Creating a Geosciences Sustainability Atlas

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Summary

Geoscientists of every discipline have a pivotal role in advancing sustainability within the framework of the United Nations Sustainable Development Goals (SDGs). Yet not all are aware of the specificities of their contributions and in position to feel proud and communicate the value proposition of the geoscience professions to society at large. Several initiatives have elevated consciousness about the geosciences' contributions and potential, but none do so expansively. The most notable effort to date is the "Geophysical Sustainability Atlas" (Capello et al., 2021), which raised the awareness about the importance of geophysics in the pursuit of each of the 17 SDGs and triggered an enhanced vision about the pivotal role of geophysicists in advancing sustainability.

This article shares our team's progress in creating a more comprehensive atlas that aims to engage all the geosciences and will communicate to a larger audience how geoscientists advance sustainability in their daily work. The aim of the Geosciences Sustainability Atlas is to motivate geoscientists and society at large to comprehend why and how geoscientists are huge contributors to sustainability and need to be part of the sustainability narrative.

By disclosing how these multinational, multidisciplinary volunteer initiatives are being shaped, we hope to foster the proliferation of similar projects.

Introduction

Geosciences are close to everyone in ways that are intuitive as well as scientific. We admire the world that surrounds us every time we are in contact with nature and have the privilege to see mountains, rivers, or valleys of tremendous beauty. The wonder increases when we discover, generally at early ages, that life on our planet was dominated by dinosaurs, among many profound developments in natural history. What amazement we have when we find fossil shells on mountain rocks at very high altitude, covered by snow! Even in youth we marvel at the magnificent and extraordinary perspectives we encounter in the realm of the geosciences.

The outlook for geosciences would be clearer if there were greater clarity about how geoscience is applied or can be applied to societal, economic, and environmental challenges. We are creating the Geosciences Sustainability Atlas to map various ways disciplines within the geosciences can be practiced and applied to augment the value they deliver to the world in the context of the 17 UN SDGs. In so doing, we are aiming to create a platform to promote better understanding of and inspiration about sustainability activity in the geosciences.

The framework

Geosciences and geoscientists can contribute unique skills and competencies to the initiatives and efforts necessary to achieve the ambitions of the "2030 Agenda for Sustainable Development," adopted by all United Nations Member States in 2015; the agenda is a blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 SDGs, which are an urgent call for action by all countries—developed and developing—in a global partnership." (UN SDG, 2022).

The 17 UN SDGs are:

SDG 1 No Poverty
SDG 2 Zero Hunger
SDG 3 Good Health and Well-being
SDG 4 Quality of Education
SDG 5 Gender Equality
SDG 6- Clean Water and Sanitation
SDG 7 Affordable and Clean Energy
SDG 8 Decent Work and Economic Growth
SDG-9 Industry, Innovation and Infrastructure
SDG 10 Reduced Inequality
SDG 11 Sustainable Cities and Communities
SDG 12 Responsible Consumption and Production
SDG 13 Climate Action
SDG 14 Life Below Water
SDG 15 Life on Land
SDG 16 Peace and Justice / Strong Institutions
SDG 17 Partnerships for the Goals

The SDGs are accompanied by an appealing graphic design that aims to enhance inclusion of the goals in projects and initiatives of all types (Figure 1).

Figure 1. The 17 UN Sustainable Development Goas (SDGs) graphical icons.

The timeline

We started the creation of the Geoscience Sustainability Atlas in February 2021, when some representatives of the American Association of Petroleum Geologists (AAPG) petitioned to expand the Geophysical Sustainability Atlas to all disciplines, to gain a fuller approach to sustainability in the profession and to inspire a larger audience. The first formal meeting about the Geosciences Sustainability Atlas was held on 10 March 2021, with a core team that later was expanded to 12 members. The aim is to finalize the Atlas in 2022 (Figure 2).

The aim

The new Geosciences Sustainability Atlas intends to address all geoscientists, related professionals and sectors, and society at large (Figure 3). This aim has led our team to place a special emphasis on keeping the Atlas writing simple and including many infographics and examples with motivational power. Our team considers it essential to support the stories and concepts within the work with excellent photographs, including many highlighting geoscientists at work to motivate readers of any sector and provenance. The team is seeking wide global dissemination of the Atlas.

The Dimensions

From the feedback received about the Geophysical Sustainability Atlas, in which geophysics was mapped to each one of the 17 UN SDGS, it became clear that a simpler approach would be more beneficial. So, the team is clustering geoscientific contributions to the SDGs into three "Dimensions"—People, Planet, and Prosperity under the 2030 Agenda UNGA Resolution 70/1. The underlying targets and indicators provide structure for consideration of a variety of avenues for contribution by geoscientists. The SDGs are assigned to Dimensions based on the Dimensions in which geosciences have the most impact with respect to achievement (targets) and/or monitoring (indicators).

Furthermore, the addition of practical "Examples" is considered pertinent to further explain geosciences contributions. The three Dimensions of the Geosciences Sustainability Atlas are:

- **PEOPLE**
- **PLANET**
- **PROSPERITY**

These Dimensions follow loosely what other organizations have done: Some of the traditional employers of geoscientists, such as oil and gas and mining companies and academia, currently are expressing their sustainability strategies in SDGs clusters, or selecting the specific SDGs toward which each organization contributes the most.

To be inclusive and thorough, the team is aiming to complete examples that would tap into all 17 SDGs, maintaining an approach similar to the one taken in development of the Geophysical Sustainability Atlas, but updating it in terms of modernity, graphic appeal, and accessibility to a large and diverse readership.

In the Geosciences Sustainability Atlas, the distributions envisioned at the current stage follows:

DIMENSION PEOPLE

- Primary: 1, 2, 3, 4, 5, 6, 17
- Secondary: 5, 8, 10, 11, 16

DIMENSION PLANET

- Primary: 6, 7, 12, 13, 14, 15, 17
- Secondary: 3, 11, 9, 16

DIMENSION PROSPERITY

- Primary 7, 8, 9, 10, 11, 17
- Secondary 1, 2, 3, 4, 5, 12, 16

Some SDGs appear in more than one Dimension, and in particular, SDG 17, Partnerships for the Goals, was considered by all in the team as crucial to advance the geosciences' contributions to sustainability. Hence, SDG 17 appears as a primary SDGs in each one of the three Dimensions.

The team

In order to include a representation of all regions of the world and give a voice to an ample variety of geoscience disciplines, 12 professionals shaped a multidisciplinary team to craft the Geosciences Sustainability Atlas. Meetings were held once a month or more frequently as needed. Sub-teams were organized to take on specific tasks. The teams and tasks:

- **Definition of the Dimensions**: To identify which SDGs were pertinent to each Dimension from a geosciences perspective
- **Materiality Matrix**: To understand what the priorities of the Atlas should be

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- **Atlas Wheel components**: To review and craft the Wheel of the Atlas, which summarizes the geosciences' contributions to each one of the SDGs
- **Geosciences Disciplines list:** To prepare a list of geoscience subdisciplines, and linking to valuable external sources for those seeking more information
- **Geosciences skills:** To list social, communication, and technical skills required in the new profile of geoscientists
- **Communication:** To communicate progress and endorsements through social media—LinkedIn, Twitter, and Instagram—and to request examples and photos to illustrate the Atlas (Figure 4)
- **Examples:** To draft of examples of geoscience projects to illustrate each of the Dimensions (several teams)

The Examples

A key component of the Atlas is the variety of examples that will illustrate each of the Dimensions. The approach followed included a call for examples in professional social-media platforms, followed by a dedicated work of analysis, ranking and selection of the final examples that will be included int the Atlas. To honor all submissions received, a catalog will be offered that will include work not selected for inclusion in the Atlas, so readers may discover additional examples of relevant geoscience work.

A template was prepared, to standardize the information provided in each example, with the following elements:

- Source
- Global to Local/ Local to Global view
- Challenges tackled
- Actions & Solutions
- Results
- Impact and Applicability of this example
- SDGs targeted
- Key Geoscience Skills used and needed (technical, conceptual, social. Skills gaps)
- Where to find out more
- Key players
- How to upscale and accelerate action, what needs to be done

Conclusions

- Multidisciplinary efforts to advance sustainability within the geosciences benefit expand understanding of the pivotal role of geoscientists play in advancing the SDGs.
- The Geosciences Sustainability Atlas would benefit from an awareness campaign to maximize collective outreach into the profession, including each of its major sectors — oil and gas, unconventional resources, near-surface geoscience applications to infrastructure projects, geohazards, mining, and academia, among others.
- There is a clear need to improve the skills, knowledge, and willingness of geoscientists to engage in assessments of their own economic, social, and environmental impacts and to optimize their participation and collaborative efforts toward achievement of the SDGs.
- The three levels of scope shaped the Atlas aims, simplifying the narrative and ensuring selection of examples meaningful to all.

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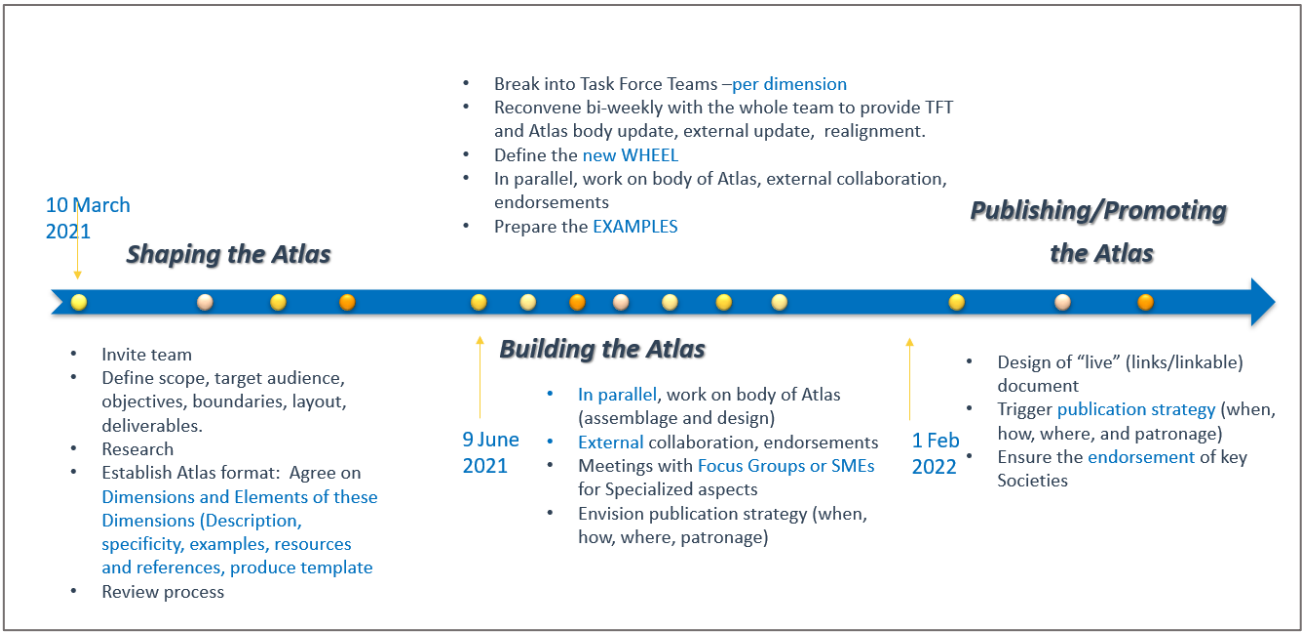

***Figure 2**. Timeline of the project. Publication is planned for 2022.*

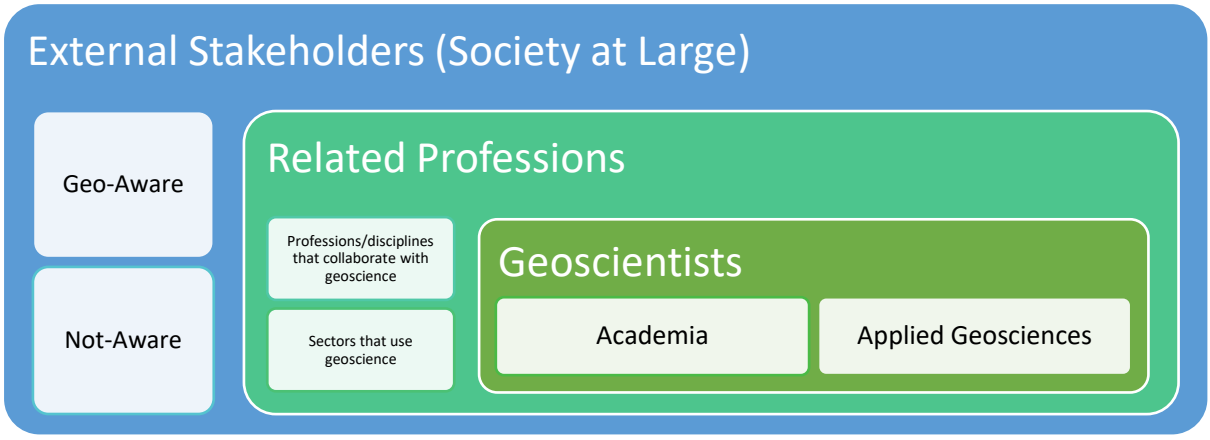

Figure 3. Three scopes of communication of the Geoscience Sustainability Atlas encompass geoscientists of all disciplines, then related professionals such as petroleum engineers, civil engineers, and environmental engineers. The final and farthest-out layer relates to society at large, in which there are individuals who are aware of geoscience and others who are not.

***Figure 4**. Examples of the posts on social media that aim to motivate geoscientists toward sustainability and the recognition of their own huge value proposition in advancing the 17 SDGs.*

REFERENCES

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