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A draft framework for understanding SDG interactions

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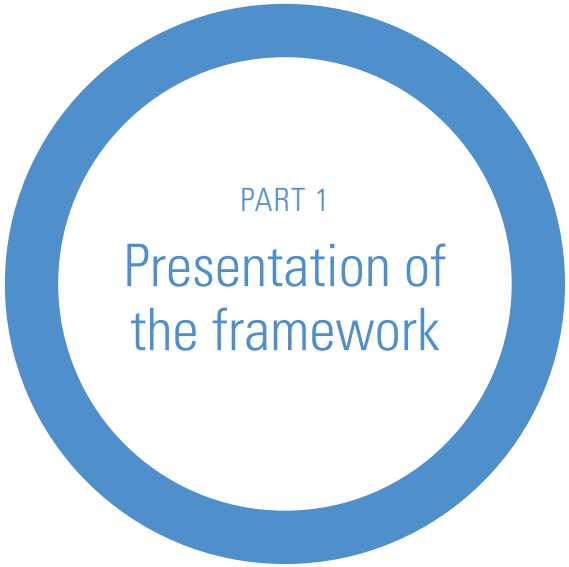


PART 1

Presentation of the framework

1 Introduction

This working paper presents a framework to characterise interactions between different sustainable development goals (SDGs) in the context of the 2030 Agenda that is relevant for both research and policy analysis to support a coherent implementation of the 2030 Agenda. The framework has been developed as part of a project led by the International Council for Science to explore an integrated and strategic approach to the implementation of the SDGs, recognizing the important interlinkages across the SDGs. While the scientific community has emphasized the need for a systems approach to sustainable development, scientists, like policy-makers, are now facing the challenge of turning the goals into reality, and achieving progress across the economic, social and environmental dimensions worldwide. This paper presents a conceptual tool to start unpacking interlinkages across the Sustainable Development Goals and provide a common basis for scientists, policymakers and practitioners to jointly explore how the SDG puzzle fits together and how it can be successfully implemented.

The framework consists of a typology of interactions, organized on a seven-point ordinal scale, along with a number of important dimensions, which can then be applied in illustrative case studies at different levels and in different situations. It is intended to form the basis of a much broader exercise to be developed with partners from research and practice to test and apply the framework via case studies of SDG interactions in various contexts. The framework and case studies together are intended to be a tool for the translation of the SDGs into policy and practice.

Why are interactions important?

The 2030 Agenda is often referred to as an integrated agenda, and its advocates, including the UN Secretary-General, frequently describe it as an "indivisible whole". What does this mean in practice? First, in contrast to the conception of the Rio "pillars" of sustainable development, in the 2030 Agenda the social, environmental and economic dimensions of sustainable development are intertwined and cut across the entire framework. Indeed, while most of the 17 goals have a clear starting point in one of the three pillars, most goals actually embed all three dimensions amongst their targets (OECD, 2015). For example, SDG 2 "End hunger, achieve food security and improved nutrition, and promote sustainable agriculture" contains targets related to social (e.g. malnutrition, and vulnerability), economic (e.g. agricultural productivity and financial services) and environmental dimensions (e.g. genetic diversity and climate resilience).

Second, there are significant interactions between goals. Staying with the food SDG example, a commonly discussed set of interactions lies in the "nexus" between food, water and energy (Weitz et al. 2014). For instance, water is required for energy production in cooling thermal power plants and generating hydropower; energy is required for water pumping and irrigation systems; and water is needed for irrigating agriculture. There are also competing resource requirements: for example, food production may compete with bioenergy production for the same land or water. However, the interactions with SDG 2 also stray into several other SDG areas, such as reducing food waste (12.3), health (3), sustainable business practices (12.6), conservation of marine areas (14.5) and rights to/control over land and resources (1.4).

Articulating these interlinkages helps explain why the 2030 Agenda must indeed be treated as an "indivisible whole". However, in that phrase there is a hidden presumption that the interactions between goals and targets are – for the most part – mutually supporting: in order to achieve one goal area you also need to address the others. At the same time, both the research community and policy makers have paid attention to the

fact that there are probably as many goal conflicts and trade-offs as there are synergies.

Moreover, given budgetary constraints, countries are likely to prioritize some goals, targets and indicators over others, and this could lead to below-base-year-target levels for 'non-prioritized' goals and targets that are trading off against the prioritized goals. An example is the continued strong support for SDG 2, which in recent decades has had clear adverse impacts for the goal and target described in SDG 15 on terrestrial ecosystems. If countries continue under business-as-usual conditions, indicator values under SDG 15 could well be below base-year-values within a short time-frame.

Due to growing globalization and trade of goods and services, many trade-offs are transboundary in nature, such that pursuing goals in one country can interact with the goals of others. An example of this has been the increase in deforestation in Cambodia and Lao PDR following a ban on logging in Thailand in 1989 with cross-country spillover effects for a single goal/target (SDG 15). The relaxation of Chinese food self-sufficiency measures for soybean in 1995 to help address challenges around environmental sustainability in the country, while also ensuring and enhancing national food grain security, led to large-scale intensification and exports of soybeans from Argentina, Brazil and the US, among others, with mixed effects on various SDGs for all countries affected by this policy change.

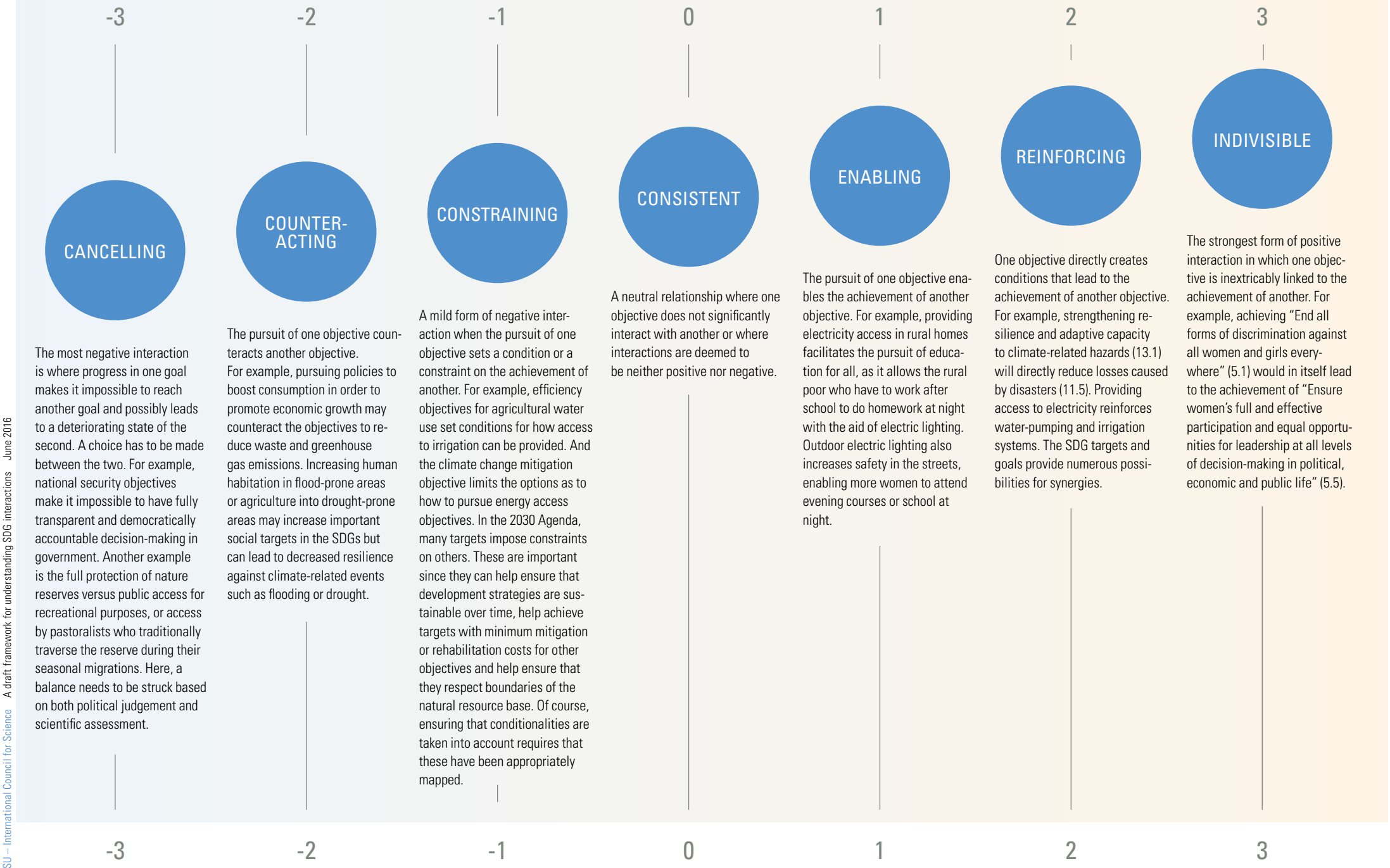
In the policy arena, most discussions about coherence and interlinkages in the 2030 Agenda have focused on the existence of trade-offs and synergies between sectors, and the need to map them out and identify ways to alleviate or remove trade-offs and maximize synergies. However, this area currently has a weak conceptual and scientific underpinning, and no common framework to analyse the nature and strengths of these interactions, and the extent to which they constrain or enable policy and action. Indeed, there is a need to develop guidance and tools that can help policymakers and investors identify and manage synergies and trade-offs across goals and targets. Before the stage of policy formulation, including the setting of context-specific (such as national or local) targets and indicators, research needs to be conducted into the nature and dynamics of the interactions. Below, we introduce a more refined typology of interactions for use in empirical research into SDG interactions. Such research needs to be developed to provide a useable knowledge base for both policy-level decision support and the design of implementation strategies.

2 Beyond trade-offs and synergies – a seven-point scale of SDG interactions

Mapping out trade-offs and synergies as simple pluses or minuses across a matrix is important policy analytical work that can provide a broad view of the challenges of the 2030 Agenda. However, thinking carefully about interactions, and more specifically the range of different types of interactions, is important because they may have very different implications in terms of implementation actions. There is a nascent literature, both academic and "grey", conceptualizing and addressing SDG interactions (e.g. Weitz et al. 2014; Coopman et al., 2016; Jönsson, 2016) growing out of earlier research in areas such as institutional interactions (Oberthür and Gehring, 2006; Young, 2002), policy coherence (Nilsson et al. 2012; May et al. 2006), earth system science (Steffen et al. 2005) and the "nexus" approach (Bazilian et al. 2011; Hoff et al. 2012). In addition, there are debates about goal relations in the literature on "governance through goals" (Kanie and Biermann, 2016; Swedish EPA, 2000).

Drawing on insights from this work, we suggest that interactions between goals (such as SDGs and/or their targets) can be presented on a seven-point ordinal scale, indicating the type of the interaction with other targets, and the extent to which the relationship is a positive or a negative one. Not all linkages between SDGs and targets will neatly fall into one of the seven points on the scale, but they provide a sufficiently wide range to classify most relationships.

GOAL INTERACTION SCORING



The nature of the interactions can be determined at the level of targets, or at the level of policy interventions and instruments. The choice depends on the purpose of the assessment: in some cases, we would like to know how, if a target is reached, it will directly affect another policy area. In other cases, we would like to know how, if a certain intervention or instrument is pursued, it will affect another policy area. The latter reflects standard impact assessment procedure. For example, the introduction of a fuel tax in order to promote energy efficiency will have certain social equality (distributional) consequences, although improved energy efficiency in itself may not have such consequences.

Thus, whether to examine the relationship between targets or instruments, or a combination, needs to be resolved on a case-by-case basis. Policy coherence analysis can be understood as the governance expression of interlinkages, focusing on how instruments and actions to pursue one set of objectives affect our ability to pursue another set. Interlinkages analysis focuses on the physical interaction as such – how one set of conditions in society or the environment affects our ability to attain another set of objectives. And in practice, in a specific case, it will usually be a combination of the two that is required to identify an optimal set of implementation strategies. To assess quantitative impacts, portfolios of development strategies or investments can be assessed and trade-off curves developed. Following the "mitigation action" logic in impact assessment, the exploitation and ancillary actions to manage interactions would lead to new (and more favourable) distribution of costs and benefits (as compared to not dealing with them). It should be possible to both simulate implementation strategies with integrated assessment models that test this and to monitor the nature of interactions during implementation in reality. Over time, the scientific community should be able to provide an ever-improving dataset.

It should be noted that the position of a given interaction on the scale is rarely absolute or generic. The position and characterization of the interaction depend on the context within which the interaction occurs. In the following section we will discuss a few key dimensions that will shape, if not determine, the interaction in specific cases.

3 Key dimensions that shape the interactions

Here, we identify a number of dimensions that can be used to contextualize the assessment of specific synergies and trade-offs in case-study research. The purpose is to describe the principal ways in which a specific empirical case is shaped by the case-specific features. These should be applied in the case-study analysis and discussion.

Geographical context-dependency

Some relationships are generic and others are highly context-dependent. For example, the trade-off between bioenergy and food production, which is gaining significant attention in EU policymaking, is not commonly understood as an issue in the Nordic region. On the contrary, farmers and foresters have benefitted from the diversification of markets because this has made their supply chains less vulnerable as a whole. However, such context-dependent relationships can have significant spill-over effects, given the international trade patterns. Hence, even if bioenergy in the Nordic countries is not considered to affect food security there, a joint change in their food export patterns to support national bioenergy production, could still have an impact on food security globally.

Governance-dependency

In some cases, the negative nature of a relationship can be the result of poor governance. For example, bioenergy production has been associated with livelihood destruction where commercial plantations have taken over lands used by local communities without consultation or compensation and with the exclusion of those communities from work opportunities. We can refer to this as a non-genuine trade-off, since the trade-off is not intrinsic to bioenergy production but comes from the manner in which it is governed. Negative impacts on local communities are more likely to occur, or tend to be larger, when institutions and rights are weak.

Technology-dependency

In some cases there is a real trade-off but there are technologies that when deployed will significantly mitigate these trade-offs, and even remove them. One example is personal motorized transport which conflicts with climate change mitigation today, while the transition towards zero-emission cars fueled by renewable electricity can be expected to remove this trade-off.

The degree to which an interaction is governance- and/or technology-dependent determines the solution space that will enable a shift from a negative to a more positive interaction – "moving up the scale", or in the other direction if changes in governance and technology choices lead to new, unintended consequences.

Reversibility

Certain interactions may be restricted in time to the actual period of intervention.

When the intervention ceases, the interaction stops. Other interactions are irreversible or take a very long time to "wear out" such that affected systems recover. Irreversible impacts are well known in both land and ocean ecosystems, such as species extinction, collapsed fisheries or changed states of eutrophication (e.g. the Baltic Sea).

Time sensitivity

Certain interactions play out in real time, whereas others show significant time lags. For example, increases in fertilizer use will help to alleviate hunger today, but over-application could reduce our ability to produce food for future generations. Similarly, harvesting remaining fishing grounds can have important food security, nutrition and poverty alleviation benefits in the short term, possibly through 2030, but can have longer-term adverse impacts on SDG 14 and several other goals, such as food security declines.

Directionality

The interaction between two areas can be unidirectional or bidirectional, and symmetrical or asymmetrical.

Unidirectional
– A affects B but B does not affect A.

For example, electricity access is needed for powering clinics and hospitals for the delivery of health care services, whereas health care services in clinics and hospitals are not needed for providing electricity access.

Bidirectional
– A affects B and B affects A.

For example, personal mobility affects climate change mitigation (greenhouse gas emissions), while measures taken to reduce greenhouse gas emissions can restrict personal mobility. In the case of bidirectionality, interactions can be **symmetrical** (where the impact is similar in type and strength) or, more commonly, **asymmetrical,** where A is affecting B more, or in different ways, than B is affecting A.

Across the SDG framework it is then possible to add causal chains. For example, a linear causality would be that A (electricity provision) affects B (girls' education) which then affects C (maternal health). Interaction can then occur across multiple goals and targets: A affects B, C, D, etc. And finally, interactions can be circular, so that there is an indirect feedback loop: A affects B, B affects C, C affects A.

Strength of interaction and level of uncertainty

An assessment of the relationship should, if possible, include an assessment of the uncertainty and the strength of the interaction (using a simple ordinal scale).

4 Other forms of coherence relationships

We have now untangled some possible coherence relationships between two or more SDG target areas. We can refer to this as horizontal coherence across sectors. While this remains the focus of the present paper, we also need to be aware of other relationships.

As mentioned in the introduction, another type of coherence relationship exists across jurisdictions. This ties in more directly to the Policy Coherence for Development agenda – observing to what extent the pursuit of objectives in one country has international repercussions or affects the abilities of another country to pursue its objectives, which leads to cross-jurisdictional concerns that need to be addressed through appropriate indicators.

Also, coherence can be examined across actions. For example, governors in a certain jurisdiction will put in place different legal frameworks, investment frameworks, capacity development mechanisms and policy instruments that may or may not pull in the same direction. For instance, it is often the case that while new policies and goals can be easily introduced, institutional capacities for implementation are not aligned with the new policy designs and are also much more difficult to develop (Gupta and Nilsson, 2016; OECD, 2015).

In addition, coherence relationships need to be observed across levels. Here, in the context of the 2030 Agenda, there may be a mismatch between the goals and targets established at the global level, and the agenda as interpreted at national level and acted upon at the local level (OECD, 2015). The link between national and sub-national governance is often contested.

And finally, coherence relationships should be considered along the implementation continuum: from the policy objective, through the instruments and measures decided, to the actual implementation practice on the ground, which often deviates substantially from the original policy intentions (Pressman and Wildavksy, 1973).

The discussion above allows a common analytical framework and set of concepts that would enable us to draw up case studies of SDG interactions at different levels and in different contexts using different SDG areas as starting points.

HORIZONTAL AND VERTICAL INTERACTIONS AND COHERENCE RELATIONSHIPS

SECTORAL COHERENCE	TRANSNATIONAL COHERENCE	GOVERNANCE COHERENCE	MULTILEVEL COHERENCE	IMPLEMENTATION COHERENCE
from one policy sector to another	from one jurisdiction to another (PCD)	from one set of interventions to another	from global/international agreements to national and local policy	from policy objective through instrument design to practice

PART 2

Development of case studies

Analytical questions for case study research into SDG interactions

The analytical framework outlined above is intended to form the basis of a report presenting the analytical framework and a set of examples from different SDG areas testing and applying the framework. The report seeks to provide conceptual tools as well as evidence-based recommendations to policy-makers on the management of interdependencies through context-specific analysis of synergies and trade-offs around specific policy areas.

The case studies should illustrate the range and nature of interactions at different geographical scales (from local to global), covering different world regions and different temporal scales (short-term, long-term), and provide recommendations on the management of trade-offs and synergies. The examples should highlight connections covering most, if not all, the SDGs.

The case studies will address the following questions:

- What are the main types of interactions between goals and targets in the 2030 Agenda?
- What are the key potential development dilemmas or serious goal conflicts?
- What is the scientific evidence underpinning these interactions and are there significant knowledge gaps?
- What would be the solution space in terms of governance measures or technological options that could transform negative interactions towards more positive interactions?
- In what ways are the identified goals nexus affected by policies or markets internationally (such as development cooperation, trade policies, exports and investments)?
- What are the main discrepancies between stated policy targets and action/practice?

Three areas have been identified initially to road-test the framework, namely food and agriculture, health and energy. ICSU is seeking to publish the report towards the end of 2016.

For partnership development enquiries, please contact Anne-Sophie Stevance, Science Officer at the International Council for Science (anne-sophie.stevance@icsu.org).

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