

Master of Science in Sustainability Management

Sustainability Metrics SUMA PS5167

TBD

3 credits

(Subject to Change)

Instructors: Sonay Aykan, sonay_aykan@colpal.com

Office Hours: Sonay Aykan: Friday 3:00-4:00 pm EST online, and by appointment

Facilitator/Teaching Assistants: TBD

Office Hours: TBA

Course Overview

The urgency to tackle sustainability-related global problems has revealed the growing need to create, maintain and analyze data on environmental and social issues with robust methodologies. The availability of large datasets and advanced data tools such as GIS, machine learning, and blockchain has expanded our capabilities for quick and agile decision-making in the corporate and urban space. However, more data does not necessarily mean better solutions.

This course will explore the relationship between sustainability and data from corporate and urban perspectives, focusing on how data is created, analyzed and used to make decisions. The course is divided into three sections. The first section focuses on measuring sustainability and will start by visiting different definitions of sustainability to outline the theoretical premises on which current data practices and policies are built. The second section focuses on examples of sustainability/ESG data in corporate management through case studies such as Home Depot, Amazon, Nestle and others. The last section focuses on disclosure and use of data by different stakeholders, with special attention on data integrity, data contingencies and disclosure risks. This section will address developing trends in voluntary and mandatory data disclosure frameworks.

The course will highlight the importance of actionable data, purpose-driven analysis and the selection of proper indicators. Moreover, students will learn how to find and use different datasets and calculation guidelines to assess corporations and cities' environmental, and social footprint. This will help students gain the knowledge of a vast array of data sources such as World Bank Open Dataset, UN SDG Indicators, WRI Aqueduct, FactSet ESG data, MSCI, WWF Biodiversity Risk Filter and Water Risk Monitizer; and process these data through suitable methodologies including basic data analytics, statistics, environmental footprint assessment, scenario analysis and other tools. The course will also present practical examples of the collection and reporting process of corporate data to comply with CSRD, GRI, SASB, TCFD, CDP and other reporting frameworks, providing insights into the concepts of data cleanliness, robustness, materiality analysis and stakeholder focus. Students will learn how to apply this knowledge both for immediate needs of companies to meet the growing investor interest and regulatory expectations, and to develop sustainability solutions.

This course is offered in the Spring Semester, and in person.

Learning Objectives

L1: Identify and distinguish different approaches to sustainability assessment.

L2: Use open-source datasets on sustainability and calculation guidelines to assess the sustainability performances of corporations, cities, or communities.

L3: Devise solutions to complex sustainability problems using data-literacy, due-diligence, teamwork, and technical skills with data analytics, GIS, Business BI, and other available tools.

Readings

(Will be updated throughout the semester, please check weekly modules for updated readings)

Required Readings:

Acaroglu, L. (2020), Quick Guide to Circular Economy Business Strategies, Medium

<https://medium.com/disruptive-design/quick-guide-to-circular-economy-business-strategies-b3d6a000facf>

Addy, C., Chorengel, M., Collins, M., & Etzel, M. (2019). Calculating the value of impact investing: An evidence-based way to estimate social and environmental returns. *Harvard Business Review*, 97(1), 102-109.

Anker, R. (2017). Living wages around the world : manual for measurement. In.

Atasu, A., Dumas, C., Wassenhove, L., N. V., (2021), The Circular Business Model

Baumann, H., Tillman A., (2004), The Hitchhiker's Guide to LCA - An orientation in LCA methodology and application, Professional Publishing House (Chapters 1, 3 & 6)

Bell, S., & Morse, S. (2008). Sustainability Indicators—Measuring the Immeasurable? 2nd Edition. P3-30. Earthscan. [DG1]

Bloomberg Gender Equality Index:

https://assets.bbhub.io/company/sites/46/2021/05/1121150_BBGT_2021GEI_Updated_GenderReportFrame_FNL.pdf

Bloomberg vs. Capital IQ vs. FactSet vs. Thomson Reuters Eikon:

<https://www.wallstreetprep.com/knowledge/bloomberg-vs-capital-iq-vs-factset-vs-thomson-reuters-eikon/>

Boulanger, P.-M. (2008). Sustainable development indicators: a scientific challenge, a democratic issue. *Surveys and Perspectives Integrating Environment and Society*, 1(1). <https://journals.openedition.org/sapiens/166>

EFRAG, (2023), Implementation Guidance for Materiality Assessment

<https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FMeeting%20Documents%2F2302241032237237%2F03-02%20Materiality%20Assessment%20Implementation%20guidance%20clean%20SRB%20231025.pdf>

Elkington, J. (1998), *Cannibals with forks: the triple bottom line of 21st century business*, (pp. 1-13, 69-94), New Society Publishers, Gabriola Island, BC ; Stony Creek, CT

Ellen MacArthur, (2023), The biological cycle of the butterfly diagram

<https://www.ellenmacarthurfoundation.org/articles/the-biological-cycle-of-the-butterfly-diagram#:~:text=On%20the%20left%2Dhand%20side,are%20consumed%2C%20such%20as%20food.>

Ellen MacArthur, (2023), The technical cycle of the butterfly diagram

<https://www.ellenmacarthurfoundation.org/articles/the-technical-cycle-of-the-butterfly-diagram>

ESG Investing: Practices, Progress and Challenges (pp. 14-67):

<https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf>

ESRS Standards (2023)

Esty, D. C., (2020). Creating Investment-Grade Corporate Sustainability Metrics. In Esty, D. C., Cort, T. (Eds.). Values at Work (pp 51-66). Palgrave Macmillan

GRI (2016), GRI 409, Forced or Compulsory Labor 2016

<https://www.globalreporting.org/standards/media/1024/gri-409-forced-or-compulsory-labor-2016.pdf>

GRI 1 Foundation (2021)

GRI 3 Material Topics (2021)

IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information

International Labour Office. (2004). A fair globalization : the role of the ILO : report of the Director-General on the World Commission on the Social Dimension of Globalization. Geneva, International Labour Office.

Leading Harvest (2021) Leading Harvest Farmland Management Standard Est. 2020 Guidebook

Leading Harvest Farmland Management Standard 2020

Living Wage Calculator Methodology:

<https://livingwage.mit.edu/resources/Living-Wage-Users-Guide-Technical-Documentation-2023-02-01.pdf> and online: <https://livingwage.mit.edu/pages/methodology>

Lovins, A. B., Lovins, L. H., & Hawken, P. (1999). A Roadmap for Natural Capitalism. Harvard Business Review, 77(3), 145.

<https://link-gale-com.ezproxy.cul.columbia.edu/apps/doc/A54556305/AONE?u=columbiau&sid=summon&xid=ca39aa31>

Pick a strategy that fits your resources and capabilities, HBR Press.

<https://hbr.org/2021/07/the-circular-business-model#:~:text=The%20Solution,extension%2C%20and%20design%20for%20recycling.>

Rate the Rankers:

<https://www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/sustainability-ratetheraters2020-report.pdf>

Ropes & Gray (2024), EU Corporate Sustainability Reporting Directive draft materiality assessment guidance published – key points from the guidance

<https://www.ropesgray.com/en/insights/viewpoints/102iw56/eu-corporate-sustainability-reporting-directive-draft-materiality-assessment-guid>

SBTN (2020) Initial Guidance for Businesses

<https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/11/Science-Based-Targets-for-Nature-Initial-Guidance-for-Business.pdf>

Sheffi, Y. and Blanco, E, S. (2018). Impact Assessment, Balancing Green (pp 55-90). The MIT Press, Cambridge, Massachusetts

Smart Freight Centre (2023), Global Logistics Emissions Council Framework for Logistics Emissions Accounting and Reporting; v3.0 edition.

https://smart-freight-centre-media.s3.amazonaws.com/documents/GLEC_FRAMEWORK_v3_UPDATED_13_12_23.pdf

Solow, R. (1991). Sustainability: An Economist's perspective. The eighteenth J. Seward Johnson lecture. Woods Hole, MA: Woods Hole Oceanographic Institution.

TCFD Implementing the Recommendations (pp. 1-24): <https://www.fsb.org/wp-content/uploads/P141021-4.pdf>

Tesco drops carbon-label pledge (news article):

<https://www.theguardian.com/environment/2012/jan/30/tesco-drops-carbon-labelling>

The thorny truth about socially responsible investing:

<https://www.vox.com/the-goods/22714761/esg-investing-divestment-fossil-fuels-climate-401k>

The Triple Bottom Line: What Is It and How Does It Work?
<https://www.ibrc.indiana.edu/ibr/2011/spring/pdfs/article2.pdf>

TNFD (2023) Recommendations of the Taskforce on Nature-related Financial Disclosures

TNFD (2023), Guidance on the Identification and assessment of nature-related issues: The LEAP approach
https://tnfd.global/wp-content/uploads/2023/08/Guidance_on_the_identification_and_assessment_of_nature-related_Issues_The_TNFD_LEAP_approach_V1.1_October2023.pdf

Using The Pressure-State-Response Model To Develop Indicators Of Sustainability:
<http://documentacion.ideam.gov.co/openbiblio/bvirtual/017931/DocumentosIndicadores/Temasvarios/Docum26.pdf>

Utz, S. and M. Wimmer (2014). "Are they any good at all? A financial and ethical analysis of socially responsible mutual funds." *Journal of Asset Management* 15(1): 72-82

Wackernagel, M., Beyers, B. (2019), *Footprint - Why?, Area as a Currency, How much Biocapacity Does a Person Need, Footprint Compass: How much Biodiversity Do we Need for a Good Life?, Ecological Footprint: Managing our Biocapacity Budget* (pp. 1-37, 95-111) Gabriola Island, BC Canada, New Society Publishers

Wackernagel, M., Beyers, B. (2019), *Footprint - Why?, Area as a Currency, How much Biocapacity Does a Person Need, Footprint Compass: How much Biodiversity Do we Need for a Good Life?, Ecological Footprint: Managing our Biocapacity Budget* (pp. 1-37, 95-111) Gabriola Island, BC Canada, New Society Publishers.

Walk Free (2023), Global Slavery Index Methodology,
<https://www.walkfree.org/global-slavery-index/methodology/methodology-content/#prevalence>

Walk Free (2023), Global Slavery Index Report,
<https://cdn.walkfree.org/content/uploads/2023/05/17114737/Global-Slavery-Index-2023.pdf>

Water Footprint Network: <https://waterfootprint.org/en/>

Why Living Wages Should Matter To Your Business <https://socapglobal.com/2017/10/living-wages-matter-business/>

Women's Empowerment and Business: 2020 Trends and Opportunities:
<https://www.unglobalcompact.org/library/5738>

WRI (2023), Aqueduct 4.0: Updated decision-relevant global water risk indicators,
https://files.wri.org/d8/s3fs-public/2023-08/aqueduct-40-technical-note.pdf?VersionId=G_TxTR2LAnlgXGzy7xtDU_P_5lmkXJY7d

WWF (2023), WWF Biodiversity Risk Filter Methodology Documentation,
https://cdn.kettufy.io/prod-fra-1.kettufy.io/documents/riskfilter.org/BiodiversityRiskFilter_Methodology.pdf

WWF (2023), WWF Water Risk Filter Methodology Documentation, January 2023
https://cdn.kettufy.io/prod-fra-1.kettufy.io/documents/riskfilter.org/WaterRiskFilter_Methodology.pdf

Optional Readings:

Addy, C., Chorenge, M., Collins, M., & Etzel, M. (2019). calculating the value of impact investing An evidence-based way to estimate social and environmental returns. *Harvard Business Review*, 97(1), 102-109.

Bloomberg vs. Capital IQ vs. FactSet vs. Thomson Reuters Eikon:
<https://www.wallstreetprep.com/knowledge/bloomberg-vs-capital-iq-vs-factset-vs-thomson-reuters-eikon/>

ESG Investing: Practices, Progress and Challenges (pp. 14-67):
<https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf>

Esty, D. C., (2020). Creating Investment-Grade Corporate Sustainability Metrics. In Esty, D. C., Cort, T. (Eds.). *Values at Work* (pp 51-66). Palgrave Macmillan

Rate the Rankers:

<https://www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/sustainability-ratetheraters2020-report.pdf>

The thorny truth about socially responsible investing:

<https://www.vox.com/the-goods/22714761/esg-investing-divestment-fossil-fuels-climate-401k>

Utz, S. and M. Wimmer (2014). "Are they any good at all? A financial and ethical analysis of socially responsible mutual funds." *Journal of Asset Management* 15(1): 72-82

Volumetric Water Benefit Accounting (VWBA): A Method For Implementing and Valuing Water Stewardship Activities:

<https://www.wri.org/research/volumetric-water-benefit-accounting-vwba-method-implementing-and-valuing-water-stewardship>

Water Footprint Assessment Manual:

https://waterfootprint.org/media/downloads/TheWaterFootprintAssessmentManual_2.pdf

WaterPub: <https://www.waterfootprint.org/publications/>

Wilkinson, A. and Kupers, R. (2013), *Managing Uncertainty: Living in the Futures*, Harvard Business Review.

Library of Tools and Datasets:

- FactSet (Refer to Columbia Resources)
- MSCI (Refer to Columbia Resources)
- WWF Biodiversity and Water Risk Filters
- EPA SmartWay
- WRI Aqueduct: <https://www.wri.org/aqueduct>
- Data World: <https://data.world/>
- Open SDG Data Hub: <https://unstats-undesa.opendata.arcgis.com/>
- World Bank Open Data: <https://data.worldbank.org/>
- The 2020 Atlas of Sustainable Development Goals: Stories and insights through innovative visuals:
<https://blogs.worldbank.org/opendata/2020-atlas-sustainable-development-goals-stories-and-insights-through-innovative-visuals>
- UN SDG Indicators: <https://unstats.un.org/sdgs/UNSDG/IndDatabasePage>
- MIT En-Roads Scenario Analysis Tool:
<https://en-roads.climateinteractive.org/scenario.html?v=21.9.0>
- OECD Sustainability Datasets:
<https://www.oecd.org/greengrowth/publicationsdocuments/datasets/>
- Water Risk Monitizer: <https://www.smartwaternavigator.com/>
- Hunger Map: <https://hungermap.wfp.org/>
- Measuring Success: Tracking the Progress of the Sustainable Development Goals
<https://storymaps.arcgis.com/stories/ffa9380903e84bd2bfdd00deaf46333>

Assignments and Assessments

First Assignment (10%) / Due on Third Week 2/8/23 (L1, L3) - Students will select the multinational company they will be focusing on for their midterm and final assignments. They will create a mini-report to describe the key characteristics of this company (revenue, locations, areas of operations, employee profile, growth prospects, potential risks and opportunities to their business, their governance structure, etc.). The report should include a statement for why this specific company has been selected. This report will prepare the basis for their midterm and final assignments. A detailed list of requirements will be provided during the class.

Second Assignment: Risks and Opportunities Report (35%) / Due on Sixth Week 3/3/23 (L1, L2, L3) - Students will prepare a detailed report on the sustainability-related risks or opportunities of a multinational company of their choice. This report will describe the importance of chosen risks or opportunities in relation to stakeholders, existing sustainability frameworks and business operations (materiality assessment) and provide quantitative analysis of the potential impacts of it. Students are expected to present their findings through various data tools and visualizations, without being limited to companies' existing disclosures, sustainability reports or other sources of information. This report will be used as the basis for the final project.

Final project (45%) / Due Final Week 4/19/23 (L1, L3) - Students will work as teams to propose collaborative solutions to the one or more problems identified during midterms. Each student will represent a corporation (selected in the first assignment). Suggested collaborative solutions will include both business and public policy components, supported with a roadmap and quantitative analysis. Each project team will present their recommendations in the final class with an accompanying paper no longer than 8-10 pages due on the final class. Presentations should be no longer than 15 minutes and will be followed by 5 minutes of Q&A.

Class participation (10%) (L1) - Class participation will be evaluated on a scale of 0-100 and all students are expected to contribute to the classroom discussion. During these discussions, students will be expected to reflect on the pre-class readings and present a critical view based on these readings. Students are welcomed to bring their skills they have learned from other classes, especially those related to data analysis and sustainability. Attendance will count as part of the participation grade and late attendance to classes will impact the grade. Students are expected to inform the instructors via email in advance and within a reasonable timeframe in case of impossibility to attend a class. Failure to attend a class without an excuse will result in deduction of the participation grade. Late submission of assignments will result in a reduction of 10% of the grade.

Grading

The final grade will be calculated as described below, and the grade weight for each assignment is as described in the assignment section.

FINAL GRADING SCALE

| Grade | Percentage |
|-------|------------|
| A+ | 98–100 % |
| A | 93–97.9 % |
| A- | 90–92.9 % |
| B+ | 87–89.9 % |
| B | 83–86.9 % |

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|-----------|-----------------|
| B- | 80–82.9 % |
| C+ | 77–79.9 % |
| C | 73–76.9 % |
| C- | 70–72.9 % |
| D | 60–69.9 % |
| F | 59.9% and below |

| Assignment/Assessment | % Weight |
|-----------------------|----------|
| First Assignment | 10% |
| Second Assignment | 35% |
| Final project | 45% |
| Participation | 10% |
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Course Schedule/Course Calendar
(Subject to change depending on availability of guest speakers)

| Date | Topics and Activities | Readings (due on this day) | Assignments (due on this date) |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Week 1 | <p>Week 1</p> <p>Intro + Course Overview + Defining Sustainability</p> <p>Questions to be addressed:</p> <ul style="list-style-type: none"> • General Course Instructions • Course Content Overview (Materiality Concept, Value Chain Concept, List of Data Tools) • Discussion on Sustainability • Definitions of Sustainability • Sustainability & Data → Examples of how data is used • Sustainability of systems | <ul style="list-style-type: none"> • Solow, R. (1991). Sustainability: An Economist’s perspective. The eighteenth J. Seward Johnson lecture. Woods Hole, MA: Woods Hole Oceanographic Institution. • Elkington, J. (1998), Cannibals with forks: the triple bottom line of 21st century business, (pp. 1-13, 69-94), New Society Publishers, Gabriola Island, BC ; Stony Creek, CT • Lovins, A. B., Lovins, L. H., & Hawken, P. (1999).A Roadmap for Natural Capitalism. <i>Harvard Business Review</i>, 77(3), 145. https://link-gale-com.ezproxy.cul.columbia.edu/apps/doc/A54556305/AONE?u=columbiau&sid=summon&xid=ca39aa31 • Wackernagel, M., Beyers, B. (2019), Footprint - Why?, Area as a Currency, How much Biocapacity Does a Person Need, Footprint Compass: How much Biodiversity Do we Need for a Good Life?, <i>Ecological Footprint: Managing our Biocapacity Budget</i> | |

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| | | <p>(pp. 1-37, 95-111) Gabriola Island, BC Canada, New Society Publishers</p> <ul style="list-style-type: none"> ● International Labour Office. (2004). A fair globalization : the role of the ILO : report of the Director-General on the World Commission on the Social Dimension of Globalization. Geneva, International Labour Office. ● The Triple Bottom Line: What Is It and How Does It Work? https://www.ibrc.indiana.edu/ibr/2011/spring/pdfs/article2.pdf | |
| Week 2 | <p>Week 2</p> <p>Measuring Sustainability: Use of Data and KPIs in Sustainability Management</p> <p>Questions to be addressed:</p> <ul style="list-style-type: none"> ● What is data? ● What is a KPI? ● How are KPIs developed? ● Uses of different KPIs in measuring sustainability (GDP, HDI, Financial KPIs) ● Use of Weightings ● Use of Standardization ● Example Calculations (HDI Calculations) ● ● What is data? ● What is a KPI? ● How are KPIs developed? ● Uses of different KPIs in measuring sustainability (GDP, HDI, Financial KPIs) ● Use of Weightings ● Use of Standardization ● Example Calculations (HDI Calculations) | <ul style="list-style-type: none"> ● Bell, S., & Morse, S. (2008). <i>Sustainability Indicators—Measuring the Immeasurable? 2nd Edition. P3-30.</i> Earthscan. [DG1] ● Boulanger, P.-M. (2008). Sustainable development indicators: a scientific challenge, a democratic issue. <i>Surveys and Perspectives Integrating Environment and Society</i>, 1(1). https://journals.openedition.org/sapiens/166 ● Using The Pressure-State-Response Model To Develop Indicators Of Sustainability: http://documentacion.ideam.gov.co/openbiblio/bvirtual/017931/DocumentosIndicadores/Temasvarios/Docum26.pdf <p><u>Tools:</u></p> <ul style="list-style-type: none"> ● Measuring Success: Tracking the Progress of the Sustainable Development Goals https://storymaps.arcgis.com/stories/ffa9380903e84bd2bfdd00deef46333 ● The 2020 Atlas of Sustainable Development Goals: Stories and insights through innovative visuals: https://blogs.worldbank.org/opendata/2020-atlas-sustainable-development-goals-stories-and-insights-through-innovative-visuals | |
| Week 3 | <p>Week 3</p> <p>Intro to Value Chain ESG Analysis: Operations</p> <p>Questions to be addressed:</p> | <ul style="list-style-type: none"> ● Wackernagel, M., Beyers, B. (2019), Footprint - Why?, Area as a Currency, How much Biocapacity Does a Person Need, Footprint Compass: How much Biodiversity Do we Need for a Good Life?, <i>Ecological Footprint: Managing our Biocapacity Budget</i> | |

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| | <ul style="list-style-type: none"> ● Basic Company Analysis: Intro to company data: XYZ Company ● Use of different data tools and sources: FactSet, MSCI, Company Reports, ● Use of data analysis tools: Excel, R, GIS ● Intro to value chain analysis and materiality ● Intro to Impact Assessment Methodologies <ul style="list-style-type: none"> ○ Scenario Analysis ○ What is Ecological Footprint ○ What is a life cycle analysis (LCA) | <p>(pp. 1-37, 95-111) Gabriola Island, BC Canada, New Society Publishers.</p> <ul style="list-style-type: none"> ● Baumann, H., Tillman A., (2004), <i>The Hitchhiker's Guide to LCA - An orientation in LCA methodology and application</i>, Professional Publishing House (Chapters 1, 3 & 6) ● Sheffi, Y. and Blanco, E, S. (2018). Impact Assessment, <i>Balancing Green</i> (pp 55-90). The MIT Press, Cambridge, Massachusetts <p><u>Optional:</u></p> <ul style="list-style-type: none"> ● Castellani V., Sala S. (2012), <i>Ecological Footprint and Life Cycle Assessment in the sustainability assessment of tourism activities, Ecological Indicators</i>, Volume 16, pp. 135-147. https://www.sciencedirect.com/science/article/pii/S1470160X11002469 ● Pierini V. I., Mazzeo N., Cazenave M., Semmartin M., (2021) Waste generation and pro-environmental behaviors at household level: A citizen science study in Buenos Aires (Argentina), <i>Resources, Conservation and Recycling</i>, Volume 170, https://www.sciencedirect.com/science/article/pii/S0921344921001671 | |
| Week 4 | <p>Week 4</p> <p>Value Chain ESG Analysis / Operations: Water</p> <ul style="list-style-type: none"> ● What are key Impact, Risk and Opportunities (IROs) of water? ● What are the key guidelines and data types? ● What are the existing tools and datasets? <p>Case Study Analysis: Dummy (XYZ) Company</p> <ul style="list-style-type: none"> ● Inside Out: Physical risks of water scarcity and pollution in the operation. Water withdrawal and consumption calculations | <ul style="list-style-type: none"> ● WRI (2023), Aqueduct 4.0: Updated decision-relevant global water risk indicators, https://files.wri.org/d8/s3fs-public/2023-08/aqueduct-40-technical-note.pdf?VersionId=G_TxTR2LAnlgXGzy7xtDUP_5lmkXJY7d ● Water Footprint Network: https://waterfootprint.org/en/ ● Tesco drops carbon-label pledge (news article): https://www.theguardian.com/environment/2012/jan/30/tesco-drops-carbon-labelling <p><u>Optional:</u></p> <ul style="list-style-type: none"> ● Volumetric Water Benefit Accounting (VWBA): A Method For Implementing and Valuing Water Stewardship Activities: https://www.wri.org/research/volumetric-wat | First assignment due |

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| | <ul style="list-style-type: none"> ● Outside In Impacts: Legal, technology, and reputation risks from the existing physical risks in the operation ● Strategy and Management: Water Stewardship Strategy and programs ● Calculations: "CDP Water Scoring, GRI 303: Water" ● Targets: "Net Positive Water (NPW) Goals, WaterSense (EPA), Zero liquid discharge (ZLD) systems" ● Example use of Tools and Datasets: "WRI Aqueduct, ECOLAB Water Risk" | <p><u>er-benefit-accounting-vwba-method-implementing-and-valuing-water-stewardship</u></p> <ul style="list-style-type: none"> ● Water Footprint Assessment Manual: <u>https://waterfootprint.org/media/downloads/TheWaterFootprintAssessmentManual_2.pdf</u> ● WaterPub: https://www.waterfootprint.org/publications/ <p>Tools:</p> <ul style="list-style-type: none"> ● <u>https://www.waterfootprintassessmenttool.org</u> ● WRI Aqueduct: <u>https://www.wri.org/aqueduct</u> | |
| Week 5 | <p>Week 5</p> <p>Value Chain ESG Analysis: Supply Chains - Material Extraction: Human Rights and Living Wage</p> <ul style="list-style-type: none"> ● What are key Impact, Risk and Opportunities (IROs) of Human Rights and Living Wage? ● What are the key guidelines and data types? ● What are the existing tools and datasets? <p>Case Study Analysis: Samsung Electronics</p> <ul style="list-style-type: none"> ● Inside Out: Human rights risks in supply chains. ● Outside In Impacts: Legal and reputation risks from the existence of human rights risks in supply chain (material extraction). ● Strategy and Management: "Establish a Human Rights Policy and Due Diligence Framework (Human Rights Risk Assessments, Responsible Sourcing and Supplier | <ul style="list-style-type: none"> ● GRI (2016), GRI 409, Forced or Compulsory Labor 2016 <u>https://www.globalreporting.org/standards/media/1024/gri-409-forced-or-compulsory-labor-2016.pdf</u> ● Walk Free (2023), Global Slavery Index Report, <u>https://cdn.walkfree.org/content/uploads/2023/05/17114737/Global-Slavery-Index-2023.pdf</u> ● Walk Free (2023), Global Slavery Index Methodology, <u>https://www.walkfree.org/global-slavery-index/methodology/methodology-content/#prevalence</u> ● Living Wage Calculator Methodology: <u>https://livingwage.mit.edu/resources/Living-Wage-Users-Guide-Technical-Documentation-2023-02-01.pdf</u> and online: <u>https://livingwage.mit.edu/pages/methodology</u> ● Anker, R. (2017). Living wages around the world : manual for measurement. In. ● Why Living Wages Should Matter To Your Business <u>https://socapglobal.com/2017/10/living-wage-s-matter-business/</u> ● Women's Empowerment and Business: 2020 Trends and Opportunities: <u>https://www.unglobalcompact.org/library/5738</u> | |

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| | <p>Engagement. Indigenous Rights and FPI, Grievance Mechanisms and Remedy Processes)</p> <ul style="list-style-type: none"> • Calculations: GRI 414: Supplier Social Assessment, GRI 412: Human Rights assessment, GRI 204: Procurement practices, Living Wage Calculations • Targets: Sustainalytics ESG Risk Rating, MSCI ESG Risk Rating, EcoVadis ESG Risk Ratings • Example use of Tools and Datasets: Living Wage Calculator | <ul style="list-style-type: none"> • Bloomberg Gender Equality Index: https://assets.bbhub.io/company/sites/46/2021/05/1121150_BBGT_2021GEI_Updte_GenderReportFrame_FNL.pdf <p><u>Case Studies:</u></p> <ul style="list-style-type: none"> • Samsung Electronics Sustainability Report 2023 • Samsung Electronics Supplier Code of Conduct • Samsung Electronic BUSINESS CONDUCT GUIDELINES 2016 • SAMSUNG ELECTRONICS Co., Ltd. 2022 Business Report <p><u>Tools:</u></p> <ul style="list-style-type: none"> • Living Wage Calculator: https://livingwage.mit.edu/ • US Census Data: https://www.census.gov/en.html • Hunger Map: https://hungermap.wfp.org/ • Call to Action: End Environmental Racism Now: https://storymaps.arcgis.com/stories/da0df1524c704b488d79bb3e656addb3?_lrsc=3a74f8ba-3735-4900-9084-134c8d7823c8 | |
| Week 6 | <p>Week 6</p> <p>Value Chain ESG Analysis: Supply Chains - Feed Stock & Farming: Nature and Biodiversity</p> <ul style="list-style-type: none"> • What are key Impact, Risk and Opportunities (IROs) of nature? • What are the key guidelines and data types? • What are the existing tools and datasets? | <ul style="list-style-type: none"> • TNFD (2023) Recommendations of the Taskforce on Nature-related Financial Disclosures • TNFD (2023), Guidance on the identification and assessment of nature-related issues: The LEAP approach • SBTN (2020) Initial Guidance for Businesses https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/11/Science-Based-Targets-for-Nature-Initial-Guidance-for-Business.pdf • Leading Harvest (2021) Leading Harvest Farmland Management Standard Est. 2020 Guidebook • Leading Harvest Farmland Management Standard 2020 | |

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| | <p>Case Study Analysis: Nestle</p> <ul style="list-style-type: none"> ● Inside Out: Biodiversity and habitats loss risks in the feedstock/farming ● Outside In Impacts: Legal, Technology and Market risks in the supply chain (feedstock/farming) ● Strategy and Management: TNFD Guidelines, LEAP Approach, Nature Strategies ● Calculations: "GRI 304 Biodiversity: ,Measuring Significant direct and indirect impacts on biodiversity in the supply chain (feedstock/farming), Analysis of IUCN Red List species affected by the operations of the supply chain (feedstock/farming), GRI 308: Supplier Environmental Assessment" ● Targets: The Science Based Targets for Nature (SBTN) ● Example use of Tools and Datasets: "TNFD Tool Catalogue, | <p><u>Case Study</u></p> <ul style="list-style-type: none"> ● Nestle 2022 Sustainability Report and performance indicators for 2022 ● Nestle regenerative agriculture Approach ● Nestle Responsible Sourcing Standard 2018 ● Nestle Agriculture Framework Measures | |
| <p>Wee k 7</p> | <p>Week 7</p> <p>Nature and Biodiversity</p> <p>Cont'd: Use of Data Tools: WWF Biodiversity Risk Filter / Use of Dummy Dataset</p> <p>Value Chain ESG Analysis / Logistics: Emissions</p> <ul style="list-style-type: none"> ● What are key Impact, Risk and Opportunities (IROs) of logistic emissions? ● What are the key guidelines and data types? ● What are the existing tools and datasets? | <ul style="list-style-type: none"> ● WWF (2023), WWF Water Risk Filter Methodology Documentation, January 2023 https://cdn.kettufy.io/prod-fra-1.kettufy.io/documents/riskfilter.org/WaterRiskFilter_Methodology.pdf ● WWF (2023), WWF Biodiversity Risk Filter Methodology Documentation, https://cdn.kettufy.io/prod-fra-1.kettufy.io/documents/riskfilter.org/BiodiversityRiskFilter_Methodology.pdf ● Smart Freight Centre (2023), Global Logistics Emissions Council Framework for Logistics Emissions Accounting and Reporting; v3.0 edition. https://smart-freight-centre-media.s3.amazonaws.com/documents/GLEC_FRAMEWORK_v3_UPDATED_13_12_23.pdf | |

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| | <p>Case Study Amazon</p> <ul style="list-style-type: none"> ● Inside Out: "Emissions from owned and Leased Vehicles. Emissions from purchased services" ● Outside In Impacts: "Legal, reputational and mitigation costs of carbon on logistics" ● Strategy and Management: Mode Switching, Electrification, Supplier prioritization ● Calculations: Scope 1, Scope3 ● Targets: SBTs ● Example use of Tools and Datasets: GLEC Framework and calculations. | | |
| | <p>Spring Break, no class</p> | | |
| <p>Week 8</p> | <p>Week 8</p> <p>Value Chain ESG Analysis: Customers, Retail: Resource Use and Circular Economy</p> <ul style="list-style-type: none"> ● What are key Impact, Risk and Opportunities (IROs) of the circular economy at retail? ● What are the key guidelines and data types? ● What are the existing tools and datasets? <p>Case Study: Home Depot</p> <ul style="list-style-type: none"> ● Inside Out: Resources use transition risks in the retail ● Outside In Impacts: Legal, technology and market risks, (e.g. CAPEX of building (circular stores and warehouses))" | <ul style="list-style-type: none"> ● Atasu, A., Dumas, C., Wassenhove, L., N. V., (2021), The Circular Business Model ● Pick a strategy that fits your resources and capabilities, HBR Press. https://hbr.org/2021/07/the-circular-business-model#:~:text=The%20Solution,extension%2C%20and%20design%20for%20recycling. ● Acaroglu, L. (2020), Quick Guide to Circular Economy Business Strategies, Medium https://medium.com/disruptive-design/quick-guide-to-circular-economy-business-strategies-b3d6a000facf ● Ellen MacArthur, (2023), The biological cycle of the butterfly diagram https://www.ellenmacarthurfoundation.org/articles/the-biological-cycle-of-the-butterfly-diagram#:~:text=On%20the%20left%2Dhand%20side,are%20consumed%2C%20such%20as%20food. | <p>Second assignment due (Midterm)</p> |

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| | <ul style="list-style-type: none"> ● Strategy and Management: "Secondhand retail and product resale, Upcycling and product repurposing, Recycling and Takeback for packaging. ● Calculations: "GRI 301: Materials , GRI 306: Waste, GRI 717: Marketing and Labelling, Life cycle assessment, SASB: MULTILINE AND SPECIALTY RETAILERS & DISTRIBUTORS , ESRS E5" ● Targets: "CDP Climate Scoring, True Zero Waste Rating System ● Example use of Tools and Datasets: "Life cycle assessment tools : Circulytics Resources (Ellen McArthur Foundation) | <ul style="list-style-type: none"> ● Ellen MacArthur, (2023), The technical cycle of the butterfly diagram https://www.ellenmacarthurfoundation.org/articles/the-technical-cycle-of-the-butterfly-diagram <p><u>Case Study:</u></p> <ul style="list-style-type: none"> ● Amazon 2022 Sustainability Report ● AWS Water Positive Methodology ● EPA (2022), Emission Factors for Greenhouse Gas Inventories ● Amazon GHG Verification Letters | |
| Week 9 | <p>Week 9</p> <p>GUEST SPEAKER: Sphera - Collecting company-wide ESG Data, Carbon Calculations</p> | TBD | |
| Week 10 | <p>Week 10</p> <p>Corporate Reporting and Data Integrity</p> <ul style="list-style-type: none"> ● ESG Reporting Frameworks <ul style="list-style-type: none"> ○ Map of reporting frameworks ○ Timeline of reporting. ○ Data entry procedures ○ Data collection and Reporting Tools ● Data Integrity and Internal Controls <ul style="list-style-type: none"> ○ What is data integrity ○ How data is “really” collected | <ul style="list-style-type: none"> ● EFRAG, (2023), Implementation Guidance for Materiality Assessment https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FMeeting%20Documents%2F2302241032237237%2F03-02%20Materiality%20Assessment%20Implementation%20guidance%20clean%20SRB%20231025.pdf ● ESRS Standards ● IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information ● GRI 1 Foundation ● GRI 3 Material Topics 2021 ● TCFD Implementing the Recommendations (pp. 1-24): | |

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| | <ul style="list-style-type: none"> ○ Data validation steps and governance structure around validation | <p>https://www.fsb.org/wp-content/uploads/P141021-4.pdf</p> <ul style="list-style-type: none"> ● Ropes & Gray (2024), EU Corporate Sustainability Reporting Directive draft materiality assessment guidance published – key points from the guidance https://www.ropesgray.com/en/insights/viewpoints/102iw56/eu-corporate-sustainability-reporting-directive-draft-materiality-assessment-guid <p>Tools:</p> <ul style="list-style-type: none"> ● GRI Standards: https://www.globalreporting.org/how-to-use-the-gri-standards/resource-center/?g=8ee95e9c-809c-4b2f-9ca2-9cf8de760a60&id=13673 ● SASB Materiality Map: https://materiality.sasb.org/materiality.html ● SASB Materiality Finder: https://www.sasb.org/standards/materiality-finder/find/ | |
| Week 11 | <p>Week 11</p> <p>Value Chain ESG Analysis: Consumer Use and End of Life</p> <p>GUEST SPEAKER: DayRize - Product Emission Calculations and How to</p> | TBD | |
| Week 12 | <p>Week 12</p> <ul style="list-style-type: none"> ● Finance & ESG: Data Providers and Raters & Rankers ● Investors' role in the ESG Space <ul style="list-style-type: none"> ○ PRI Principles | <ul style="list-style-type: none"> ● ESG Investing: Practices, Progress and Challenges (pp. 14-67): https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf ● Esty, D. C., (2020). Creating Investment-Grade Corporate Sustainability Metrics. In Esty, D. C., Cort, T. (Eds.). <i>Values at Work</i> (pp 51-66). Palgrave Macmillan | |

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| | <ul style="list-style-type: none"> ○ Raters and Rankers: How ESG scores work OR don't work ○ Proxy Voting ● ESG Mutual Funds and ETFs <ul style="list-style-type: none"> ○ SEC regulation on definitions. ○ How is raw ESG data used in investment tools <p>Case Study: Company Comparison: Apple vs Samsung</p> | <ul style="list-style-type: none"> ● Rate the Rankers: https://www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/sustainability-ratetheraters2020-report.pdf ● Bloomberg vs. Capital IQ vs. FactSet vs. Thomson Reuters Eikon: https://www.wallstreetprep.com/knowledge/bloomberg-vs-capital-iq-vs-factset-vs-thomson-reuters-eikon/ ● The thorny truth about socially responsible investing: https://www.vox.com/the-goods/22714761/esg-investing-divestment-fossil-fuels-climate-401k ● Addy, C., Chorenge, M., Collins, M., & Etzel, M. (2019). calculating the value of impact investing An evidence-based way to estimate social and environmental returns. Harvard Business Review, 97(1), 102-109. ● Utz, S. and M. Wimmer (2014). "Are they any good at all? A financial and ethical analysis of socially responsible mutual funds." Journal of Asset Management 15(1): 72-82 <p><u>Optional:</u></p> <ul style="list-style-type: none"> ● Wilkinson, A. and Kupers, R. (2013), <i>Managing Uncertainty: Living in the Futures</i>, Harvard Business Review. <p><u>Tools:</u></p> <ul style="list-style-type: none"> ● Bloomberg Terminal ESG Screen (Or any system available terminal through SUMA) ● FactSet ● MSCI ● Sustainalytics | |
| Week 13 | <p>Week 13</p> <p>GUEST SPEAKER: WRI - ESG Data tools, methodologies behind them and how to use them effectively.</p> | TBD | |
| Week 14 | <p>Week 14</p> <p>Final Presentations and Final Project Due</p> | N/A | Final Assignment Due |

Course Policies

Participation and Attendance

You are expected to complete all assigned readings, attend all class sessions, and engage with others in class discussions. If you need to miss a class for any reason, please discuss the absence with the instructor in advance.

Late work

There will be no credit granted to any written assignment that is not submitted on the due date noted in the course syllabus without advance notice and permission from the instructor.

Citation & Submission

All written assignments must use standard citation format (e.g., MLA, APA, Chicago), cite sources, and be submitted to the course website or in hardcopies.

School and University Policies and Resources

Copyright Policy

Please note—Due to copyright restrictions, online access to this material is limited to instructors and students currently registered for this course. Please be advised that by clicking the link to the electronic materials in this course, you have read and accept the following:

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials. Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specified conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

Academic Integrity

Columbia University expects its students to act with honesty and propriety at all times and to respect the rights of others. It is fundamental University policy that academic dishonesty in any guise or personal conduct of any sort that disrupts the life of the University or denigrates or endangers members of the University community is unacceptable and will be dealt with severely. It is essential to the academic integrity and vitality of this community that individuals do their own work and properly acknowledge the circumstances, ideas, sources, and assistance upon which that work is based. Academic honesty in class assignments and exams is expected of all students at all times.

SPS holds each member of its community responsible for understanding and abiding by the SPS Academic Integrity and Community Standards posted at <https://sps.columbia.edu/students/student-support/academic-integrity-community-standards>. You are required to read these standards within the first few days of class. Ignorance of the School's policy concerning academic dishonesty shall not be a defense in any disciplinary proceedings.

Diversity Statement

It is our intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength and benefit. It is our intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture.

Accessibility

Columbia is committed to providing equal access to qualified students with documented disabilities. A student's disability status and reasonable accommodations are individually determined based upon disability documentation and related information gathered through the intake process. For more information regarding this service, please visit the University's Health Services website: <https://health.columbia.edu/services/ods/support>.

School Policies and Expectations:

Accessibility Statement – I want you to succeed in this course. Contact disability@columbia.edu for learning accommodations.

Names/Pronouns

You deserve to be addressed in a manner that reflects your identity. You are welcome to tell me your pronoun(s) and/or name (if different from University records) at any time, either in person or via email.

Discrimination

We embrace the diversity of gender, gender identity & expression, sex, sexual orientation, race, ethnicity, national origin, age, religion, disability status, family status, socioeconomic background, and other visible and non-visible identities. Columbia University does not tolerate unlawful discrimination, discriminatory harassment, sexual assault, domestic violence, dating violence, stalking, or sexual exploitation and all such conduct is forbidden by Columbia University Policy.

Duty to Report

You deserve a University community free from discrimination, harassment, and gender-based misconduct including sexual harassment, sexual assault, domestic and dating violence, stalking, and sexual exploitation. It is therefore University policy to require Columbia faculty and staff to report to EOAA any instance or allegation of prohibited conduct involving any undergraduate or any graduate student that is disclosed to, observed by, or otherwise known to that employee. This requirement to report is in place to help ensure that students are provided appropriate resources and to allow the University to mitigate harm to our community.

Confidential Resources

There are confidential resources on campus who do not have a Duty to Report, including:

- * Sexual Violence Response & Rape Crisis/Anti-Violence Support Center (SVR)
- * Ombuds Office
- * Medical Services
- * University Counseling and Psychological Services
- * University Pastoral Counseling
- * Columbia Office of Disability Services

University employees working in a confidential capacity will not report information shared with them.

Inclusion

In the M.S. in Sustainability Management program, faculty and staff are committed to the creation and maintenance of “inclusive learning” spaces – classrooms and other places of learning where you will be treated with respect and dignity, and where all individuals are provided equitable opportunity to participate, contribute, and succeed.

All students are welcome regardless of race/ethnicity, gender identities, gender expressions, sexual orientation, socio-economic status, age, disabilities, religion, regional background, Veteran status, citizenship status, nationality and other diverse identities that we each bring to class.

Class Recordings

All or portions of the class may be recorded at the discretion of the Instructor to support your learning. At any point, the Instructor has the right to discontinue the recording if it is deemed obstructive to the learning process.

If the recording is posted, it is confidential and it is prohibited to share the recording outside of the class.

SPS Academic Resources

The Office of Student Affairs provides students with academic counseling and support services such as online tutoring and career coaching: <https://sps.columbia.edu/students/student-support/student-support-resources>.

Columbia University Information Technology

Columbia University Information Technology (CUIT) provides Columbia University students, faculty and staff with central computing and communications services. Students, faculty and staff may access University-provided and discounted software downloads.

Columbia University Library

Columbia's extensive library system ranks in the top five academic libraries in the nation, with many of its services and resources available online.

The Writing Center

The Writing Center provides writing support to undergraduate and graduate students through one-on-one consultations and workshops. They provide support at every stage of your writing, from brainstorming to final drafts. If you would like writing support, please visit the following site to learn about services offered and steps for scheduling an appointment. This resource is open to Columbia graduate students at no additional charge. Visit <http://www.college.columbia.edu/core/uwp/writing-center>.

Career Design Lab

The Career Design Lab supports current students and alumni with individualized career coaching including career assessment, resume & cover letter writing, agile internship job search strategy, personal branding, interview skills, career transitions, salary negotiations, and much more. Wherever you are in your career journey, the Career Design Lab team is here to support you. Link to <https://careerdesignlab.sps.columbia.edu/>

Netiquette

[Only applies to courses using online platforms]

Online sessions in this course will be offered through Zoom, accessible through Canvas. A reliable Internet connection and functioning webcam and microphone are required. It is your responsibility to resolve any known technical issues prior to class. Your webcam should remain turned on for the duration of each class, and you should expect to be present the entire time. Avoid distractions and maintain professional etiquette.

Please note: Instructors may use Canvas or Zoom analytics in evaluating your online participation.

More guidance can be found at https://jolt.merlot.org/vol6no1/mintu-wimsatt_0310.htm

Netiquette is a way of defining professionalism for collaborations and communication that take place in online environments. Here are some Student Guidelines for this class:

- Avoid using offensive language or language that is not appropriate for a professional setting.
- Do not criticize or mock someone's abilities or skills.
- Communicate in a way that is clear, accurate and easy for others to understand.
- Balance collegiality with academic honesty.
- Keep an open-mind and be willing to express your opinion.
- Reflect on your statements and how they might impact others.
- Do not hesitate to ask for feedback.
- When in doubt, always check with your instructor for clarification.