



"Identifying Interactions for SDG Implementation in Ireland"

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D2.1 Report on international review of SDG interactions

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EXECUTIVE SUMMARY



An **opportunity** for **Ireland** to continue its leading role from negotiating the 2030 Agenda to providing a **lead** in the context of adopting a '**whole-of-Government**' approach to **implementing the SDGs**.

As outlined in the project proposal the expected outcome is:

A comprehensive reporting of critical nodes for SDG implementation in Ireland and the goals and targets that will be most influential in aligning with and delivering on the country's priorities.

What does this mean for Ireland?

The novelty of the SDGs comes with the challenge of interpreting them in the national context and implementing them in an integrated and cross-cutting manner. Achieving the transformative change set out in the SDGs requires Government to adopt new approaches to collaboration across Departments, and also to facilitate innovative solutions.

This review specifically addresses the 2030 Agenda from the perspective of the policy challenges faced by a sovereign Government for implementing the SDGs, and the implications of the interlinked nature of individual goals, with a focus on the specific situation relating to Ireland and best practice for policy coherence.

The history and evolution of the Sustainable Development Goals illustrates how the latest iteration of the SDGs are a global drive for achieving human development goals without compromising the integrity and stability of the planetary system to provide for future generations. It is in this context that the *SDGs4I project* explores these global aspiration against national implementation requirements. With this comes the importance of acknowledging national context, perspectives and priorities and understanding the nature of interactions between SDGs as well as their targets -negative and positive -and their implication for coherent planning and efficient policy design in Ireland.

“One of the strategic priorities of the SDG National Implementation Plan is to identify opportunities for

Challenges, opportunities and means of implementation

One of the main challenges is the need for governments to change from working in a “silo” or sectoral approach to work instead across sectors: applying not only vertical coherence but also horizontal. This requires coordination and collaboration at every level of government (national, regional and local) as well as across all sectors and departments and applied throughout the political cycle.

Ireland, as do many other countries, faces the challenge of aligning national priorities and existing programmes with the SDGs without risking that this alignment simply becomes a reporting framework rather than an action framework. This review and project help identify a means and opportunity to re-structure and re-frame the way integration and cooperation function across Government in order to

achieve 'whole-of-government' approaches that many countries, including Ireland, are advocating in their Voluntary National Reports for implementation of SDGs.

The multi-sectoral nature of sustainable development and the need for greater policy integration will be one of the most difficult

Framework for approaching, addressing, analysing and assessing SDG interlinkages and targets

Concepts of policy coherence have evolved, particularly in the context of the OECD, to become fit for purpose in support of implementing the SDGs at both national and international levels.

The OECD approach to policy coherence provides a framework to analyse the context, relevancy and implications of interlinkages between SDGs and their targets with existing national policy. Without such a framework then assessing the consequences of any given interlinkage between SDG/Target on meeting the national sustainable development agenda has no meaningful metric and is therefore not possible. Implementation of the SDGs at national level requires an understanding of how SDGs are aligned to national priorities, and *vice versa*. In addition, the implications of interlinkages between SDGs and Targets need to be addressed as part of the process of implementing the SDGs.

The SDGs4I project provides a space to explore the utility and application of Ireland's SDG implementation plan to support policy coherence for sustainable development in Ireland and;

1. **Integrate policy analysis:** to ensure that proposed policies, programmes and targets are supportive of nationally tailored SDGs;
2. **Coordinate institutional mechanisms:** to create formal partnerships across sectoral line departments and agencies;
3. **Integrate modelling:** to help clarify and articulate the interconnected system of goals and targets and to analyse and inform key policies, programs and projects for their impact on nationally tailored SDGs.

Ireland, in common with many other countries, recognises that policies can have an impact/influence beyond its national borders. Concurrently, national policy does not occur in a vacuum, but is increasingly influenced by policy decisions made by the United Nations (UN) and the European Union (EU) at international forums that lead to international legislation and (voluntary) obligations.

A key tenet of the SDGs is that, notwithstanding that they articulate a set of global goals and targets with indicators to measure progress, they are adaptable to local (national) situations and circumstances allowing individual countries to implement them in a way that addresses national goals and priorities at the same time as contributing to the global effort.

The “**Identifying Interactions for SDG Implementation in Ireland**” project aims to produce an evaluation of the alignment of current Government of Ireland policy to the SDGs and a tool to analyse policy interlinkages across economic, social and environmental areas, including the identification of synergies and trade-offs. This activity supports the approach adopted by the Irish Government to take a whole-of-Government approach to the SDGs, because they are relevant to the work of every Government Department, and each has been assigned specific responsibilities in relation to one or more of the Goals. This is further reflected in the first Voluntary National Review report on the Implementation of the 2030

Agenda to the UN High-level Political Forum on Sustainable Development that Identified the strategic priority to identify opportunities for enhancing policy coherence.

The project will focus on two policy areas that are important in the context of national, regional and international responsibilities and obligations for Ireland:

1. **Biodiversity** - ensuring that natural resources are properly harnessed and protected are key to the success of the United Nations 2030 Agenda for Sustainable Development and provides benefits to all sectors of society in Ireland.
2. **Climate Action** – addressing climate change and its impacts are integral to successfully achieving all SDGs and is already having diverse and wide ranging impacts on Ireland's environment, society, economic and natural resources.

This report is the first step to delivering the project and has revealed the complexities and challenges of implementing SDGs. It provides background material that places Ireland in an international context and highlights the need for a coherent governmental approach for successful implementation.

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1 Preamble

This report D2.1: Report on international review of SDG interactions is the outcome from Task 2.1: Global literature review which entailed undertaking a comprehensive review of published literature dealing with the Sustainable Development Goals, the relationships and interactions between goals and targets, and their integration with policy dimensions in the context of Ireland to address challenges in achieving a better balance between economic, social and environmental dimensions with the SDGs. This review provides an overview of the scope of the challenges for policy makers in addressing policy coherence for SDG implementation. A more specific analysis of policy alignment for implementing the SDGs in Ireland is addressed deliverable D2.2.

This first section outlines the broad context and scope for the “Identifying Interactions for SDG Implementation in Ireland” (SDGs4I) project funded under the EPA Research Programme 2014-2020.

The 2030 Agenda for Sustainable Development presents principles for secure and just development of humanity’s social and economic aspirations globally, while ensuring the ability of the natural environment to persistently provide goods and services beyond the current generation. The 2030 Agenda consists of four sections: (i) A political Declaration, (ii) a set of 17 Sustainable Development Goals (SDGs) and 169 targets, (iii) Means of Implementation, and (iv) a framework for follow up and review of the Agenda¹.

The Sustainable Development Goals (Figure 1), which were unanimously adopted by world leaders in September 2015, came into force on 1 January, 2016 and build on the Millennium Development Goals. The SDGs are intended to be integrated and indivisible and stimulate action in areas of critical importance for humanity and the planet [1–4] to be achieved by 2030.

The SDGs present unprecedented technical challenges and resourcing required to address the 232 indicators² that measure progress towards the 17 SDG goals and their 169 targets requiring governments to work both horizontally and vertically including a wide range of public and private actors in both policy formulation and implementation³. For national governments the SDGs present the challenge of how to align their existing policies in practice given the breadth and complexity of the 17 SDGs and their 169 targets, and coping with

¹ See <https://sustainabledevelopment.un.org/post2015/transformingourworld>.

² The list includes 232 indicators on which general agreement has been reached. The total number of indicators listed in the global indicator framework of SDG indicators is 244. However, nine indicators repeat under two or three different targets (<https://unstats.un.org/sdgs/indicators/indicators-list/>).

³ See <http://oecdinsights.org/2016/04/05/coordination-and-implementation-of-the-sdgs-the-role-of-the-centres-of-government/>



Figure 1. SDGs: A universal call to end poverty, protect the planet and ensure all people enjoy peace and prosperity. The 2030 Agenda - and its 17 Sustainable Development Goals - is the roadmap for global development in the coming years. These global goals (and 169 targets) build on the achievements and aspirations of the Millennium Development Goals (MDGs) but go well beyond and include new, interdependent challenges such as climate change, economic inequality, sustainable consumption, peace and justice, among others.

the interactions among these goals and targets is a formidable institutional challenge at both national and international levels [5].

Most countries govern their public policy sectors, such as health, energy, agriculture and education, through sectoral ministries and agencies. There are very good reasons for this, such as the need to have specialization of competence and establishing clear accountability relationships. The trade-offs, however, are well documented since the lack of joint agendas and coordination often leads to inefficient or even contradictory policy actions [1,6]. The 2030 Agenda puts great emphasis on policy coherence [7–9], and includes a specific target: “17.14: Enhance policy coherence for sustainable development”, that mirrors aspirations that already exist at many national levels to work across policy sectors and have better coordination. These aspirations cannot be met solely by existing arrangements but demand an approach that adapts global targets to national contexts that ensures an inclusive process with real buy-in from key stakeholders both within and outside of government. Achieving progress across the SDGs will require governments to work across policy areas and overcome obstacles, such as immediate economic and social pressures that often crowd out strategic policy initiatives, particularly when the benefits from the latter fall outside usual electoral 4-5 year cycles, as well as budgetary systems that have difficulty tracking progress and valuing outcomes that accrue in multiple policy areas across departmental structures.

This setting shapes the Environmental Protection Agency’s research project “Identifying Interactions for SDG Implementation in Ireland” that seeks to carry-out an analysis of the policy environment in Ireland in the

context of the interlinkages and interactions across SDGs and targets. Such an analysis allows for the interpretation of the SDGs by Government from the perspective of national priorities and existing policies to facilitate integration of sustainability goals with those of social, environmental and economic development.

There is a considerable volume of literature that has grown around the topic of sustainable development, the 2030 Agenda and the SDGs from a conceptual and technical perspective. Whilst it is recognised that a key feature of the SDGs is their inclusivity across sectors, disciplines and governance levels (local to global), these topics are exhaustively covered by the literature and are not reviewed further here.

This review specifically addresses the 2030 Agenda from the perspective of the policy challenges faced by a sovereign Government for implementing the SDGs, and the implications of the interlinked nature of individual goals, with a focus on the specific situation relating to Ireland and best practice for policy coherence.

2 Background to the SDGs

This section provides a brief history to the evolution of the Sustainable Development Goals, their purpose and introduces the challenges they present to national governments.

The 1987 report of the World Commission on Environment and Development [10] focused attention on the relationship between development and its environmental effects, strengthening and advancing concepts that had been introduced at the United Nations Conference on the Human Environment at Stockholm in 1972 [11]. However, definitions that describe sustainable development as development which ‘meets the needs of the present without compromising the ability of future generations to meet their own needs’ is overly simplistic from a policy perspective [12]. In the extensive discussion and use of the concept since 1987 there has been a growing recognition of three essential aspects of sustainable development that need to be reconciled [13]:

- **Economic** - An economically sustainable system must be able to produce goods and services on a continuing basis, to maintain manageable levels of government and external debt, and to avoid extreme sectoral imbalances that damage agricultural or industrial production.
- **Environmental** - An environmentally sustainable system must maintain a stable resource base, avoiding overexploitation of renewable resource systems or environmental sink functions and depleting non-renewable resources only to the extent that investment is made in adequate substitutes. This includes maintenance of biodiversity, atmospheric stability and other ecosystem functions not ordinarily classed as economic resources.

- **Social** - A socially sustainable system must achieve fairness in distribution and opportunity, adequate provision of social services, including health and education, gender equity, and political accountability and participation.

Policy for sustainable development is increasingly driven by social pressures that demand appropriate responses to environmental pressures but which is made more difficult by the existence of competing policy priorities and, in particular, of important unmet social needs in many parts of the world [14]. In practice,



Figure 2. The road to Agenda 2030 (Eurostat, 2017).

policies for sustainable development have begun to redress inappropriate incentives that mean economic activities have often taken a toll on the environment and natural resources, both nationally and globally, and this is reflected in several international conventions and treaties of which the 2030 Agenda is part of.

The resultant 2030 Agenda and its SDGs [15] are the culmination of a long history of sustainable development⁴ as a concept, with goals, targets and indicators, that have evolved since it first entered the

Box 1. Timeline of sustainable development prior to the 2030 Agenda

- 1962** – Rachel Carson publishes “Silent Spring” recognising the relationship between economic growth and development and environmental degradation.
- 1966** - Kenneth E. Boulding essay “The Economics of the Coming Spaceship Earth” identifies that economic systems should recognise the limited pools of resources of ecological systems
- 1972** – Club of Rome “The Limits to Growth” report describes the desirable “state of global equilibrium”.
- 1980** - International Union for the Conservation of Nature publishes world conservation strategy that includes one of the first references to sustainable development as a global priority.
- 1987** - United Nations World Commission on Environment and Development releases report “*Our Common Future*”, commonly called the Brundtland Report that includes one of the most widely recognised definitions of sustainable development.
- 1992** - UN Conference on Environment and Development Agenda21, which outlines the building of a just, sustainable, and peaceful global society in the 21st century.
- 2000** - The United Nations Millennium Summit, which led to the eight Millennium Development Goals emphasizing the role of developed countries in aiding developing countries.
- 2002** - World Summit on Sustainable Development, which affirmed UN commitment to Agenda 21, the Millennium Development Goals and other international agreements.
- 2012** - The United Nations Conference on Sustainable Development, results in the report “*The Future We Want*” supporting the development of Sustainable Development Goals (SDGs) and a set of measurable targets.
- 2015** - Transforming our world: the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States, is signed and comes into force 1 January 2016.

⁴ See <http://rethinkingprosperity.org/a-short-history-of-sustainable-development/>;

lexicon of the international arena (Box 1) [16,17]. The 2030 Agenda includes 17 Sustainable Development Goals, or SDGs, with 169 targets that are intended to be integrated and indivisible and balance quantitative objectives across the social, economic, and environmental dimensions of sustainable development to be achieved by 2030 [15,18,19]. The idea for SDGs was originally proposed in July 2011 by the Governments of Columbia and Guatemala to guide the international sustainable development agenda (Figure 2), and serve

Box 2. The SDGs contrasted to the Agenda 21 and MDGs [19,165]

Agenda 21 had the aim of achieving global sustainable development to be implemented at international, national, regional and local levels. Agenda 21 was structured around 4 sections that addresses (i) Social and economic dimensions; (ii) Conservation and management of resources for development; (iii) Strengthening the role of major groups; and (iv) Means of implementation.

The MDGs originated from the United Nations Millennium Declaration. The Declaration asserted that every individual has dignity; and hence, the right to freedom, equality, a basic standard of living that includes freedom from hunger and violence and encourages tolerance and solidarity. The MDGs maintained a retrospectively narrow focus on poverty reduction, focussed around 8 goals measured by 18 targets.

The SDGs expands both Agenda 21 and the MDGs to include new themes which reflect an approach that sees the environment, economy and society as embedded systems rather than separate competing “pillars”. Significantly “Transforming Our World” challenges not just Governments to deliver against the SDGs, but also encourages involvement by all parts of society: public and private sectors and civil society. The 2030 Agenda takes all of the goals set by Agenda 21 and re-asserts them as the basis for sustainable development, by defining a total of 17 goals revolving around the 5Ps concepts of sustainable development (people, planet, prosperity, peace, and partnership). Furthermore, whilst the MDGs were seen as only applicable to developing countries, with the role of developed countries not extending beyond funding, the SDGs recognise that developed countries have huge ability to promote or limit development and are as much part of the sustainable development challenge as developing countries.

as a vital contribution to the successor framework to Agenda 21 and the Millennium Development Goals (MDGs) (Box 2) after they expired in 2015 [20–22]. While the MDGs aimed to lift people out of poverty, the SDGs aim to keep them out of poverty by ensuring that development is both socially and environmentally sustainable [23].

Modern concepts of sustainable development arose from earlier ideas about sustainable forest management and twentieth century environmental concerns [24]. The concept has evolved from solely enviro-centric views of sustainability to include a focus on economic and social development, and protection for future generations [25–29]. The lexicon has also evolved to differentiate between "the term 'sustainability' as humanity's target goal of human-ecosystem equilibrium (homeostasis), and 'sustainable development' as a holistic approach and temporal processes that lead to the end point of sustainability" [30]. With the 2030 Agenda “sustainable development” has progressed to embrace a framework that focuses on the goal of socially inclusive and environmentally sustainable economic growth, and which overcomes perspectives that economic and social development are usually seen as happening at the expense of the environment [31,32].

None of the topics covered by the 17 SDGs are novel and all are related to issues on which countries and organisations are already working before the SDGs were adopted. Their novelty, however, comes with the

challenge of implementing them in an integrated and cross-cutting manner, which will require organisations to change from working in a “silo” or sectoral approach, and to finding integrated ways of working across sectors. Implementation of the SDGs is intended to address the United Nations’ five pledges (Figure 3) underlying the concept of Sustainable Development, and balance the three dimensions of sustainable development: the economic, social and environmental in a context of ethics (balancing ideals and values such as equality, freedom, human dignity and justice) implemented by a global partnership (of all countries, all stakeholders and all people) (Figure 3). The SDGs demonstrate an understanding that the environment is not an add-on or in opposition to sustainable development, but rather the base that underpins all other goals. The SDGs have been accepted by all governments as universal, integrated, transformative, and to be implemented by all countries of the world (Box 3) [33].

Box 3: The role of developed countries in SDG implementation (after UNDESA, 2014; ESDN, 2015)

The text of the *Future we want* emphasizes the global character of SDGs and, therefore, also addresses developed or industrialized countries. In the following paragraphs of the SDGs proposal, the importance of developed countries in the realization of SDGs becomes evident:

- The global nature of climate change requires the widest possible cooperation by all countries. International participation in accelerating the reduction of global greenhouse gas emissions and protecting the climate system for present and future generations should be based on common but differentiated responsibilities and respective capabilities.
- The importance of development strategies is underlined in that each country has primary responsibility for its own economic and social development and that the role of national policies, domestic resources and development strategies cannot be overemphasized enough.
- The phrase ‘common and differentiated responsibilities and respective capabilities’ stresses the different approaches, visions, models and tools available to each country, in accordance with its national circumstances and priorities in order to achieve SD in its three dimensions.

The goals are expected to offer a ‘transformational’ agenda to set the world on course to end poverty and climate change and enable a more socially just and environmentally balanced approach to development [34,35]. There are two interrelated aspects of the “fitting together” of the SDGs [36], both of which were anticipated by the Rio+20 outcome document when it called for developing SDGs that “address and incorporate in a balanced way all three dimensions of sustainable development and their interlinkages” [36, para 246]. Balance and interlinkage among the three dimensions of sustainable development is reflected not only at the level of the goals but also at the level of the targets. The goals themselves are linked through the proposed targets. Thus, action to achieve one goal and its targets clearly has a bearing on other goals’ attainment. In this sense the SDGs function as an interconnected system, and the approach to their implementation therefore needs to be holistic, multi-sectoral and multidimensional [38]. However, within this framing different perspectives can lead to differing views on how the SDGs can be grouped to reflect their relationship and inter-connectedness to each other (e.g. [39] cf. [40]). This can lead to differing perspectives on how to implement the SDGs depending on national priorities and/or sector/discipline specific intended outcome [41].

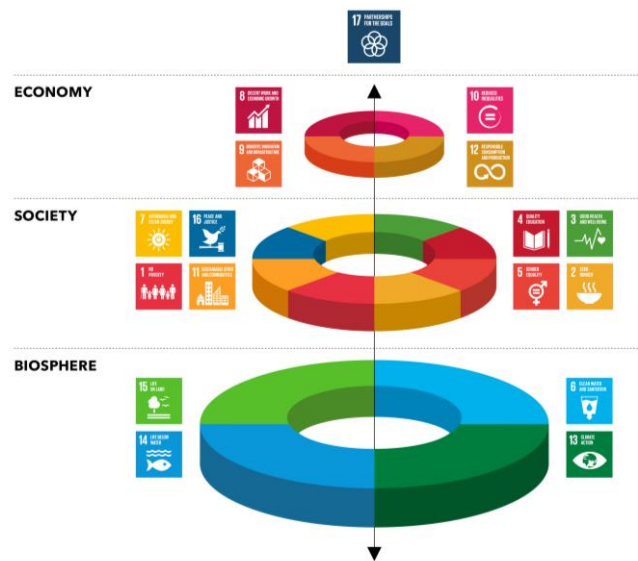


Figure 3. Left: The 2030 Agenda conceptualises a five-dimensional model of sustainable development, known as the 'Five P's' model of sustainable development: People: the social dimension; Planet: the environmental dimension; Prosperity: the economic dimension; Peace: the ethical dimension; and Partnership: a collective and collaborative approach (Source UN). Right: The SDGs arranged to illustrate their intertwined nature and bring a broader perspective to provide a focus of the biosphere underpinning social justice, economic development, and sustainability (Source Folke, Biggs, Norstrom, Reyers, & Rockstrom, 2016 & <https://www.dnvgl.com/feature/sdgs-business-action.html>).

This background demonstrates how the SDGs are the latest iteration of a global drive for achieving human development goals without compromising the integrity and stability of the planetary system to provide for future generations. The background sets the context for the SDG4I project and emphasises the connection between the SDGs as a global aspiration and the requirement to implement them within the context of national perspectives and boundaries.

3 Implementing the SDGs in the context of policy

This section provides a short review of how the SDGs lead to policy challenges arising from a global agenda that requires implementation at the national level.

The SDGs do not exist in a policy vacuum, but are part of a complex portfolio of (national) policy and legislation that is increasingly driven by an international agenda, e.g. climate change reporting (NDC and NAP) (Figure 4) as well as addressing an increasingly interconnected national and international policy arena that often has to respond to short term shocks e.g. global risks [42,43]. Within a continually evolving and increasingly interdependent global system, nations will be confronting environmental, social, political and economic changes that will put to the test their abilities in policy formulation [44].

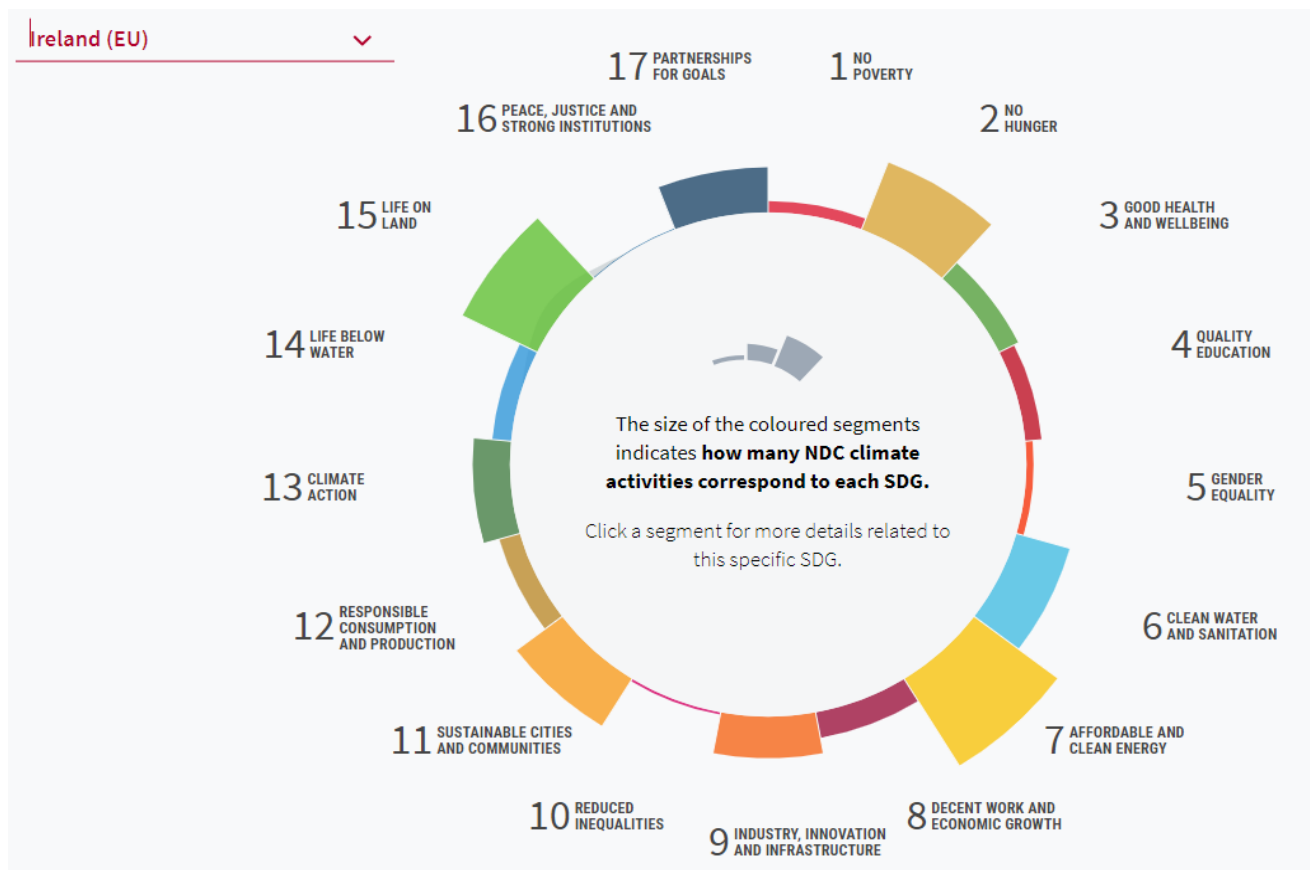


Figure 4. Countries' NDCs, their climate plans, include not only commitments to mitigate emissions but also address many other themes relevant to sustainable development. There is enormous potential for co-benefits to arise from the mutually supportive implementation processes of the 17 Sustainable Development Goals (SDGs) elaborated in the 2030 Agenda and the Nationally Determined Contributions (NDCs) underpinning the legally binding Paris Agreement. Source: <https://klimalog.die-gdi.de/ndc-sdg/>

3.1 Policy objectives in the context of the SDGs

The Millennium Development Goals included a goal for coherent policies in the form of “MDG8: Develop a global partnership for development”, but this did not move away from the traditional “donor-recipient paradigm”[45–47]. However, there are a number of lessons to be learned from the implementation of the MDGs that can support SDG progress [38,48]:

- Multiple goals and targets cannot be achieved without coherent strategies and well integrated policies. Uncoordinated sector-oriented approaches are bound to have unintended consequences that can undermine progress in other areas and weaken policy coherence. For instance, over the last quarter of a century economic growth reduced unemployment and poverty but increased environmental pressures.
- For all countries to implement the 2030 Agenda, implementing the SDGs must find a better balance than was the case with the rigid target and indicator framework developed under the MDGs. Countries will have to adapt the global targets of the SDGs into their own national situation and incorporate them in national planning, processes, policies and strategies.

A key tenet of the SDGs is that, notwithstanding that they articulate a set of global goals and targets with indicators to measure progress, they are adaptable to local (national) situations and circumstances allowing individual countries to implement them in a way that addresses national goals and priorities at the same time as contributing to the global effort. The 2030 Agenda text states that “Targets are defined as aspirational and global, with each Government setting its own national targets guided by the global level of ambition but taking into account national circumstances. Each Government will also decide how these aspirational and global targets should be incorporated into national planning processes, policies and strategies” [15,49,50]. Each country will need to decide on how the SDGs relate to their own national priorities and how the SDG targets can be integrated into national processes, in order to determine how to implement policy strategies to achieve the SDGs, and how to track progress in their implementation plans [51]⁵. Importantly, despite the emphasis given to the integrated and indivisible nature of the SDGs, there are likely to be trade-offs as well as reinforcing relationships among the goals and targets in the reality of inculcating the SDGs within national planning frameworks and policy [1]. For instance, goals to protect the environment can conflict with goals to end poverty and promote industrialisation. For example, the removal of fossil fuel subsidies helps the environment in the long term but hurts the poor in the short term, and whilst rich countries can protect the environment without increasing poverty by investing in greener energy, this may not be a viable option in poorer countries⁶. Policy is also more than expression founded on evidence, it is also based on values,

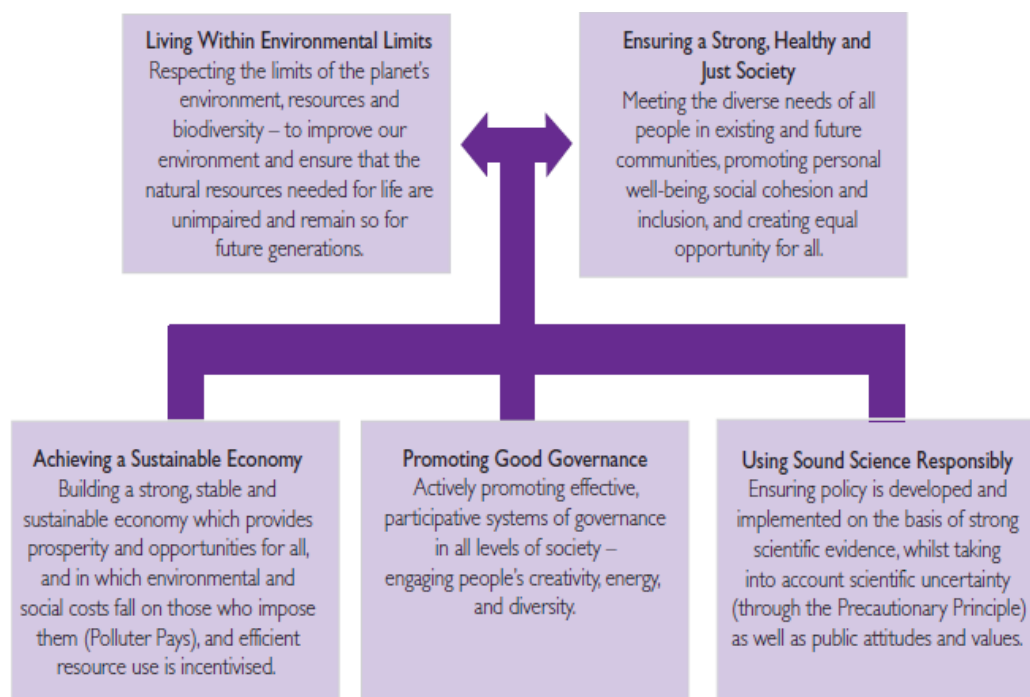


Figure 5. Shared principles that form a basis for sustainable development policy in the UK (DEFRA, 2005a).

⁵ The Government of Ireland “The Sustainable Development Goals National Implementation Plan 2018-2020” sets out how Government will implement the SDGs nationally and support countries around the world to do the same. The Plan includes an Annex that lists existing national policies against the SDGs. This is further analysed in D2.2 of this project.

⁶ <https://www.theguardian.com/global-development/2015/mar/20/are-there-too-many-sustainable-development-goals> (Accessed 4/6/19).

emotions, and perspectives of different (and often competing) interest groups [52], which has led to notions that policy in support of sustainable development should respect five principles (Figure 5). The central challenge of the post-2015 UN development agenda is to ensure that globalization becomes a positive force for all the worlds' peoples of present and future generations [21].

Coping with the principle of universality and interactions among these goals and targets is a formidable institutional challenge at both national and international levels [50] from two distinct perspectives:

- 1) The 2030 Agenda is not constrained by national borders such that all countries, regardless of their levels of consumption and international trade connections, must account for the external and global environmental and socio-economic impacts of their consumption.
- 2) The SDGs require integrated implementation so that actions on one goal or target must not compromise achievement of others.

The consequence is that whereas implementation of the SDGs will happen predominantly at the national level, cross-border and global effects must also be considered including use of natural resources, such as land and water, and impacts on global public goods and the services they provide such as the atmosphere, the biosphere and the oceans. The success of the SDGs is partly dependent on aligning targets and goals with existing international agreements and political processes [53]. These include the Post-2015 Sendai Framework for Disaster Risk Reduction, the UNFCCC Paris climate agreement, and the Addis Ababa process on Financing for Development⁷.

What this means in practice, in a way no other internationally driven agenda has previously, is that the SDGs should be implemented as an internal activity and integral component of national policy and planning, and is not 'just' another international agenda to which a national government contributes as an external activity. The system of governance for sustainable development requires collaboration from a plethora of public, private and voluntary agencies working with citizens and communities at many levels of organisation. Within the agenda of sustainable development, the interface between environmental and social policies will not always be a comfortable one [54]. Yet if sustainability is to be achieved, social policies need to interact creatively with environmental strategies, and vice versa [26], in a way that ensures policy components are designed in the context of the SDGs. There are a number of components typically associated with the policy process:

⁷ See <https://www.unisdr.org/we/coordinate/sendai-framework>; <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>; and <https://www.un.org/esa/ffd/publications/aaaa-outcome.html> respectively.

- Policy framing: concerns the ways in which the notion of sustainable development is understood and conceptualised.
- Policy implementation: relates to the main approaches that are adopted to intervene in the management of SD, and the organisational, managerial and other arrangements (instruments, mechanisms and frameworks) that are constructed to realise objectives and purposes.
- Policy evaluation: focuses on the models and performance management regimes that are used to measure and evaluate progress towards SD outcomes, as well as the organisational learning and capacity building that ensues.
- Policy co-ordination: centres on working between organisations, and explores the ways in which the network of actors and organisations within the governing system attempts to co-ordinate its actions and interventions, and the tensions and contradictions that arise as a consequence.

3.2 Defining policy constraints in the context of SDGs

A defining paradigm of sustainable development and rationale for the 2030 Agenda and the SDGs is that current patterns of resource use and social and economic development are not sustainable. Designing policy

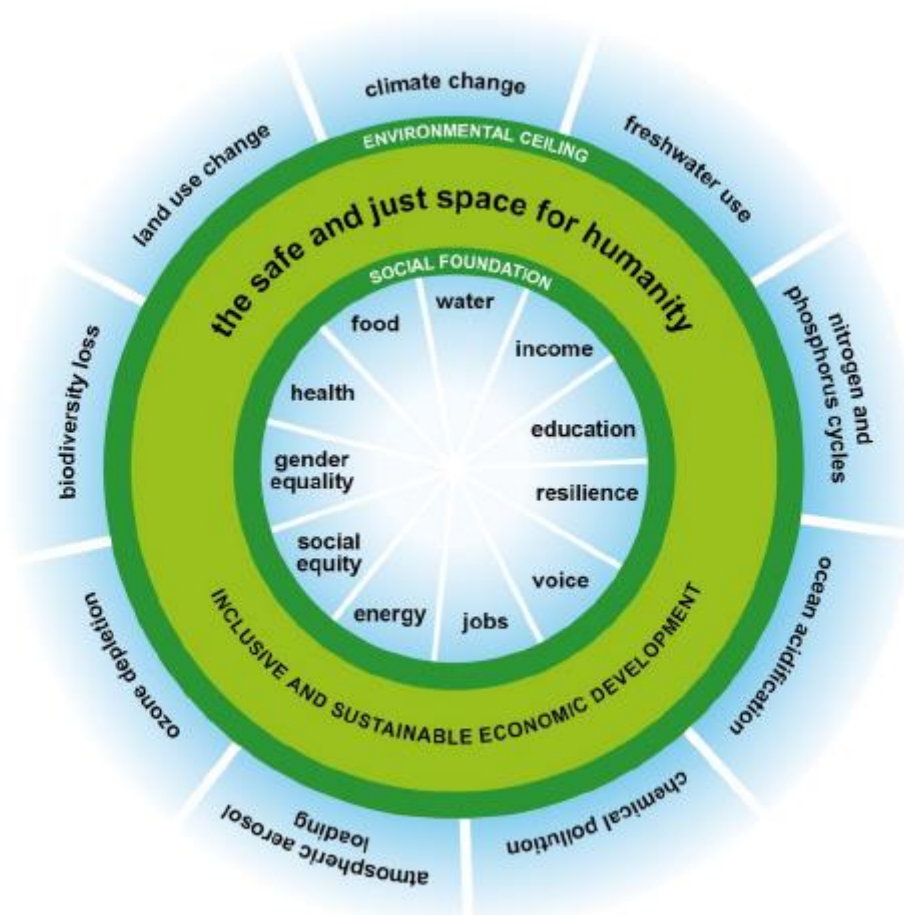


Figure 6. Combining the social foundation with the environmental ceiling creates a doughnut-shaped area between these social and planetary boundaries. It is an illustrative depiction of a safe and just space for humanity. The 11 dimensions of the social foundation are illustrative and are based on governments' priorities for Rio+20 (Raworth, 2012). The nine dimensions of the environmental ceiling are based on the planetary boundaries set out by Rockström et al (2009).

that will lead towards sustainable pathways requires an understanding of where the boundaries between sustainability and unsustainability lie. A further underpinning concept to the SDGs is the notion that the fabric of society, economy and environment is constantly evolving and constrained by boundaries that delimit a 'safe' space for humanity from both environmental [55,56] and societal [57] perspectives (Figure 6).

Uncoordinated policy-making has deep roots [58]. Typical policy-making experiences involve multiple independent policy processes, each with its own history, power relationships, stakeholders and costs, which can result in interdependent policy outcomes that are unexpected, undesirable and misunderstood. Overcoming uncoordinated policy-making requires an understanding of institutions and their effects, and on how to promote "cross-boundary thinking" [59]. The presence in the SDGs of targets that refer to multiple goals and sectors may facilitate integration and policy coherence across sectors. Such links among goals through targets may also facilitate real mainstreaming of dimensions that previously suffered from not having strong sectoral anchoring, such as sustainable consumption and production. However, important links that exist among sustainable development areas through the biophysical, social and economic systems are not explicitly reflected in the SDGs [60].

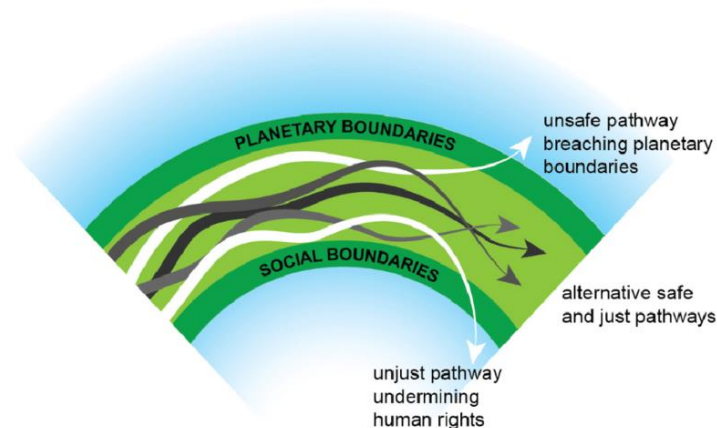


Figure 7. Defining social and planetary boundaries between which humanity can thrive. There are likely to be many possible pathways in that space, which will be aligned with different cultures, visions and values, and with different costs, risks, and distributions of power and benefits between social groups (Leach, Raworth and Rockström, 2013).

The idea that development is constrained by limitations in an evolving and changing planet has led to a recognition that approaches to policy should shift, from those that aspire to control change in systems assumed to be stable, to managing the capacity of social, economic and ecological systems to cope with, adapt to, and shape change [61,62]. In this context, policy goals are seen as maintaining humanity within a safe pathway of development that does not transcend boundaries which lead to unsustainable outcomes [63] (Figure 7). The challenge of moving into the safe and just space for humanity is complex because social and planetary boundaries are interdependent. Environmental stress can exacerbate poverty, and vice versa. Policies aimed at moving back within planetary boundaries can, if poorly designed, push people further below the social foundation, and vice versa. Well-designed policies can promote both poverty eradication and

environmental sustainability – bringing humanity into the doughnut from both sides. There are important characteristics that these two concepts have in common [57]:

- The fundamentals of sustainable development: Ensuring all people's lives are built upon a social foundation is essential for sustainable development, but so is staying below the environmental ceiling: crossing over either of these boundaries can trigger both social and ecological crises (although it is argued that humanity has already moved out of the Holocene into a new geological epoch, the Anthropocene [64–66]).
- Boundaries based on norms: Both the social foundation and the environmental ceiling are essentially normative boundaries⁸. What constitutes human deprivation or where to set the boundaries of natural resource use are ultimately normative, based on perceptions of acceptable levels of risk and reality
- Global to local: Scale and connectivity are important for staying within planetary and social boundaries. For example, deforestation within a country can be a tipping point towards localised flash flooding and soil degradation, long before it affects land-use change at the Earth-system scale. Likewise, minority social groups within a country may experience severe marginalisation long before their exclusion is evident in national, let alone global, data on social inequalities.

Creating the post-2015 global development agenda is not only founded on a progression from the MDGs, but also recognition that sustainable development challenges are ubiquitous, affecting all countries, rich and poor, and include tangible inter-dependencies between the quality of wellbeing and the environment. The universality of the 2030 Agenda and its SDGs, along with its ambition, means that the policy demands to implement the SDGs are not framed by the World of today but that of the World of tomorrow. This means that it is incumbent on each nation's Government to outline its own '*Future it wants*' in the context of the "*Future We Want*" as outlined by the 2030 Agenda [15,22]. At the nation state level, the opportunity presented by the post-2015 agenda is an ambition to reconcile the dichotomy of growing wealth coupled with growing environmental degradation. Such ambition has to also address the reality that countries, regardless of status, face their own challenges from an aging society, a sustainability gap and changes in production structures, urbanisation and migration, imbalances of emissions relative to population, protecting biodiversity, and the sustainable, fair and effective use of natural resources [67,68]: This is often reflected in countries' vision of sustainable development, e.g. Finland [69] or Ireland [70] (Box 4). The cross-cutting and systemic nature of these challenges call for breaking out of policy silos and strengthening policy integration

⁸ There is one significant difference between the environmental ceiling and the social foundation: their initial states of stress. Earth-system processes were in a 'safe space' prior to the industrial era when human activity began to add significant stress: the aim must now be to move back into that 'safe space'. In contrast, the human population has never all lived above the social foundation in a 'just space': the aim now must be for all of humanity to reach it [57].

Box 4. Examples of National strategies for sustainable development***The Finland we want by 2050 – Society's commitment to sustainable development***

In 2050, every person in Finland will be a valuable member of society. Finland will be an affluent society that lays the foundation for sustainability and provides its citizens, communities and companies with the conditions they need to operate sustainably. The carrying capacity of nature is not exceeded and natural resources are used in a sustainable manner. Finland will promote peace, equality and justice, and offer practical and sustainable solutions to the world's problems.

Our Sustainable Future: A Vision for Ireland

Sustainable development is about ourselves. It is about inhabiting a place where there is economic stability based on a model of national progress and development that respects the three core pillars of sustainability: the environment, the economic, and the social.

and co-ordination [71] to overcome failures and inefficiencies in the way economies are managed and policies designed.

This section has articulated how the SDGs present both significant challenges to existing paradigms of policy implementation at national levels, whilst also presenting a means and opportunity to re-structure and re-frame the way integration and cooperation function across Government in order to achieve 'whole-of-government' approaches that many countries are advocating in their Voluntary National Reports for implementation of SDGs.

4 Policy coherence for SDG implementation

This section provides a summary of how concepts of policy coherence have evolved, particularly in the context of the OECD, to become fit for purpose in support of implementing the SDGs at both national and international levels.

Implementation of the SDGs demands a conducive policy environment that enables and facilitates a more integrated policy framework; promotes synergies between economic, social and environmental policies; identifies trade-offs; and considers transboundary and inter-generational impacts [7]. SDGs are not only meant to be action-oriented, but take into consideration different levels of application: on the one hand SDGs will be global in nature and universally accepted. On the other hand, while respecting national policies and priorities, they will account for different national realities, capacities and levels of development [72]. In practice, this means that new policy coherence tools are needed to take into account more complex policy inter-linkages (e.g. the water-energy-food nexus) that will require whole-of-government approaches and strengthened institutional coordination and coherence [73].

Generally, government policy for sustainable development has been largely predicated towards economic growth as a means of increasing human welfare. Whilst this is generally supported by the public, they are also aware that their wellbeing encompasses more than just economic growth [74], but is also affected by

Box 5. The Green Economy as a pathway for sustainable development (UNEP, 2011)

There is a recognition that achieving sustainability rests almost entirely on getting the economy right and improving human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. The “Green Economy” is promoted as a sustainable development approach which is low carbon, resource efficient and socially inclusive. In a green economy, growth in income and employment should be driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. The active participation of Government to catalyse and support targeted public expenditure, policy reforms and regulation changes is seen as a critical enabler of a green economy by:

- establishing sound regulatory frameworks;
- prioritizing government investment and spending in areas that stimulate the greening of economic sectors;
- limiting spending in areas that deplete natural capital;
- employing taxes and market-based instruments to shift consumer preference and promote green investment and innovation;
- investing in capacity building and training; and
- strengthening international governance.

other considerations such as health risks from transport emissions and ozone depletion, declining biodiversity from loss of habitat, access to resources and new forms of inequality associated with changes in technologies and production patterns. Such an approach has been advocated by the UN through promotion of the Green economy (Box 5), which has also been extended into concepts of Blue Growth and the Circular Economy. This has been echoed in regional perspectives for sustainable development, for instance, the European Council agreed on a strategy for sustainable development and added an environmental dimension to the Lisbon process for employment, economic reform and social cohesion [75] noting that the circular economy, green and blue growth are widely advocated by the EU⁹.

The multi-sectoral nature of sustainable development and the need for greater policy integration will be one of the most difficult challenges to achieve in policy making and implementation. A more interconnected world economy means that policies in any country can influence sustainable development across the globe [7]. Policy coherence is not a new concept and has been widely promoted in Europe and by the OECD as Policy Coherence for Development (PCD) for integrating the economic, social, environmental dimensions of sustainable development at all stages of domestic and international policy making within existing governance frameworks [71,76–79]. Policy coherence is a means for overcoming the often fragmentary nature of governance as a consequence of individual government departments/agencies holding focussed sectoral briefs. The fragmentation of governance has been cited as a critical barrier to achieving the SDGs [80] Although the terms “coherence” and “integration” are often used as synonyms, there is a significant difference albeit small between them: Policy integration emphasises taking the objectives of other policy sectors into account (e.g., environmental integration in energy policy) or even merging objectives [81]. The

⁹ See http://ec.europa.eu/environment/green-growth/index_en.htm and https://ec.europa.eu/maritimeaffairs/policy/blue_growth_en.

promotion of policy coherence implies ensuring logic and consistency among policies and preventing them from undermining each other. At the core of the concept is that there should be coherence between different policies in different sectors that coordinate the actions of different departments, agencies and administrations such that developing countries are not disadvantaged by the activities of donor (developed) countries.

Lack of policy coherence across sectors in terms of strategies, policies and implementation has hampered previous approaches to sustainable development [82]. Insufficient understanding of, and accounting for, trade-offs and synergies across sectors have rendered policies incoherent leading to diverging outcomes and trends across broad objectives for sustainable development. Policy integration will not happen automatically. Integration of thinking across sectors and policy advice represents a challenge to social and economic development at national and international level. In the post-2015 framework, policy coherence needs to reflect the multipolar global economy in which all countries are playing a role in driving global growth and development [7,83]. Governments in developed, emerging and developing countries alike can maximise the impact of their policies in terms of growth and poverty reduction by assessing and tackling possible policy incoherencies [81]. The OECD [7] has identified five complementary levels for implementing policy coherence for sustainable development for the post-2015 agenda (Figure 8). Policy coherence requires a political choice by governments to establish supporting institutional structures and take specific initiatives. Enhancing PCSD as called for in SDG target 17.14 will depend on mechanisms to anticipate, balance and reconcile divergent policy pressures, including conflicting domestic and international priorities; opposing economic, social and environmental concerns; competing sectoral interests; and reconciling short-term priorities with the long-term policy direction integral to attaining sustainable development objectives.

The 2030 Agenda introduces the new principle of Policy Coherence for Sustainable Development (PCSD) in Target 17.14 as a means of implementation of the SDGs in an integrated and holistic manner. PCSD may sound similar to PCD but in practice is considerably more complex as it covers the whole scope of sustainable



Sources: Adapted from OECD (2015).

Figure 8. Policy coherence for sustainable development as defined by the OECD (2015). Source: Connor et al. 2016.

development [8,45,76,84]. Despite their basic similarity and semantic proximity, there is one fundamental difference between PCD and PCSD. In the case of PCSD, policy-makers have to secure multi-directional coherence by pursuing multiple goals at the same time, whereas for PCD coherence is uni-directional, i.e. it is directed towards a single overarching cause, which is primarily of interest to developing countries: PCSD has an internal (national) sustainability, as well as an external (international) interest. Policy coherence for sustainable development is an approach for integrating the economic, social, environmental and governance dimensions of sustainable development at all stages of domestic and international policy making [8,45,78,85,86]. Its main objectives are to create a framework that fully engages the whole government through:

- An **Analytical** framework that identifies policy coherence issues, and improves understanding of the interactions among SDGs and targets and their implications, and how certain policy actions might support or hinder the achievement of the goals and targets in order to address the negative spill-overs of domestic policies on long-term development prospects.
- An **Institutional** framework to align existing institutional mechanisms for policy coherence to the needs and vision of the 2030 Agenda for Sustainable Development in order to increase governments' capacities to identify trade-offs and reconcile domestic policy objectives with internationally agreed objectives.
- A **Monitoring** framework to consider key elements for tracking progress on PCSD, with the aim of contributing to national efforts to monitor and report progress on SDG target 17.14 in order to foster synergies across economic, social and environmental policy areas to support sustainable development.

There are different perspectives on the meaning of policy coherence and, in many cases, there is little or no clarity what needs to be measured (processes, policy changes or efforts, or policy impacts): There has been no agreed definition of policy coherence for sustainable development—sometimes it is equated to coordination and joint decision-making mechanisms and at other times it is presented as a highly technical issue to be addressed through a mapping of interlinkages between and within the SDGs: The OECD defines PCSD as [7];

PCSD is [a framework that describes] an approach and policy tool to integrate the economic, social, environmental and governance dimensions of sustainable development at all stages of domestic and international policy-making.

Strong inter-sectoral governance helps policy makers understand how economic, social, and environmental policies jointly impact on individual and across multiple sectors [87], e.g. health with agriculture. Analysing

policy interactions as well as the role of diverse sectoral policies can contribute to understanding the implications of SDG interlinkages to policy implementation, and *vice versa*, by addressing the following questions:

- Have economic, social and environmental policy inter-linkages (synergies and trade-offs) been considered?
- How do the planned policy outputs contribute to achieve Sustainable Development Goals?
- How do actions to attain one SDG (e.g. food security) support or hinder progress in other SDGs (e.g. Water or Health)?
- Are governmental organisations moving from sectoral perspectives (e.g. agriculture, trade, investment, water, energy) towards a more integrated decision-making processes and “issues-oriented” agenda (e.g. food security)?

Agenda 2030 states that: Targets are defined as aspirational and global, with each government setting its own national targets guided by the global level of ambition but taking into account national circumstances. Each government will also decide how these aspirational and global targets should be incorporated in national planning processes, policies and strategies [68]. International organisations such as the OECD, UNDESA and UNEP [1] have all launched efforts and processes to better understand, manage and leverage interactions and linkages among development policy areas. Many institutes and ad hoc expert groups have also contributed (e.g. [4,88,89]) as has the European Commission [90]. Whereas much written on the ‘what and why of policy coherence’, **how** to engage with a methodology for policy coherence remains elusive. At present there is no structured evidence base or framework for unpacking interactions to establish a systems understanding of whether and when goals and targets are indeed “indivisible”, or actually are to be traded off against each other [1].

The OECD approach to policy coherence outlined in this section provides a framework to analyse the context, relevancy and implications of interlinkages between SDGs and their targets with existing national policy. Without such a framework then assessing the consequences of any given interlinkage between SDG/Target on meeting national sustainable development agenda has no meaningful metric and is therefore not possible.

5 Defining the national challenges for implementing the SDGs

This section looks in more detail at the nature of the implications of interlinkages between SDGs and National policy for Ireland with examples from other countries and how their policies and academic studies have approached addressing interlinkages.

At the same time as the integration discourse grows in official documents, real world policy making is often based on negotiations around competing goals and interests. From the outset it has been intended that the SDGs should also express the sustainability challenges facing the developed world in their own countries. But so far, less attention has been paid to this aspect of the SDGs and the ways in which they represent a fundamental challenge to more developed countries (and increasingly the middle income countries as well) to transform their own domestic economies in a more sustainable direction [38,91]. A lesson from the MDGs was that individual UN agencies took charge of individual targets and implemented them with limited regard for other (particularly environmental) targets. A significant policy innovation with the SDGs is the creation of the UN's High-Level Political Forum (HLPF), which meets annually at the ministerial level, and every fourth year at the heads of state level. The HLPF is tasked with ensuring the integration of the three dimensions of sustainable development in a holistic and cross-sectoral manner at all levels. It is meant to have higher authority than similar previous institutions at the UN, to coordinate, secure interlinkages, mobilize resources for implementation, and monitor progress [92]. At the national level, the challenge is how to implement the SDGs in a manner that both contributes to the globally held aspirations of the SDGs and meets the needs of a country-wide sustainable development agenda.

The recent shift from the Millennium Development Goals to the much broader Sustainable Development Goals has given further impetus to the debate on the nexus between the multiple sectors of policy-making that the Goals are to cover [93]. The integrated nature of the SDGs [94] means that it is critical to work with the integrated nature of SDGs as each goal covers multiple domains of sustainable development and thus an integrated cross-sectoral approach to implementation is required. Interlinkages across policy areas is not new (Figure 9), however, the 2030 Agenda introduces an intensity and complexity of inter-linkages between the goals to the extent never experienced before in any national or international policy setting [38]. This requires full and genuine governments' ownership of the global agenda [9] and, although PCSD provides a framework to do this, methods are needed to frame conversations and approaches to address the interconnections and linkages between and within individual goals and their targets.

An integrated policy framework that reflects all development models and ensures policy coherence across goals is needed to assure that social, economic and environmental goals are mutually supportive. Policy coherence aims to increase governments' capacities to foster synergies across policy areas; identify trade-

offs; reconcile domestic policy objectives with internationally agreed objectives; and address the spill-overs of domestic policies. Policy coherence is fundamental to ensure that progress achieved in one Goal contributes to progress in other Goals, and to avoid the risk of progress in one goal at the expense of another. It can also shed light on critical sectoral interactions to achieve the 2030 Agenda and inform how efforts to attain a goal in one sector would affect, or be affected by, efforts in another.

The SDG goals and targets can be viewed as a network where targets may also contribute to several goals, and some goals and targets may conflict [82]. Action to meet one target could have unintended consequences on others if they are pursued separately so that there are important trade-offs among several goals and targets. For example, progress on ending poverty (SDG 1) cannot be achieved without progress on the food security target under SDG 2, macroeconomic policies related to targets on full and productive employment and decent work under SDG 8, the reduction of inequality under SDG 10, and without enhancing resilience to climate change under SDG 13. Success in these will lead to better health and wellbeing, thus contributing to the achievement of SDG 3.

There are also important trade-offs between targets: For example, an increase in agricultural land-use to help end hunger can result in biodiversity loss, as well as in overuse and/or pollution of water resources and downstream (and likely negative) effects on marine resources, which in turn could exacerbate food security concerns [53,95]. The key message in this debate is that different domains—for instance, water, energy and food—are interconnected and can thus not be effectively resolved unless they are addressed as being fully interrelated and interdependent. Yet while this overall narrative is forcefully supported in the new UN 2030 Agenda for Sustainable Development and the 17 Sustainable Development Goals that are the main part of this agenda, many Goals still remain sectoral in their basic outlook. For example, the Goals on marine resources and ecosystem protection address primarily the environmental dimension and are only marginally connected with broader social and economic questions and other Sustainable Development Goals.

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 [96] whilst considering [96] the policy objective, through the instruments and measures decided, to the actual implementation practice on the ground. For policy and planning support, simply identifying a link is insufficient. In the SDG policy debate, therefore much of the discourse has been around the existence of “trade-offs” and “synergies” [e.g. 96,97], representing whether an interaction is broadly beneficial or adverse. Similarly, institutional interaction and policy coherence literatures have often applied such a “binary” view (with variations in terminology) (see e.g. [98]).

Many, if not most, countries (e.g. Canada [99]) have focussed on aligning their implementation strategies to the global targets and in particular their indicators without recognising the need – and call in the 2030 Agenda documentation – for nation states to adapt and align the SDGs, their targets and indicators, to national priorities and strategies to ensure that linkages across SDGs lead to positive outcomes [100]. Countries need to be able to adapt the global indicators to fit national priorities and context, thus the global description of an indicator could be reduced to describe only what is relevant to the country. Countries may also, for the National Voluntary Review, use indicators that are unique to the country but nevertheless contribute to measurement of progress towards the global SDG target. Agenda 2030 states that the SDGs are aspirational, thus monitoring and compliance entails a systematic process to measure and manage performance in management of the resource towards achievement of the vision, goal, target and benchmarks.

A challenge for implementing the SDGs stems from the development of the SDGs themselves as individual goals are not, however, so well balanced within themselves. Some are clearly primarily economic goals, others social and some environmental. Within the targets under each goal there is some attempt to include elements reflecting the other dimensions [33]. Many of the goals are strongly oriented towards a single dimension of sustainability, in some cases to the exclusion of the other two dimensions. To some extent this is no doubt inevitable. However, as expressed, some of the goals and their targets (e.g. the goal of poverty reduction) will tend to have a greater emphasis on economic or social objectives, while others (e.g. the goal on ecosystems) will be more oriented towards environmental objectives. So it is not to be expected that all three dimensions could have equal weight in every one of the individual goals and its set of targets.

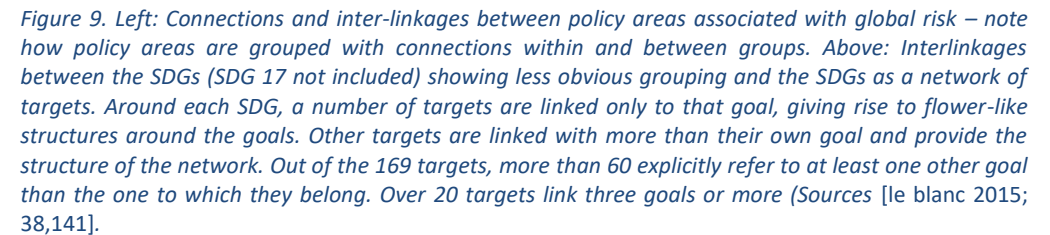
The EU is still grappling with how to translate the 2030 Agenda into actions, commitments, responsibilities and accountability that respect the priorities and circumstances in Europe [77,101,102]. The EU Policy Coherence for Development (PCD) experience offers many insights into the international impacts of EU policy-making but remains largely unrelated to broader work on ensuring internal coherence. This is part of the complex transition to working with Policy Coherence for Sustainable Development. Policy silos will need to be re-thought within a universal paradigm of development.

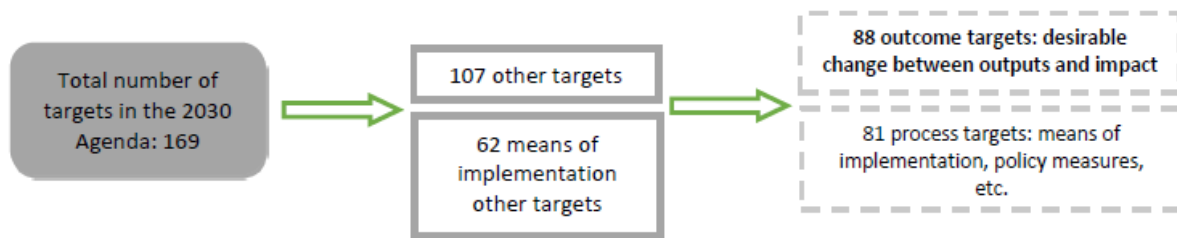
The Sustainable Development Goals require Governments to carefully consider nationally adapted priorities and strategies to achieve them at all institutional levels, including target and policy adaptation, anticipatory policy-making and programme design and the measurement of progress towards achievement of the Goals [48,103]. Countries will likely prioritise, map, and monitor interactions based on their specific contexts, if and when they have the capacity, and will most likely depend on the political environment within the country and political considerations in relation with other countries. In common with many countries and regions (e.g. UK [104], EU [105]), Ireland, in common with many other countries, recognises that policies can have an impact/influence beyond its national borders [106]. Concurrently, national policy does not occur in a vacuum,

but is increasingly influenced by policy decisions made by the United Nations (UN) and the European Union (EU) at international forums that lead to international legislation and (voluntary) obligations [107]. Nonetheless, three outstanding issues remain. First, national ownership is likely to be a problem. The centrally agreed goals need to be interpreted nationally to allow for national priorities and circumstances and to secure national commitment to them. Secondly, the goals are silent on the underlying economic structures needed to realise some of the goals, particularly of reducing inequality. Existing economic structures and policies are likely to result in a move away from achievement of this goal. Thirdly, most important, there is not true integration of the sustainability and economic goals. The goal of promoting economic growth needs to be better qualified for middle and high income countries, if the sustainability objectives – particularly on carbon emissions – are to be realised. This requires either that economic growth should only be promoted if sustainability can be assured, or that growth is redefined as ‘green growth’ so that promoting economic growth and achieving sustainability become consistent [108].

An understanding of the nature of SDG targets across the sustainable development dimensions – social, economic and environment or across the 5Ps (People, Planet, Prosperity, Peace and Partnerships – see Figure 3) – is key to ensuring a balanced plan [109]. Most of the goals in the SDGs contain a variety (or mixture) of targets with varying emphasis across the sustainable development dimensions. It would be a mistake to think that the SDGs with headline Goals that address climate change (SDG-13), on life below water (SDG-14), and on life on land (SDG-15) are the only goals focusing on environmental issues. Sixty-two of the 169 SDG targets (Figure 10) are related to the Means of Implementation (MoI): these include 43 targets under SDGs 1 through 16, and 19 targets under SDG 17. These MoI targets along with 19 policy measure targets under SDG 17 are referred to as process targets i.e., targets to do with the means of implementation, the measures to be implemented [109]. The remaining 88 targets are called outcome targets because they specify the expected outcome to be achieved.

Ireland has produced its Sustainable Development Goals National Implementation Plan 2018-2020 [110], which advocates a whole-of-government approach to develop alignment of national policy with the SDGs and identify opportunities for policy coherence. To achieve these aims, government departments and agencies individually and collectively should implement the 17 SDGs to cut across silos, bring about shared understanding of interlinkages and trade-offs between the various goals, and highlight major leverage points for interventions (Box 6) [59,85,111–113].





Source: OECD (2016).¹

Figure 10. The 169 outcome and process SDG targets in the 2030 Agenda. Source: UNDP 2017.

In common with other countries, it is unlikely that Ireland can address all 17 Goals and 169 Targets with the same degree of attention, and this will mean a degree of prioritisation will be necessary. Studies have suggested that for developed countries the greatest challenges are presented by the goals of sustainable consumption and production (SDG 12), sustainable energy (SDG 7) and combating climate change (SDG 13) as the three most transformational challenges facing developed countries – and as being the challenges on which the world at large needs to see the developed world place a strong emphasis for action so as to relieve the overall anthropogenic pressures on the planet and its natural systems. Other goals involving significant transformational change in developed countries include the need to achieve more sustainable economies and growth pathways, the goal of greater equality, and the goals to achieve better protection of the oceans and of terrestrial ecosystems [91]. Social problems of poverty, health, education and gender issues still persist in developed countries as well as in developing countries (though to differing degrees) as do all the other issues covered by the SDGs. The universal applicability of the SDGs stresses the need to continue to confront all of these issues comprehensively in all countries. Further progress on these issues in the developed world, however, cannot be expected to have such a comparatively large, transformational effect either within those countries themselves or in its impact on the rest of the world, thereby stressing the requirement for developed countries to maintain their support for sustainable development internationally. The principles of the OECD PCSD framework [8] to structure an analysis of the way different SDGs interact and interlink with each other can be used to take this into account:

- i) the roles of diverse actors at different levels (governments, international organisations, private sector and non-governmental organisations), as well as the diverse sources of finance – public and private, domestic and international – for achieving sustainable development outcomes;
- ii) the policy inter-linkages across economic, social and environmental areas, including the identification of synergies, contradictions and trade-offs, as well as the interactions between domestic and international policies;
- iii) the contextual factors, i.e. the enablers (that can contribute to) and disablers (that hamper) sustainable development at the global, national, local and regional levels; and

- iv) the policy effects on the well-being in one particular country “here and now”, on the well-being of people living in other countries “elsewhere”, and of future generations “later”.

This approach can be used to assess the national challenges for implementing the SDGs through an analysis of the extent to which domestic policies are aligned to the achievement of the SDGs and how they contribute to international sustainable development objectives (Box 6). Notably, identifying and understanding the different types of interactions and interlinkages between the SDGs and their respective targets will help policy makers maximise synergies and exploit win-wins (pursuing multiple objectives at the same time); avoid potential policy conflicts (pursuing one policy objective without undermining others); manage trade-offs (minimising negative impacts on other policy objectives); and ultimately design policies that generate co-benefits for sustainable development.

Box 6. Example of a whole of Government policy approach to sustainable development in the UK [167].

In order to make sustainable development ‘relevant’ in the UK, there were four agreed priorities – sustainable consumption and production, climate change, natural resource protection and sustainable communities. All central Government departments and their executive agencies were tasked to produce focused sustainable development action plans based on this strategy. Underpinning the UK approach is reference to natural resources that are vital to the UK’s existence and to the development of communities throughout the world coupled with the need for a more integrated policy framework to deliver sustainable development.

This section has demonstrated that implementation of the SDGs at national level requires both how alignment of SDGs to national priorities, and *vice versa*, as well the implications of interlinkages between SDGs and Targets need to be addressed as part of the process of implementing the SDGs.

6 Framing the SDGs4I project - Exploring interlinkages of SDGs in a national context

This section looks at how interlinkages between SDGs and Targets have been incorporated from national and analytical perspectives and how this will be addressed within the context of the SDGs4I project.

How the sustainable development goals (SDGs) interact with each other, and potentially lead to cumulative impacts, has emerged as a key question in the implementation of the 2030 Agenda (Figure 11), as it has potentially strong implications for prioritisation of actions and their effectiveness [114]. Most research to date has analysed interactions starting from one SDG, counting the number of interactions, and discussing synergies and trade-offs from the perspective of a specific issue area (e.g. from a particular nexus area, for instance, food-water-energy [115] (Box 7)).

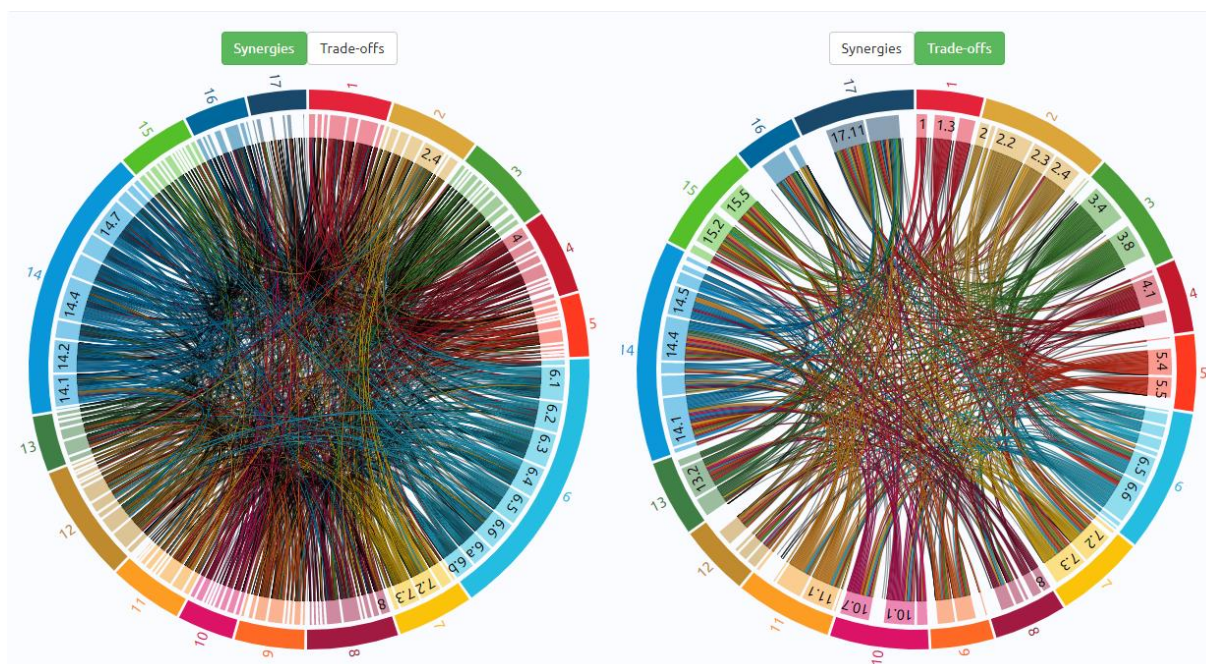


Figure 11. Illustration of all the possible (Left) synergistic (positive/reinforcing) and (Right) trade-offs (negative/weakened) linkages between the 17SDGs and 169 Targets). Source: <http://knowsdqs.jrc.ec.europa.eu/interlinkages/info>

Integration and coherence has for some time been at the forefront of concern for international and national agencies around the world [1,6] as it is realised that no one goal can be attained in isolation of at least two others. The dynamics of how exactly targets interact with each other is an empirical question and the answer will be different in different contexts. Balance and inter-linkages among the three dimensions of sustainable development is reflected not only at the level of the goals but also at the level of the targets. The goals themselves are linked through the proposed targets. There is a subtle, but important, nuance between interlinkages and reciprocity (goals that are mutually reinforcing without being duplicative) [33]. Simple interlinkages can be one-way relationships with a theme feeding into the achievement of another, often broader and more crosscutting, theme. Reciprocity creates a two-way relationship between thematic areas and is a more evolved form of interlinkages which are important to achieving integration as well as delivering co-benefits to ensure that policy coherence is achieved across the SDG framework.

Box 7. The Nexus approach for sustainable development (Hoff, 2012; Weitz, Nilsson and Davis, 2014)

When developing SDGs recognizing the interactions and feedback among limiting factors was an important consideration. A nexus angle is particularly important given the strong links between sectors, i.e., agriculture, water, energy, environment, which are likely to get even stronger so that externalities across resources become co-constraints of sustainable development. For example, food security needs to be cognisant of water, land, and energy factors; energy and climate protection goals need to factor in the dynamics of water and land change; and water security is dependent on managing energy demands and climate change. Such balancing across sectors is made more difficult in Industrialized countries with their high per-capita resource demands and large (often remote) resource footprints will have to reduce consumption levels and wastage. They will also need to mainstream nexus approaches into economic and development cooperation, share innovative technologies, for example on modern renewable energies, and link nexus-conscious institutions with other countries. A “nexus” approach that integrates goals across sectors, makes the SDGs more cost-effective and efficient, reduces the risk that SDG actions will undermine one another, and ensures sustainable resource use is necessary.

6.1 Addressing interlinkages between SDGs

So far, the intergovernmental negotiations on the SDGs have not addressed national-level implementation arrangements, beyond stating that national implementation should “build on existing planning instruments, such as national development and sustainable development strategies, as appropriate” and calling for “practicable ambitious national responses” [116]. Trying to develop analytical systems to optimise the best integrated approach to 169 separate targets at the same time may be too ambitious, at least in the first instance. What is needed therefore is a method of analysis that can pinpoint the most important linkages between different targets indicating areas where it will be particularly beneficial to promote joint or cooperative action between the actors involved in the linked targets and integrated policy measures that will have an impact on two or more separate targets [4,117].

Whatever modality an individual country takes as a construct for linking the SDGs to national policies, and vice versa, finding a method to address the complexity of inter-linkages between both SDGs, and the possible contradictions from sectoral perspectives, will be a challenge. Without policy coherence SDG implementation through existing national policy instruments could lead to divergent policy outcomes. At national scales, arguably the scale at which implementation and achievement of the SDGs will be most critical, the SDGs will depend upon alignment and integration between national targets, strategies, and plans for implementation, as well as with national and local delivery programs [103,118]. This level is thus critical to producing true policy coherence and linkages across sectors. Policy instruments, such as national sustainable development strategies, national development plans, and green economy plans, can work to link across sectors and actors. For example, national sustainable development strategies in Finland (Figure 12), Germany, and Wales have adopted cross-cutting, integrated approaches (using concepts such as circular economies) to delivering sustainable development [119]. Similarly, national and local development plans in some countries, such as China and South Africa [120], and aspects of federal planning in the United States [121], are transcending their typical focus on economic development to open up opportunities for cross-sectoral engagement and implementation, linking areas such as water, soil, and extreme events, and biodiversity conservation.

The different goals and targets will however represent different degrees of challenge and ambition for different countries depending on their present state of development and other national circumstances. So when it comes to implementation different countries will need to give different degrees of attention and effort to addressing the different goals and meeting their targets, depending on where they currently stand in relation to them, their differentiated responsibilities and their different capabilities and resources [72,91]. One approach that can be taken at a national level for implementing the SDGs in a way that supports and is compatible with national planning frameworks is to accommodate diverse areas in a strategic and coherent way that matches relevant targets for specific goal areas [23,122], the Nexus approach (Box 7).



Source: Annika Lindblom, presentation at WRI/OECD Workshop, 2–3 May 2016.

Figure 12. The alignment of Finland's SD commitments with the SDGs.

Coherently addressing the 17 Sustainable Development Goals requires planning tools that guide policy makers [123]. There are many efforts underway to measure sustainability progress, but to date these have been focused on measures of national and regional asset stocks, or ‘capitals’ [124]. Instead, there is a need for integrative approaches that are capable of analysing and elucidating the dynamic effects of interdependencies.

Several different approaches for analysing interactions have been tested and published. One approach has been to simply identify them [1,125]. Le Blanc [82] used network analysis techniques to establish the existence of linkages and based its findings on the linkages expressed in the wording of the SDGs. In further elaborations, Vladimorova and Le Blanc [126] explore more linkages based on document review in the UN system, focusing on the case of education. International policy and academic literature on the water-energy-food nexus has also highlighted the existence of linkages among, in particular, Goals 2, 6, and 7 (e.g. [127,128]).

Other attempts have been made to establish a more nuanced way of viewing interactions, in order to move the discourse beyond simply trade-offs and synergies. Weitz et al [23] applied three forms of interactions in their analysis of the water-energy-food nexus in the SDGs: interdependence, imposing conditions or constraints, and reinforcing. Similarly, Coopman et al. [129] applied an approach for interlinkages with three categories – supporting, enabling and relying, with subcategories. Also international agencies have published increasingly advanced takes on interactions in official reports (e.g. UNESCO, [130]; UN, [131]). The policy

coherence and institutional interaction literatures have often applied a “binary” view of interactions and focused on whether interaction is either beneficial or adverse [114]. As the conceptual basis for a science-based assessment of interactions, Nilsson et al. [6] and ICSU [96] presented a seven point typology of interactions, ranging from cancelling, counteracting, constraining on the negative side to enabling, reinforcing and indivisible on the positive side.

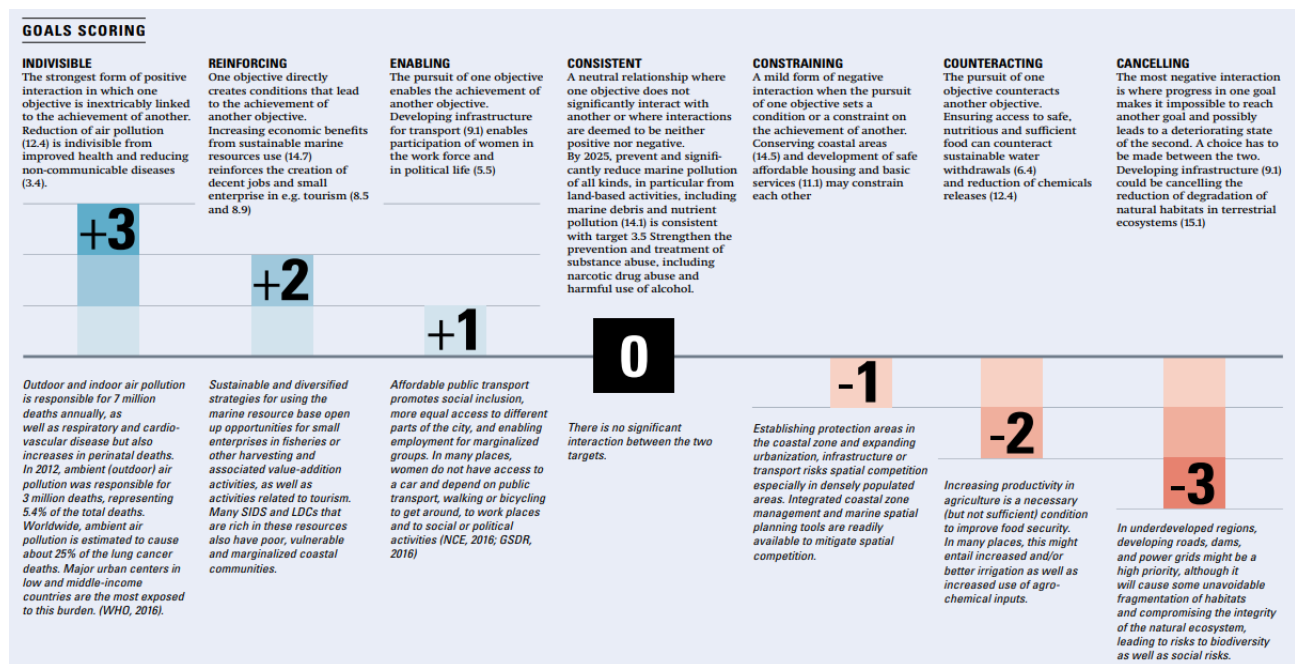


Figure 13. Interactions between goals (such as SDGs and/or their targets) can be presented on a seven-point ordinal scale, indicating the type of the interaction with other targets, and the extent to which the relationship is a positive or a negative one. Source: [6] and [96].

Implementation of this framework in Sweden [116] has shown that it appears that negative interactions are likely outnumbered by positive ones [125]. The implication of this finding is that the interactions between SDGs can demonstrate that priorities within any given sector influence - and are influenced by – actions and priorities from other sectors but that these connections can lead to common interests and (unexpected) alliances and that more integrated policy making is likely to pay off in terms of more effective development outcomes. This finding has also been articulated from the business sector whose perspective on the 2030 Agenda is striving to achieve a thriving society in a thriving environment [132].

The possible interlinkages (both positive and negative) between the SDGs (Figure 11) and their universality underscore the importance of policy coherence and mutually supportive policies working in synergy to achieve the multiple goals encompassed by the SDGs [53,114,133–135]. Unlike the Millennium Development Goals (MDGs), SDGs are not all positively correlated [136–138]. Some targets can negatively influence others, thus requiring policymakers to undertake a certain arbitrage. Across the goals, 42 targets focus on means of implementation, and the final goal, Goal 17, is entirely devoted to means of implementation [103]. However, these implementation targets do not, in general, consider interlinkages and interdependencies among goals.

This leaves open the possibility of perverse outcomes and unrealised synergies unless greater attention is paid to interlinkages between individual SDGs and their targets. Multiplying the complex equation of complementarities and trade-offs across the whole spectrum of policy areas covered by the SDGs implies a need for prioritisation and negotiation involving all parts of government as well as the businesses sector and civil society. In addition, the SDGs are also a ‘foreign policy’ issue, requiring significant involvement from the diplomatic and development communities [9].

6.2 Framing the SDGs4I project in Ireland

A feature of existing studies on SDG interlinkages is that they pay relatively less attention to supporting institutions and decision-making processes that are crucial to mobilising different agencies and other stakeholders behind multi-issue strategies [139]. Integrated approaches hence may require an identification of linkages as well as the comparatively more difficult task of aligning different interests in support of proposed solutions. Such research follows a growing trend towards the application of evidence-based decision-making tools and analytical frameworks that first gained currency in the United Kingdom during efforts to “modernise government” in the late 1990s [140,141]. In the nearly three decades since the United Kingdom began popularising these techniques, the work on evidence-based policymaking has found its way into research on integrated planning for sustainable development, including recent work on the SDGs. The Institute for Global Environmental Strategies (IGES) [41], for example, has drawn upon social network analysis to create a web-based interface aimed at helping decision makers visualise interlinkages across a wide range of SDGs and targets. Similarly, the Millennium Institute [142] developed a model that considers multiple economic, social, environmental and governance factors in supporting national mid- to long-term planning. Other similarly themed—but less data intensive— research has sought to classify sets of connections within and between the SDGs [4,6,143].

How and what to strategize is largely uncovered in the literature except that there is a suggestion to align to national planning frameworks and strategies. In terms of how a country should prioritise its SDG implementation there is equal lack of information – should the priority be aligned to those goals performing the weakest, or to those goals where interlinkages are likely to have the greatest knock-on benefits (spillovers)? - despite the emphasis on this aspect of the 2030 Agenda [144–150]. In part this reflects that while the Agenda is applicable to all countries, its implementation recognises that countries have different national realities, capacities and levels of development, and there is a need to respect national policies and priorities. Countries are addressing the SDGs in the context of broad societal goals, such as the attainment of lower-middle income status, against the varied backdrops of conflict, climate phenomena like El Niño and economic crises [151]. Countries outlined efforts to map departments and government agencies with responsibility for the implementation of SDG targets. The issues addressed by the SDGs are not new. There is a danger,

however, that the key actors will focus on collecting and reporting on the indicators and/or cherry picking individual SDGs which already conform to business as usual, rather than using them as an opportunity to achieve transformational change and treating the SDGs as indivisible and comprehensively linked [152].

The SDGs4I project provides a space to explore the utility and application of Ireland's SDG implementation plan to support policy coherence for sustainable development in Ireland and;

4. Integrate policy analysis: to ensure that proposed policies, programmes and targets are supportive of nationally tailored SDGs;
5. Coordinate institutional mechanisms: to create formal partnerships across sectoral line departments and agencies;
6. Integrate modelling: to help clarify and articulate the interconnected system of goals and targets and to analyse and inform key policies, programs and projects for their impact on nationally tailored SDGs.

A separate review of SDG tools has identified over 80 models that include a variety of variables relating to all 17 SDGs, and it may be that not one single model can analyse all variables of interest from a national government perspective¹⁰. For this reason, the SDGs4I project will identify some key policy areas to analyse priority sectoral issues, and combine different models that address these issues in a broader analytical framework [153]. This project will analyse Ireland's first SDG National Implementation Plan for 2018-20 [110,154] in order to identify the priority policy areas upon which to focus. In order to identify priority policy areas to focus upon. The Plan identifies the association of individual SDGs of the 2030 Agenda with national policies and identifies the government departments and agencies responsible for each of the SDG targets, namely:

- The framework of Project Ireland 2040, which identifies Ireland's overarching policy goals and values, and sets out 10 strategic objectives. Project Ireland 2040 is composed of two documents:
 - 1) the National Planning Framework to 2040 (NPF), published in February 2018, which sets out a national coordinated policy covering a wide variety of fields;
 - 2) the National Development Plan 2018-2027 (NDP), which provides for €116 billion in capital investment over 10 years.
- Ireland's National Marine Planning Framework, which sets out the policy, legislative and regulatory context for marine spatial planning and the development for Ireland.

¹⁰ D3.1 will provide a review of existing tools to analyse SDG interactions.

- The framework of Ireland’s A Better World: Ireland’s Policy for International Development, which places the SDGs at the heart Ireland’s international policy.
- The Climate Action Plan 2019, which addresses carbon emissions and creating a resilient, vibrant and sustainable country.

7 Conclusion

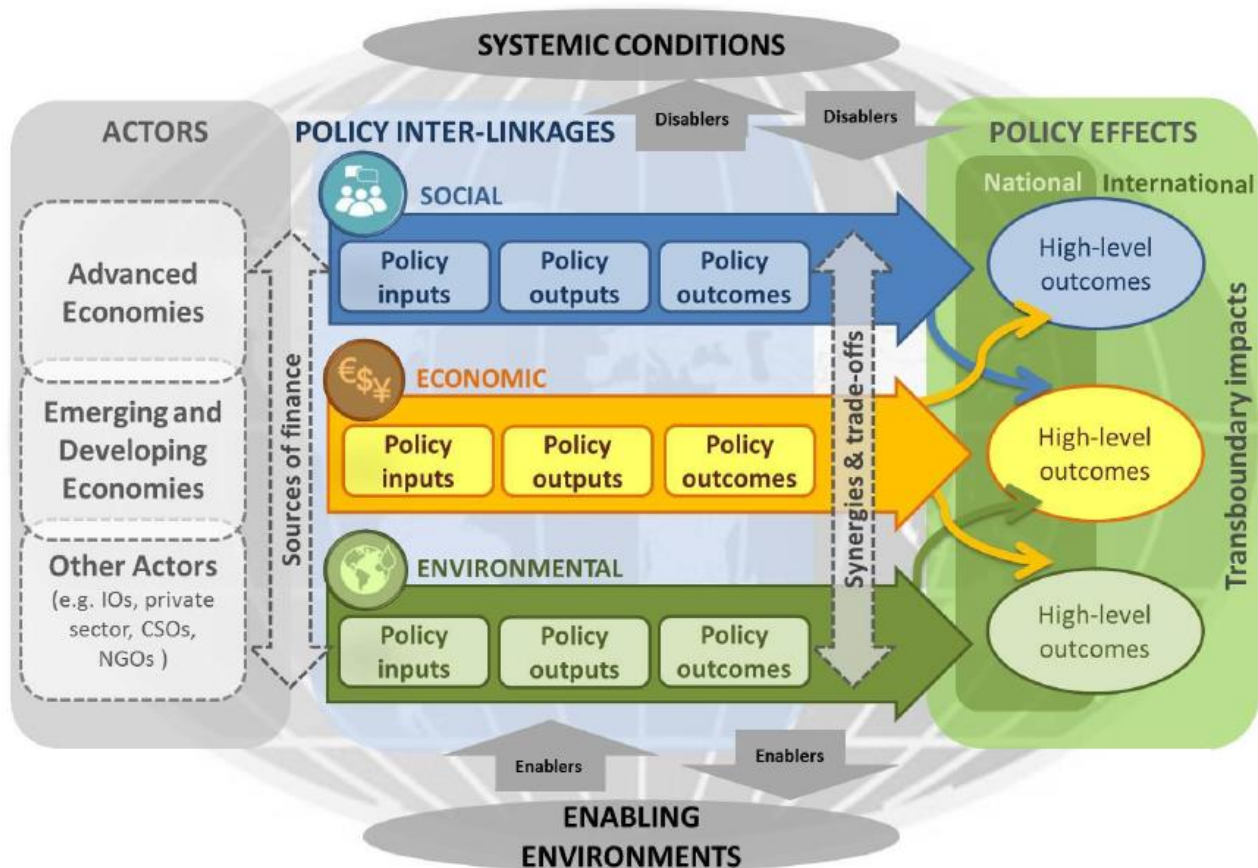
The proposed UN Sustainable Development Goal 17 (means of implementation) includes Target 17.14, to: “enhance policy coherence for sustainable development”. Like other means of implementation targets that are included with each of the 17 SDGs, Target 17.14 requires governments to review and reflect on their governance processes and means, rather than ultimate outcomes, in order to achieve the integration and indivisibility – universality - that are at the core of the 2030 Agenda [84]. Policy Coherence for Sustainable Development (PCSD) aims to increase governments’ capacities to achieve the following three objectives:

- 1) Foster synergies across economic, social and environmental policy areas;
- 2) Identify trade-offs and reconcile domestic policy objectives with internationally objectives; and
- 3) Address the spill-overs of domestic policies.

The “Identifying Interactions for SDG Implementation in Ireland” project aims to produce an evaluation of the alignment of current Government of Ireland policy to the SDGs and a tool to analyse policy inter-linkages across economic, social and environmental areas, including the identification of synergies and trade-offs. This is a contribution to a wider analytical framework for policy coherence for sustainable development [41,155] that provides a process for government to implement coherent and mutually supportive policies that align to the SDGs, in ways that balance economic, social and environmental goals; consider domestic and international effects of policies; and support long-term sustainability. Such an approach has the intention of decoupling environmental degradation and resource consumption from economic and social development and redress outcomes whereby action to achieve objectives in one policy area hinders progress in another, while solutions to problems often lie in the hands of policy makers in other sectors or at other levels of government. This is a major cause of many long-term unsustainable trends [75,118].

Delivering on the SDGs is a formidable governance challenge and, at a national level, implementation of the SDGs is complicated by the sector-specific nature of government organisation that can appear at odds to the principle of universality as an integrated whole that is at the core of the 2030 Agenda [9]. Governments also face the challenge of addressing the aspirations of the 2030 Agenda and the SDGs whilst not contradicting national policy strategies, which can lead to governments selectively engaging with a sub-set of the SDGs [156,157]. The “Identifying Interactions for SDG Implementation in Ireland” project will analyse the SDGs as

a complex chain of interlinked goals and means to better understand how to implement the SDGs in a more integrated way, and avoid having to choose between allocating efforts [117,152] whilst meeting both international and national objectives. The project will focus on two policy areas that are important in the



Source: OECD PCD Unit, inspired by the work of UNECE/OECD/Eurostat Task Force on measuring sustainable development.

Figure 14. The analytical framework to which the "Identifying Interactions for SDG Implementation in Ireland" project aims to contribute.

context of national, regional and international responsibilities and obligations for Ireland:

3. Biodiversity - ensuring that natural resources are properly harnessed and protected are key to the success of the United Nations 2030 Agenda for Sustainable Development [158,159] and provides benefits to all sectors of society in Ireland [160,161].
4. Climate Action – addressing climate change and its impacts are integral to successfully achieving all SDGs [162,163] and is already having diverse and wide ranging impacts on Ireland's environment, society, economic and natural resources [164].

This report is the first step to delivering the project and has revealed the complexities and challenges of implementing SDG and provides background material that places Ireland in an international context and highlights the need for a coherent governmental approach for successful implementation.

8 References

- [1] M. Nilsson, Understanding and mapping important interactions among SDGs: Ready institutions and policies for integrated approaches to implementation of the 2030 Agenda., in: Expert Meet. Prep. HLPF 2017, 2016: pp. 1–33. [https://sustainabledevelopment.un.org/content/documents/12067Understanding and mapping important interactions among SDGs.pdf](https://sustainabledevelopment.un.org/content/documents/12067Understanding%20and%20mapping%20important%20interactions%20among%20SDGs.pdf).
- [2] UNRISD, Policy innovations for transformative change. Implementing the 2030 agenda for sustainable development, The United Nations Research Institute for Social Development, 2016. [http://www.unrisd.org/80256B42004CCC77/\(httpInfoFiles\)/2D9B6E61A43A7E87C125804F003285F5/\\$file/Flagship2016_FullReport.pdf](http://www.unrisd.org/80256B42004CCC77/(httpInfoFiles)/2D9B6E61A43A7E87C125804F003285F5/$file/Flagship2016_FullReport.pdf).
- [3] R.D. van den Berg, I. Naidoo, S.D. Tamondong, Evaluation for Agenda 2030, International Development Evaluation Association (IDEAS), 2017. https://ideas-global.org/wp-content/uploads//2017/12/IDEAS-web-REV_08Dec.pdf.
- [4] A. Coopman, D. Osborn, F. Ullah, E. Auckland, G. Long, Seeing the Whole: Implementing the SDGs in an Integrated and Coherent Way - A Research Pilot by stakeholder forum, Bioregional and Newcastle University, A research pilot by Stakeholder Forum, Bioregional and Newcastle University, 2016. <https://flic.kr/p/5sbJAj>.
- [5] E. Zusman, S. Hoiberg, Z. Xin, M. Moinuddin, R. Nakano, B.K. Mitra, Taking an Integrated Approach to the SDGs: A Survey and Synthesis, 2017.
- [6] M. Nilsson, D. Griggs, M. Visbeck, Map the interactions between Sustainable Development Goals, *Nature*. 534 (2016) 320–322. doi:10.1038/534320a.
- [7] OECD, Better Policies for Development 2015. Policy Coherence and Green Growth, OECD Publishing, Paris, 2015. doi:10.1787/eco_surveys-col-2015-en.
- [8] OECD, Better Policies for Sustainable Development 2016. A New Framework for policy coherence, OECD Publishing, Paris, 2016.
- [9] OECD, Getting Governments Organised to Deliver on the Sustainable Development Goals, Organisation for Economic Co-operation and Development, 2017.
- [10] WCED, Report of the World Commission on Environment and Development: Our Common Future (The Brundtland Report), The World Commission, 1987. doi:10.1080/07488008808408783.
- [11] UN, Report of the United Nations conference on the human environment, United Nations, 1972. doi:10.1080/00103829.1973.10877486.
- [12] B. Purvis, Y. Mao, D. Robinson, Three pillars of sustainability: in search of conceptual origins, *Sustain. Sci.* 14 (2019) 681–695. doi:10.1007/s11625-018-0627-5.
- [13] J. Harris, N. Goodwin, M.H. Jonathan, A.W. Tomothy, P.G. Kevin, R.G. Neva, A survey of sustainable development: social and economic dimensions, frontier issues in economic thought, Social And Economic Dimensions. Bibliovault OAI Repository, the University of Chicago Press, 2001.
- [14] OECD, Sustainable Development: Critical Issues, Organisation for Economic Co-operation and Development, 2001. doi:10.1787/9789264193185-en.
- [15] UN, Transforming our world: The 2030 agenda for sustainable development, United Nations, 2015. [https://sustainabledevelopment.un.org/content/documents/7891Transforming Our World. pdf](https://sustainabledevelopment.un.org/content/documents/7891Transforming%20Our%20World.pdf).
- [16] J.A. Du Pisani, Sustainable development – historical roots of the concept, *Environ. Sci.* 3 (2006) 83–96. doi:10.1080/15693430600688831.
- [17] D.P. Bâc, A history of the concept of sustainable development: Literature review, *J. Fac. Econ.* 17 (2008) 576–580. doi:10.1016/j.fsi.2009.10.004.
- [18] UNGA, Report of the Open Working Group of the General Assembly on Sustainable Development Goals, United Nations General Assembly, 2014.
- [19] UNDESA, Open Working Group proposal for Sustainable Development Goals, United Nations, 2014. <http://undocs.org/A/68/970>.

- [20] J. Lingán, J. Cornforth, R. Pollard, S. Forum, Sustainable Development Goals: Building the Foundations for an Inclusive Process, Stakeholder Forum for a Sustainable Future for BOND-DEG, 2012. <http://www.justforests.org/custom/public/files/bond-sdgs-paper-may-2012.pdf>.
- [21] UN System Task Team on the Post-2015 UN Development Agenda, Realizing the Future We Want for All, UN System on the Post-2015 UN Development Agenda, 2012.
- [22] UN, The future we want - Outcome document of the United Nations Conference on Sustainable Development, United Nations, 2012. <https://sustainabledevelopment.un.org/content/documents/733FutureWeWant.pdf>.
- [23] N. Weitz, M. Nilsson, M. Davis, A Nexus Approach to the Post-2015 Agenda: Formulating Integrated Water, Energy, and Food SDGs, SAIS Rev. Int. Aff. 34 (2014) 37–50. doi:10.1353/sais.2014.0022.
- [24] U. Grober, Deep roots – A conceptual history of ‘sustainable development,’ Discuss. Pap. / Wissenschaftszentrum Berlin Für Sozialforschung, 2007-002. (2007) 37. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-110771>.
- [25] J. Robinson, Squaring the circle? Some thoughts on the idea of sustainable development, Ecol. Econ. 48 (2004) 369–384. doi:10.1016/j.ecolecon.2003.10.017.
- [26] P. Williams, A. Thomas, Sustainable development in Wales: Understanding effective governance, University of Wales Swansea, 2004.
- [27] R.B. Gibson, S. Hassan, S. Holtz, J. Tansey, G. Whitelaw, Sustainability Assessment: Criteria, Processes, and Applications, Earthscan, 2005.
- [28] B. Hopwood, M. Mellor, G.O. Brien, Sustainable Development: mapping different approaches, Sustain. Dev. 13 (2005) 38–52.
- [29] B.J.M. de Vries, A.C. Petersen, Conceptualizing sustainable development. An assessment methodology connecting values, knowledge, worldviews and scenarios, Ecol. Econ. 68 (2009) 1006–1019. doi:10.1016/j.ecolecon.2008.11.015.
- [30] R.R. Shaker, The spatial distribution of development in Europe and its underlying sustainability correlations, Appl. Geogr. 63 (2015) 304–314. doi:10.1016/j.apgeog.2015.07.009.
- [31] V. Jeremic, J.D. Sachs, The United Nations in the age of globalization, Econ. Soc. Rev. 45 (2013) 161–188.
- [32] L. Vasseur, D. Horning, M. Thornbush, E. Cohen-Shacham, A. Andrade, E. Barrow, S.R. Edwards, P. Wit, M. Jones, Complex problems and unchallenged solutions: Bringing ecosystem governance to the forefront of the UN sustainable development goals, Ambio. 46 (2017) 731–742. doi:10.1007/s13280-017-0918-6.
- [33] A. Cutter, D. Osborn, J. Romano, F. Ullah, Sustainable Development Goals and integration: Achieving a better balance between the economic, social and environmental dimensions, German Council for Sustainable Development, 2015.
- [34] Stakeholder Forum, Tests of Success for the SDGS, Stakeholder Development Programme, 2014.
- [35] UN, The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet, United Nations, 2014.
- [36] UN, Global Sustainable Development Report. 2015 Edition Advance unedited version, Department of Economic and Social Affairs, New York, 2015.
- [37] UN, The future we want, Rio+20, United Nations, 2012. doi:12-38164* (E) 220612.
- [38] ECA R-UNDG, RCM, Building more inclusive and prosperous societies in Europe and Central Asia: From Vision to Achievement of the Sustainable Development Goals, Regional UN Development Group for Europe and Central Asia (ECA R-UNDG) and the Regional Coordination Mechanism (RCM), 2017.
- [39] J. Waage, C. Yap, S. Bell, C. Levy, G. Mace, T. Pegram, E. Unterhalter, N. Dasandi, D. Hudson, R. Kock, S. Mayhew, C. Marx, N. Poole, Governing the UN sustainable development goals: Interactions, infrastructures, and institutions, Lancet Glob. Heal. 3 (2015) e251–e252. doi:10.1016/S2214-109X(15)70112-9.
- [40] N. Hall, R. Richards, D. Barrington, H. Ross, S. Reid, B. Head, P. Jagals, A. Dean, K. Hussey, E. Abal, S. Ali, L. Bouilly, J. Willis, Achieving the UN Sustainable Development Goals for water and beyond, Global Change Institute, The University of Queensland, Brisbane, 2016.

- [41] X. Zhou, M. Moinuddin, Sustainable Development Goals Interlinkages and Network Analysis: A practical tool for SDG integration and policy coherence, IGES Research Report No. RR1602, Institute for Global Environmental Strategies (IGES), 2017. <https://pub.iges.or.jp/pub/sustainable-development-goals-interlinkages>.
- [42] WEF, The Global Risks Report 2019 14th Edition Insight Report, World Economic Forum, 2019.
- [43] C. Brandi, A. Dzebo, H. Janetschek, The Case for Connecting the Implementation of the Paris Climate Agreement and the 2030 Agenda for Sustainable Development, German Development Institute, 2017.
- [44] S.R. Dovers, J.W. Handmer, Uncertainty, sustainability and change, *Glob. Environ. Chang.* 2 (1992) 262–276. doi:10.1016/0959-3780(92)90044-8.
- [45] OECD, Policy coherence for inclusive and sustainable development, OECD, 2013. http://www.oecd.org/pcd/POST-2015_PCD.pdf.
- [46] ITU, OHCHR, UNDESA, Assessment of MDG8 and lessons learnt - Thematic Think Piece, United nations, 2013.
- [47] OECD, Better policy for development 2014: policy coherence and illicit financial flow, 2014. doi:<http://dx.doi.org/10.1787/9789264210325-en>.
- [48] ECOSOC, Institutional arrangements for the Sustainable Development Goals, United Nations Economic and Social Council, 2017. <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N17/025/12/PDF/N1702512.pdf?OpenElement>.
- [49] H. Hoff, Bringing EU policy into line with the Planetary Boundaries, Stockholm Environment Institute, 2017.
- [50] H. Hoff, How the Planetary Boundaries framework can support national implementation of the 2030 Agenda, Stockholm Environment Institute, 2017. <https://www.sei-international.org/mediamanager/documents/Publications/SEI-2017-PB-Hoff-HowthePlanetary.pdf>.
- [51] OECD, Measuring Distance to the SDGs Targets - An assessment of where OECD countries stand, OECD, 2017. <http://www.oecd.org/std/OECD-Measuring-Distance-to-the-SDGs-Target-Pilot-Study-web.pdf>.
- [52] B.C.K. Choi, Can scientists and policy makers work together?, *J. Epidemiol. Community Heal.* 59 (2005) 632–637. doi:10.1136/jech.2004.031765.
- [53] ICSU & ISSC, Review of Targets for the Sustainable Development Goals: The Science Perspective, International Council for Science (ICSU), 2015.
- [54] The World Bank, Making Sustainable Commitments. An Environment Strategy for the World Bank, The World Bank, 2001.
- [55] J. Rockström, W. Steffen, K. Noone, Å. Persson, F.S. Chapin, E. Lambin, T.M. Lenton, M. Scheffer, C. Folke, H.J. Schellnhuber, B. Nykvist, C. a. de Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P.K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R.W. Corell, V.J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, J. Foley, Planetary boundaries: Exploring the safe operating space for humanity, *Ecol. Soc.* 14 (2009) 472–475. doi:10.1038/461472a.
- [56] W. Steffen, M. Stafford Smith, Planetary boundaries, equity and global sustainability: Why wealthy countries could benefit from more equity, *Curr. Opin. Environ. Sustain.* 5 (2013) 403–408. doi:10.1016/j.cosust.2013.04.007.
- [57] K. Raworth, A Safe and Just Space For Humanity: Can we live within the Doughnut?, Oxfam Discussion Papers, 2012. doi:10.5822/978-1-61091-458-1.
- [58] L. Brimont, D. Demaillly, J. Vaillé, SDG implementation: what are the countries doing?, IDDRI, 2016.
- [59] UNDESA, Policy integration in government in pursuit of the sustainable development goals, Department of Economic and Social Affairs Division for Public Administration and Development Management, 2015.
- [60] D. Le Blanc, Towards integration at last? The sustainable development goals as a network of targets, Division for Sustainable Development, United Nations Department of Economic and Social Affairs, UN DESA, 2015.
- [61] U. Pisano, Resilience and Sustainable Development: Theory of resilience, systems thinking and adaptive governance, ESDN Quarterly Report N°26. European Sustainable Development Network, 2012.

- [62] B.J. Fiksel, I. Goodman, A. Hecht, Resilience: Navigating toward a Sustainable Future, *Solut. a Sustain. Desirable Futur.* 5 (2014) 38–47.
- [63] M. Leach, K. Raworth, J. Rockström, Between social and planetary boundaries : Navigating pathways in the safe and just space for humanity, in: *World Soc. Sci. Rep.*, OECD Publishing, Paris/Unesco Publishing, Paris, 2013: pp. 84–89. doi:10.1787/9789264203419-10-en.
- [64] C. Folke, R. Biggs, A. V. Norstrom, B. Reyers, J. Rockstrom, Social-ecological resilience and biosphere-based sustainability science, *Ecol. Soc.* 21 (2016). doi:10.5751/ES-08748-210341.
- [65] F. Biermann, X. Bai, N. Bondre, W. Broadgate, C.T. Arthur Chen, O.P. Dube, J.W. Erisman, M. Glaser, S. van der Hel, M.C. Lemos, S. Seitzinger, K.C. Seto, Down to Earth: Contextualizing the Anthropocene, *Glob. Environ. Chang.* 39 (2016) 10. doi:10.1016/j.gloenvcha.2015.11.004.
- [66] W. Steffen, P.J. Crutzen, J.R. McNeill, The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature, *AMBIO A J. Hum. Environ.* 36 (2007) 614–621. doi:10.1579/0044-7447(2007)36[614:TAAHNO]2.0.CO;2.
- [67] OECD, *OECD Environmental Outlook to 2050: The Consequences of Inaction*, OECD Publishing, 2012. doi:10.1787/9789264122246-en.
- [68] IPCC, *Climate change 2014 synthesis report*, IPCC, 2014.
- [69] S. Ahvenharju, *The Finland we want by 2050 – Society’s commitment to sustainable development*, 2014.
- [70] Government of Ireland, *Our sustainable future: A Framework for Sustainable Development for Ireland*, DOE, 2012.
- [71] D. O’Connor, J. Mackie, D. van Esveld, K. Hoseok, I. Scholz, N. Weitz, *Universality, Integration, and Policy Coherence for Sustainable Development: Early SDG Implementation in Selected OECD Countries*, Working Paper. Washington, DC: World Resources Institute, 2016. http://www.wri.org/publication/universality_%0Aintegration_and_policy_coherence.
- [72] U. Pisano, L. Lange, G. Berger, The Sustainable Development Goals (SDGs) and their impact on the European SD governance framework, *Eur. Sustain. Dev. Netw.* (2015) 67. [http://www.sd-network.eu/quarterly-reports/report-files/pdf/2015-January-The_Sustainable_Development_Goals_\(SDGs\)_and_their_impact_on_the_European_SD_governance_framework.pdf](http://www.sd-network.eu/quarterly-reports/report-files/pdf/2015-January-The_Sustainable_Development_Goals_(SDGs)_and_their_impact_on_the_European_SD_governance_framework.pdf).
- [73] UNDG, *Delivering the post-2015 agenda. Opportunities at the national and local levels*, United Nations Development Group, 2014.
- [74] OECD, *Policies to Enhance Sustainable Development*, OECD Publishing, 2001.
- [75] European Commission, *A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development*, COM(2001)264 final. European Commission, 2001.
- [76] J. Mackie, M. Ronceray, E. Spierings, *Policy coherence and the 2030 Agenda: Building on the PCD experience*, European Centre for Development Policy Management, 2017. www.ecdpm.org/dp210.
- [77] C. Gregersen, J. Mackie, C. Torres, E. Entre, P. Et, P. Dans, L.A. Coopération, C. Gregersen, J. Mackie, C. Torres, *Implementation of the 2030 Agenda in the European Union: Constructing an EU approach to Policy Coherence for Sustainable Development for Sustainable Development*, *Eur. Cent. Dev. Policy Manag.* (2016) 1–28.
- [78] OECD, *Policy Coherence for Development – Lessons Learned*, Organisation for Economic Co-operation and Development (OECD), 2008.
- [79] OECD, *Policy framework for policy coherence for development*, OECD Publishing, Paris, 2012.
- [80] F. Biermann, C. Stevens, S. Bernstein, A. Gupta, N. Kabiri, N. Kanie, M. Levy, M. Nilsson, L. Pintér, M. Scobie, O.R. Young, *Integrating Governance into the Sustainable Development Goals Policy Brief*, POST2015/UNU-IAS Policy Br. (2015) 4. http://collections.unu.edu/eserv/UNU:1825/Post2015_UNU-IAS_PolicyBrief3.pdf.
- [81] UNESC, *Promoting policy and institutional coherence for the Sustainable Development Goals*, United Nations Economic and Social Council, 2018.
- [82] D. Le Blanc, *Towards Integration at Last? The Sustainable Development Goals as a Network of Targets*, *Sustain.*

Dev. 23 (2015) 176–187. doi:10.1002/sd.1582.

- [83] OECD, 2014 Report on the Implementation of the OECD Strategy on Development, OECD Publishing, Paris, 2014.
- [84] OECD, Policy Coherence for Sustainable Development in the SDG Framework. Shaping Targets and Monitoring Progress, OECD, 2015. [http://www.oecd.org/development/pcd/Note on Shaping Targets.pdf](http://www.oecd.org/development/pcd/Note%20on%20Shaping%20Targets.pdf).
- [85] R. Steurer, G. Berger, The Lisbon Strategy and Sustainable Development Strategies Across Europe: How Different Governance Arrangements Shape the European Coherence of Policy Documents, the Institute of Forest, Environmental, and Natural Resource Policy, University of Natural Resources and Applied Life Sciences, Vienna (BOKU), 2010. doi:10.2139/ssrn.2342118.
- [86] F. Machingura, S. Lally, The Sustainable Development Goals and their trade-offs, ODI, 2017. <https://www.odi.org/sites/odi.org.uk/files/resource-documents/11329.pdf>.
- [87] H. Clark, Governance for planetary health and sustainable development, *Lancet*. 386 (2015) e39–e41. doi:10.1016/S0140-6736(15)61205-3.
- [88] IRP, Policy Coherence of the Sustainable Development Goals. A Natural Resource Perspective, International Resource Panel, United Nations Environment Programme, 2015. http://www.unep.org/resourcepanel/Portals/50244/publications/Policy_Coherenceofthe_Sustainable_DevelopmentGoals.pdf.
- [89] Sustainable Development Solutions Network (SDSN), Indicators for the SDGs: Identifying inter-linkages, 2015.
- [90] European Commission, The Role of Science, Technology and Innovation Policies to Foster the Implementation of the Sustainable Development Goals (SDGs), European Commission, 2015. file:///C:/Users/az-20/Downloads/ReportoftheExpertGroupSDGs_online.pdf.
- [91] D. Osborn, A. Cutter, F. Ullah, Universal Sustainable Development Goals: Understanding the transformational challenge for developed countries, Stakeholder Forum, 2015. <https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=1684&menu=35>.
- [92] S. Bernstein, J. Gupta, S. Andresen, P.M. Haas, N. Kanie, M. Kok, M.A. Levy, C. Stevens, Coherent Governance, the UN and the SDGs, POST2015/UNU-IAS Policy Br. (2014) 4. https://collections.unu.edu/eserv/UNU:1826/Post2015_UNU-IAS_PolicyBrief4.pdf.
- [93] I. Boas, F. Biermann, N. Kanie, Cross-sectoral strategies in global sustainability governance: towards a nexus approach, *Int. Environ. Agreements Polit. Law Econ.* 16 (2016) 449–464. doi:10.1007/s10784-016-9321-1.
- [94] L. Bizikova, Scenario approaches and SDGs at the Sub- national Level, IISD, 2016.
- [95] ICSU, Supporting Science for the Sustainable Development Goals Towards a Global. Forum of Research Funding Agencies, Foundations and Development Agencies, ICSU, 2017.
- [96] M. Nilsson, D. Griggs, M. Visbeck, C. Ringler, A draft framework for understanding SDG interactions, International Council for Science (ICSU), 2016.
- [97] PBL, Roads from Rio+20. Pathways to achieve global sustainability goals by 2050, PBL Netherlands Environmental Assessment Agency, 2012.
- [98] S. Oberthür, L. Groen, Explaining goal achievement in international negotiations: the EU and the Paris Agreement on climate change, *J. Eur. Public Policy*. 00 (2017) 1–20. doi:10.1080/13501763.2017.1291708.
- [99] S. Kindornay, Progressing National SDG Implementation: An independent assessment of the voluntary national review reports submitted to the United Nations High-level Political Forum in 2018, Ottawa: Canadian Council for International Co-operation, 2019.
- [100] C. Dickens, V. Smakhtin, M. McCartney, G. O'Brien, L. Dahir, Defining and quantifying national-level targets, indicators and benchmarks for management of natural resources to achieve the sustainable development goals, *Sustain.* 11 (2019). doi:10.3390/su11020462.
- [101] House of Commons, UK implementation of the Sustainable Development Goals, House of Commons, UK, 2016. <http://www.ncbi.nlm.nih.gov/pubmed/10345731>.
- [102] P. Lucas, K. Ludwig, M. Kok, S. Kruitwagen, Sustainable Development Goals in the Netherlands, PBL

Netherlands Environmental Assessment Agency, 2016.

- [103] M. Stafford-Smith, D. Griggs, O. Gaffney, F. Ullah, B. Reyers, N. Kanie, B. Stigson, P. Shrivastava, M. Leach, D. O'Connell, Integration: the key to implementing the Sustainable Development Goals, *Sustain. Sci.* 12 (2017) 911–919. doi:10.1007/s11625-016-0383-3.
- [104] CIOB, Environmental Legislation and Incentives in the UK, 2014.
- [105] EC, Next Steps for a Sustainable European Future. European Action for Sustainability, European Commission, 2016.
- [106] Government of Ireland, A Better World. Ireland's Policy for International Development, Government of Ireland, 2019.
- [107] M.E. Zaei, Globalization of national policy-making: An international perspective, *Public Policy Adm.* 13 (2014) 331–340. doi:10.13165/VPA-14-13-2-11.
- [108] F. Stewart, The Sustainable Development Goals: A comment, *J. Glob. Ethics.* 11 (2015) 288–293. doi:10.1080/17449626.2015.1084025.
- [109] UNDP, Rapid Integrated Assessment (RIA) To facilitate mainstreaming of SDGs into national and local plans, United Nations Development Programme, 2017.
- [110] DCCAE, The Sustainable Development Goals National Implementation Plan 2018-2020, Department of Communications, Climate Action & Environment, 2018.
- [111] EU, Science for Environment Policy. Special Issue. Sustainable Development, European Union, 2009.
- [112] UNEP, Integrated Policymaking for Sustainable Development: A reference manual, United Nations Environment Programme, 2009.
- [113] R.W. Flint, Symbolism of Sustainability: Means of Operationalizing the Concept, *SYNESIS.* 1 (2010) 25–37.
- [114] N. Weitz, H. Carlsen, M. Nilsson, K. Skånberg, Towards systemic and contextual priority setting for implementing the 2030 Agenda, *Sustain. Sci.* 13 (2018) 531–548. doi:10.1007/s11625-017-0470-0.
- [115] A. Persson, N. Weitz, M. Nilsson, Follow-up and Review of the Sustainable Development Goals: Alignment vs. Internalization, *Rev. Eur. Comp. Int. Environ. Law.* 25 (2016) 59–68. doi:10.1111/reel.12150.
- [116] N. Weitz, Å. Persson, M. Nilsson, S. Tenggren, Sustainable Development Goals for Sweden: Insights on Setting a National Agenda, (2015) 1–57. <https://www.sei-international.org/mediamanager/documents/Publications/SEI-WP-2015-10-SDG-Sweden.pdf>.
- [117] M. Elder, M. Bengtsson, L. Akenji, An optimistic analysis of the means of implementation for sustainable development goals: Thinking about goals as means, *Sustain.* 8 (2016). doi:10.3390/su8090962.
- [118] SDSN, Getting started with the Sustainable Development Goals: A guide for stakeholders, Sustainable Development Solutions Network, 2015.
- [119] Stakeholder Forum, Building the Europe we want: Models for civil society involvement in the implementation of the Post-2015 agenda at the EU level, the European Economic and Social Committee, 2015.
- [120] C. Li, H. Zheng, S. Li, X. Chen, J. Li, W. Zeng, Y. Liang, S. Polasky, M.W. Feldman, M. Ruckelshaus, Z. Ouyang, G.C. Daily, Impacts of conservation and human development policy across stakeholders and scales, *Proc. Natl. Acad. Sci.* 112 (2015) 7396–7401. doi:10.1073/pnas.1406486112.
- [121] M. Schaefer, E. Goldman, A.M. Bartuska, A. Sutton-Grier, J. Lubchenco, Nature as capital: Advancing and incorporating ecosystem services in United States federal policies and programs: Table 1., *Proc. Natl. Acad. Sci.* 112 (2015) 7383–7389. doi:10.1073/pnas.1420500112.
- [122] M. Nilsson, P. Lucas, T. Yoshida, Towards an integrated framework for sdgs: Ultimate and enabling goals for the Case of energy, *Sustain.* 5 (2013) 4124–4151. doi:10.3390/su5104124.
- [123] D. Collste, M. Pedercini, S.E. Cornell, Policy coherence to achieve the SDGs: using integrated simulation models to assess effective policies, *Sustain. Sci.* 12 (2017) 921–931. doi:10.1007/s11625-017-0457-x.
- [124] P. Dasgupta, A. Duraipappah, S. Managi, E. Barbier, R. Collins, B. Fraumeni, H. Gundimeda, G. Liu, K.J. Mumford, How to measure sustainable progress, *Science* (80-.). 350 (2015) 748.

- [125] M. Nilsson, E. Chisholm, D. Griggs, P. Howden-Chapman, D. McCollum, P. Messerli, B. Neumann, A.S. Stevance, M. Visbeck, M. Stafford-Smith, Mapping interactions between the sustainable development goals: lessons learned and ways forward, *Sustain. Sci.* 0123456789 (2018) 1–15. doi:10.1007/s11625-018-0604-z.
- [126] K. Vladimirova, D. Le Blanc, Exploring Links Between Education and Sustainable Development Goals Through the Lens of UN Flagship Reports, *Sustain. Dev.* 24 (2016) 254–271. doi:10.1002/sd.1626.
- [127] F. Brouwer, G. Anzaldi, C. Laspidou, S. Munaretto, G. Schmidt, P. Strosser, F.) Acteon, L. Vamvakieridou-Lyroudia, Commentary to SEI report 'Where is the added value? A review of the water-energy-food nexus literature,' SIM4NEXUS consortium, 2018. <https://magic-nexus.eu/>.
- [128] H. Hoff, Understanding the Nexus. Background paper for the Bonn2011 Nexus Conference, Stockholm Environment Institute, Sweden, 2011.
- [129] A. Coopman, D. Osborn, Healthier Planet - Healthier Lives. An analysis of the connections between environment and health - related targets in the Sustainable Development Goals and the 2030 Agenda, Stakeholder Forum, 2016.
- [130] UNESCO, Education for people and planet: Creating Sustainable Futures for all, UNESCO, 2016.
- [131] UN-Water, Water and sanitation interlinkages across the 2030 Agenda for Sustainable Development, United Nations, Geneva, 2016. <http://www.unwater.org/publications/water-sanitation-interlinkages-across-2030-agenda-sustainable-development/>.
- [132] PwC, Navigating the SDGs: a business guide to engaging with the UN Global Goals, PwC, 2016. www.pwc.com/globalgoals.
- [133] Commission Staff Working Document, 2019 EU report on Policy Coherence for Development, European Commission, 2019.
- [134] UNDESA, Advancing the 2030 Agenda: Interlinkages and Common Themes at the HLPF 2018, Department of Economic and Social Affairs, United Nations, 2018. https://sustainabledevelopment.un.org/content/documents/18777Interlinkages_EGM_Summary_Report_2018.pdf.
- [135] UKSSD, Measuring up: How the UK is performing on the UN Sustainable Development Goals, UK Stakeholders for Sustainable Development, 2018. <https://www.ukssd.co.uk/measuringup>.
- [136] M.H. Bchir, L. Bassil, N. Khaled, Prototype model for Sustainable Development Goal simulation, Economic and Social Commission for Western Asia (ESCWA), 2017. <https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/prototype-model-sdg-simulation-english.pdf>.
- [137] A. Karnib, Mapping the direct and indirect interlinkages across the sustainable development goals: A qualitative nexus approach, *Int. J. Dev. Sustain.* 6 (2017) 1150–1158. www.isdsnet.com/ijds.
- [138] O. Selomane, B. Reyers, R. Biggs, M. Hamann, Harnessing Insights from Social-Ecological Systems Research for Monitoring Sustainable Development, *Sustainability.* 11 (2019) 1190. doi:10.3390/su11041190.
- [139] E. Zusman, N. Amanuma, Governance for Integrated Solutions to Sustainable Development and Climate Change: From Linking Issues to Aligning Interests, Institute for Global Environmental Strategies (IGES), 2018.
- [140] H.T.O. Davies, S.M. Nutley, P.C. Smith, H.T.O. Davies, S.M. Nutley, P.C.S. Viewpoint, Viewpoint: Editorial: What Works? The Role of Evidence in Public Sector Policy and Practice, *Public Money Manag.* 19 (1999) 3–5.
- [141] S. Sutcliffe, J. Court, Evidence-based policy making: What is it? How does it work? What relevance for developing countries, Overseas Development Institute, 2005. <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Evidence-Based+Policymaking+:+What+is+it+?+How+does+it+work+?+What+relevance+for+developing+countries+?#1>.
- [142] Millennium Institute, Homepage of the Integrated Model for Sustainable Development Goals Strategies (iSDG), (2017). <http://www.isdgs.org/>.
- [143] ICSU, A Guide To SDG Interactions: From Science to implementation, D.J. Griggs, M. Nilsson, A. Stevance, D. McCollum (eds)]. International Council for Science, Paris, 2017. doi:10.24948/2017.01.

- [144] SDSN, The World's Knowledge Network for the Sustainable Development Goals, The Sustainable Development Solutions Network, 2018.
- [145] J. Randers, J. Rockström, E. Stoknes, U. Golüke, D. Collste, S. Cornell, Transformation is feasible. How to achieve the Sustainable Development Goals within Planetary Boundaries, Stockholm Resilience Centre, 2018.
- [146] P.J.K. McGowan, G.B. Stewart, G. Long, M.J. Grainger, An imperfect vision of indivisibility in the Sustainable Development Goals, *Nat. Sustain.* 2 (2018) 1. doi:10.1038/s41893-018-0190-1.
- [147] S. Karlsson-Vinkhuyzen, A.L. Dahl, Å. Persson, The emerging accountability regimes for the Sustainable Development Goals and policy integration: Friend or foe?, *Environ. Plan. C Polit. Sp.* 36 (2018) 1371–1390. doi:10.1177/2399654418779995.
- [148] EC, Delivering the Sustainable Development Goals at local and regional level, European Commission, 2018.
- [149] UNDP, Global Trends Challenges and Opportunities in the Implementation of the Sustainable Development Goals, United Nations Development Programme and United Nations Research Institute for Social Development, 2017. www.undp.org.
- [150] UNDP, The Institutional and Coordination Mechanisms guidance note on facilitating integration and coherence for SDG implementation, United Nations Development Programme, 2017.
- [151] UNDESA, Synthesis of Voluntary National Reviews 2017, Division for Sustainable Development (DSD), Department of Economic and Social Affairs (DESA) United Nations, 2017.
- [152] M. Elder, P. King, Realising the Transformative Potential of the SDGs, Institute for Global Environmental Strategies (IGES), 2018.
- [153] C. Allen, G. Metternicht, T. Wiedmann, National pathways to the Sustainable Development Goals (SDGs): A comparative review of scenario modelling tools, *Environ. Sci. Policy.* 66 (2016) 199–207. doi:10.1016/j.envsci.2016.09.008.
- [154] UNDESA, Compendium of National Institutional Arrangements for implementing the 2030 Agenda for Sustainable Development, United Nations, 2019. <http://workspace.unpan.org/sites/Internet/Documents/UNPAN97468.pdf>.
- [155] C. Allen, G. Metternicht, T. Wiedmann, An Iterative Framework for National Scenario Modelling for the Sustainable Development Goals (SDGs), *Sustain. Dev.* 25 (2017) 372–385. doi:10.1002/sd.1662.
- [156] P. Horn, J. Grugel, The SDGs in middle-income countries: Setting or serving domestic development agendas? Evidence from Ecuador, *World Dev.* 109 (2018) 73–84. doi:10.1016/j.worlddev.2018.04.005.
- [157] J.M. Martens, Redefining policies for sustainable development, Spotlight on Sustainable Development 2018, 2018. www.2030spotlight.org.
- [158] Secretariat of the Convention on Biological Diversity, Biodiversity at the Heart of Sustainable Development Input to the 2018 High-level Political Forum on Sustainable Development (HLPF), 2018. www.ipbes.net/sites/default/files/downloads/pdf/spm_deliverable_3a_pollination_20170222.pdf.
- [159] IPBES, Scenarios and Models of Biodiversity and Ecosystem services, Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany, 2016.
- [160] DCHG, National Biodiversity Action Plan 2017-2021, Government of Ireland, 2017. <http://nbaindia.org/uploaded/Biodiversityindia/NBAP.pdf>.
- [161] C. Bullock, C. Kretsch, E. Candon, The Economic and Social Aspects of Biodiversity Benefits and Costs of Biodiversity in Ireland, Government of Ireland, 2008. doi:ISBN 978-1-4064-2105-7.
- [162] A. Dzebo, C. Brandi, H. Janetschek, G. Savvidou, K. Adams, S. Chan, C. Lambert, SEI, Exploring connections between the Paris Agreement and the 2030 Agenda for Sustainable Development, Stockholm Environment Institute, 2017. http://unfccc.int/focus/ndc_registry/items/9433.php.
- [163] GIZ, Connecting the Dots: Elements for a Joined-Up Implementation of the 2030 Agenda and Paris Agreement, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2018.
- [164] Government of Ireland, Climate action Plan 2019, Department of Communications, Climate Action & Environment, 2019. doi:10.5860/choice.46-0890.

- [165] ESDN, Integrating SDGs into national SD policy frameworks and governance structures – activities in 4 selected EU Member States, European Sustainable Development Network (ESDN), 2015.
- [166] UN, Global Sustainable Development report., United Nations, 2015.
- [167] DEFRA, The UK Government Sustainable Development Strategy, DEFRA, HM Government, 2005.