our World in Data, sdg-tracker.org/.

“Net ODA Received (% of GNI).” Data, The World Bank, data.worldbank.org/indicator/DT.ODA.ODAT.GN.ZS.

O'Neill, Brian C., and Michael Oppenheimer. “Dangerous Climate Impacts and the Kyoto Protocol.” Science, American Association for the Advancement of Science, 14 June 2002, science.sciencemag.org/content/296/5575/1971?
casa_token=BdtYCNeBfYAAAAA:5PVLhhqitRur_SEtk_bjrzhsDYs6AAM1ejxwNpP3fZqNPw wml0EbhX4Xm6j-T9rnkvbXGW7tv6yS4Q.


“SDGIntegration.” SDG Integration, United Nations Development Programme, sdgintegration.undp.org/.


yToolkit/index.php/earth-summit-
history/historical-ngo/96-the-founex-report.

“Tracking SDG7: The Energy Progress Report
2019.” World Bank,

Development Goals.” United Nations, United
Nations,

United Nations Development Programme.

“Millennium Development Goals.” UNDP,
www.undp.org/content/undp/en/home/sdgoverti
ew/mdg_goals.html.

United Nations Statistics Division. “Goal 8:
Promote Sustained, Inclusive and Sustainable
Economic Growth, Full and Productive
Employment and Decent Work for All - SDG
Indicators.” United Nations, United Nations,

World Business Council for Sustainable
Development. “Our History.” World Business
Council for Sustainable Development (WBCSD),
www.wbcsd.org/Overview/Our-history.