

Introducing the *Atlas of Sustainability*: A case study in Actionable Cartography

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Introduction: The *Atlas of Sustainability* (Figure 1) is a compendium of maps and geographic narratives that promote action on the largest social, economic, and environmental challenges facing our world as identified through the United Nations Sustainable Development Goals (SDGs; Roth, Gartner, et al., 2025). The *Atlas* builds on past collaborations between the United Nations and the International Cartographic Association to develop resources for designing “SDG maps” that aim to achieve a more equitable and just world. Among other initiatives, past projects include creation and distribution of *Mapping for a Sustainable World*, a Cartography textbook jointly published by the United Nations and International Cartographic Association that uses the SDG global indicator framework as the central theme throughout the book (Kraak et al., 2020). The *SDG global indicator framework* comprises (at the time of this writing) 17 goals to address the most pressing problems facing our planet, 169 targets that prescribe real and actionable outcomes for sustainability, and 231 unique indicators used to measure and monitor progress towards these targets, inform policy at global and local levels, and promote accountability across all stakeholders. The *Atlas of Sustainability* is the practical application of the textbook *Mapping for a Sustainable World*, extending the SDG mapping from the book to produce a compelling, innovative, and personalized visual essay on each of the 17 SDGs.

Background: The *Atlas of Sustainability* is the result of the 2025 *Design Challenge*, a condensed mapping workshop that brings together cartographers, domain experts, and local stakeholders around a curated mapping theme (Roth, 2024). The “Design Challenge” has run consecutively in the University of Wisconsin Cartography Lab (UW Cart Lab) since 2015, wrapping its 10th annual event in 2024 (e.g., Moore et al., 2017; Kelly, 2020; Bley et al., 2022; Iverson et al., 2025). For 2025, we combined efforts with the ICA Commissions on Cartography & Sustainable Development and the User Experience as well as students from the Erasmus Mundus MSc Cartography Programme and Masaryk University. Specifically, we “challenged” ourselves to design a collective atlas of the SDGs inspired by the Guerrilla Cartography “Atlas” model (Cowart & Powell, 2019) ... in just one week! Accordingly, the 2025 Design Challenge and resulting *Atlas* is a case study in *Actionable Cartography*, demonstrating that Cartography is not only methodologically and technically capable of visualizing global goals but also agile and impactful within tight timeframes.



Figure 1. Cover design, *Atlas of Sustainability*.

Process: The 2025 Design Challenge was held on May 12–16 at the Technische Universität Wien and built on the deep prior collaborations among the 13 organizers / *Atlas* editors as well as the diverse backgrounds and experiences of participating students. Notably, the MSc Cartography Programme is explicitly international in enrollment, with the 2025 workshop drawing 38 students from 26 countries. Accordingly, the organizers set out not to replicate the authoritative SDG mapping from the *Mapping for a Sustainable World* textbook, but rather to explore national and local inequalities and interdependencies existing within each SDG. Specifically, we asked students to form small groups based on common interests in the SDGs and to tell a compelling visual story about their team’s common ground around the SDG and the alternatives possible from their different, worldwide perspectives.

Rather than supplying a single specification sheet for all groups to follow as with the *Mapping for a Sustainable World* textbook (see Roth, Iverson, et al., 2025), we encouraged students to develop novel cartographic solutions and unique visual styles that matched their narrative about the SDG (Figure 2). We imposed only three constraints to maintain some coherence for the *Atlas*: (1) Students formed one group per SDG (group organization was remarkably effortless, demonstrating the diverse interests of the student participants), (2) each group used the same four-column, landscape, A4 design template for their layout, and (3) each group developed an artistic statement following the same question prompts about their creative design process and what the resulting maps mean for action about our planet's future.

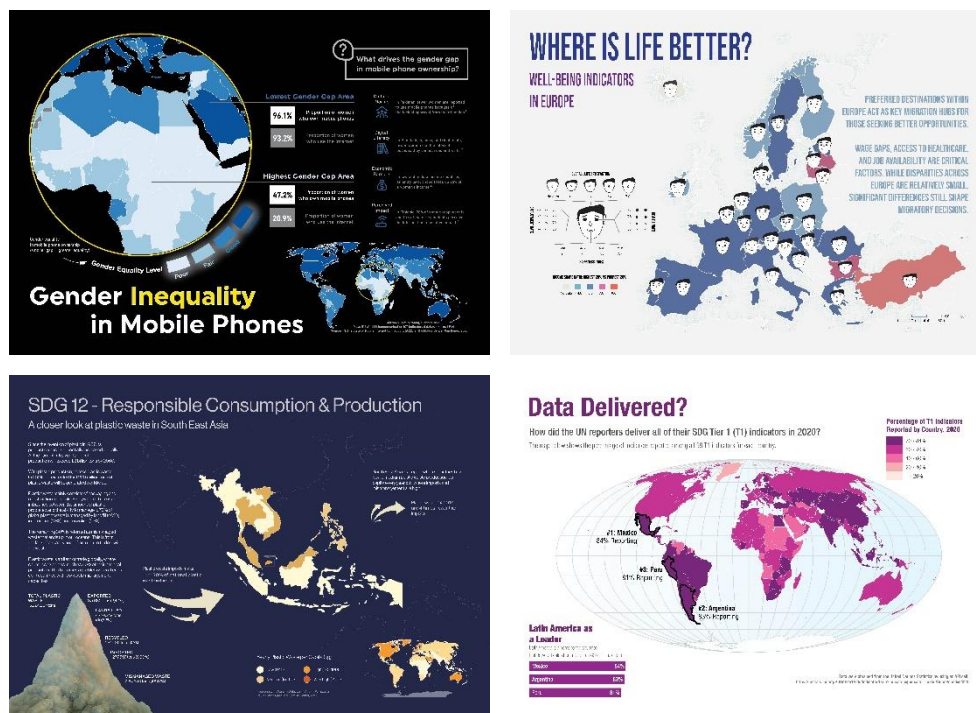


Figure 2. Example Maps from the *Atlas of Sustainability*. Top-left: *Gender Inequality in Mobile Phones* by Ximing Wang & Yvonne Darko. Top-Right: *Where is Life Better? Well-being Indicators in Europe* by Kristina Dujakovic & Miguel A Martinez Solano. Bottom-left: *A Closer Look at Plastic Waste in South East Asia* by Paula Martín Castillo & Camille Rahier. Bottom-right: *Data Delivered? Reporting SDG Tier 1 Indicators in 2020* by Anna Auermüllerová, Gabriela Godišková, & Dajana Snopková.

We broke the 2025 Design Challenge into six 90-150 minute units, each with its own learning objectives based on Bloom's updated taxonomy (see Appendix; Krathwohl, 2002), circulating recently extended open source QGIS tutorials on SDG mapping beforehand for technical support (Houtman et al., 2021; Houtman & Roth, 2021). The schedule included opening inspiration talks (Unit 1), a group formation and brainstorming process (Unit 2), three focused sprints that move the story through data, design, and development (Units 3–5), and group presentations for constructive feedback (Unit 6). Thus, while the workshop stretched over a week, actual student design occurred in roughly 12 hours of creative bursts with gaps for critical reflection (and attendance of other courses).

Results: The *Atlas of Sustainability* was published in May 2025 by the International Cartographic Association and distributed at the 2025 United Nations Global Geospatial Information Management meeting in New York City (USA). The Design Challenge schedule and resources, along with the *Atlas* itself, are archived under a CC BY license for reuse and extension: <https://github.com/uwcartlab/Vienna-DC-2025>.

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Appendix: Learning objectives of the six units constituting the 2025 Design Challenge based on Bloom's taxonomy.

	Unit 1		Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Collaborative	Create	x	L4: Formulate	L5: Assemble	L5: Design	L5: Develop	L5: Produce
			LO2.4: Formulate potential data-driven stories about an SDG	LO3.5: Assemble UN and alternative geospatial datasets for an SDG story	LO4.5: Design appropriate thematic maps and supporting charts for an SDG story in GIS and statistical software	LO5.5: Develop an SDG atlas spread in graphic design software using the grid	LO6.5: Produce a collective atlas of the SDGs using desktop publishing software
	Evaluate	L5: Evaluate	L1: Appraise	L2: Assess	L4: Select	L2: Critique	L3: Recommend
		LO1.5: Evaluate creative map design possibilities for inclusion in a collective atlas	LO2.1: Appraise the 17 SDGs based on experiences and interests	LO3.2: Assess SDG indicator data availability and quality for an SDG story	LO4.4: Select an optimal layout based on the grid	LO5.2: Critique cartographic design decisions that are difficult to change outside of GIS software, such as projections, generalization, normalization, and classification	LO6.3: Recommend design revisions based on cartographic principles as constructive peer feedback
	Analyze	L2: Examine	L2: Organize	L4: Analyze	L2: Compare	L3: Explore	L1: Deconstruct
		LO1.2: Examine the SDGs as pressing geographic challenges facing our planet	LO2.2: Organize into small groups according to mutual interests in the SDGs	LO3.4: Analyze patterns, trends, and uncertainties in SDG indicator data	LO4.2: Compare and contrast how different places represent alternative solutions for an SDG	LO5.3: Explore different visual styles that reinforce an SDG story according to form, color, type, and texture	LO6.1: Deconstruct the creative design process into the most relevant milestones using visual screenshots
Individual	Apply	L3: Use	L5: Apply	L3: Execute	L3: Sketch	L1: Demonstrate	L4: Implement
		LO1.3: Use the SDG global indicator framework and the M49 standard	LO2.5: Apply unique experiences and interests to SDG stories	LO3.3: Execute joins of SDG indicator attributes to geospatial boundary files in GIS software	LO4.3: Sketch different layouts for an SDG atlas spread	LO5.1: Demonstrate tips and tricks for polishing mapping in graphic design software	LO6.4: Implement peer feedback into an SDG spread
	Understand	L1: Understand	L3: Discuss	L1: Identify	L1: Locate	L4: Describe	L2: Report
		LO1.1: Understand the history and purpose of the United Nations Sustainable Development Goals (SDGs)	LO2.3: Discuss professional and research interests in the SDGs	LO3.1: Identify the main point of an SDG story	LO4.1: Locate important places (i.e., key characters) to an SDG story	LO5.4: Describe the creative design process behind an SDG atlas spread as an artistic statement	LO6.2: Report on the creative design process behind the SDG atlas spread
	Remember	L4: List	x	x	x	x	x
		LO1.4: List tips and tricks for mapping the SDG global indicator framework					

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