Climate Change, Sustainable Forest Management, ICT Nexus, and the SDG 2030: A Systems Thinking Approach

Supplementary Materials

Table S1 displays a list of 12 literature sources, their corresponding references, and the number of SDTs aligned to CC, SFM, and ICT. The table highlights the clustering of SDTs and the CSI Nexus domains, as illustrated by the circular relationship diagram in Figure 1. This diagram visually represents the interlinkages among the SDTs and the three groups of data sources identified in the study.

Additionally, the table shows four literature references identified in each of the three domains of the CSI Nexus. Each reference was associated with a specific set of SDTs. The clustering of literature sources connecting SDTs to CC, SFM, and ICT was based on a content analysis of the identified sources.

Table S1. List of Connected SDTs as Data Source Aligned to CC, SFM, and ICT

CSI Clusters Code	Literature References	Connected SDG Targets (SDTs)
Climate Change (CC1)	Fuso Nerini, F.; Sovacool, B.; Hughes, N.; Cozzi, L.; Cosgrave, E.; Howells, M.; Tavoni, M.; Tomei, J.; Zerriffi, H.; Milligan, B. Connecting climate action with other Sustainable Development Goals. Nature Sustainability 2019, 2, 674-680. https://doi.org/10.1038/s41893-019-0334-y	1.1, 1.2, 1.3, 1.4, 1.5, 1.b, 2.1, 2.2, 2.3, 2.4, 2.5, 2.c, 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.5, 5.1, 5.2, 5.5, 5.a, 5.b, 5.c, 6.1, 6.2, 6.4, 6.6, 7.1, 7.2, 7.b, 8.1, 8.3, 8.4, 8.5, 8.6, 8.8, 8.9, 8.10, 9.1, 10.1, 10.2, 10.6, 10.7, 11.1, 11.2, 11.5, 12.1, 12.2, 13.1, 13.2, 13.3, 13.a, 13.b, 14.1, 14.2, 14.3, 14.4, 14.7, 14.a, 14.b, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.8, 15.c, 16.1, 16.7.
Climate Change (CC2)	IPCC. Global warming of 1.5 C: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways. Available online: https://bit.ly/3vztl9P (accessed on December 5, 2022)	1.1, 1.2, 1.3, 1.4, 1.5, 1.a, 1.b, 2.1, 2.2, 2.3, 2.4, 2.a, 2.b, 2.c, 3.1, 3.2, 3.3, 3.4, 3.6, 3.9, 3.a, 3.c, 4.1, 4.2, 4.3, 4.4, 4.5, 4.7, 4.b, 5.1, 5.4, 5.5, 5.a, 5.b, 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 7.1, 7.2, 7.3, 7.a,7.b, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9,8.10, 8.a, 8.b, 9.1, 9.2, 9.3, 9.4, 9.5, 9.a, 9.b, 10.1, 10.2, 10.3, 10.4, 11.1, 11.2, 11.3, 11.6, 11.7, 11.a, 11.b, 11.c, 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8, 12.a, 12.c, 13.1, 13.2, 13.3, 13.a,13.b, 14.1, 14.2, 14.3, 14.4, 14.5, 14.7, 15.1, 15.2, 15.3, 15.4, 15.5, 15.8, 15.9, 16.1, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8, 16.a, 17.1, 17.3, 17.4, 17.5, 17.6, 17.7, 17.10, 17.14, 17.17.
Climate Change (CC3)	FAO. Climate-smart agriculture and the Sustainable Development Goals: Mapping interlinkages, synergies and trade-offs and guidelines for integrated implementation. Available online: https://bit.ly/3vx2Xx7 (accessed on October 23, 2022).	1.1, 1.2, 1.3, 1.4, 1.5, 1.a, 1.b, 2.1, 2.2, 2.3, 2.4, 2.5, 2.a, 3.1, 3.2, 3.3, 3.4, 3.9, 4.1, 4.2, 4.4, 5.1, 5.4, 5.5, 5.a, 5.b, 6.1, 6.3, 6.4, 6.5, 6.6, 6.a, 7.1, 7.2, 7.3, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.10, 9.1, 9.3, 9.4, 9.c, 10.1, 10.2, 10.3 10.4, 10.b, 11.4, 11.5, 11.6, 11.a, 12.2, 12.3, 12.4, 12.5, 12.a, 12.c, 13.1, 13.2, 13.3, 13.a, 13.b, 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.b, 14.c, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.9, 15.a, 15.b, 16.6, 16.7, 16.b, 17.3, 17.14, 17.17
Climate Change (CC4)	Zhou, X., Moinuddin, M., Li, Y., 2019. SDG Interlinkages Analysis & Visualisation Web Tool (V3.0). Hayama: IGES. Available at: https://sdginterlinkages.iges.jp/visualisationtool.html	1.1, 1.2, 1.3, 1.4, 1.5, 1.a, 1.b, 2.1, 2.2, 2.3, 2.4, 2.5, 2.a, 2.c, 3.2, 3.3, 3.4, 3.6, 3.8, 3.9, 3.b, 3.d, 4.1, 4.2, 4.7, 4.a, 5.1, 5.3, 5.4, 5.5, 5.a, 5.b, 5.c, 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.a, 6.b, 7.1, 7.2, 7.3, 7.a, 7.b, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.8, 8.9, 8.a, 9.1, 9.2, 9.3, 9.4, 9.5, 9.a, 9.b, 9.c, 10.1, 10.2, 10.3, 10.7, 10.a, 10.b, 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.a, 11.b, 11.c, 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8, 12.a, 12.b, 12.c, 13.1, 13.2, 13.3, 13.a, 13.b, 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.a, 14.b, 15.1, 15.2, 15.3, 15.4, 15.5, 15.9, 16.5, 16.6, 16.7, 16.8, 16.10, 17.1, 17.2, 17.3, 17.6, 17.7, 17.8, 17.9, 17.11, 17.12, 17.13, 17.14, 17.15, 17.16, 17.17, 17.18, 17.19
Sustainable Forest Management (SFM1)	FAO. 2018. The State of the World's Forests 2018 - Forest Pathways to sustainable development. Rome. License: CC BY-NC-SA 3.0 IGO. Available at https://www.fao.org/3/I9535EN/i9535en.pdf	1.1, 1.4, 1.5, 2.1, 2.3, 5.5, 5.a, 6.6, 6.6.1, 7.1, 7.2, 8.3, 8.9, 11.4, 11.7, 12.2, 12.5, 12.6, 12.7, 13.1, 13.2, 13.3, 15.1, 15.1.1, 15.1.2, 15.2, 15.2.1, 15.3, 15.4, 15.4.1, 15.4.2, 15.5, 15.5.1, 15.b
Sustainable Forest Management (SFM2)	OLI-UNFF. Development of a global core set of forest indicators to support the implementation of the 2030 Agenda on Sustainable Development and the IAF Strategic Plan. Available online: https://bit.ly/3G66RlH (accessed on October 29, 2022) .	2.3, 6.6, 7.1, 7.2, 8.3, 12.5, 13.2, 15.1, 15.2, 15.3, 15.4, 15.5, 15.7, 15.b, 15.c, 17.9, 17.14

Sustainable Forest Management (SFM3)	FSC: A tool to implement the sustainable development goals. Revised July 2019 Available at https://fsc.org/en/media/6272	1.4, 1.5, 4.3, 4.4, 4.7, 5.1, 5.5, 5.b, 5.c, 6.3, 6.4, 6.5, 6.6, 7.2, 7.3, 7.a, 8.2, 8.3, 8.4, 8.5, 8.8, 9.1, 9.3, 11.1, 11.3, 11.4, 11.6, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8, 13.1, 13.2, 13.3, 13.a, 14.1, 15.2, 15.3, 15.5, 15.a, 15.c
Sustainable Forest Management (SFM4)	World business Council for Sustainable Development (WBCSD). Forest Sector SDG (FSG) Roadmap. Availabel at https://docs.wbcsd.org/2019/07/WBCSD_Forest_Sector_SDG_Roadmap.pdf	1.4, 1.5, 4.3, 4.4, 4.7, 5.1, 5.5, 5.b, 5.c, 6.3, 6.4, 6.5, 6.6, 7.2, 7.3, 7.a, 8.2, 8.3, 8.4, 8.5, 8.8, 9.1, 9.3, 11.1, 11.3, 11.4, 11.6, 12.2, 12.3, 12.5, 12.6, 12.7, 12.8, 13.1, 13.2, 13.3, 13.a, 15.1, 15.2, 15.3, 15.5, 15.a, 15.b
Information and Communication Technology (ICT1)	Partnership on Measuring ICT for Development, 2019. A thematic list of ICT indicators for the SDG. Available at https://www.itu.int/en/ITUD/Statistics/Documents/intlcoop/partnership/Thematic_ICT_indicators_for_the_SDGs.pdf	1.4, 2.3, 2.a, 2.c, 3.8, 4.4, 4.5, 4.a, 5.b, 8.1, 8.2, 8.3, 8.5, 8.10, 9.1, 9.5, 9.a, 9.c, 10.c, 12.4, 12.5, 12.8, 16.6, 16.7, 16.10, 17.6, 17.8
Information and Communication Technology (ICT2)	ITU-WSIS, 2015. World Summit on Information Society - Action Lines. Linking WSIS Action Lines with Sustainable Development Goals. Available at https://www.itu.int/net4/wsis/sdg/Content/Documents/wsis-sdg_matrix_document.pdf	1.4, 1.5, 1.b, 2.3, 2.4, 2.5, 2.a, 3.3, 3.7, 3.8, 3.b, 3.d, 4.1, 4.3, 4.4, 4.5, 4.7, 5.5, 5.6, 5.b, 6.a, 6.b, 7.1, 7.a, 7.b, 8.1, 8.2, 8.3, 8.5, 8.9, 8.10, 9.1, 9.3, 9.4, 9.a, 9.c, 10.2, 10.3, 10.c, 11.3, 11.4, 11.5, 11.6, 11.b, 12.6, 12.7, 12.8, 12.a, 12.b, 13.1, 13.2, 13.3, 13.b, 14.a, Goal 15 (15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.a, 15.b, 15.c), 16.2, 16.3, 16.5, 16.6, 16.7, 16.10, 16.a, 16.b, 17.6, 17.8, 17.9, 17.11, 17.14, 17.17, 17,17, 17.18, 17.19
Information and Communication Technology (ICT3)	Huawei, 2018. ICT Sustainable Development Goals Benchmark: Accelerating SDGs through ICT. Available at https://www.huawei.com/minisite/gci/assets/files/Huawei_2018_SDG_report_en.pdf	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.a, 3.b, 3.c, 3.d, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.a, 4.b, 4.c, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.a, 5.b, 5.c, 7.1, 7.2, 7.3, 7.a, 7.b, 9.1, 9.2, 9.3, 9.4, 9.5, 9.a, 9.b, 9.c, 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.a, 11.b, 11.c.
Information and Communication Technology (ICT4)	The Earth Institute Columbia University & Ericsson, 2017. ICT & SDG: How Information and Communication Technology can Accelerate Action on Sustainable Development Goals. Available at https://www.ericsson.com/assets/local/news/2016/05/ict-sdg.pdf	1.4, 3.3, 3.4 3.7, 3.8, 3.d, 4.1, 4.2, 4.3, 4.4, 4.6, 4.a, 4.b, 5.b, 7.1, 7.2, 7.3, 7.a, 7.b, 8.3, 8.10, 9.3, 9.c, 16.9, 17.6, 17.8,17.18

Table S2 presents an affiliation matrix using binary notation to indicate the relationship between specific SDTs and CSI. The table provides the total number of SDTs aligned with each focal area and clusters the SDTs into four categories based on their interconnections with the focal areas: CC + SFM, SFM + ICT, ICT + CC, and CC + SFM + ICT. In the matrix, a 0 indicates no connection, and a 1 indicates a connection. The Total column for each domain of CC, SFM, and ICT ranges from 1 to 4, representing the total number of SDTs connected to each domain. The CC+SFM+ICT Total column ranges from 1 to 12, meaning the possible number of SDTs associated when all three domains are combined.

Table S2. Affiliation Matrix Mapping of CC, SFM, ICT, SDTs, SDGs, and CSI Nexus Clusters

		Climate Change Mitigation and Adaptation (CC)					**Sustainable Forest Management (SFM)**					**Information & Communication Technology (ICT)**					**CC+SFM+ICT (CSI) Total**				**CC+SFM+ICT Integration**							
17 SDGs	169 SDTs	Nerini, F. 2019	IPCC., 2019	FAO, 2019	Zhou, X. et al., 2021	Total (CC)	FAO, 2018	OLI-UNFF, 2016	FSC, 2019	WBCSD-FSG, 2019	Total (SFM)	PMID, 2019	WSIS, 2015	Huawei, 2018	ERICSSON & EICU, 2017 [25]	Total (ICT)	CC	SFM	ICT	Total (CSI)	CC+SFM+ICT	CC +SFM	CC+ICT	SFM+ICT	CC	SFM	ICT	No Connection
Goal 1: No Poverty	1.1	1	1	1	1	4	1	0	0	0	1	0	0	0	0	0	4	1	0	5	0	1	0	0	0	0	0	0
	1.2	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	1	0	0	0
	1.3	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	1	0	0	0
	1.4	1	1	1	1	4	1	0	0	1	2	1	1	0	1	3	4	2	3	9	1	0	0	0	0	0	0	0
	1.5	1	1	1	1	4	1	0	1	1	3	0	1	0	0	1	4	3	1	8	1	0	0	0	0	0	0	0
	1.a	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	1	0	0	0
	1.b	1	1	1	1	4	0	0	0	0	0	0	1	0	0	1	4	0	1	5	0	0	1	0	0	0	0	0
Goal 2: Zero Hunger	2.1	1	1	1	1	4	1	0	0	0	1	0	0	0	0	0	4	1	0	5	0	1	0	0	0	0	0	0
	2.2	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	1	0	0	0

	2.3	1	1	1	1	4	1	1	0	0	2	1	1	0	0	2	4	2	2	8	1	0	0	0	0	0	0	0
	2.4	1	1	1	1	4	0	0	1	0	1	0	1	0	0	1	4	1	1	6	1	0	0	0	0	0	0	0
	2.5	1	0	1	1	3	0	0	0	0	0	0	1	0	0	1	3	0	1	4	0	0	1	0	0	0	0	0
	2.a	0	1	1	1	3	0	0	0	0	0	1	1	0	0	2	3	0	2	5	0	0	1	0	0	0	0	0
	2.b	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
	2.c	1	1	0	1	3	0	0	0	0	0	1	0	0	0	1	3	0	1	4	0	0	1	0	0	0	0	0
Goal 3: Good Health and Well Being	3.1	1	1	1	0	3	0	0	0	0	0	0	0	1	0	1	3	0	1	4	0	0	1	0	0	0	0	0
	3.2	1	1	1	1	4	0	0	0	0	0	0	0	1	0	1	4	0	1	5	0	0	1	0	0	0	0	0
	3.3	1	1	1	1	4	0	0	1	0	1	0	1	1	1	3	4	1	3	8	1	0	0	0	0	0	0	0
	3.4	1	1	1	1	4	0	0	0	0	0	0	0	1	1	2	4	0	2	6	0	0	1	0	0	0	0	0
	3.5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	1	0
	3.6	0	1	0	1	2	0	0	0	0	0	0	0	1	0	1	2	0	1	3	0	0	1	0	0	0	0	0
	3.7	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	0	0	3	3	0	0	0	0	0	0	1	0
	3.8	0	0	0	1	1	0	0	1	0	1	1	1	1	1	4	1	1	4	6	1	0	0	0	0	0	0	0
	3.9	0	1	1	1	3	0	0	1	0	1	0	0	1	0	1	3	1	1	5	1	0	0	0	0	0	0	0
	3.a	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	1	2	0	0	1	0	0	0	0	0
	3.b	0	0	0	1	1	0	0	0	0	0	0	1	1	0	2	1	0	2	3	0	0	1	0	0	0	0	0
	3.c	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	1	2	0	0	1	0	0	0	0	0
	3.d	0	0	0	1	1	0	0	0	0	0	0	1	1	1	3	1	0	3	4	0	0	1	0	0	0	0	0
Goal 4: Quality Education	4.1	1	1	1	1	4	0	0	1	0	1	0	1	1	1	3	4	1	3	8	1	0	0	0	0	0	0	0
	4.2	1	1	1	1	4	0	0	0	0	0	0	0	1	1	2	4	0	2	6	0	0	1	0	0	0	0	0
	4.3	0	1	0	0	1	0	0	0	1	1	0	1	1	1	3	1	1	3	5	1	0	0	0	0	0	0	0
	4.4	0	1	1	0	2	0	0	0	1	1	1	1	1	1	4	2	1	4	7	1	0	0	0	0	0	0	0
	4.5	1	1	0	0	2	0	0	0	0	0	1	1	1	0	3	2	0	3	5	0	0	1	0	0	0	0	0
	4.6	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	2	2	0	0	0	0	0	0	1	0
	4.7	0	1	0	1	2	0	0	0	1	1	0	1	1	0	2	2	1	2	5	1	0	0	0	0	0	0	0
	4.a	0	0	0	1	1	0	0	0	0	0	1	0	1	1	3	1	0	3	4	0	0	1	0	0	0	0	0
	4.b	0	1	0	0	1	0	0	0	0	0	0	0	1	1	2	1	0	2	3	0	0	1	0	0	0	0	0
	4.c	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	1	0
Goal 5: Gender Equality	5.1	1	1	1	1	4	0	0	0	1	1	0	0	1	0	1	4	1	1	6	1	0	0	0	0	0	0	0
	5.2	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	1	2	0	0	1	0	0	0	0	0
	5.3	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1	0	1	2	0	0	1	0	0	0	0	0
	5.4	0	1	1	1	3	0	0	0	0	0	0	0	1	0	1	3	0	1	4	0	0	1	0	0	0	0	0
	5.5	1	1	1	1	4	1	0	1	1	3	0	1	1	0	2	4	3	2	9	1	0	0	0	0	0	0	0
	5.6	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	2	2	0	0	0	0	0	0	1	0
	5.a	1	1	1	1	4	1	0	1	0	2	0	0	1	0	1	4	2	1	7	1	0	0	0	0	0	0	0
	5.b	1	1	1	1	4	0	0	0	1	1	1	1	1	1	4	4	1	4	9	1	0	0	0	0	0	0	0
	5.c	1	0	0	1	2	0	0	0	1	1	0	0	1	0	1	2	1	1	4	1	0	0	0	0	0	0	0
Goal 6: Clean Water and Sanitation	6.1	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	1	0	0	0
	6.2	1	1	0	1	3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	1	0	0	0
	6.3	0	1	1	1	3	0	0	0	1	1	0	0	0	0	0	3	1	0	4	0	1	0	0	0	0	0	0
	6.4	1	1	1	1	4	0	0	1	1	2	0	0	0	0	0	4	2	0	6	0	1	0	0	0	0	0	0
	6.5	0	1	1	1	3	0	0	1	1	2	0	0	0	0	0	3	2	0	5	0	1	0	0	0	0	0	0
	6.6	1	1	1	1	4	1	1	1	1	4	0	0	0	0	0	4	4	0	8	0	1	0	0	0	0	0	0
	6.a	0	0	1	1	2	0	0	0	0	0	0	1	0	0	1	2	0	1	3	0	0	1	0	0	0	0	0
	6.b	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	1	0	1	2	0	0	1	0	0	0	0	0
Goal 7: Affordable and Clean Energy	7.1	1	1	1	1	4	1	1	0	0	2	0	1	1	1	3	4	2	3	9	1	0	0	0	0	0	0	0
	7.2	1	1	1	1	4	1	1	1	1	4	0	0	1	1	2	4	4	2	10	1	0	0	0	0	0	0	0
	7.3	0	1	1	1	3	0	0	0	1	1	0	0	1	1	2	3	1	2	6	1	0	0	0	0	0	0	0
	7.a	0	1	0	1	2	0	0	0	1	1	0	1	1	1	3	2	1	3	6	1	0	0	0	0	0	0	0
	7.b	1	1	0	1	3	0	0	0	0	0	0	1	1	1	3	3	0	3	6	0	0	1	0	0	0	0	0
Goal 8: Decent Work and Economic Growth	8.1	1	1	1	1	4	0	0	0	0	0	1	1	0	0	2	4	0	2	6	0	0	1	0	0	0	0	0
	8.2	0	1	1	1	3	0	0	0	1	1	1	1	0	0	2	3	1	2	6	1	0	0	0	0	0	0	0
	8.3	1	1	1	1	4	1	1	0	1	3	1	1	0	1	3	4	3	3	10	1	0	0	0	0	0	0	0
	8.4	1	1	1	1	4	0	0	1	1	2	0	0	0	0	0	4	2	0	6	0	1	0	0	0	0	0	0
	8.5	1	1	1	1	4	0	0	1	1	2	1	1	0	0	2	4	2	2	8	1	0	0	0	0	0	0	0
	8.6	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	1	0	0	0
	8.7	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	1	1	0	2	0	1	0	0	0	0	0	0
	8.8	1	1	0	1	3	0	0	1	1	2	0	0	0	0	0	3	2	0	5	0	1	0	0	0	0	0	0
	8.9	1	1	0	1	3	1	0	0	0	1	0	1	0	0	1	3	1	1	5	1	0	0	0	0	0	0	0
	8.10	1	1	1	0	3	0	0	0	0	0	1	1	0	1	3	3	0	3	6	0	0	1	0	0	0	0	0
	8.a	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	0	0	0
	8.b	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
Goal 9: Industry, Innovation, and Infrastructure	9.1	1	1	1	1	4	0	0	0	1	1	1	1	1	0	3	4	1	3	8	1	0	0	0	0	0	0	0
	9.2	0	1	0	1	2	0	0	0	0	0	0	0	1	0	1	2	0	1	3	0	0	1	0	0	0	0	0
	9.3	0	1	1	1	3	0	0	0	1	1	0	1	1	1	3	3	1	3	7	1	0	0	0	0	0	0	0
	9.4	0	1	1	1	3	0	0	0	0	0	0	1	1	0	2	3	0	2	5	0	0	1	0	0	0	0	0
	9.5	0	1	0	1	2	0	0	0	0	0	1	0	1	0	2	2	0	2	4	0	0	1	0	0	0	0	0
	9.a	0	1	0	1	2	0	0	0	0	0	1	1	1	0	3	2	0	3	5	0	0	1	0	0	0	0	0

	9.b	0	1	0	1	2	0	0	0	0	0	0	0	1	0	1	2	0	1	3	0	0	1	0	0	0	0	0
	9.c	0	0	1	1	2	0	0	0	0	0	1	1	1	1	4	2	0	4	6	0	0	1	0	0	0	0	0
Goal 10: Reduced Inequalities	10.1	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	1	0	0	0
	10.2	1	1	1	1	4	0	0	0	0	0	0	1	0	0	1	4	0	1	5	0	0	1	0	0	0	0	0
	10.3	0	1	1	1	3	0	0	0	0	0	0	1	0	0	1	3	0	1	4	0	0	1	0	0	0	0	0
	10.4	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	0	0	0
	10.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	10.6	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
	10.7	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	0	0	0
	10.a	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
	10.b	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	0	0	0
	10.c	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	2	2	0	0	0	0	0	0	1	0
Goal 11: Sustainable Cities and Communities	11.1	1	1	0	1	3	0	0	0	1	1	0	0	1	0	1	3	1	1	5	1	0	0	0	0	0	0	0
	11.2	1	1	0	1	3	0	0	0	0	0	0	0	1	0	1	3	0	1	4	0	0	1	0	0	0	0	0
	11.3	0	1	0	1	2	0	0	0	1	1	0	1	1	0	2	2	1	2	5	1	0	0	0	0	0	0	0
	11.4	0	0	1	1	2	1	0	0	1	2	0	1	1	0	2	2	2	2	6	1	0	0	0	0	0	0	0
	11.5	1	0	1	1	3	0	0	0	0	0	0	1	1	0	2	3	0	2	5	0	0	1	0	0	0	0	0
	11.6	0	1	1	1	3	0	0	0	1	1	0	1	1	0	2	3	1	2	6	1	0	0	0	0	0	0	0
	11.7	0	1	0	1	2	1	0	0	0	1	0	0	1	0	1	2	1	1	4	1	0	0	0	0	0	0	0
	11.a	0	1	1	1	3	0	0	0	0	0	0	0	1	0	1	3	0	1	4	0	0	1	0	0	0	0	0
	11.b	0	1	0	1	2	0	0	0	0	0	0	1	1	0	2	2	0	2	4	0	0	1	0	0	0	0	0
	11.c	0	1	0	1	2	0	0	0	0	0	0	0	1	0	1	2	0	1	3	0	0	1	0	0	0	0	0
Goal 12: Responsible Consumption and Production	12.1	1	1	0	1	3	0	0	1	0	1	0	0	0	0	0	3	1	0	4	0	1	0	0	0	0	0	0
	12.2	1	1	1	1	4	1	0	1	1	3	0	0	0	0	0	4	3	0	7	0	1	0	0	0	0	0	0
	12.3	0	1	1	1	3	0	0	0	1	1	0	0	0	0	0	3	1	0	4	0	1	0	0	0	0	0	0
	12.4	0	1	1	1	3	0	0	0	0	0	1	0	0	0	1	3	0	1	4	0	0	1	0	0	0	0	0
	12.5	0	1	1	1	3	1	1	1	1	4	1	0	0	0	1	3	4	1	8	1	0	0	0	0	0	0	0
	12.6	0	1	0	1	2	1	0	1	1	3	0	1	0	0	1	2	3	1	6	1	0	0	0	0	0	0	0
	12.7	0	1	0	1	2	1	0	1	1	3	0	1	0	0	1	2	3	1	6	1	0	0	0	0	0	0	0
	12.8	0	1	0	1	2	0	0	1	1	2	1	1	0	0	2	2	2	2	6	1	0	0	0	0	0	0	0
	12.a	0	1	1	1	3	0	0	1	0	1	0	1	0	0	1	3	1	1	5	1	0	0	0	0	0	0	0
	12.b	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	1	0	1	2	0	0	1	0	0	0	0	0
	12.c	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	1	0	0	0
Goal 13: Climate Action	13.1	1	1	1	1	4	1	0	1	1	3	0	1	0	0	1	4	3	1	8	1	0	0	0	0	0	0	0
	13.2	1	1	1	1	4	1	1	0	1	3	0	1	0	0	1	4	3	1	8	1	0	0	0	0	0	0	0
	13.3	1	1	1	1	4	1	0	0	1	2	0	1	0	0	1	4	2	1	7	1	0	0	0	0	0	0	0
	13.a	1	1	1	1	4	0	0	0	1	1	0	0	0	0	0	4	1	0	5	0	1	0	0	0	0	0	0
	13.b	1	1	1	1	4	0	0	0	0	0	0	1	0	0	1	4	0	1	5	0	0	1	0	0	0	0	0
Goal 14: Life Below Water	14.1	1	1	1	1	4	0	0	1	0	1	0	0	0	0	0	4	1	0	5	0	1	0	0	0	0	0	0
	14.2	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	1	0	0	0
	14.3	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	1	0	0	0
	14.4	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	1	0	0	0
	14.5	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	1	0	0	0
	14.6	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	0	0	0
	14.7	1	1	0	1	3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	1	0	0	0
	14.a	1	0	0	1	2	0	0	0	0	0	0	1	0	0	1	2	0	1	3	0	0	1	0	0	0	0	0
	14.b	1	0	1	1	3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	1	0	0	0
	14.c	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
Goal 15: Life on Land	15.1	1	1	1	1	4	1	1	1	1	4	0	1	0	0	1	4	4	1	9	1	0	0	0	0	0	0	0
	15.2	1	1	1	1	4	1	1	1	1	4	0	1	0	0	1	4	4	1	9	1	0	0	0	0	0	0	0
	15.3	1	1	1	1	4	1	1	1	1	4	0	1	0	0	1	4	4	1	9	1	0	0	0	0	0	0	0
	15.4	1	1	1	1	4	1	1	1	0	3	0	1	0	0	1	4	3	1	8	1	0	0	0	0	0	0	0
	15.5	1	1	1	1	4	1	1	1	1	4	0	1	0	0	1	4	4	1	9	1	0	0	0	0	0	0	0
	15.6	1	0	1	0	2	0	0	0	0	0	0	1	0	0	1	2	0	1	3	0	0	1	0	0	0	0	0
	15.7	0	0	0	0	0	0	1	1	0	2	0	1	0	0	1	0	2	1	3	0	0	0	1	0	0	0	0
	15.8	1	1	0	0	2	0	0	1	0	1	0	1	0	0	1	2	1	1	4	1	0	0	0	0	0	0	0
	15.9	0	1	1	1	3	0	0	0	0	0	0	1	0	0	1	3	0	1	4	0	0	1	0	0	0	0	0
	15.a	0	0	1	0	1	0	0	0	1	1	0	1	0	0	1	1	1	1	3	1	0	0	0	0	0	0	0
	15.b	0	0	1	0	1	1	1	0	1	3	0	1	0	0	1	1	3	1	5	1	0	0	0	0	0	0	0
	15.c	1	0	0	0	1	0	1	1	0	2	0	1	0	0	1	1	2	1	4	1	0	0	0	0	0	0	0
Goal 16: Peace, Justice, and Strong Institutions	16.1	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	0	0	0
	16.2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0	0	0	0	0	0	1	0
	16.3	0	1	0	0	1	0	0	1	0	1	0	1	0	0	1	1	1	1	3	1	0	0	0	0	0	0	0
	16.4	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	1	1	0	2	0	1	0	0	0	0	0	0
	16.5	0	1	0	1	2	0	0	1	0	1	0	1	0	0	1	2	1	1	4	1	0	0	0	0	0	0	0
	16.6	0	1	1	1	3	0	0	1	0	1	1	1	0	0	2	3	1	2	6	1	0	0	0	0	0	0	0
	16.7	1	1	1	1	4	0	0	1	0	1	1	1	0	0	2	4	1	2	7	1	0	0	0	0	0	0	0
	16.8	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	0	0	0
	16.9	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	1	0

	16.10	0	0	0	1	1	0	0	0	0	0	1	1	0	0	2	1	0	2	3	0	0	1	0	0	0	0	0
	16.a	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	1	2	0	0	1	0	0	0	0	0
	16.b	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	1	0	1	2	0	0	1	0	0	0	0	0
Goal 17: Partnerships and the Goals	17.1	0	1	0	1	2	0	0	1	0	1	0	0	0	0	0	2	1	0	3	0	1	0	0	0	0	0	0
	17.2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
	17.3	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	1	0	0	0
	17.4	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
	17.5	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
	17.6	0	1	0	1	2	0	0	0	0	0	1	1	0	1	3	2	0	3	5	0	0	1	0	0	0	0	0
	17.7	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	0	0	0
	17.8	0	0	0	1	1	0	0	0	0	0	1	1	0	1	3	1	0	3	4	0	0	1	0	0	0	0	0
	17.9	0	0	0	1	1	0	1	0	0	1	0	1	0	0	1	1	1	1	3	1	0	0	0	0	0	0	0
	17.10	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
	17.11	0	0	0	1	1	0	0	1	0	1	0	1	0	0	1	1	1	1	3	1	0	0	0	0	0	0	0
	17.12	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
	17.13	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
	17.14	0	1	1	1	3	0	1	0	0	1	0	1	0	0	1	3	1	1	5	1	0	0	0	0	0	0	0
	17.15	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0
	17.16	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	1	0	1	2	0	0	1	0	0	0	0	0
	17.17	0	1	1	1	3	0	0	1	0	1	0	1	0	0	1	3	1	1	5	1	0	0	0	0	0	0	0
	17.18	0	0	0	1	1	0	0	0	0	0	0	1	0	1	2	1	0	2	3	0	0	1	0	0	0	0	0
	17.19	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	1	0	1	2	0	0	1	0	0	0	0	0

Table S3 presents the results of the network analysis of the CSI Nexus Network graph. It provides a list of targets and their corresponding CSI clusters and network centrality measures, including weighted degree, closeness, betweenness, and eigenvector centrality. The targets are described based on their relationship to the CSI focal areas of CC, SFM, and ICT and their interconnections in the network. The centrality measures indicate the importance of each target in the network and their potential impact on sustainability challenges. The table provides valuable information for identifying key targets and areas for intervention to address sustainability challenges and promote sustainable development.

Table S3: Network Centrality Measures of SDTs and the CSI Clusters with Corresponding Descriptions

SDG Targets (SDTs) and CSI Domains Description	CSI Clusters	Weighted Degree	Closeness Centrality	Betweenness Centrality	Eigenvector Centrality
Target 1.1: Eradicate extreme poverty	CC+SFM	5	0.501992	0.000053	0.100143
Target 1.4: Equal rights to ownership, basic services, technology, and economic resources	CC+SFM+ICT	9	0.506024	0.000132	0.155382
Target 1.5: Build resilience to environmental, economic, and social disasters	CC+SFM+ICT	8	0.506024	0.000132	0.155382
Target 1.B: Pro-poor public spending	ICT+CC	5	0.501992	0.000014	0.116569
Target 2.1: Universal access to safe and nutritious food	CC+SFM	5	0.501992	0.000053	0.100143
Target 2.3: Double the productivity and incomes of small-scale food producers	CC+SFM+ICT	8	0.506024	0.000132	0.155382
Target 2.4: Sustainable food production and resilient agricultural practices	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 2.5: Maintain the genetic diversity in food production	ICT+CC	4	0.501992	0.000014	0.116569
Target 2.A: Invest in rural infrastructure, agricultural research, technology and gene banks	ICT+CC	5	0.501992	0.000014	0.116569
Target 2.C: Ensure stable food commodity markets and timely access to information	ICT+CC	4	0.501992	0.000014	0.116569
Target 3.1: Reduce maternal mortality	ICT+CC	4	0.501992	0.000014	0.116569
Target 3.2: End all preventable deaths under 5 years of age	ICT+CC	5	0.501992	0.000014	0.116569
Target 3.3: Fight communicable diseases	CC+SFM+ICT	8	0.506024	0.000132	0.155382
Target 3.4: Reduce mortality from non-communicable diseases and promote mental health	ICT+CC	6	0.501992	0.000014	0.116569
Target 3.6: Reduce road injuries and deaths	ICT+CC	3	0.501992	0.000014	0.116569

Target 3.8: Achieve universal health coverage	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 3.9: Reduce illnesses and deaths from hazardous chemicals and pollution	CC+SFM+ICT	5	0.506024	0.000132	0.155382
Target 3.A: Implement the WHO framework convention on tobacco control	ICT+CC	2	0.501992	0.000014	0.116569
Target 3.B: Support research, development and universal access to affordable vaccines and medicines	ICT+CC	3	0.501992	0.000014	0.116569
Target 3.C: Increase health financing and support health workforce in developing countries	ICT+CC	2	0.501992	0.000014	0.116569
Target 3.D: Improve early warning systems for global health risks	ICT+CC	4	0.501992	0.000014	0.116569
Target 4.1: Free primary and secondary education	CC+SFM+ICT	8	0.506024	0.000132	0.155382
Target 4.2: Equal access to quality pre-primary education	ICT+CC	6	0.501992	0.000014	0.116569
Target 4.3: Equal access to affordable technical, vocational and higher education	CC+SFM+ICT	5	0.506024	0.000132	0.155382
Target 4.4: Increase the number of people with relevant skills for financial success	CC+SFM+ICT	7	0.506024	0.000132	0.155382
Target 4.5: Eliminate all discrimination in education	ICT+CC	5	0.501992	0.000014	0.116569
Target 4.7: Education for sustainable development and global citizenship	CC+SFM+ICT	5	0.506024	0.000132	0.155382
Target 4.A: Build and upgrade inclusive and safe schools	ICT+CC	4	0.501992	0.000014	0.116569
Target 4.B: Expand higher education scholarships for developing countries	ICT+CC	3	0.501992	0.000014	0.116569
Target 5.1: End discrimination against women and girls	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 5.2: End all violence against and exploitation of women and girls	ICT+CC	2	0.501992	0.000014	0.116569
Target 5.3: Eliminate forced marriages and genital mutilation	ICT+CC	2	0.501992	0.000014	0.116569
Target 5.4: Value unpaid care and promote shared domestic responsibilities	ICT+CC	4	0.501992	0.000014	0.116569
Target 5.5: Ensure full participation in leadership and decision-making	CC+SFM+ICT	9	0.506024	0.000132	0.155382
Target 5.A: Equal rights to economic resources, property ownership and financial services	CC+SFM+ICT	7	0.506024	0.000132	0.155382
Target 5.B: Promote empowerment of women through technology	CC+SFM+ICT	9	0.506024	0.000132	0.155382
Target 5.C: Adopt and strengthen policies and enforceable legislation for gender equality	CC+SFM+ICT	4	0.506024	0.000132	0.155382
Target 6.3: Improve water quality, wastewater treatment and safe reuse	CC+SFM	4	0.501992	0.000053	0.100143
Target 6.4: Increase water use efficiency and ensure freshwater supplies	CC+SFM	6	0.501992	0.000053	0.100143
Target 6.5: Implement integrated water resources management	CC+SFM	5	0.501992	0.000053	0.100143
Target 6.6: Protect and restore water-related ecosystems	CC+SFM	8	0.501992	0.000053	0.100143
Target 6.A: Expand water and sanitation support to developing countries	ICT+CC	3	0.501992	0.000014	0.116569
Target 6.B: Support local engagement in water and sanitation management	ICT+CC	2	0.501992	0.000014	0.116569
Target 7.1: Universal access to modern energy	CC+SFM+ICT	9	0.506024	0.000132	0.155382
Target 7.2: Increase global percentage of renewable energy	CC+SFM+ICT	10	0.506024	0.000132	0.155382
Target 7.3: Double the improvement in energy efficiency	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 7.A: Promote access, technology and investments in clean energy	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 7.B: Expand and upgrade energy services for developing countries	ICT+CC	6	0.501992	0.000014	0.116569
Target 8.1: Sustainable Economic Growth	ICT+CC	6	0.501992	0.000014	0.116569
Target 8.2: Diversify, innovate and upgrade for economic productivity	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 8.3: Promote policies to support job creation and growing enterprises	CC+SFM+ICT	10	0.506024	0.000132	0.155382
Target 8.4: Improve resource efficiency in consumption and production	CC+SFM	6	0.501992	0.000053	0.100143
Target 8.5: Full employment and decent work with equal pay	CC+SFM+ICT	8	0.506024	0.000132	0.155382
Target 8.7: End modern slavery, trafficking, and child labour	CC+SFM	2	0.501992	0.000053	0.100143
Target 8.8: Protect labour rights and promote safe working environments	CC+SFM	5	0.501992	0.000053	0.100143
Target 8.9: Promote beneficial and sustainable tourism	CC+SFM+ICT	5	0.506024	0.000132	0.155382
Target 8.10: Universal access to banking, insurance and financial services	ICT+CC	6	0.501992	0.000014	0.116569
Target 9.1: Develop sustainable, resilient and inclusive infrastructures	CC+SFM+ICT	8	0.506024	0.000132	0.155382
Target 9.2: Promote inclusive and sustainable industrialization	ICT+CC	3	0.501992	0.000014	0.116569
Target 9.3: Increase access to financial services and markets	CC+SFM+ICT	7	0.506024	0.000132	0.155382
Target 9.4: Upgrade all industries and infrastructures for sustainability	ICT+CC	5	0.501992	0.000014	0.116569

Target 9.5: Enhance research and upgrade industrial technologies	ICT+CC	4	0.501992	0.000014	0.116569
Target 9.A: Facilitate sustainable infrastructure development for developing countries	ICT+CC	5	0.501992	0.000014	0.116569
Target 9.B: Support domestic technology development and industrial diversification	ICT+CC	3	0.501992	0.000014	0.116569
Target 9.C: Universal access to information and communications technology	ICT+CC	6	0.501992	0.000014	0.116569
Target 10.2: Promote universal social, economic and political inclusion	ICT+CC	5	0.501992	0.000014	0.116569
Target 10.3: Ensure equal opportunities and end discrimination	ICT+CC	4	0.501992	0.000014	0.116569
Target 11.1: Safe and affordable housing	CC+SFM+ICT	5	0.506024	0.000132	0.155382
Target 11.2: Affordable and sustainable transport systems	ICT+CC	4	0.501992	0.000014	0.116569
Target 11.3: Inclusive and sustainable urbanization	CC+SFM+ICT	5	0.506024	0.000132	0.155382
Target 11.4: Protect the world's cultural and natural heritage	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 11.5: Reduce the adverse effects of natural disasters	ICT+CC	5	0.501992	0.000014	0.116569
Target 11.6: Reduce the environmental impacts of cities	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 11.7: Provide access to safe and inclusive green and public spaces	CC+SFM+ICT	4	0.506024	0.000132	0.155382
Target 11.A: Strong national and regional development planning	ICT+CC	4	0.501992	0.000014	0.116569
Target 11.B: Implement policies for inclusion, resource efficiency and disaster risk reduction	ICT+CC	4	0.501992	0.000014	0.116569
Target 11.C: Support least developed countries in sustainable and resilient building	ICT+CC	3	0.501992	0.000014	0.116569
Target 12.1: Implement the 10-year sustainable consumption and production framework	CC+SFM	4	0.501992	0.000053	0.100143
Target 12.2: Sustainable management and use of natural resources	CC+SFM	7	0.501992	0.000053	0.100143
Target 12.3: Halve global per capita food waste	CC+SFM	4	0.501992	0.000053	0.100143
Target 12.4: Responsible management of chemicals and waste	ICT+CC	4	0.501992	0.000014	0.116569
Target 12.5: Substantially reduce waste generation	CC+SFM+ICT	8	0.506024	0.000132	0.155382
Target 12.6: Encourage companies to adopt sustainable practices and sustainability reporting	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 12.7: Promote sustainable public procurement practices	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 12.8: Promote universal understanding of sustainable lifestyles	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 12.A: Support developing countries' scientific and technological capacity for sustainable consumption and production	CC+SFM+ICT	5	0.506024	0.000132	0.155382
Target 12.B: Develop and implement tools to monitor sustainable tourism	ICT+CC	2	0.501992	0.000014	0.116569
Target 13.1: Strengthen resilience and adaptive capacity to climate-related disasters	CC+SFM+ICT	8	0.506024	0.000132	0.155382
Target 13.2: Integrate climate change measures into policy and planning	CC+SFM+ICT	8	0.506024	0.000132	0.155382
Target 13.3: Build knowledge and capacity to meet climate change	CC+SFM+ICT	7	0.506024	0.000132	0.155382
Target 13.A: Implement then UN Framework Convention on Climate Change	CC+SFM	5	0.501992	0.000053	0.100143
Target 13.B: Promote mechanisms to raise capacity for planning and management	ICT+CC	5	0.501992	0.000014	0.116569
Target 14.1: Reduce marine pollution	CC+SFM	5	0.501992	0.000053	0.100143
Target 14.A: Increase scientific knowledge, research and technology for ocean health	ICT+CC	3	0.501992	0.000014	0.116569
Target 15.1: Conserve and restore terrestrial and freshwater ecosystems	CC+SFM+ICT	9	0.506024	0.000132	0.155382
Target 15.2: End deforestation and restore degraded forests	CC+SFM+ICT	9	0.506024	0.000132	0.155382
Target 15.3: End desertification and restore degraded land	CC+SFM+ICT	9	0.506024	0.000132	0.155382
Target 15.4: Ensure conservation of mountain ecosystems	CC+SFM+ICT	8	0.506024	0.000132	0.155382
Target 15.5: Protect biodiversity and natural habitats	CC+SFM+ICT	9	0.506024	0.000132	0.155382
Target 15.6: Protect access to genetic resources and fair sharing of the benefits	ICT+CC	3	0.501992	0.000014	0.116569
Target 15.7: Eliminate poaching and trafficking of protected species	SFM+ICT	3	0.501992	0.000065	0.094052
Target 15.8: Prevent invasive alien species on land and in water ecosystems	CC+SFM+ICT	4	0.506024	0.000132	0.155382
Target 15.9: Integrate ecosystem and biodiversity in governmental planning	ICT+CC	4	0.501992	0.000014	0.116569
Target 15.A: Increase financial resources to conserve and sustainably use ecosystem and biodiversity	CC+SFM+ICT	3	0.506024	0.000132	0.155382
Target 15.B: Finance and incentivize sustainable forest management	CC+SFM+ICT	5	0.506024	0.000132	0.155382
Target 15.C: Combat global poaching and trafficking	CC+SFM+ICT	4	0.506024	0.000132	0.155382
Target 16.3: Promote the rule of law and ensure equal access to justice	CC+SFM+ICT	3	0.506024	0.000132	0.155382

Target 16.4: Combat organized crime and illicit financial and arms flows	CC+SFM	2	0.501992	0.000053	0.100143
Target 16.5: Substantially reduce corruption and bribery	CC+SFM+ICT	4	0.506024	0.000132	0.155382
Target 16.6: Develop effective, accountable and transparent institutions	CC+SFM+ICT	6	0.506024	0.000132	0.155382
Target 16.7: Ensure responsive, inclusive and representative decision-making	CC+SFM+ICT	7	0.506024	0.000132	0.155382
Target 16.10: Ensure public access to information and protect fundamental freedoms	ICT+CC	3	0.501992	0.000014	0.116569
Target 16.A: Strengthen national institutions to prevent violence and combat crime and terrorism	ICT+CC	2	0.501992	0.000014	0.116569
Target 16.B: Promote and enforce non-discriminatory laws and policies	ICT+CC	2	0.501992	0.000014	0.116569
Target 17.1: Mobilize resources to improve domestic revenue collection	CC+SFM	3	0.501992	0.000053	0.100143
Target 17.6: Knowledge sharing and cooperation for access to science, technology, and innovation	ICT+CC	5	0.501992	0.000014	0.116569
Target 17.8: Strengthen the science, technology, and innovation capacity of least-developed countries	ICT+CC	4	0.501992	0.000014	0.116569
Target 17.9: Enhanced SDG capacity in developing countries	CC+SFM+ICT	3	0.506024	0.000132	0.155382
Target 17.11: Increase the exports of developing countries	CC+SFM+ICT	3	0.506024	0.000132	0.155382
Target 17.14: Enhance policy coherence for sustainable development	CC+SFM+ICT	5	0.506024	0.000132	0.155382
Target 17.16: Enhance the global partnership for sustainable development	ICT+CC	2	0.501992	0.000014	0.116569
Target 17.17: Encourage effective partnerships	CC+SFM+ICT	5	0.506024	0.000132	0.155382
Target 17.18: Enhance the availability of reliable data	ICT+CC	3	0.501992	0.000014	0.116569
Target 17.19: Further develop measurements of progress	ICT+CC	2	0.501992	0.000014	0.116569
Climate Change (CC)	CC-H	328	0.969231	0.500538	1.000000
Sustainable Forest Management (SFM)	SFM-H	128	0.547826	0.136038	0.636635
Information and Communication Technology (ICT)	ICT-H	179	0.787500	0.340440	0.904838

Figure S1a presents a network visualization connecting CC1 to CC4, SFM1 to SFM4, ICT1 to ICT4, and the SDTs into one network system. The study created a dataset using all SDTs aligned to CC, SFM, and ICT, identified from 12 relevant pieces of literature, and conducted social network analysis using Gephi, resulting in an undirected graph with 181 nodes 733 edges. The nodes were color-coded by CSI cluster, with each domain having four sub-nodes labeled CC1 to CC4, SFM1 to SFM4, and ICT1 to ICT4. The network's statistics showed an average weighted degree of 8.099, a network diameter of 4, and a graph density of 0.045. The hubs of each domain were depicted in darker colors of blue, green, and orange. The visualization helps identify the interconnections between nodes and clusters, and the thicker lines between nodes indicate more linked edges.

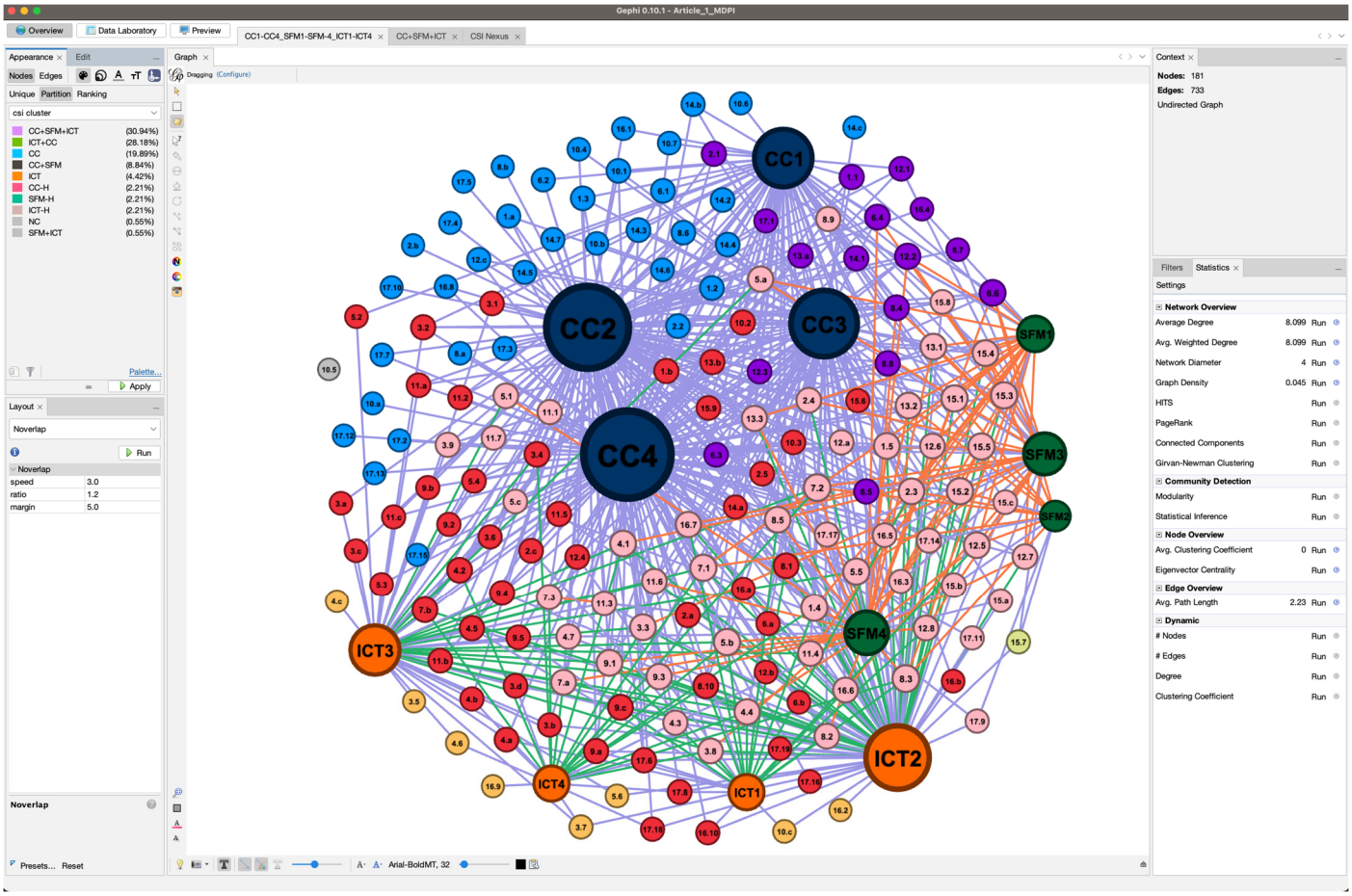

Figure S1a. complex network visualization based on twelve data sources (CC1 to CC4, SFM1 to SFM4, and ICT1 to ICT4)

Figure S1b is a simplified version of Figure 3a, consolidating the CC, SFM, and ICT hubs into three network hubs. The resulting undirected graph has 155 nodes and 332 edges. The average weighted degree is 8.573, indicating that each node is connected to an average of 8.573 other nodes. The graph's diameter is 4, and the density is 0.028. The modularity value is 0.0, indicating no clear community structure, and the statistical inference value is 659.536. The network visualization color-codes nodes are based on CSI clusters, with CC in blue, ICT in orange, CC+SFM in purple, SFM+ICT in yellow, ICT+CC in red, and CC+SFM+ICT in pink. The hubs are represented with darker shades of blue, green, and orange; thicker lines indicate more connected edges. Overall, the simplified network graph provides insights into the interconnectivity between the three network hubs and their characteristics, which can aid in interpreting the network and identifying key connections.

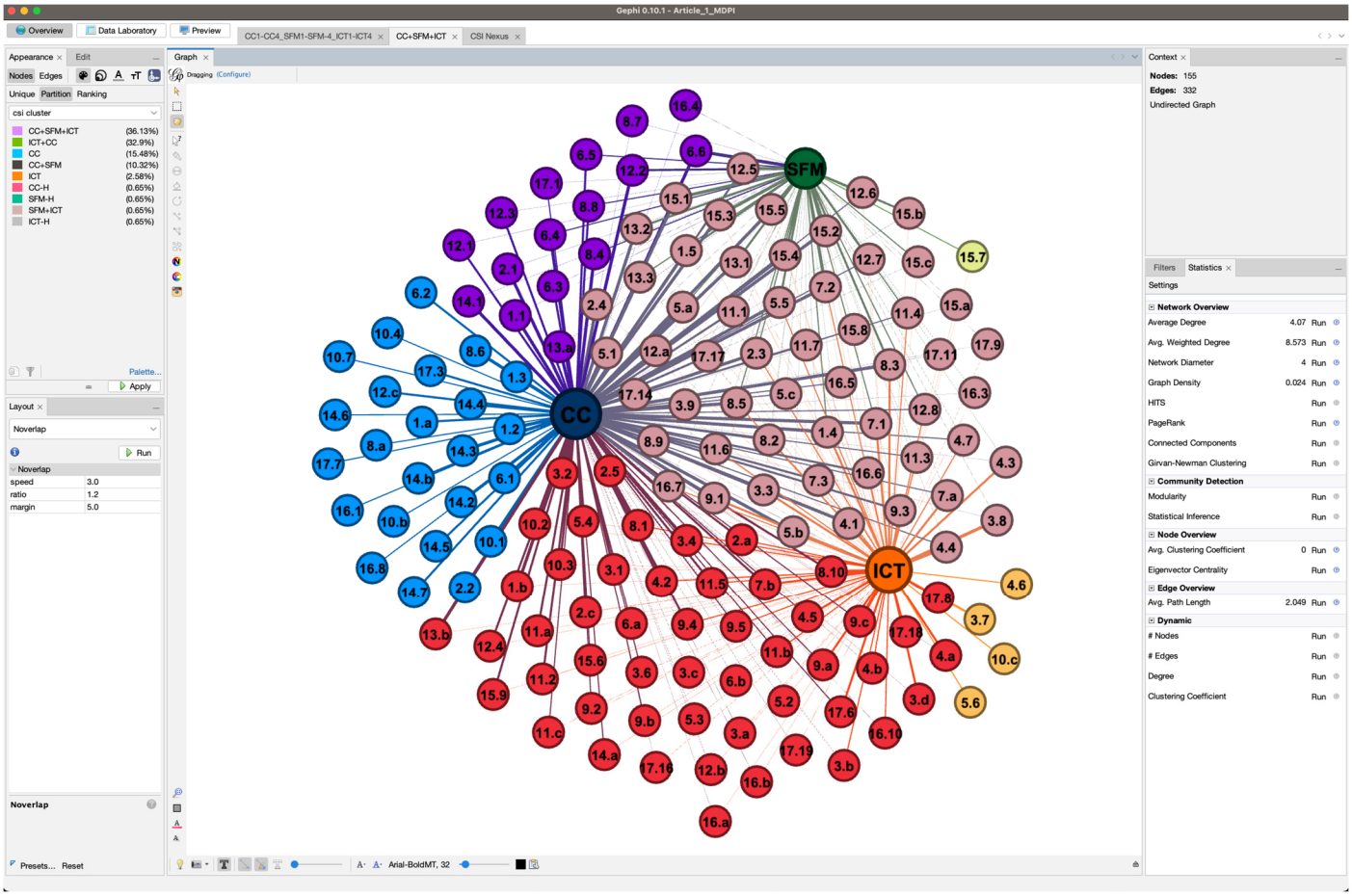

Figure S1b. The simplified network of CC, SFM, and ICT Combines CC1 to CC4 into CC, SFM1 to SFM4 into SFM, and ICT1 to ICT4 into ICT only.

The outcome of the CSI Nexus and SDTs Integration is presented in Figure S1c, showing a streamlined and focused network structure. The network has 127 nodes and 304 edges, with a high average weighted degree of 10, indicating highly connected nodes, and a small network diameter of 3, suggesting closely clustered nodes. The low graph density of 0.024 means few edges compared to the total possible edges. The modularity of 0.173 shows some organization into distinct communities. The nodes are color-coded based on the CSI clusters and hub nodes identified by the analysis. The larger node size for CC reflects its central role in the network. The thicker lines connecting nodes with more connected edges demonstrate the strength of their relationships within the network. The network visualization helps interpret the overall structure of the network and identifies the different hubs and their connections, providing a valuable tool for understanding and addressing sustainability challenges.

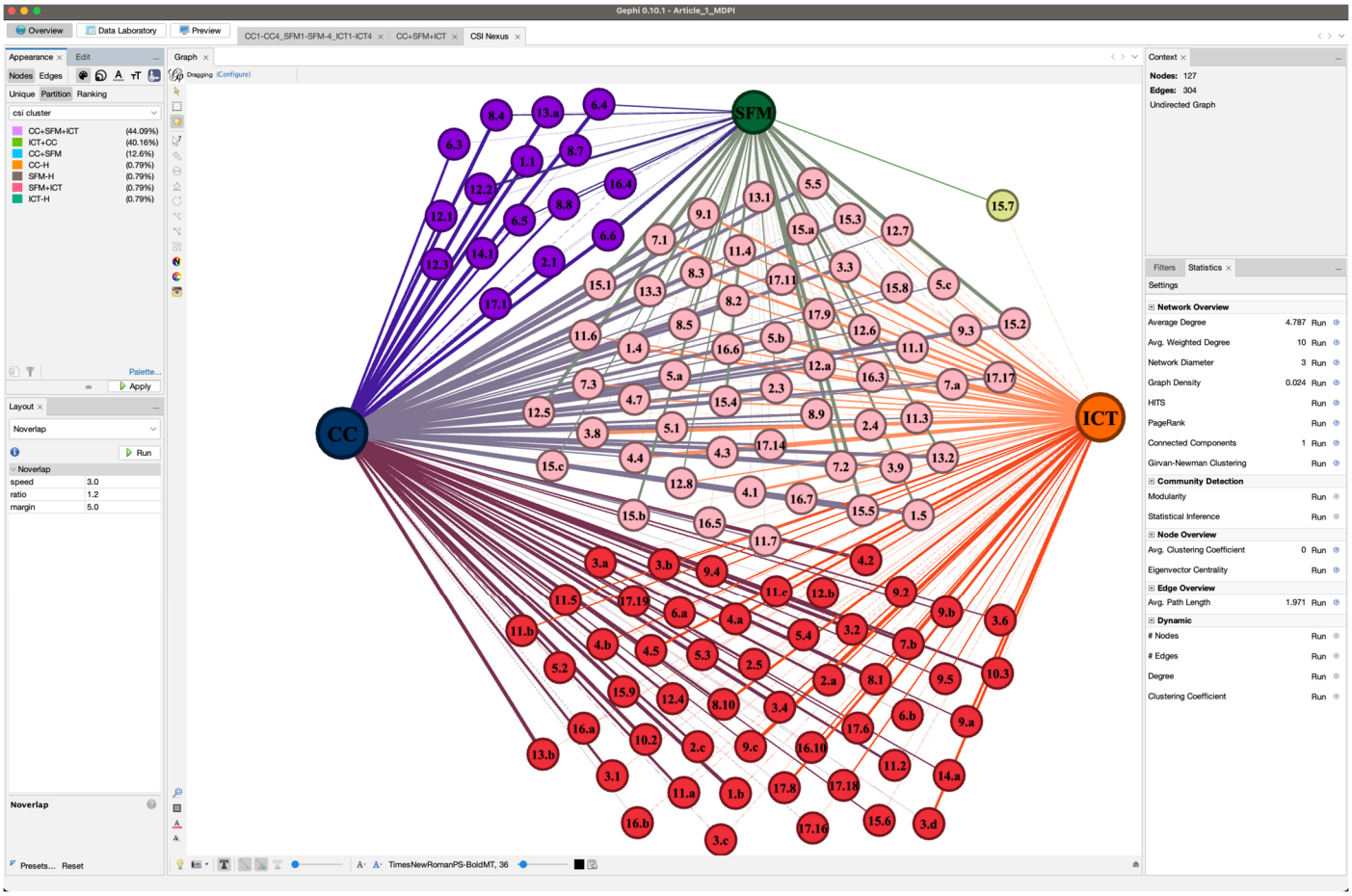

Figure S1c. The CCC, SFM, and ICT Domains and the 124 SDTs interconnected to form the CSI Nexus and SDTs Integration