

The Agenda 2030 Compass: 2030 Compass CoLab

Work Package 2.2 Report for the Agenda 2030 Compass project

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This report presents the findings from the Agenda 2030 Compass project's Work Package 2.2 focusing on the development of the 2030 Compass CoLab. The project's overall findings are presented in the Agenda 2030 Compass synthesis report, which can be found along with all available project reports at: www.sei.org/agenda2030compass.

The research and development work has been carried out by a consortium consisting of the Stockholm Environment Institute (SEI), Jernkontoret (the Swedish Iron and Steel Producers' Association), the MIT Center for Collective Intelligence and Swedish software developer Swedwise.

Summary

2030 Compass CoLab used an online platform <https://www.2030compasscolab.org> to crowdsource input on SDG interactions from a large group of globally distributed experts. 163 experts were recruited and enrolled on the platform, which was accessible only to invited participants. The online exercise was conducted over a 3-week period during April and May of 2021.

An online form invited experts to select an SDG pair and to submit an interaction score for varying values of factors that described conditions within a country. 18 factors were provided in the default web form, and experts could also suggest additional factors of their own choosing. Among the factors included by default were economic indicators such as gross national income, social indicators like gender equity, and measures of physical and social infrastructure such as access to clean water/sanitation and spending on social protection programs.

Experts submitting interaction scores on a +3 (Strongly reinforcing) to -3 (Strongly counteracting) scale, with different scores requested for countries that had three different values for the selected factor: high (top quartile), medium (middle two quartiles) or low (bottom quartile). The evaluation of 518 SDG pairs were submitted by the experts.

The crowdsourced inputs were evaluated and 197 were judged to be of sufficient quality to be used to generate context maps, and these were imported into preliminary maps. The baseline maps aggregated 13 factors that were closely correlated with national income (Spearman rank correlation > 0.7). These maps can be seen as showing the range of interaction scores that ranged from countries with high income to those with low income. In addition to maps based on GNI (and factors highly

correlated with GNI), 3 additional, sparsely populated maps were generated for factors not closely correlated with national income, based on additional sets of factors: social protection, material footprint, and natural resources. These preliminary context maps, based on crowdsourced inputs, can serve as a resource to teams preparing 2030 Compass workshops in the future.

Sammanfattning

[As above but in Swedish]

Key words:

SDG interactions, crowdsourcing

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1 Introduction

The goal of 2030 Compass CoLab was to use an online platform to elicit input from a large group of experts on SDG interactions. Use of an online platform would allow the overall 2030 Compass project to incorporate input from a more geographically distributed and disciplinarily diverse group than could be reached by using traditional means of eliciting expert input, for example, face-to-face workshops or one-on-one interactions. If we were unable use an online platform in this way, the inputs to the larger project would of necessity have been be from a more geographically circumscribed and less diverse group of experts.

Successful deployment of an online platform, by contrast, could expand the geographic spread and diversity of perspectives represented. In particular, could enable greater participation by experts from the Global South, which would provide perspectives that may have been lacking in prior work on SDG interactions, which has primarily been undertaken by researchers based in Western Europe and North America. It would also facilitate greater participation from experts, since they could contribute asynchronously, as their schedules allowed.

2 Purpose, scope and deliverables

2030 Compass CoLab sought to build a web platform that could be used by a globally distributed group of experts and deploy that platform to elicit input on SDG interactions. Project success would be achieved if (a) a group of experts could be recruited and enrolled (b) if they were able to and did contribute their perspectives in SDG interactions (c) the results could be contribute to the creation of context maps showing the nature of SDG interactions in different national settings.

2030 Compass CoLab's success could contribute to a broadening of perspectives in efforts to analyze synergies and trade-offs between the SDGs, thanks to its ability to obtain inputs from a more distributed and diverse group of experts than is typically accessible in studies of SDG interactions.

The project's deliverables would be data on SDG interactions submitted by the experts and the context maps that would be generated from them.

3 Scientific background and state of the art

Prior work that has sought to analyze the nature of SDG interactions has primarily involved eliciting inputs from small groups of experts (Nilsson et al., 2016) or translating into quantitative terms published studies that describe the nature of those interactions in a qualitative manner (Fuso Nerini et al., 2019).

Crowdsourcing and open innovation exercises have used online platforms to surface creative new ideas or to identify trends that can shape the future (for a review, see Cricelli et al., 2021). The MIT

Center for Collective Intelligence, collaborator on 2030 Compass CoLab, has experience with several such crowdsourcing platforms (Malone et al., 2017; Cook et al., 2017; Garard et al., 2018).

2030 Compass CoLab sought to use crowdsourcing to obtain inputs on SDG interactions from a broader and more diverse group than has typically been consulted in prior studies.

4 Methods

A pilot test of 2030 Compass CoLab was undertaken in the fall of 2019. A simple platform was launched that allowed participants to select an SDG pair and submit an interaction score for it. In addition, participants were allowed to specify whether the scores they submitted were generally applicable, in a broad range of situations, or whether they applied to a specific context. 47 participants were enrolled on the platform, and 17 contributed assessments of 67 SDG pairs during a two-week exercise. The pilot demonstrated that the platform was usable.

During a workshop for the 2030 Compass project held in Stockholm in the fall of 2019, the idea of *factor* emerged. A factor is a measurable characteristic that differs across countries and can be quantifiably measured. In addition, variations in a factor's values can reasonably be expected to lead to differences in interaction scores for at least one SDG pair. Take for example, national income. In a rich country, progress on SDG 8 Decent Work and Economic Growth can be expected to have little impact on SDG 6 Clean Water and Sanitation, since in high income countries, almost everyone already has access to clean water and sanitation. But for low income countries, where many citizens lack access to clean water and sanitation, progress on SDG 8 could well lead to significant progress on SDG 6.

The decision was taken to use factors to elicit interaction scores from participants in 2030 Compass CoLab. The participants would be invited first to select a factor and then to submit an interaction score for countries that had high, medium, or low values on that factor. There are, however, potentially an infinite number of factors that could be used to characterize SDG interactions. The challenge lies in selecting a parsimonious set of factors that could be embedded in a manageable online interface.

To select such a list of factors, the 2030 Compass CoLab team analyzed a set of factors proposed by an expert panel convened by SEI in late 2019 and early 2020. That group submitted more than 700 factors and interaction scores associated with 750+ SDG pairs. By combining like factors, the 2030 Compass CoLab team selected a set of 18 so-called meta factors to use in the platform.

Prospective participants were recruited from three sources: -SEI's network, the UN's Sustainable Development Solutions Group, and the MIT Climate CoLab, which had attracted a community of more than 100,000 people interested in developing creative ideas about how to address climate change. 163 were selected to participate, based on their experience with government agencies,

NGOs, or private companies active in the field of sustainable development or their enrollment in university graduate programs in fields relevant to sustainable development.

Participants were enrolled and invited to participate in an online exercise that ran over a 3 week period from late April to early May 2021. The platform allowed participants to contribute their ideas by selecting SDG pairs through one of two ways.

The default view was a set of tiles of the 17 starting SDGs, with their names and associated icons appearing inside a “tile” on a tile view in which all of the starting SDGs were listed in order. After selecting a starting SDG, users could then select a target SDG from a pulldown menu (see Figure 1):



Figure 1: Tile view in 2030 Compass CoLab

Users could also click on a link and see the grid view, which showed a 17 x 17 matrix with all of the SDG icons were laid out along the horizontal and vertical axis. Users could click on any square in the grid to open a page with the starting and target SDG already pre-selected. In the matrix, certain

squares were shaded to highlight SDG pairs for which analysis of historical data had shown potentially large spreads between interaction scores. Users were especially encouraged to make contributions that pertained to shaded pairs (see Figure 2):

We encourage you to focus on the shaded cells. Prior research has identified these as pairs where the interaction scores may vary widely. Click on a shaded cell to contribute your perspective on that pair. When you do so, the web form will automatically open with the relevant SDGs already filled in. If the entire matrix does not fit on your screen, you can scroll side-to-side and up-and-down. To view the SDGs arranged in list, see the [SDG view](#)

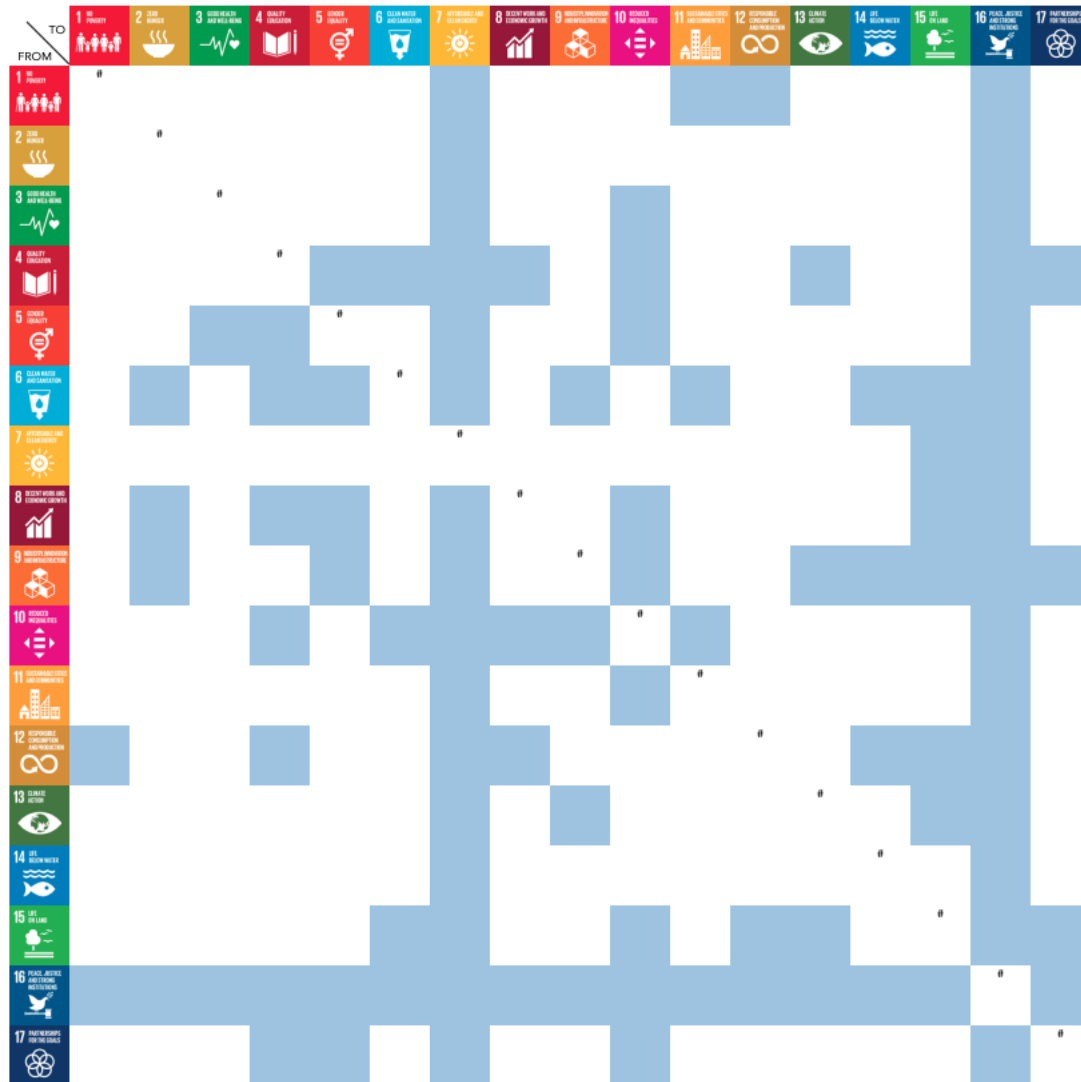


Figure 2: Grid view in 2030 Compass CoLab

Once they had selected an SDG pair, participants were taken to an online form that elicited information these categories: summary (280 characters), factor (selected from a pull-down menu, with users also able to contribute additional factors of their own choosing), interaction score in countries with high value on the factor (selected from a pull down menu, with options ranging from +3 Strongly reinforcing to – 3 Strongly counteracting), interaction score for countries with a low

value on the factor, interaction score for countries with a low value on the factor, and mechanism by which the factor will influence the SDG interaction.

An example of the pull down menu participants could use to select a factor is shown in Figure 3 (in the figure, the selected factor is Human infrastructure: Governance):

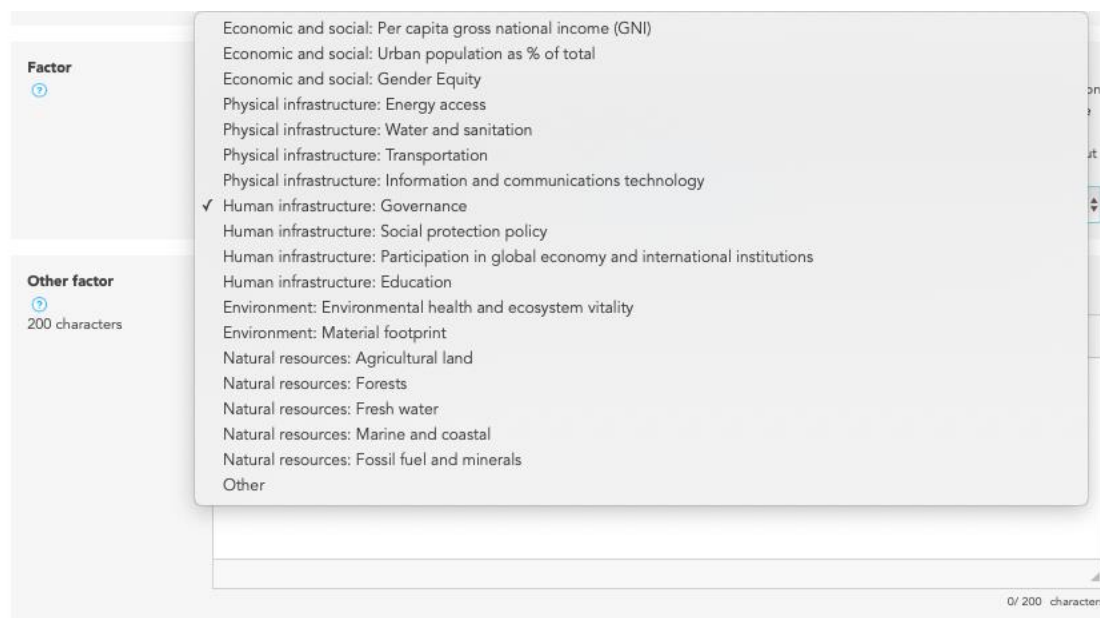


Figure 3: Pull down menu for selecting factors in 2030 Compass CoLab

During the exercise, participants contributed interaction scores for 518 SDG pairs. The 2030 Compass CoLab team reviewed these and judged a number to be unusable for a range of reasons. Approximately half of the contributions were rejected because they had identical interaction scores, which meant they provided no guidance for creating interaction maps for countries with different values on the factors; the logic was difficult to follow; or they were contributed by participants who had a myopic focus on a single issue and made numerous contributions, with identical scoring, pertaining to that issue.

Another tenth of the contributions were judged unusable because the order of the SDGs was reversed (the contributor was envisioning the starting SDG as the target SDG and vice versa); the scores as the factor value ranged from high to medium to low did not proceed consecutively up or down, as the team decided using only consecutive scores would make creating context maps more tractable); they were sample contributions submitted by the 2030 Compass CoLab team to guide participants; the starting and target SDG were the same; the items duplicated other contributions; or the item suggested new factors for which no publicly available indicator data could be found.

The table in Figure 4 summarizes which contributions were not used and why. In the end, interaction scores for 195 SDG pairs were judged usable, just under 40 percent of all items submitted.

Start SDG	Same scores	Poor logic	My- opic	SDG order	Non- consec	Sam- ple	Same SDG	Dupli- cate	Data issues	Usable	Grand total
SDG 1	8	7	15	2	2	1	2	0	0	7	44
SDG 2	2	2	1	5	1	1	1	0	0	3	16
SDG 3	1	1	1	6	0	1	0	1	0	5	16
SDG 4	12	6	11	0	1	1	0	0	0	18	49
SDG 5	7	3	1	0	0	0	1	0	0	8	20
SDG 6	12	7	1	2	3	0	1	0	0	13	39
SDG 7	9	4	9	0	0	1	0	0	1	18	42
SDG 8	10	6	1	2	2	0	0	0	0	9	30
SDG 9	10	4	1	1	0	1	0	0	0	13	30
SDG 10	1	6	1	2	0	0	1	0	0	10	21
SDG 11	9	2	1	1	0	1	0	0	0	11	25
SDG 12	9	3	0	1	0	1	0	0	0	21	35
SDG 13	8	3	1	1	1	0	0	1	1	13	29
SDG 14	3	1	1	2	0	1	0	0	0	7	15
SDG 15	5	3	1	1	0	1	0	1	0	8	20
SDG 16	7	17	12	3	0	0	0	0	1	22	62
SDG 17	5	6	1	1	2	1	0	0	0	9	25
Totals	118	81	59	30	12	11	6	3	3	195	518
	23%	16%	11%	6%	2%	2%	1%	1%	1%	38%	100%

Frequently in crowdsourcing efforts, a large percentage of the ideas submitted are not usable. Crowdsourcing relies on lowering the barrier to contribution, thereby encouraging a large number ideas to be submitted. There can often be substantial redundancy and numerous submitted items that are not up to usable standards.

5 Results and outcomes

195 contributions from the 518 submitted in total were used to create context maps.

An initial map was created based on 150 contributions that cited 13 factors closely correlated to national income (Spearman rank correlation on the relevant indicator > 0.70). These factors were

- Governance (use in 32 submissions),
- Gross National Income (21 submissions),
- Educational attainment (20),
- Environmental health (16),
- Energy access (14)
- Water-sanitation infrastructure (13),

- ICT infrastructure (10),
- Gender equity (8),
- Participation in global economy/ institutions (8),
- Urban residents as percentage of total population (4),
- Transportation infrastructure (2),
- R&D spending as a percentage of GDP (2).

Assumptions for the creating the context map were:

- If the interactions scores submitted in connection with an SDG pair were *higher* for countries ranked in the top quartile than the scores for countries ranked in the bottom quartile, the *maximum* interaction score for top quartile countries was entered on the left side of the relevant cell.
- If, by contrast, the interaction scores submitted in connection with an SDG pair were *lower* for countries ranked in the top quartile than the scores for countries in the bottom quartile, the *minimum* interaction score for top quartile countries was entered on the left side of the relevant cell.
- On the right side of the cell, an inverse procedure to the one described above was used. For cells where the maximum was entered for top quartile countries, the *minimum* interaction score for countries in the bottom quartile was entered on the right side of the cell. And if the minimum was entered on the left side for top quartile countries, the *maximum* score for bottom quartile countries was entered on the right side of the cell.

The baseline context map appears in Figure 5.

	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17
SDG 1						+0 +3	+1 +3				+3 -3	+3 +1	+3 +1			+2 +3	
SDG 2	+3 -2												-1 +2				
SDG 3										+3 -3							
SDG 4	+3 -1		+3 -2		+3 -1		+3 -1	+3 -1		+3 +1			-2 +3			+3 -1	+3 -1
SDG 5			+0 +3	+3 +0			+2 +0	+3 +2								+3 +0	
SDG 6		+3 +0	+3 -1	+2 +0	+1 +0		+2 -1							+3 +1		+3 -1	
SDG 7	+1 +3		+1 +3	+3 +1				+3 +1		+3 -2	+3 +1		+2 +1		+1 +3	+3 -1	
SDG 8	+0 +3			+2 -1	+1 -1		+1 +3			+3 -2		+1 +3					
SDG 9					+1 +3	+2 +0	+3 +1			+0 +3			+3 +0	+1 -3	+2 -3		+3 +0
SDG 10			+3 +0	+3 +0		+3 +1			+3 +1		+0 +2					+0 +3	
SDG 11			+2 +3							+3 -1				+2 +1			
SDG 12	+0 +2		+1 +3				+3 +0	+0 +3					+3 +0	+1 +3	+3 +0		
SDG 13									+3 -1	+3 -2					+3 +0		+3 +2
SDG 14								+2 +0		+1 +3						+3 -3	
SDG 15													+1 +3			+1 +2	
SDG 16	+3 +0			+3 -3	+3 -1		+2 -1					+3 +1	+3 -1	+3 +0			+3 -1
SDG 17					+3 -1					+3 -1						+3 +0	

Table 5: Baseline context map using GNI-correlated factors

Note: High/Low interaction scores for countries in *top* quartile for factor are listed on left side of cell;
Low/high interaction score for countries in *bottom* quartile for factor listed on right side of cell

This baseline map can be used to spur thinking when 2030 Compass workshops are being planned that will address countries the organizing team may not be familiar with. If the country being considered has high income, the organizing team can look at values on the left side of the map's cells to get a sense of interactions between the SDG pairs in question. And if instead the country is low income, the organizing team can use the values on the right side as a prompt for their thinking. And if country is middle income, they can consider values in between the two extremes.

These maps should not be considered a definitive source, since the figures in the cells are based on a single contribution in some cases, and only a few in others (150 contributions are populating a matrix that describes 272 possible SDG interactions). That said, these are judgments provided by experts, in many cases experts with first-hand knowledge of how progress is being made on the SDGs in developing countries. These maps can provoke thinking and suggest areas where additional research may be warranted.

In addition to this baseline map, a supplemental map was created using 45 other interaction scores based on factors that did not correlate well with national income. The first of these was social protection, which was only somewhat correlated with national income (Spearman rank correlation 0.60) and thus deemed to warrant separate consideration. Another factor used in supplemental map was material footprint, which is correlated with national income (Spearman rank correlation 0.86) but deemed to warrant separate consideration as well, due to its quite different valence (a large material footprint is negative from the point of view of sustainability, as opposed to a factor like water-sanitation infrastructure, where high coverage is rightly viewed as positive).

A final set of factors were related to natural resources. Interestingly, they showed little correlation with national income and in some instances a negative correlation. These included Agricultural land (-0.26 Spearman rank correlation), Marine and coastal resources (-0.01 correlation), Fresh water resources (0.01), Fossil fuel and mineral rents (-0.27) and Forest cover (0.09).

The 45 interactions governed by these factors were mapped on a single matrix, in the same manner as the map based on the GNI-related factors, with the score for countries that ranked in the top quartile on the factor appearing on the left side of the cell and the score for countries ranked in the bottom quartile appearing on the right side.

Because these factors are not correlated, an abbreviation for the factor that relates to the cell is also included: Social for Social protection; Foot for Material footprint; Agric for Agricultural land; Coast for Marine and coastal resources; Water for Fresh water resources; Fossil for Fossil fuel and mineral rents; and Forest for Forest cover.

The supplemental map can be used when 2030 Compass workshops are planned for countries with high distinctive characteristics, such as very strong (or very weak) social safety nets, a long seacoast or substantial income from oil. The supplemental map appears in Figure 6 (parts 1 and 2).

	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17
SDG 1				+2 -2 Social							+0 +3 Social						
SDG 2																+2 -2 Social	
SDG 3						+3 +2 Water				+1 +3 Social						+2 +0 Social	
SDG 4					+0 +1 Social							+1 +2 Foot					
SDG 5																	
SDG 6														+1 +3 Coast			
SDG 7						+3 +1 Water		-1 +2 Fossil									
SDG 8						+0 -3 Water									+3 +1 Foot		
SDG 9																	

Figure 6, Part 1: Supplemental context map using non-GNI correlated factors

Note: High/Low interaction scores for countries in top quartile for factor are listed on left side of cell;

Low/high interaction score for countries in bottom quartile for factor listed on right side of cell

Abbreviation for factor appears under interaction score

Agric Agricultural land, **Coast** Marine and coastal resources, **Foot** Material footprint. **Forest** = Forest cover,

Fossil Fossil fuel and mineral rents, **Social** = Social protection, **Water** = Fresh water resources

	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17
SDG 10			+2 +3 Social					+3 +1 Social									
SDG 11	+0 +3 Social	+2 +3 Agric								+3 -3 Social							
SDG 12			+1 +3 Social			+1 +3 Water		+3 +1 Foot					+3 +1 Foot	+3 +1 Coast	+3 +1 Foot +1 +3 Forest		
SDG 13		+3 +1 Agric							+3 +1 Fossil					+3 +2 Coast	-2 -1 Agric +3 +2 Forest	-2 +0 Fossil	
SDG 14	+2 +3 Social								+2 +1 Coast								
SDG 15		+3 +2 Agric				+3 +0 Agric		-2 +0 Agric									
SDG 16	+0 +3 Social				+3 -2 Social												+1 +3 Social
SDG 17														+1 +3 Coast			

Figure 6, Part 2: Supplemental map using non-GNI related factors

Note: High/Low interaction scores for countries in top quartile for factor are listed on left side of cell;

Low/high interaction score for countries in bottom quartile for factor listed on right side of cell

Abbreviation for factor appears under interaction score

Agric Agricultural land, **Coast** Marine and coastal resources, **Foot** Material footprint. **Forest** = Forest cover,

Fossil Fossil fuel and mineral rents, **Social** = Social protection, **Water** = Fresh water resources

6 Discussion

The baseline context map can help to inform the maps that get created in 2030 Compass workshops, especially for countries where the organizers are less familiar. In addition, the baseline data could serve as a kernel of a data set that could be expanded upon by subsequent crowdsourcing activities in the future.

7 Conclusions

2030 Compass CoLab showed it is possible to crowdsource inputs on SDG interactions through a web platform and thereby expand the geographic scope and professional and disciplinary diversity of the experts included in an assessment of SDG interactions. On this front, 2030 Compass CoLab was successful.

That said, the cells in the initial context maps that resulted from this effort are currently based on at most a few contributions. To have more confidence in crowdsourced maps, a much larger number of contributions and an even larger exercise would be desirable.

With enough scale, the process could result in convergence in expert opinion, which could provide confidence that the figures collected are a true reflection of the dynamics of SDG interactions.

8 Implementation of the results and future work

The initial maps, preliminary as they are, can still serve as a resource for teams that organize future 2030 Compass workshops. Building on those maps with future crowdsourcing activities could turn those initial maps into a resource with scientific validity.

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