

Green Economy and Sustainable Development

SDG interlinkages perspective

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IGES
Institute for Global
Environmental Strategies

Introduction



Mutually exclusive or complementary?

Sustainable Development

Many definitions

"Sustainable development is development that meets the needs of the present without compromising the ability of the future generations to meet their own needs"(Brundtland, 1987).

"...development that meets the basic needs of all human beings and which conserve, protect and restore the health and integrity of the earth's ecosystem, without compromising the ability of future generations to meet their own needs and without going over the limits of long term capacity of the earth's ecosystem" (Stappen, 2008),

... "both a way of understanding the world and a method of solving global problems"

Normative approach "to understand the world as a **complex interaction** of economic, social, environmental and political systems" that encourage us to "have a holistic vision of what a good society should be" (Sachs, 2015)

Nature of sustainable development

Cross cutting, cross border, and interdisciplinary (Kim, San-Hyup, 2018)

Key features of the Sustainable Development Goals (SDG)

- Unprecedented scope
- Integrated and indivisible
- Leave no one behind
- Global in nature and universally applicable

SUSTAINABLE DEVELOPMENT GOALS



Green economy and SDGs

 UNEP's definition of a green economy

*"...one that results in **improved human well-being and poverty eradication**, while significantly reducing **environmental damages and ecological scarcities**. In a green economy, **growth in industry, income and employment is driven by green investment** that reduce carbon emissions and pollution, enhance energy and resource efficiency and prevent the loss of biodiversity and ecosystem services."*

(UNEP, 2011)



Source: Zhou (2018)

Importance of SDG interlinkages analysis

- 🌐 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.

Quantification of interlinkages

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

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).

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/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
5. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
6. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
7. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
8. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
9. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
10. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
11. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
12. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
13. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
14. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
15. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
16. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).
17. Select/Deselect SDG Target(s) and related Indicator(s) for the selected Goal(s).

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

Export Chart

Bangladesh

Economic targets

Social targets

Environmental 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.

Environmental-economic and environmental-social linkages of SDGs

- 🌐 To understand green economy from SDG interlinkages perspective, we will take a closer look into the environmental-economic and environmental-social dimensions of the SDGs
- 🌐 Two example countries, Republic of Korea and Bangladesh
 - 🌐 Different levels of economic growth, different opportunities and challenges

Republic of Korea



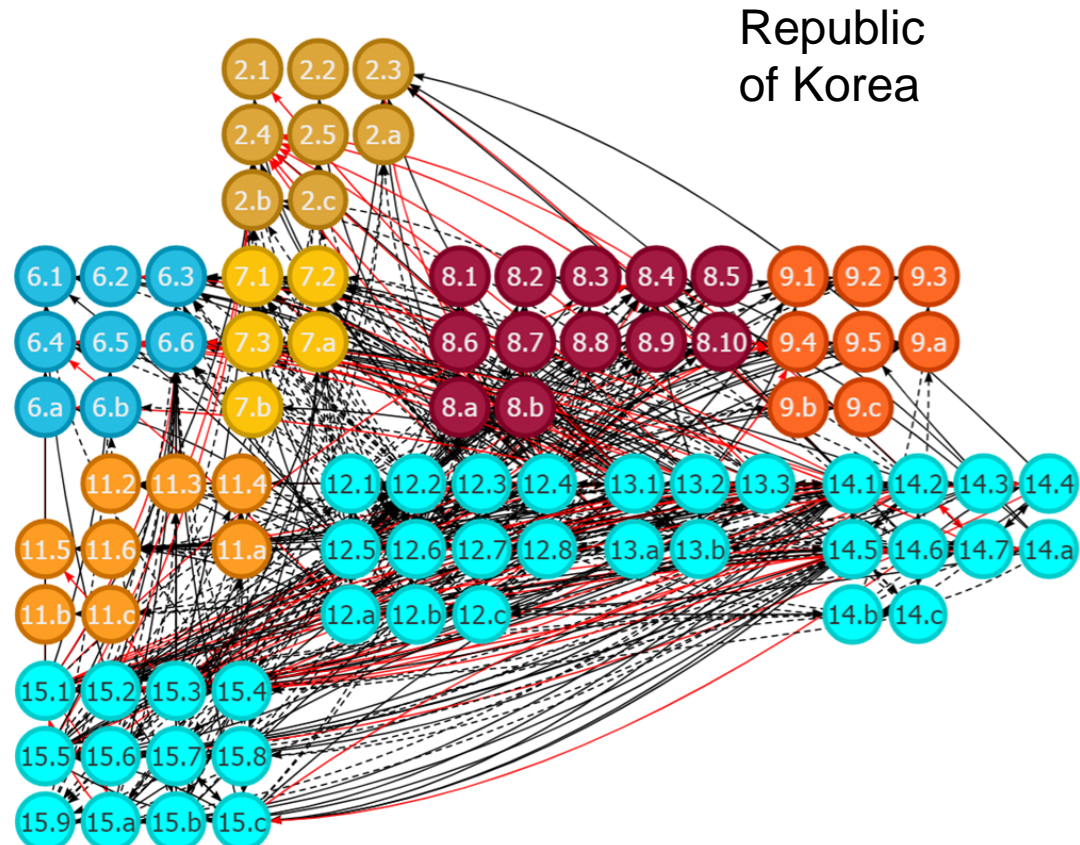
Bangladesh



Source: SDSN (2017). SDG Index and Dashboards Report 2017

Environmental-economic links: Synergies and trade-offs

- The interactions presented here visualizes how progress in the targets under the environmental goals will affect the targets under the economic goals in the Republic of Korea.
- The presence of many black lines indicate that the environmental goals are more synergistic with the economic goals. Compared to the other environmental SDGs, Goal 12 (SCP) and Goal 14 (Life below water) seem to be more reinforcing.
- On the other hand, significant trade-offs also exist between the environmental and economic goals. In particular, Goal 13 (Climate action) has a lot of conflicts with Goal 2 (Zero hunger) and Goal 6 (Clean water and sanitation).
- Korea can benefit by tapping the already existing synergies of Goals 12 and 14 with the economic goals. Understanding where cobenefits exist can help shaping the country's SDG plans. At the same time, policy makers should take note of the conflict areas and try to adopt policies that can at least reduce the trade-offs.



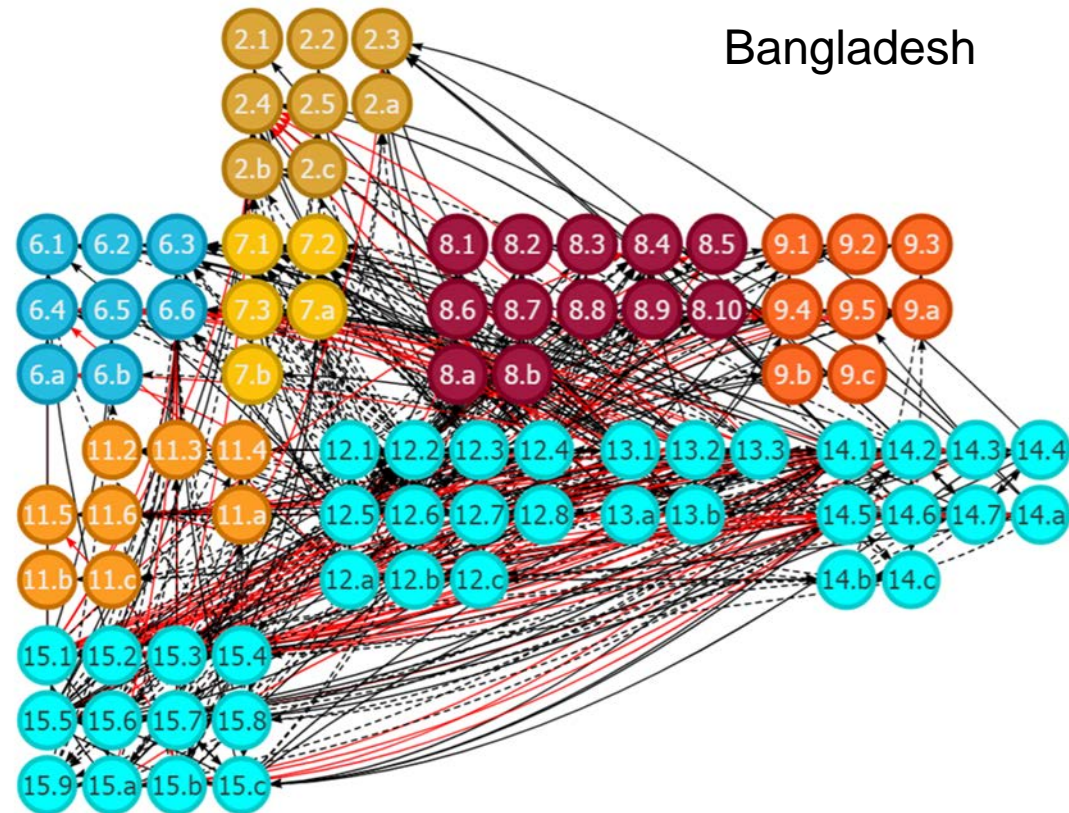
Environmental SDGs: Goals 12, 13, 14 and 15

Economic SDGs: Goals 2, 6, 7, 8, 9 and 11

Black lines indicate synergies, red lines indicate trade-offs

Environmental-economic links: Synergies and trade-offs

- Now if we look at Bangladesh, where the level of socio-economic development is very different than Korea, we see a different picture.
- Unlike the case of Korea, black lines are outnumbered by red lines, indicating that the environmental goals are relatively less synergistic with the economic goals for Bangladesh. Compared to the other environmental SDGs, Goal 12 (SCP) appear to have some synergies with the economic goals.
- Wide level of trade-offs exist between the environmental and economic goals. In particular, Goal 13 (Climate action) has a lot of conflicts with Goal 2 (Zero hunger) and Goal 6 (Clean water and sanitation) and Goal 11 (Industry, innovation and infrastructure).
- Bangladesh can leverage from strengthening Goal 12 which will create co-benefits, by tapping the already existing synergies of Goals 14 and 15 with the economic goals. Understanding where cobenefits exist can help shaping the country's SDG plans. At the same time, policy makers should take note of the conflict areas and try to adopt policies that can at least reduce the trade-offs.



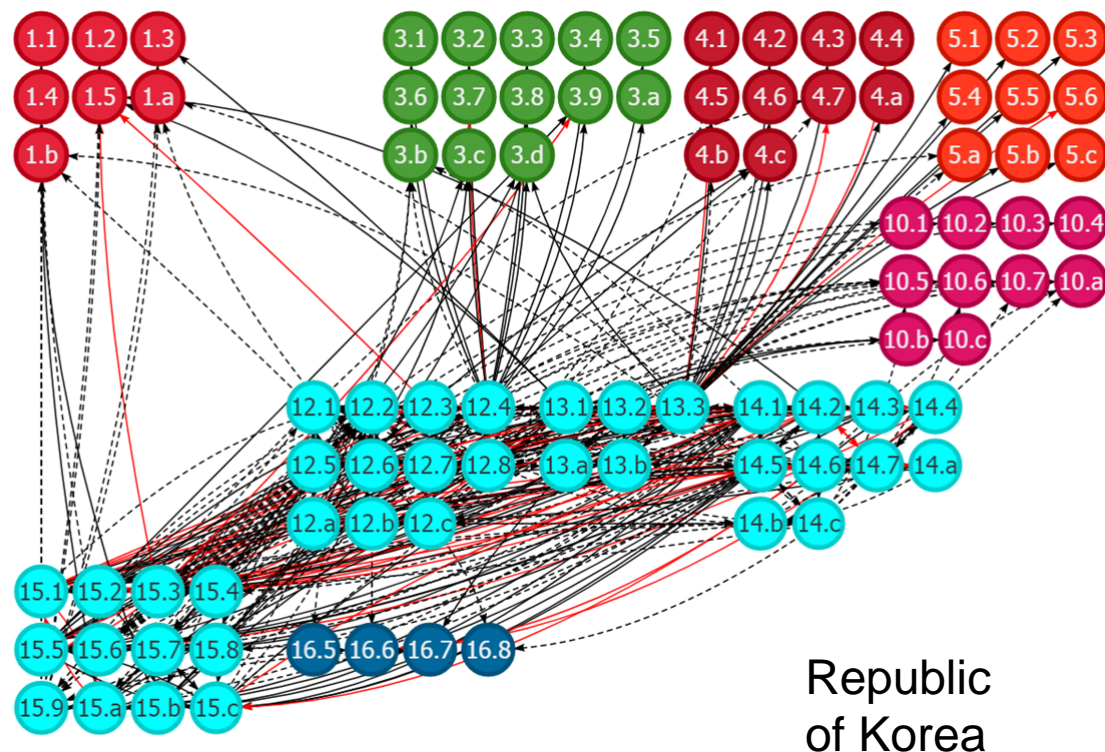
Environmental SDGs: Goals 12, 13, 14 and 15

Economic SDGs: Goals 2, 6, 7, 8, 9 and 11

Black lines indicate synergies, red lines indicate trade-offs

Environmental-social links: Synergies and trade-offs

- The interactions presented here visualizes how progress in the targets under the environmental goals will affect the targets under the social goals in the Republic of Korea.
- Social Goals 3 (Good health and well-being) and 4 (Quality education) have strong synergies with the environmental goals, particularly Goals 12 (SCP) and 13 (Climate action).
- Some trade-offs do exist. For instance, target 15.3 and target 13.3 have some trade-offs with targets under Goals 1, 3 and 4.
- Environmental Goals 12 and 13 thus provide leverage to the Republic of Korea. In addition, even though trade-offs are limited, Korea will benefit by addressing the conflicting targets.



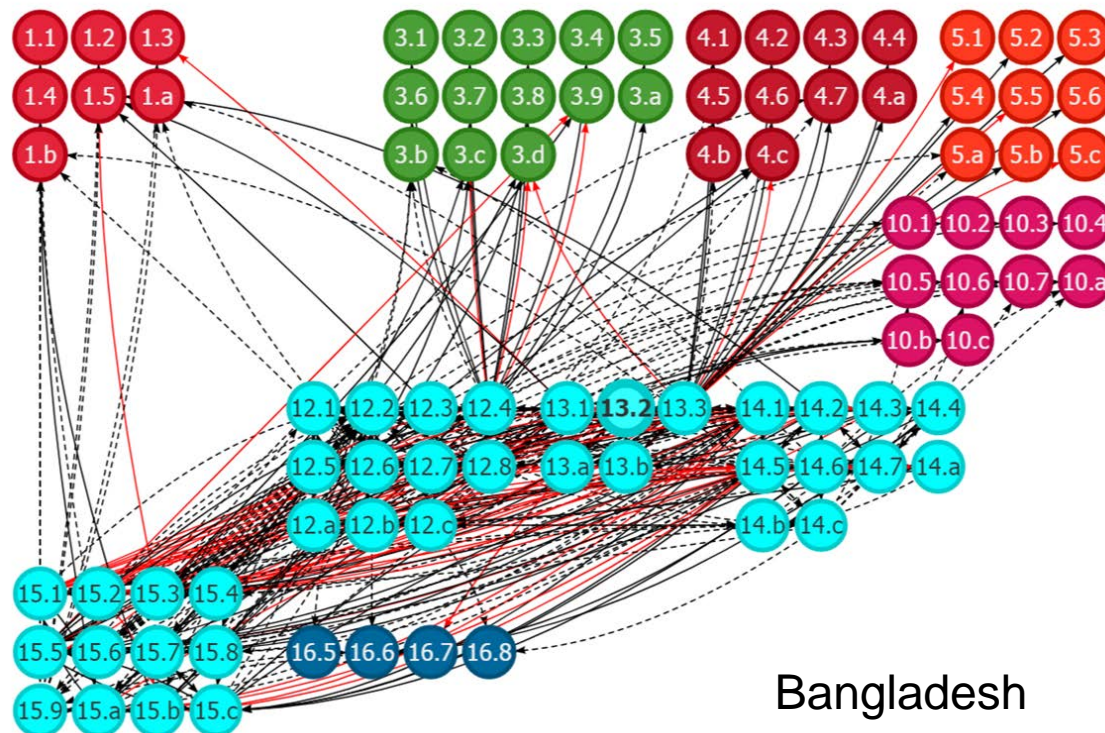
Environmental SDGs: Goals 12, 13, 14 and 15

Economic SDGs: Goals 1, 3, 4, 5, 10 and 16

Black lines indicate synergies, red lines indicate trade-offs

Environmental-social links: Synergies and trade-offs

- In case of Bangladesh, relatively higher number of conflicts in environmental-social links is observed. The
- Goal 15 (Life on land) has the highest number of synergies (though a lot of trade-offs as well) with Goals 1 (No poverty), 3 (Good health and well-being), and 10 (Reduced inequality). Similarly Goal 12 (SCP) also demonstrate significant synergies with the social goals particular goal3.
- The other three environmental goals have some trade-offs across all the social goals.
- Environmental Goals 12 and 15 thus provide leverage points to Bangladesh. In addition, Bangladesh should be carefully address the conflicting targets so as the maintain its momentum in social progress..



Environmental SDGs: Goals 12, 13, 14 and 15

Economic SDGs: Goals 1, 3, 4, 5, 10 and 16

Black lines indicate synergies, red lines indicate trade-offs

Applications of the tool for SDG integration



SDG interlinkages analysis for Bangladesh: Priorities, trade-offs and synergies

IGES-recommended key Targets for Bangladesh

- 1.1 End extreme poverty
- 1.2 Halve national poverty
- 1.3 Implement social protection systems to the poor
- 1.5 Build resilience of the poor to climate and other disasters
- 2.1 End hunger
- 2.2 End malnutrition
- 2.3 Double agriculture productivity
- 2.4 Build sustainable food production systems
- 2.5 Maintain agricultural genetic diversity
- 3.3 End epidemics of diseases
- 3.8 Universal health coverage
- 3.b Access to essential medicines
- 5.1 End gender discrimination
- 6.1 Universal access to safe drinking water
- 6.2 Universal access to sanitation and hygiene
- 7.1 Universal access to energy
- 7.2 Increase renewable energy
- 8.1 Sustain inclusive economic growth
- 8.5 Decent work for all
- 9.a Enhance international aid to build resilient infrastructure
- 10.a Special trade treatment for LDCs
- 10.b Encourage ODA to LDCs
- 11.1 Universal access to urban housing and basic services
- 12.2 Sustainable resource use
- 13.1 Strengthen resilience to climate change
- 17.9 International support for sustainable development
- 17.18 Capacity building for developing countries

Source: Based on Moinuddin and Zhou (2018 (forthcoming)).

SDG interlinkages analysis for Bangladesh: Priorities, trade-offs and synergies

Bangladesh SDG Target 2.2 End malnutrition

Synergistic with Target 2.2

1.1	1.2	1.5	2.1	3.1
3.2	3.3	4.1	4.5	5.3
5.5	5.6	5.b	7.1	4.2

Conflicting with Target 2.2

1.3	7.2	3.4	5.1	6.4
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Linked with Target 2.2 but the nature of the link unavailable (data missing)

1.4	1.a	1.b	5.2	5.4
5.a	5.c	12.3		

Legend

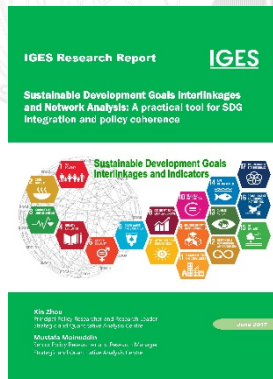
Strong +ve	Weak +ve	Strong -ve	Weak -ve	n.a.
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Institutional arrangements for Target 2.2 (IGES recommendations)

Lead/Co-Lead	Associates	
Lead: CD (leading the NSSS)	Ministries and divisions that are identified by both GED and IGES	
	MoA; MoCWA; MoDMR; MoE; MoFL; MoInd; MoPME; MoSW	
	GED mapping only	IGES recommendations only
Co-Lead: GED (as NPFP)	MoInf; SID	
	<u>Strong links</u> MoHFW; PD	
	<u>Weak links</u> LGD, RDCCD	

Source: Based on Moinuddin and Zhou (2018 (forthcoming)).

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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>