## **YALE SCHOLARSHIP** AND THE SUSTAINABLE DEVELOPMENT GOALS



No poverty Gender Equality Quality Education Reduced Inequalities

Affordable and Clean Energy

Life On Land

Decent Work and Economic Growth

Industry, Innovation and Infrastructure

Good Health and Well-Being

Clean Water and Sanitation

**Climate Action** Partnerships for the Goals Life Below Water Sustainable Cities and Communities Zero Hunger Responsible Consumption and Production

Peace, Justice and Strong Institutions

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### **ACRONYMS AND ABBREVIATIONS**

EALL	Department of East Asian Languages and Literatures
EEB	Department of Ecology & Evolutionary Biology
FAS	Faculty of Arts and Sciences
FES	School of Forestry & Environmental Studies
HLPF	United Nations High-Level Political Forum on Sustainable Development
MBB	Department of Molecular Biophysics and Biochemistry
MCDB	Department of Molecular, Cellular and Developmental Biology
MDGs	Millennium Development Goals
MED	Medical School Departments
NELC	Department of Near Eastern Languages & Civilizations
OB/GYN	Department of Obstetrics, Gynecology & Reproductive Sciences
SDGs	Sustainable Development Goals
SOM	School of Management
UN	United Nations
WGSS	Women's, Gender, & Sexuality Studies Program

Archaeology	Archaeological Studies
Chemical Engineering	Department of Chemical & Environmental Engineering
Geology	Department of Geology & Geophysics
Italian	Department of Italian Language and Literature
Mechanical Engineering	Department of Mechanical Engineering & Materials Science
Ophthalmology	Department of Ophthalmology & Visual Science
Orthopedics	Department of Orthopedics and Rehabilitation
Physiology	Department of Cellular & Molecular Physiology
Radiology	Department of Radiology & Biomedical Imaging
Slavic	Department of Slavic Languages and Literatures
Spanish	Department of Spanish and Portuguese
Therapeutic Radiology	Department of Therapeutic Radiology/Radiation Oncology

#### **EXECUTIVE SUMMARY**

Following the adoption of the United Nations Sustainable Development Goals (SDGs) by 193 countries in 2015, the Yale Office of Sustainability began a project aimed at understanding how Yale teaching and research connects to the SDGs. The aims of this work are to identify the expertise Yale University might lend to helping achieve the SDGs, to identify pathways for transdisciplinary collaboration, and to provide a rationale for thinking about sustainability in higher education beyond campus initiatives. At the heart of this work is a commitment to highlight the role of higher education institutions – the knowledge sector – in addressing global challenges.

Over the course of two years, a team of Yale student research assistants reviewed the department websites and publications for all faculty and researchers in the University to collect information about their specialties and interest, and how their research and teaching relates to the SDGs. To streamline the process and ensure consistency between team members, the team used an online form to enter and organize the data. This methodology produced a database with over 100,000 data points reflecting the teaching, research, and writing of 4,415 Yale faculty members.

Based on this investigation, we find that Yale University has ample coverage of the SDGs and every department or school has at least one faculty member whose scholarship relates to the SDGs. Below is a list of the SDGs with an indication of the number of faculty whose teaching and research connects to each one. While these results indicate that Yale is particularly strong on SDG 3 (Good Health and Well-Being), it is important to note that roughly half of the faculty members reviewed for this study have primary appointments in Medicine, Public Health, or Nursing. In addition, faculty members in Yale's 11 Professional Schools, including those three schools, are often active practitioners who teach part-time.

- SDG 1 (No Poverty): 153
- SDG 2 (Zero Hunger): 66
- SDG 3 (Good Health): 2,810
- SDG 4 (Quality Education): 733
- SDG 5 (Gender Equality): 410
- SDG 6 (Clean Water and Sanitation): 98
- SDG 7 (Renewable Energy): 111
- SDG 8 (Good Jobs and Economic Growth): 292

- SDG 10 (Reduce Inequalities): 616
- SDG 11 (Sustainable Cities and Communities): 333
- SDG 12 (Responsible Consumption): 202
- SDG 13 (Climate Action): 179
- SDG 14 (Life Below Water): 54
- SDG 15 (Life on Land): 326
- SDG 16 (Peace and Justice): 933
- SDG 17 (Partnership for the Goals): 354
- SDG 9 (Innovation and Infrastructure): 562

A major finding of this work is that while some departments and schools are obvious in their connections, there is often good coverage in others that may not seem so clearly connected. This has led to the use of the data as a platform for collegial connections – for example, the team has generated reports upon request to demonstrate faculty members working on specific SDGs and on SDG combinations such as SDG 3 (Human Health) and SDG 13 (Climate Action).

As all work to-date is based on publicly available information, the next stage for this project will be a series of key informant interviews with departmental leadership to confirm the findings. We suggest that this data can be used to promote transdisciplinary dialogue among faculty and to support pan-university teaching and research efforts. It may also be of use to students seeking to enhance their interdisciplinary learning. We also hope that it can help increase knowledge about the SDGs on campus and further connect Yale's sustainability efforts to address global challenges.

#### **INTRODUCTION**

In 2015, the United Nations adopted the Sustainable Development Goals (SDGs). Comprised of 17 global goals and 169 targets, the SDGs are said to be a "blueprint to achieving a more equitable and sustainable future for all."<sup>1</sup> Building on their predecessor, the Millennium Development Goals (MDGs), the SDGs strive to finish the unmet MDG objectives and address the most pressing global challenges of today. A key distinction between these two sets of commitments is that the MDGs were aimed solely at developing countries, but the SDGs are intended to be a unified set of global priorities. To achieve the SDGs by 2030, all nations and actors have been called upon to help accelerate progress on the goals.

The SDGs are a universal agenda.<sup>2</sup> Starting with their development, which featured significant consultative processes with stakeholders at all scales, through the <u>final adopted resolution</u>, the SDGs emphasize that no one may be left behind in the process of achieving the goals. While they advocate that all nations should work on promoting sustainable development nationally and internationally, they are clear that the most vulnerable and the poorest must be given additional support and attention.<sup>3</sup>

Central to the SDGs are the three pillars of sustainable development – environmental, economic, and social sustainability (also referred to as people, planet, and prosperity).<sup>4</sup> The three pillars are interrelated, one cannot be achieved without the others. Similarly, the SDGs are interconnected. The SDGs, and their associated targets, comprise a network that links them together. Progress on one target has the potential to support development gains for another goal but will at times contradict.<sup>5</sup> All of this suggests that achieving the SDGs is far from simple and requires dedicated and deliberate attention from all sectors.



Figure 1. Sustainable Development Goals

While national governments are primarily tasked with implementing the SDGs, if we are to achieve them by 2030, all sectors must lend support. As the knowledge sector, academic institutions can and should play a critical role. To better understand the role of academic institutions in accelerating progress on the SDGs, in 2016 the Yale Office of Sustainability launched a project aimed at helping understand how Yale teaching and research aligns with the SDGs.

Yale University is a global leader in teaching and research and has a strong reputation for its commitment to sustainability. Yale's mission statement commits it to "improving the world today and for future generations through outstanding research and scholarship, education, preservation, and practice."<sup>6</sup> President Peter Salovey states that the University is dedicated to providing essential research and innovation for local and global positive change and fostering the next generation of leaders. In 2016, Yale launched its <u>Sustainability Plan 2025</u>, which supports the ambitions of the SDGs and

the Paris Climate Agreement.<sup>7</sup> With these serving as the foundation, the project serves three purposes:

- 1. Identify the expertise Yale might lend to the process of achieving the SDGs
- 2. Provide a rationale for thinking of higher education sustainability beyond operational commitments and student campaigns
- 3. Start to identify pathways for collaboration between disciplines

An important caveat to this work is that it is not intended to be prescriptive, nor is it intended to imply that any percentage of Yale faculty members are "working on" the SDGs. Rather, this exercise seeks to connect the existing teaching and research at Yale to these globally-established priorities. Thus, the intent is not to change or redirect the academic culture at Yale, but to highlight pathways for collaboration and, if desirable, connections to a larger context.

#### **METHODOLOGY**

From 2015 to the summer of 2016, the Yale Office of Sustainability conducted a pilot for this project to determine the feasibility of conducting this review. Data was collected on select departments and professional schools. Using the information gleaned from the pilot, in the fall 2016 the Office launched a revised program and methodology.

Faculty members at Yale can be divided into two main groups: those in the Faculty of Arts and Sciences provide instruction to the students of Yale College and the Graduate School of Arts and Sciences, the rest are distributed in Yale's 11 Professional Schools (Professional Schools offer advanced degrees, but their students generally plan to become practitioners rather than academics).

Including tenured, term, non-ladder, and research positions, there are over 4,400 faculty members at Yale. For a review of this nature, it is particularly important to include faculty members who may not be full-time, as most of the professional schools rely on active practitioners to ensure their content is fresh and relevant. There are 17 SDGs, so the review process required a team of dedicated student research assistants two years to complete. In preparation for the data collection, the research assistants were required to develop a thorough understanding of the SDGs, including the narrative and targets that undergird each goal. Importantly, the team is composed of students from degrees in the humanities, social sciences, and natural sciences, which provides balance in perspectives and opportunity for dialogue. The team leader makes an effort to assign students to departments related to their interests, as this both keeps the work interesting and avoids confusion over technical language.

Research assistants were assigned batches of departments for review. The team used an online form mainly composed of pre-populated fields to reduce human error in data entry and to ensure consistency in how particular data points are entered (i.e. Yale Nursing, Nursing, YSN, School of Nursing).

The basic review tactic was an audit of faculty biographies, websites, and courses taught. Information collected on each faculty member includes:

- Full name, NetID (unique Yale identifier), title, email
- Primary appointment
- Secondary appointment (where applicable)
- Centers, Labs, or Programs (where applicable)
- Other Affiliations (where applicable)
- Specialties & Interests
- Website(s) (link)
- Courses (link)
- Connections to each of the 17 goals

The team used the Yale Directory to determine primary appointments. To ascertain the secondary appointment(s), centers, labs and programs, other affiliations, and specialties and interests we used the faculty websites hosted by the departments. Secondary appointments are important to consider, as several of Yale's degree-granting programs are multidisciplinary and are therefore not a primary affiliation for faculty.

To determine the connections to the SDGs, the team reviewed electronically faculty members' biographies, CVs, published articles, research programs, and labs. In cases where limited information was available, an internet search supplemented. Based on the publicly available information, the research assistants indicated if a faculty members' work was tied to each SDG. In particular, research assistants assessed if the faculty members' work related to the targets of each SDG. In the dataset, faculty members are dichotomized as either having their work connected to the SDG or not.

This methodology yielded data for 4,415 faculty members. The data is stored as a CSV file and can be sorted by department, SDG, multiple SDGs, or keywords. To assess accuracy, the team leader with the help of a research assistant, cross-checked the number of reported faculty in each department with the number of faculty in the dataset. In cases of inconsistency, data was rechecked. The team leader also spot-checked several departments to assess if the data collection protocol and procedures produced a level of consistency with SDG tagging. As of the writing of this report, all 2017 faculty hires have been added to the database.

It is important to note that this is not intended to be a perfect or finite project. Faculty members come and go each semester and department websites and faculty information are updated with inconsistent frequency, so the source of the information is not entirely accurate. In addition, reviewing biographies and linking faculty work to the SDGs is a subjective exercise, and since the students working on this project have been from a variety of degree programs – economics, engineering, environmental studies, global studies, music, political science, public health, and women and gender studies – key terms and concepts have been subject to interpretation. While team discussions and the drop-down menus of the web form streamlined the data entry process and offer more consistent results, the next phase of this project will necessarily include an active review with faculty members and department leaders.

#### **CURRENT WORK & NEXT STEPS**

Internally, the data is being used to create multidisciplinary lists of faculty members with shared interests in key topics such as urbanization or climate change and health – generally at the request of Yale faculty and staff. In addition to a variety of presentations and other visibility tactics, we have used it to integrate academic highlights into a set of <u>sustainability action plans</u> for Professional Schools and academic departments.

In June 2018, the International Alliance of Research Universities (IARU), led by Yale University, hosted a half-day program on the role of higher education institutions in advancing the SDGs. Universities from around the globe presented on how they were integrating the SDGs into research, campus operations, teaching, and service. A report on this event was released in Fall 2018 and is available on the <u>Office of Sustainability website</u>.

As the next steps for the project, the Office of Sustainability plans to:

- 1. Develop select department-specific reports to be used to start discussions with department leadership and faculty
- 2. Explore opportunities to share the methodology, and potentially the platform, with peer institutions
- 3. Consider pathways for sharing the data within the Yale community

We hope to continue to convene and participate in interdisciplinary, global dialogues about the role of universities in helping to achieve the SDGs.

#### **OUTCOMES**

Initial results show that every academic department or school at Yale has at least one faculty member whose scholarship relates to the SDGs, and the University has ample coverage for each SDG (see Figure 2). Overall, key strengths of Yale are SDG 3 (Good Health and Well-Being), SDG 4 (Quality Education), SDG 10 (Reduce Inequality), and SDG 16 (Peace and Justice). Figure 2 provides Yale's SDG distribution as of September 2018. The size of each box corresponds with the number of faculty whose work supports the SDG.



Figure 2. Yale Faculty SDG review as of September 2018

The extreme weighting toward SDG 3 can be explained by the distribution of Yale's faculty. As shown in Figure 3, which provides the number of faculty members in each part of the university, Yale reports 2,394 faculty in the Medical School, 180 in Public Health, and 88 in Nursing. In addition, the work of many non-medical faculty members was identified as supporting SDG 3.

Medicine	Faculty of Arts and Sciences			
	1000			
	1092	1092		
	Music	Law	Nursing	Art
			88	83
	180		Divinity	Forestry & Environme
	Public Health	164	81	Studies 74
		Mnagement	Drama	Archiecture
2394	180	94	81	68

Figure 3. Distribution of Yale Faculty Members as of the 2016-17 factsheet. Dark blue contains the 50+ departments of the Faculty of Arts and Sciences. Light Blue is the Professional Schools. NB: Many Professional School faculty members are part-time.

The section that follows provides preliminary insights into how Yale's teaching and research relate to each of the SDGs. For the purposes of this report, we have separated the findings into three categories:

- Faculty of Arts and Sciences (by department)
- Professional Schools (apart from Medicine)
- Medical School (by department)

While the medical school is a professional school, because of its size and the variety of disciplines, it was helpful to separate its data.

The direct language of the SDG targets is included in each section, as the student researchers were instructed to use that language when auditing faculty information.

This report is intended as informational. Our hope is that it allows readers to see connections between disciplines and see connections between current academic activities and the SDGs, which are a direct reflection of the need for a collaborative and concerted push to address global challenges. Members of the Yale community are encouraged to contact the <u>Yale Office of Sustainability</u> (sustainability@yale.edu) with feedback, questions, and requests for data.



SDG 1 has 5 targets that focus on poverty reduction, with the goal of ending extreme poverty by 2030:<sup>8</sup>

1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day

1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable

1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance

1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

Each of the SDG targets has an assigned indicator to track progress. According to the UN review,\* while there has been significant progress made on SDG 1, and poverty around the world has decreased substantially in the last decade, in 2017 around 9 percent of the world's workers were living on less than US \$1.90 per person per day.<sup>9</sup>



SDG 1 Aggregate Data

<sup>\*</sup> Each year the UN High-Level Political Forum on Sustainable Development reviews the progress of select SDGs

## SDG 1 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 2 has 5 targets that focus on food security, nutrition, and agriculture, with the central aim of ending hunger and all forms of malnutrition by 2030:<sup>10</sup>

1.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round

1.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons

1.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

1.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

1.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed

In the past two decades, there has been a decrease in the prevalence of global hunger and malnutrition, but with the current trajectory, we will not achieve zero hunger by 2030. The UN urges for increased investments in agriculture and focus on regions with the largest burden of food insecurity.<sup>11</sup>



SDG 2 Aggregate Data

## SDG 2 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 3, the primary health goal, has 9 targets that include maternal and child health, communicable and non-communicable diseases, environmental health, health systems, and universal health coverage:<sup>12</sup>

1.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births

1.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births

1.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

1.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being

1.5 Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol

1.6 By 2020, halve the number of global deaths and injuries from road traffic accidents

1.7 By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes

1.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

1.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

According to the UN review of SDG 3, there has been progress on this goal, but the world needs to double down efforts and focus on the parts of the world with a disproportionate disease burden if we are to achieve its aims.<sup>13</sup>



SDG 3 Aggregate Data

## SDG 3 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 4 has 7 targets concentrating on education, with an emphasis on primary and secondary education and equal access for all:<sup>14</sup>

4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and preprimary education so that they are ready for primary education

4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

4.4. By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy

4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

As of 2018, the UN estimates that worldwide less than half of children achieve "minimum proficiency standards in reading and mathematics."<sup>15</sup> We need to continue to focus on achieving universal primary school education while also improving the quality and equity of education.<sup>16</sup>



SDG 4 Aggregate Data

## SDG 4 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 5 has 6 targets that revolve around gender equality and ending discrimination, violence, and harmful practices:<sup>17</sup>

5.1 End all forms of discrimination against all women and girls everywhere

5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation

5.3 Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation

5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate

5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decisionmaking in political, economic and public life

5.6 Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences

The UN reports that physical and sexual violence rates, child marriage, and harmful practices are not declining fast enough to meet the targets of SDG 5. Based on a survey of women aged 15 to 49 in 87 countries, the UN reports that 19 percent of participants had experienced physical or sexual violence by an intimate partner within the 12 months prior to the survey.<sup>18</sup>

# Percent of Faculty 117/1,092 Faculty of Arts and Sciences 10% 94/986 Professional Schools 9.8% 234/2,394 Medical School

SDG 5 Aggregate Data

## SDG 5 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







The 6 targets of SDG 6 focus on universal and equitable access to water and sanitation as well as the efficient and sustainable use of water:<sup>19</sup>

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all

6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

Globally, we have made gains in ensuring availability to improved drinking water sources and sanitation facilities. But the UN reports there are disparities with those who currently lack access, primarily living in rural areas, and 2 billion people living in countries who face water stress. Future efforts on this goal should focus on those who lack access with an emphasis on sustainable practices.<sup>20</sup>



SDG 6 Aggregate Data

## SDG 6 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 7 has 3 targets that promote universal access to energy, renewable energy, and energy efficiency:<sup>21</sup>

- 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
- 7.3 By 2030, double the global rate of improvement in energy efficiency

Energy is key to sustainable development and to achieve this goal by 2030, we must accelerate progress on SDG 7. Only 85 percent of the world population has access to energy, and the majority of those without access live in sub-Saharan Africa.<sup>22</sup> In addition to increasing overall access, we must also increase access to and the share of renewable energy. According to the UN Sustainable Development Knowledge Platform, "progress in every area of sustainable energy falls short of what is needed to achieve energy access for all and to meet targets for renewable energy and energy efficiency. Meaningful improvements will require higher levels of financing and bolder policy commitments, together with the willingness of countries to embrace new technologies on a much wider scale."<sup>23</sup>

#### Percent of Faculty

5%	55/1,092	Faculty of Arts and Sciences
5.5%	54/986	Professional Schools
<1%	4/2,394	Medical School

SDG 7 Aggregate Data

## SDG 7 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







The 9 targets of SDG 8 focus on economic growth, employment, labor rights, sustainable tourism, and financial institutions:<sup>24</sup>

8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries

8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors

8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead

8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value

8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training

8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms

8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment

Although we have seen an upward annual growth rate of real GDP per capita worldwide, in the least developed countries it falls below the SDG target of 7 percent.<sup>25</sup>



SDG 8 Aggregate Data

## SDG 8 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 9 has 5 targets that emphasize the need for sustainable and resilient infrastructure, industrialization, enterprise, and scientific research:<sup>26</sup>

9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries

9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets

9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resourceuse efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

Review of this goal indicated that there have been gains in manufacturing outputs and many countries are transitioning towards less energy-intensive industries, but to achieve SDG 9 we must further progress and least developed countries need increased attention.<sup>27</sup>



SDG 9 Aggregate Data

## SDG 9 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 10 has 7 targets that emphasize reducing global inequity through income growth, social and political inclusion, equal opportunity, as well as policies and regulations:<sup>28</sup>

10.1 By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average

10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status

10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard

10.4 Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality

10.5 Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations

10.6 Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions

10.7 Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies

The UN has reported that progress on reducing inequalities has been "mixed."<sup>29</sup> While efforts are needed in all countries to achieve this goal, lease developed countries and Small Island Developing States should receive heightened support.<sup>30</sup>

#### Percent of Faculty



SDG 10 Aggregate Data

## SDG 10 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 11 has 7 targets that relate to the sustainable development of cities. The targets focus on housing, transportation, urbanization, cultural and natural heritage, economics, and access to public spaces:<sup>31</sup>

11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums

11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage

11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations

11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

By 2030, the majority of the world population (5 billion) is expected to live in cities, and cities present unique sustainable development challenges. Rapid progress and improved planning and management of cities are needed to achieve SDG 11.<sup>32</sup>



SDG 11 Aggregate Data

## SDG 11 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







The 8 targets of SDG 12 focus on a variety of consumption and production elements, such as instigating a 10-year framework on sustainable consumption and production, reducing waste and food waste, and procurement practices.<sup>33</sup>

12.1 Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries

12.2 By 2030, achieve the sustainable management and efficient use of natural resources

12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses

12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle

12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities

12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature

According to the UN, data on SDG 12 suggest some worsening trends in natural resource consumption.<sup>34</sup> We must reverse these trends and hasten gains.

# Percent of Faculty 5.6% 61/1,092 Faculty of Arts and Sciences 13% 126/986 Professional Schools <1%</td> 19/2,394 Medical School

SDG 12 Aggregate Data

## SDG 12 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 13 and its 3 targets support the aims of the Paris Climate Agreement and focus on resilience, adaptation, mitigation, and education. SDG 13 clearly acknowledges the United Nations Framework Convention on Climate Change as the forum for climate change negotiation. The three targets are as follows:<sup>35</sup>

13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

13.2 Integrate climate change measures into national policies, strategies and planning

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Progress on SDG 13 is integrated with progress on the Paris Agreement. As of 2017, 143 countries ratified the Paris Agreement and the majority have developed their Nationally Determined Contributions. Despite these commitments, the global temperature continues to rise.<sup>36</sup> The UN Sustainable Development Knowledge Platform states: "Climate change presents the single biggest threat to development, and its widespread, unprecedented impacts disproportionately burden the poorest and most vulnerable. Urgent action to combat climate change and minimize its disruptions is integral to the successful implementation of the Sustainable Development Goals."<sup>37</sup>



SDG 13 Aggregate Data
# SDG 13 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 14 has 7 targets that include preventing and reducing marine pollution, ocean acidification, overfishing, and the preservation of marine and coastal areas:<sup>38</sup>

14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics

14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation

14.7 By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism

Review of this goal in 2017 highlighted that previous gains are being threatened by climate change and increased attention is needed on SDG 14.<sup>39</sup>

1.9%	21/1,092	Faculty of Arts and Sciences
3.1%	31/986	Professional Schools
<1%	2/2,394	Medical School

Percent of Faculty

SDG 14 Aggregate Data

# SDG 14 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 15 is composed of 9 targets that focus on the conservation and restoration of freshwater ecosystems, sustainable forest management, biodiversity, and poaching:<sup>40</sup>

15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development

15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species

15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed

15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products

15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species

15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

While there have been some advances, several of SDG 15's targets are worsening or stagnant. Land production, biodiversity, and poaching and trafficking all require significant attention.<sup>41</sup>



## Percent of Faculty

SDG 15 Aggregate Data

# SDG 15 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 16 has 10 targets that promote peaceful and inclusive societies. The targets include: reducing all forms of violence and death, ending trafficking, promoting the rule of law, and increasing transparency:<sup>42</sup>

16.1 Significantly reduce all forms of violence and related death rates everywhere

16.2 End abuse, exploitation, trafficking and all forms of violence against and torture of children

16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all

16.4 By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime

16.5 Substantially reduce corruption and bribery in all their forms

16.6 Develop effective, accountable and transparent institutions at all levels

16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels

16.8 Broaden and strengthen the participation of developing countries in the institutions of global governance

16.9 By 2030, provide legal identity for all, including birth registration

16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements

To date, the UN reports that progress on the goal has been "uneven."<sup>43</sup> While access to justice has improved in many countries, globally we have experienced an increase in violent conflicts.<sup>44</sup>

#### Percent of Faculty



SDG 16 Aggregate Data

# SDG 16 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments







SDG 17 has 19 targets that are in five categories: financial, technology, capacity-building, trade, and systemic issues:<sup>45</sup>

#### Finance

17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection

17.2 Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of ODA/GNI to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries

17.3 Mobilize additional financial resources for developing countries from multiple sources

17.4 Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress

17.5 Adopt and implement investment promotion regimes for least developed countries

#### Technology

17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism

17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favorable terms, including on concessional and preferential terms, as mutually agreed

17.8 Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology

#### **Capacity Building**

17.9 Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation

#### Trade

17.10 Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under

the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda

17.11 Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020

17.12 Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access

#### Systemic Issues

17.13 Enhance global macroeconomic stability, including through policy coordination and policy coherence

17.14 Enhance policy coherence for sustainable development

17.15 Respect each country's policy space and leadership to establish and implement policies for poverty eradication and sustainable development

17.16 Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries

17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships

17.18 By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts

17.19 By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries

As SDG 17 is responsible for tracking global commitment to sustainable development, the goal is reviewed by the UN every year. Most recently they urge global partnerships for sustainable development "at all levels and by all actors" to help achieve this SDG.<sup>46</sup>

# Percent of Faculty8.8%96/1,092Faculty of Arts and Sciences17%163/986Professional Schools4.1%98/2,394Medical School

SDG 17 Aggregate Data

# SDG 17 DEPARTMENT CHARTS

#### Faculty of Arts and Sciences Departments



#### Medical School Departments





## **OPPORTUNITIES**

Based on the review and mapping of publicly available information about how Yale's teaching and research relate to the SDGs, we see several opportunities to use the data. These are not intended to be prescriptive, but rather as opportunities to support existing and proposed efforts at Yale.

- 1. Promote Transdisciplinary Collaboration: With 4,400+ faculty at Yale and a campus that is distributed across New Haven and the surrounding area, it can be challenging for faculty to find colleagues with shared interests. The data from this project can help connect faculty to each other and may also offer new pathways for existing transdisciplinary initiatives such as the Global Health Initiative, <u>Tsai CITY</u>, the <u>Center for Ecosystems in</u> <u>Architecture</u>, and the <u>Institute for Biospheric Studies</u>, and this data may be helpful in identifying affiliates and new efforts such as Urban@Yale.
- 2. Support Efforts for Pan-university Teaching: In an increasingly interconnected world, the opportunities and benefits of pan-university teaching are expanding. This dataset may help to support multi-departmental courses on global challenges such as climate, water, food, and security.
- **3.** Encourage Students' Passions: Many Yale students are globally-oriented. If hosted publicly, the SDG database could help students diversify the faculty they connect with while on campus. For example, if a student is interested in nutrition, they may consider looking at the faculty tagged for SDG 4 (Zero Hunger).
- 4. Increase Knowledge of Sustainability and the SDGs: Many define university sustainability as recycling and saving energy. While these activities are important, it is imperative to understand the larger context. The SDGs provide a widening and rationale for thinking of sustainability from a social, economic, and environmental perspective. They also show how sustainable development encompasses and requires disparate fields and sectors to work together. This project can help build a broad understanding of, and the language to discuss sustainability at Yale.
- 5. Connect to Global Challenges: As expressed by Jeffrey Sachs, Director of the Sustainable Development Solutions Network, Director of the Center for Sustainable Development at Columbia University, and global SDG leader and advocate, "the SDGs represent a profound set of global challenges...they call for molding a world that is currently neither socially fair nor environmentally sustainable into a world that is simultaneously prosperous, inclusive, and sustainable.<sup>47</sup> Through its teaching and research, Yale is helping to realize this vision. This project can help the Yale community to see how work in labs, classrooms, offices, and in the field, is vital in helping the world to achieve the SDGs.

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