

Sustainable Development Goals (SDG) Interlinkages Analysis and Visualisation

*A practical tool supporting SDG integration and
policy coherence*

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Outline

- About the Institute for Global Environmental Strategies (IGES)
- IGES SDG Interlinkages analytical methodology and Visualisation Tool
- Example of its application and initial findings



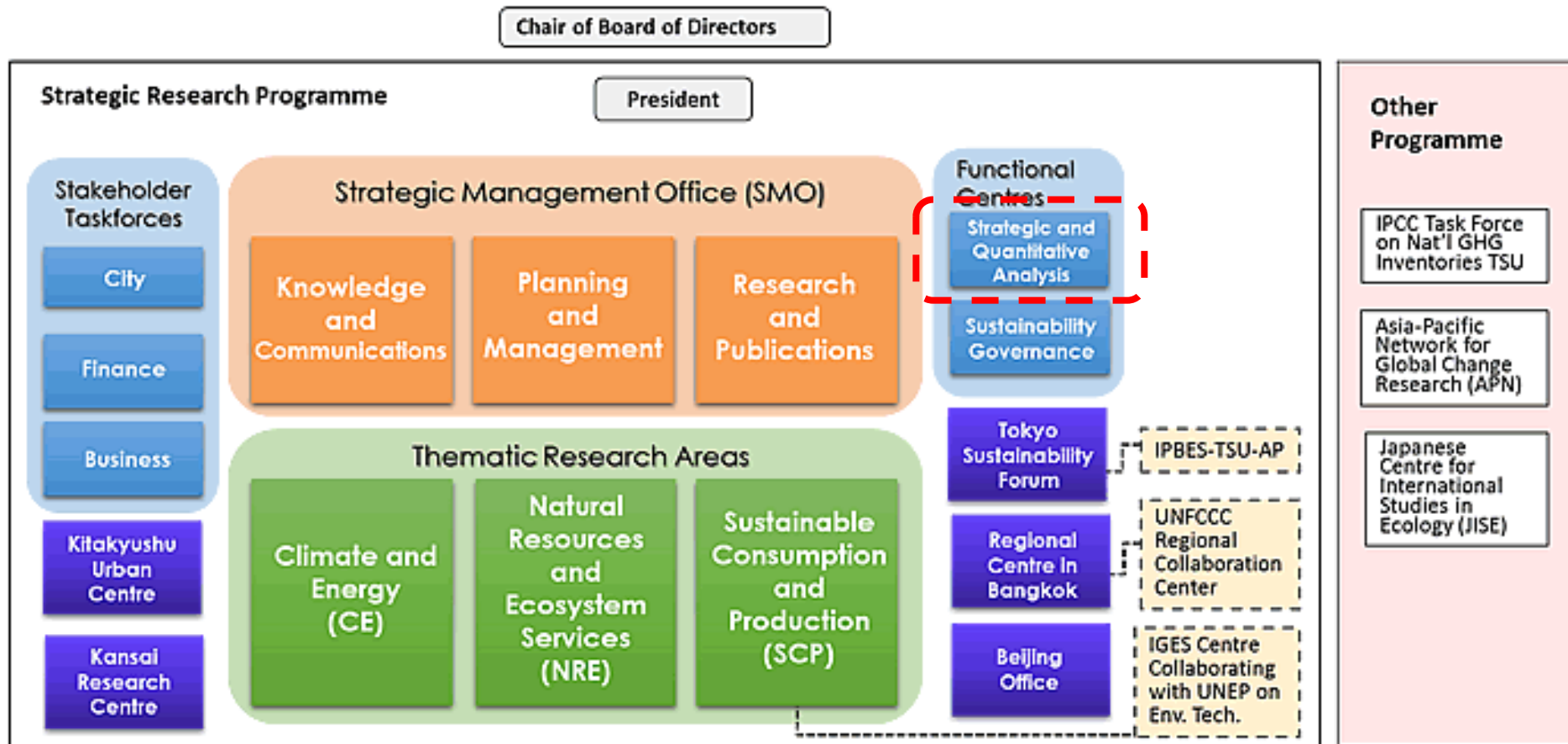
About the Institute for Global Environmental Strategies (IGES)

About the Institute for Global Environmental Strategies (IGES)

- IGES, a public interest incorporated foundation, focuses on accelerating the transition to a sustainable, resilient, shared, inclusive Asia-Pacific region, both across borders and within the world at large.
- IGES operates as an agent of change to foster a world where planetary boundaries are fully respected, a green economy is flexibly implemented, and the well-being of people is steadily improved.
- The Institute maintains its international headquarters in Hayama, Japan, with offices and country desks in Tokyo, Kansai, Kitakyushu, Beijing, Bangkok, and New Delhi.

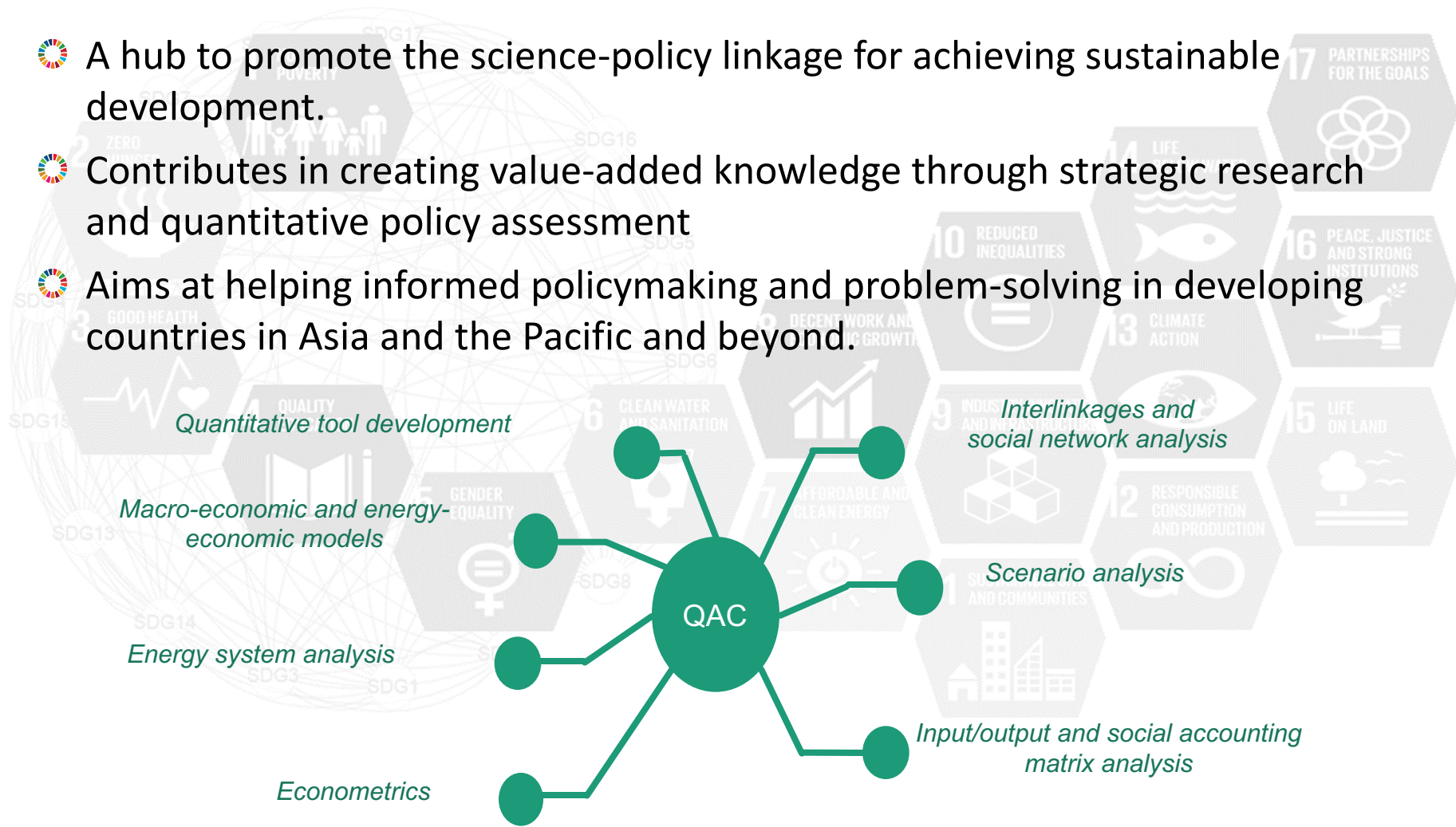


Organisational Structure

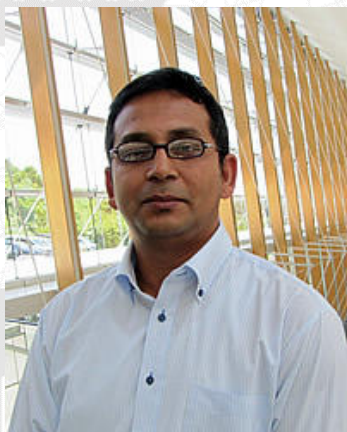


Strategic and Quantitative Analysis Centre

- 🌐 A hub to promote the science-policy linkage for achieving sustainable development.
- 🌐 Contributes in creating value-added knowledge through strategic research and quantitative policy assessment
- 🌐 Aims at helping informed policymaking and problem-solving in developing countries in Asia and the Pacific and beyond.



Bangladeshi researchers in IGES



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IGES activities in Bangladesh

Various thematic areas including

- Low carbon technology/ Joint Crediting Mechanism
- Water-energy-food nexus
- Capacity building for low carbon development
- Climate change adaptation measures

Partners and collaborators including

- Governmental ministries/agencies (DOE and others)
- Research/academic institutes (BUET, Khulna University, ICCCAD)



IGES SDG Interlinkages analytical methodology and Visualisation Tool

Importance of SDG interlinkages analysis and existing knowledge gaps

- 
- 🌐 The 17 SDGs and their targets cover separate and diverse elements that interact and complement each other in an indivisible way, and in doing so make up a complex network of interlinkages.
 - 🌐 The framework of the SDGs suggests an integrated approach to seek and scale up the synergies, and mitigate and eliminate the trade-offs through integration across sectors and collaborations across various administrative levels and actors.
 - 🌐 However, existing knowledge on SDG interlinkages remains limited.
 - Lack of comprehensive interlinkages study covering all targets;
 - Quantification of the SDG interlinkages is limited;
 - SDG interlinkages study at the national level is lagging behind;
 - Analysis of SDG interlinkages, beyond the identification of the interlinkages, is limited.
 - 🌐 IGES developed a practical and science-based SDG Interlinkages Visualisation Web Tool that can help in shifting from a silo approach to an integrated approach.

IGES' integrated approach on SDG interlinkages analysis and visualisation

- 🌐 The SDG Interlinkages Web Tool (i) allows users to visualise the interlinkages between SDG targets, (ii) helps identify potential synergies and trade-offs between SDG targets, (iii) provides indicator-level time-series data for selected countries in Asia, and (iv) enables comparison of country progress and performance over time.

Identification of interlinkages

- Identification of binary links (1 for presence of interlinkage, 0 otherwise) between 169 SDG targets based on:
 - knowledge obtained from international consultation processes on SDG indicators (such as IAEG-SDGs and SDSN);
 - literature review.

Indicators and data collection

- Identification of 51 indicators (SDSN and others) with trackable data for 108 SDG targets;
- Collection of time series data (2001-2014) for 51 indicators for nine Asian countries (BGD, KHM, CHN, IND, IDN, JPN, ROK, PHL, VNM).

Quantification of interlinkages

- Statistical data treatment;
- Quantification of the interlinkages of SDG targets based on regression analysis of indicator-level time-series data.

Interlinkages analysis and visualisation

- Development of IGES SDG Interlinkages and Data Visualisation Web Tool to visualise interlinkages and indicator-level data;
- Apply Social Network Analysis techniques to analyse the structure of the interlinkages network and identify strategic targets.

IGES' SDG Interlinkages and Data Visualisation Web Tool (Ver. 1)

Free to access online at:

<https://sdginterlinkages.iges.jp/visualisationtool.html>

SDG Interlinkages and Data Visualisation

Display

Comparison

1 Select One Country

- ☒ Bangladesh
- ☐ Cambodia
- ☐ China
- ☐ India
- ☐ Indonesia
- ☐ Japan
- ☐ Republic of Korea
- ☐ Philippines
- ☐ Viet Nam

How to use

1. Select only one country.
2. Select one or more Goals.
3. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
4. Select or Deselect SDG Targets & Indicators
5. Visualisation of interlinkages in a network
6. Detailed Explanation
7. Interlinkage Scenarios
8. Export Chart

Users can select a country from here

2 Select Sustainable Development Goals (SDGs)

Select All

User can select Goals from here.

3 Select SDG Targets & Indicators (See more)

- ☐ Goal 2. Zero hunger
 - ☐ 2.1 End hunger
 - Population undernourished
 - ☐ 2.2 End malnutrition
 - Prevalence of wasting
 - ☒ 2.3 Double agriculture productivity
 - Crop production index
 - ☐ 2.4 Build sustainable food production systems
 - Crop production index
 - ☐ 2.5 Maintain agricultural genetic diversity

User can select Targets from here.

4 Select or Deselect SDG Targets & Indicators

For example, here we selected Bangladesh, Goal 2 on zero hunger and Target 2.3 on doubling agriculture productivity. Target 2.3 has potential synergies with many targets of Goal 2 (hunger), Goal 12(SCP), and Goal 14 (life below water) but possible trade-offs with several targets of Goal 1 (poverty), Goal 8 (jobs and growth), Goal 6 (water) and Goal 10 (inequalities).

6 Visualisation of interlinkages in a network

Detailed Explanation

Interlinkage Scenarios

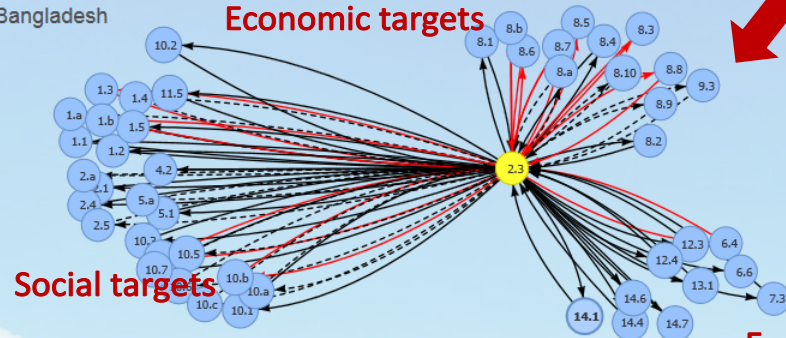
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Export Chart

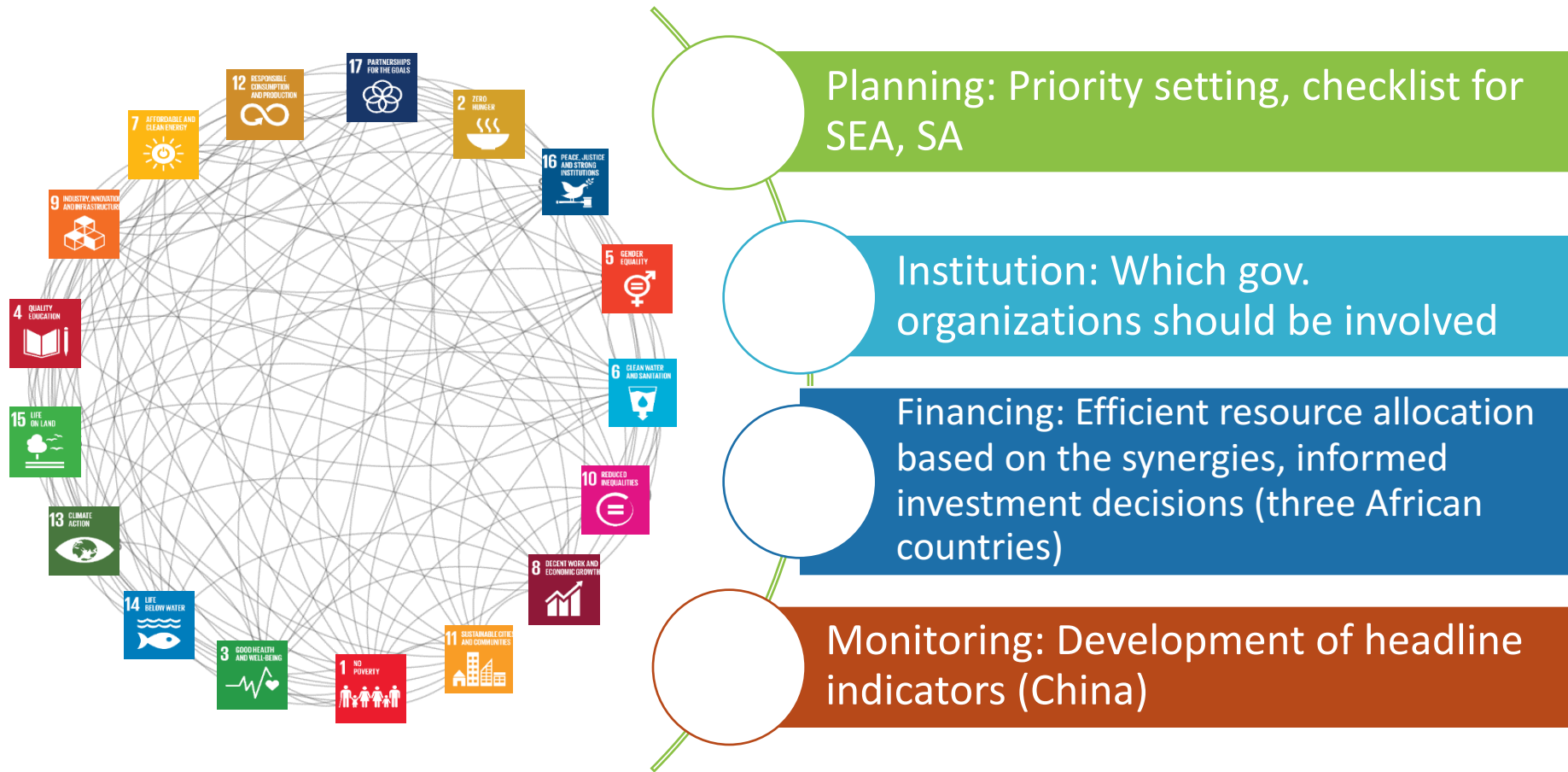
Bangladesh

Economic targets



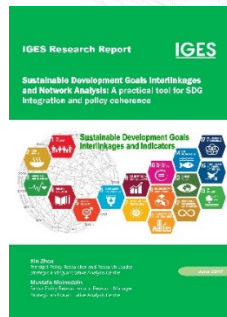
Note: i) Each node represents one SDG Target, e.g. Target 1.1, with yellow ones indicating the selected targets.
ii) Each line with an arrow linking two nodes represents a directional/causal link between two Targets, e.g. Target 1.1 to Target 1.2. The value over the line (by putting the cursor on the line) indicates the strength of the linear relation between the pair of targets.
iii) A line in black represents a positive link and a line in red represents a negative link.

Applications of the tool for SDG integration



Application of the tool for SDG integration

- ❁ The SDG Interlinkages methodology and tool has been demonstrated at various international symposiums including the SDTF 2017 and APFSD 2018.
- ❁ The tool has been well received by international organizations, experts and practitioners for its high potential for practical application. It has been featured in the homepage of Green Growth Knowledge Platform, cited in several reports, and recently it has been included in UNESCAP's SDG HelpDesk.
- ❁ The methodology has been applied for academic publication relating to identifying headline indicators for China.
- ❁ IGES is now developing a comprehensive flagship publication with the results of the application of the methodology on various thematic issues (SCP, sustainable infrastructure, trade, climate change, and cities) as well as country case studies).
- ❁ Related publication:



IGES Research Report

Sustainable Development Goals Interlinkages and Network Analysis: A practical tool for SDG integration and policy coherence

Xin Zhou and Mustafa Moinuddin

June 2017

<https://sdginterlinkages.iges.jp/publications.html>

Experts

17 PARTNERSHIPS
FOR THE GOALS

Project coordination, SDG framework and database development

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Mr. Andreas Jaeger

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Dr. Ali Nageen





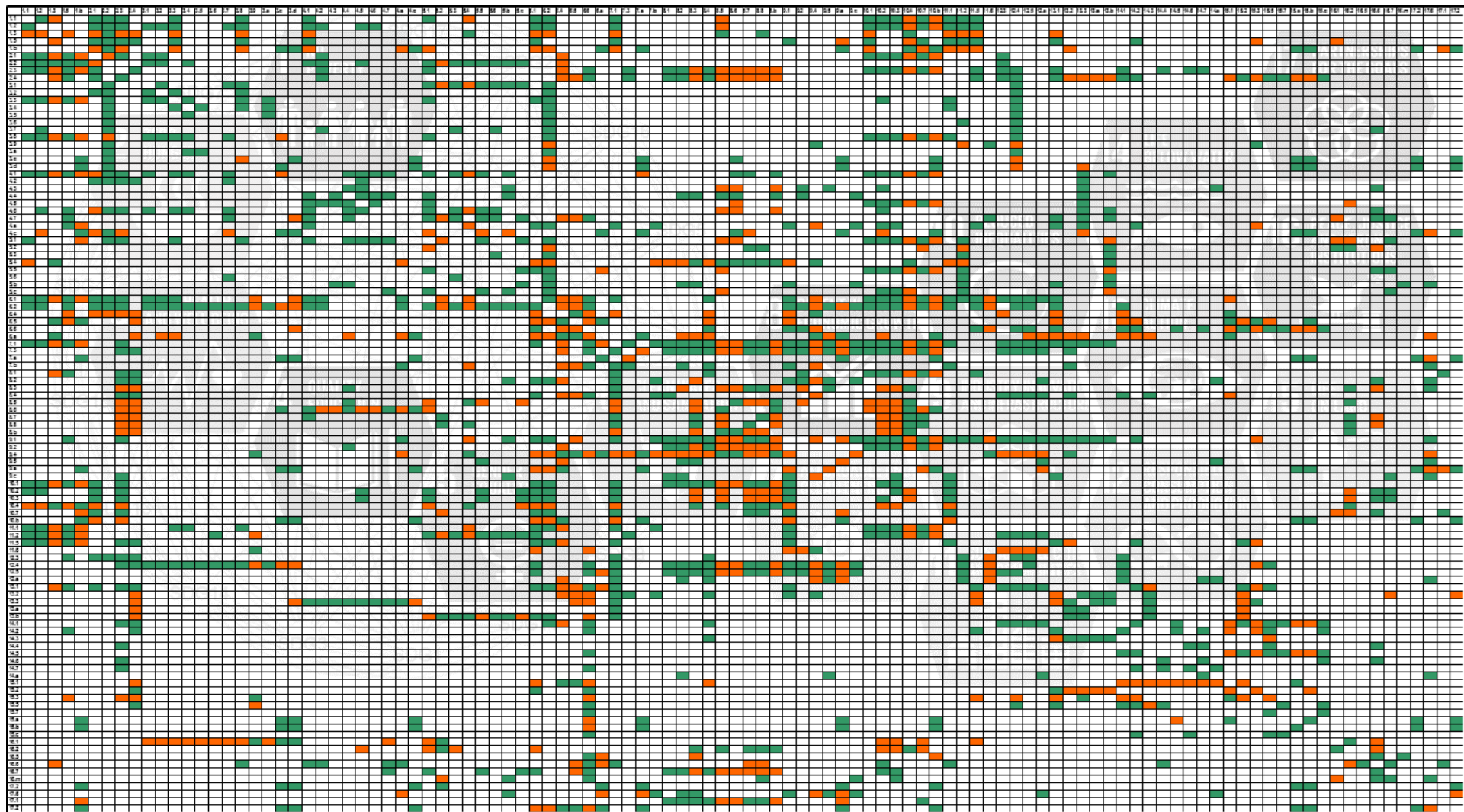
Example of its application and initial findings

Bangladesh's MDG achievements and preparations for SDG implementation

- Impressive performance in implementing the MDGs, though some areas need further and continuous attention
- MDG progress, high growth, large labour force, increasing connectivity and a growing middle class has created a solid foundation for embracing the SDGs
- Governmental policies and actions demonstrate clear intent and strong commitment from the highest political offices to successfully implement the SDGs
- Some challenges such as resource mobilization, stakeholders engagement, data availability and management and localizing SDGs remain, but can be overcome with positive intent and efforts
- SDGs are holistic, and calls for leaving no one behind. Breaking the silos and adopting an integrated approach therefore is necessary.



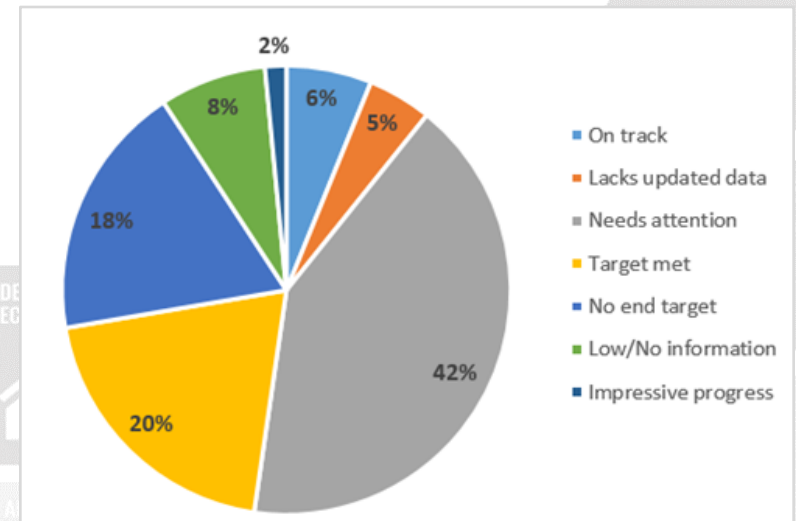
Country-specific dashboards indicating potential reinforcing (green) and conflicting (red) interlinkages



Bangladesh

Bangladesh's unfinished MDG agenda and links with SDG

- While Bangladesh made significant progress in MDGs, there are some specific areas where progress has been slow and needs further attention.
- These areas include employment generation, primary school completion, adult literacy rate, decent wage employment for women, skilled health professionals, and forest area coverage.
- We make an tentative mapping of the related targets/indicators with SDG targets. Based on this, some initial analysis of interlinkages of these targets as well as why they were difficult to attain have been traced.



Overall snapshot of Bangladesh's MDG progress based on 65 reported indicators

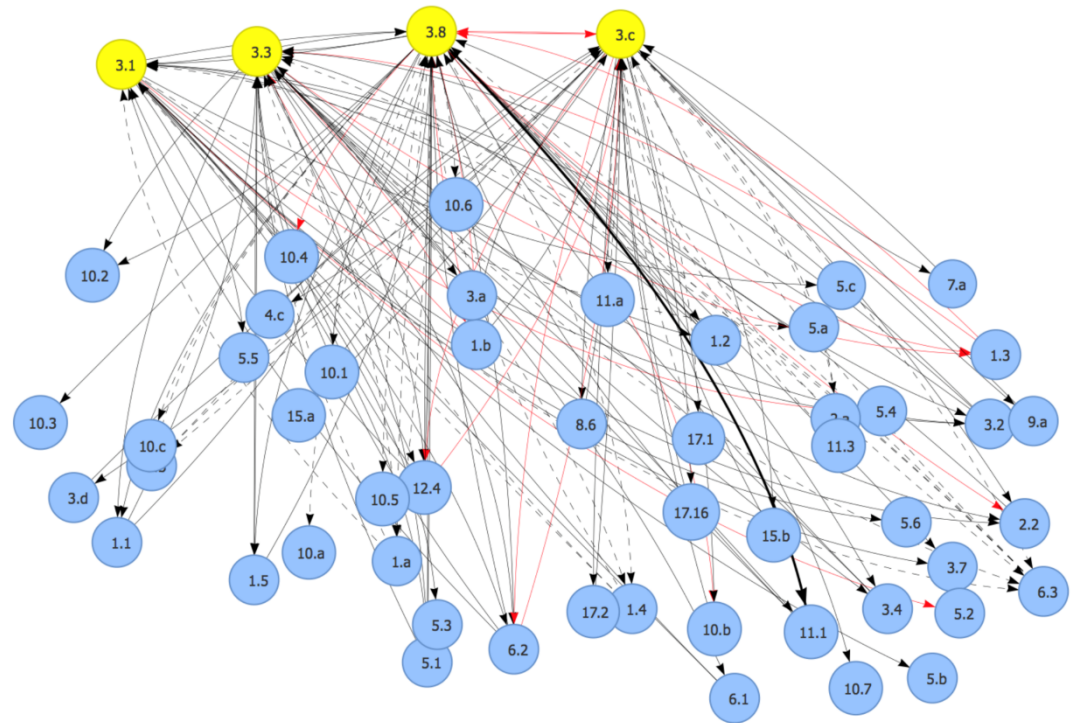
Source: Based on (General Economics Division 2016)

Bangladesh's unfinished MDG agenda and links with SDG

MDG indicators	SDG targets
1.5: Employment-to-population ratio (15+)	Target 8.5 by 2030 achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value
2.2: Proportion of pupils starting grade 1 who reach grade 5, %	Target 4.1 by 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes
2.3: Literacy rate of 15 -24 year olds, women and men, %	Target 4.6 by 2030 ensure that all youth and at least x% of adults, both men and women, achieve literacy and numeracy
3.2: Share of women in wage employment in the nonagricultural sector, (%)	Target 5.5 ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic, and public life
4.3: Proportion of 1 year old children immunized against measles, %	Target 3.8 achieve universal health coverage (UHC), including financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all
5.1: Maternal mortality ratio (per 100,000 live births)	Target 3.1 by 2030 reduce the global maternal mortality ratio to less than 70 per 100,000 live births
5.2: Proportion of births attended by skilled health personnel (%)	Target 3.c increase substantially health financing and the recruitment, development and training and retention of the health workforce in developing countries, especially in LDCs and SIDS
5.3: Contraceptive prevalence rate (%)	Target 5.6 ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the ICPD and the Beijing Platform for Action and the outcome documents of their review conferences
6.9a: Prevalence of TB per 100,000 population	Target 3.3 by 2030 end the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases and combat hepatitis, water-borne diseases, and other communicable diseases
7.1: Proportion of land area covered by forest, % (tree coverage)	Target 15.3 by 2020, combat desertification, and restore Share of forest area in total land area degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation neutral world

Targets under SDG 3 (Health)



- These 4 targets are interlinked with many other targets under as many as 14 Goals (SDG 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, and 17).
- We can see many synergies (black lines) but also a number of trade-offs (red lines).
- The presence of these trade offs with targets in other Goals makes it difficult to achieve these targets.
- We can take a closer look at one single target to illustrate this issue.

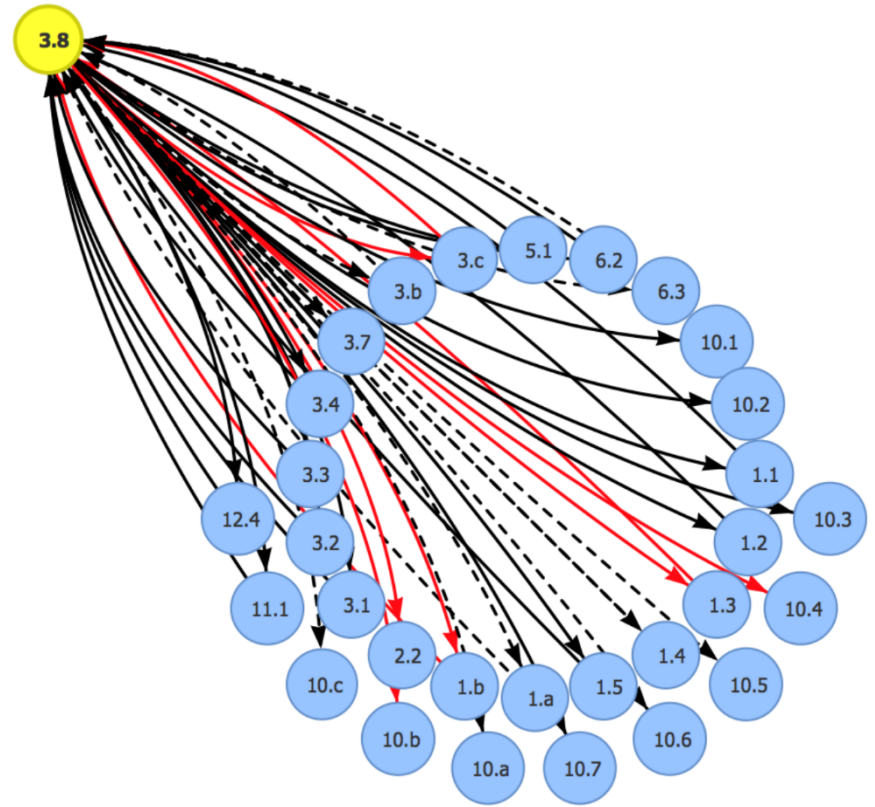


Interlinkages of several targets under Goal 3 (health)

Notes: Target 3.1= Reduce maternal mortality; Target 3.3 = End epidemics of diseases; Target 3.8 = Universal health coverage; and Target 3.c. Increase health workforce

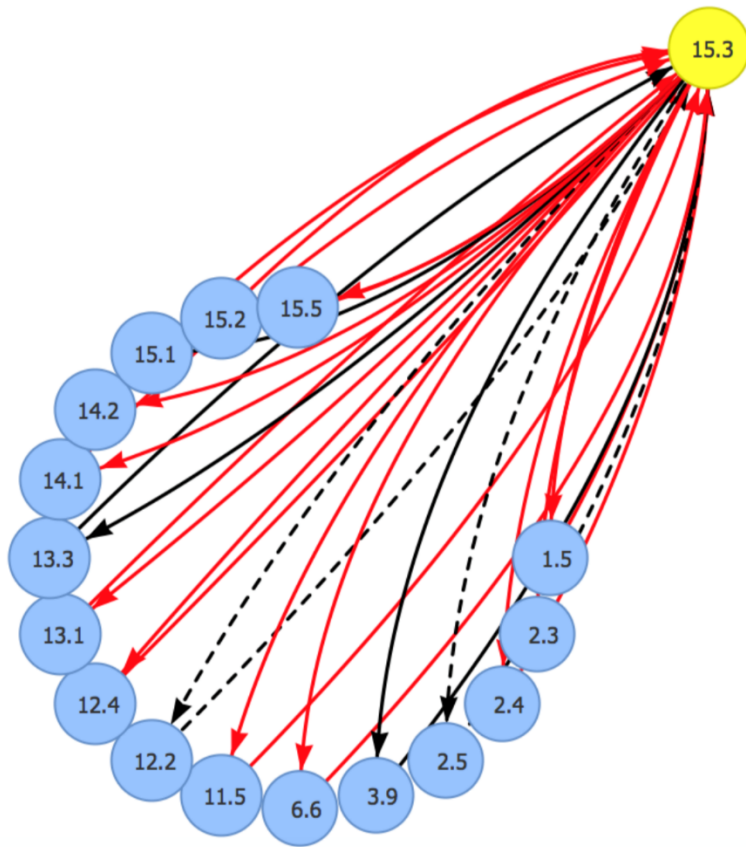
Targets under SDG 3 (Health)

-  Here we chose Target 3.8 on universal health coverage, which is related to the unfinished MDG Target or reducing child mortality. The indicator where Bangladesh's performance lagged behind was related to children's immunization, and the IGES SDG Interlinkages Tool uses a similar indicator on immunization.
-  The interlinkages visualization chart on the right side shows the presence of many trade-offs, particularly with targets under Goal 1 (poverty) and Goal 10 (inequalities). These conflicts with other targets may have affected achieving this target.



Interlinkages of Target 3.8 on universal health coverage

Another example with Goal 15 (Life on land)



Interlinkages of Target 15.3 on combatting desertification and soil degradation.

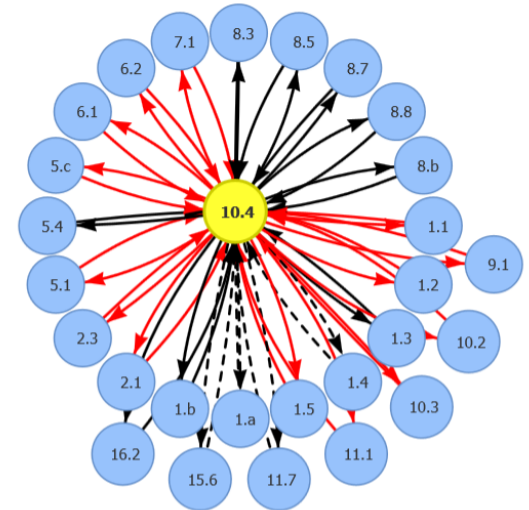
- Share of forest area in total land area is another area where Bangladesh faced difficulties in the MDG period. This indicator is covered under SDG Target 15.3 on combatting desertification and soil degradation.
- We visualized the interlinkages of Target 15.3 (on the left). This target is linked with 10 Goals, mostly in the environmental domain (SDG 6, 12, 13, 14 and 15) but also several in social domain (SDG 1, 2, 3 and 11)
- The visualization chart shows that this target has clear and way too many conflicts or trade-offs with many of the social and environmental targets. In fact, trade-offs outweigh synergies for this specific target.

Need for understanding the interlinkages

- Many countries, including Bangladesh made great efforts in achieving the MDG Targets, and the progress made was really remarkable. There are however some more-than-usual difficult Goals or Targets where progress has been relatively low.
- The examples provided in the previous slides indicate that completing the MDG unfinished agenda and achieving the SDGs through an integrated approach will require minimizing the trade-offs and maximizing synergies among the Goals and Targets.
- The interlinkages charts also demonstrate that institutional arrangements will be a major issue in this integrated approach, because the interlinkages of a Goal or Target are not limited to the same Goal area, rather often they are connected with many other Goals and Targets. The conventional silo-based approach needs to be radically transformed.
- While minimizing the trade-offs is important, it is often more difficult and requires more resources. Strategies for enhancing synergies in priority Goals/Targets can help achieve co-benefits, allocate resources more efficiently, and pave a learning-by-doing pathway towards achieving the SDGs.

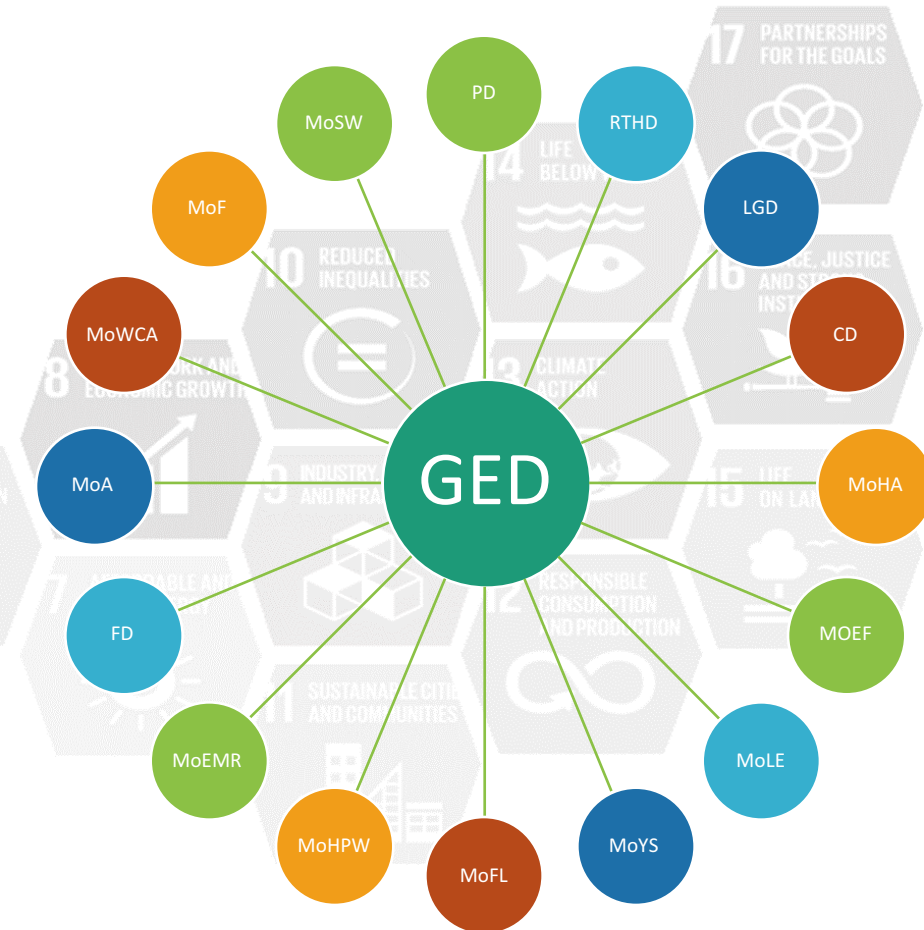
Institutional arrangements

- 🌐 The General Economics Division of Bangladesh Planning Commission has conducted a mapping of all relevant ministries and divisions by SDGs at the targets level. This is very detailed work, and demonstrates the commitment and optimism of Bangladesh in attaining the SDGs.
- 🌐 This institutional arrangements could be further enhanced if it can also take into consideration the interlinkages of the Goals and Targets to break the silo approach.
- 🌐 For instance, the GED mapping suggests that Target 10.4 on policies for greater inequality should be led by GED, with CD, FD, MoLE, MoSW, Prog. Div and IRD playing an associate role. Most of these ministries/divisions largely deal with issues under the area of Goal 10, and social domain in particular, though some have broader scope.
- 🌐 However, Target 10.4 is interlinked with other Goal areas as well as the other two domains of sustainability: economy (SDG 8) and environment (SDG 6, 7 and 15).
- 🌐 Maximizing synergies and minimizing trade-offs while addressing this target will therefore require the involvement – at least at the associate level – of other ministries and divisions. For instance, this target is connected with 3 targets under Goal 5 on gender. So the involvement of MoWCA will be important.




Institutional arrangements for Target 10.4


- Based on the mapping of lead ministries by GED and the interlinkages of Target 10.4 identified by the IGES SDG tool, we derived a very initial outline of the institutional arrangement for Target 10.4.
- Note that as suggested in the governmental mapping study, GED still remains the lead for this Target, but the lead ministries/divisions of the other interlinked targets should also be part, at various capacity, of the institutional arrangements. This is because these targets also affect or are affected by Target 10.4.
- This figure presents the arrangements at the target level, but a more aggregated and pragmatic arrangement at the goal level may also be generated.
- Nonetheless, for priority targets it may be useful to consider more detailed institutional arrangements.




Priority SDG Targets for Bangladesh


	Top 20 targets		
	Weighted in-degree	Weighted out-degree	Weighted degree
1	2.3	6.2	6.2
2	12.4	9.1	1.2
3	6.6	1.2	12.4
4	6.2	6.1	2.3
5	4.c	12.4	9.1
6	7.a	7.1	7.a
7	1.2	17.2	7.1
8	1.1	7.a	17.2
9	7.1	14.1	6.6
10	17.2	2.3	1.1
11	11.1	17.16	17.16
12	17.16	15.b	6.1
13	13.3	1.1	14.1
14	3.c	15.a	3.c
15	9.1	4.1	4.c
16	15.5	2.4	15.a
17	14.2	3.c	11.1
18	8.4	3.d	13.3
19	5.b	6.6	14.2
20	11.2	11.2	15.b

 We applied social network analysis (SNA) techniques for through various centrality measures to identify the structure and unique features of the SDG interlinkages networks for Bangladesh. Based on these analyses, the top 20 most important, synergistic targets and bottom 10 targets with potential trade-offs are identified.

 The synergistic targets suggest possible co-benefits while the bottom 10 indicates the need for precautionary measures.

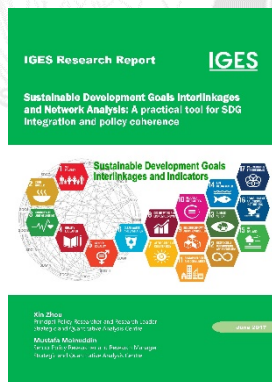
 This information can be very useful for SDG planning and prioritization as well as for resources allocation

	Bottom 10 targets		
	Weighted in-degree	Weighted out-degree	Weighted degree
1	9.4	9.4	9.4
2	6.4	6.4	6.4
3	10.4	15.1	11.6
4	6.5	6.a	10.4
5	11.6	11.6	6.5
6	8.5	5.2	15.1
7	5.2	16.1	5.2
8	8.b	6.5	3.9
9	3.9	3.9	15.3
10	8.6	10.4	8.5

 The methodology can also be applied for identifying headline indicators for monitoring SDG progress.

Thank you!

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IGES Research Report **Sustainable Development Goals Interlinkages and Network Analysis: A practical tool for SDG integration and policy coherence**

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