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Approaches to the implementation of the Sustainable Development Goals – some considerations on the theoretical underpinnings of the 2030 Agenda

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Abstract
The paper discusses the theoretical underpinning of the concept of sustainable development, especially in relation to follow-up and review, including evaluation of progress. The purpose is to explore methodological aspects of applied approaches to the implementation process, e.g. ways to unravel possible interactions among the numerous SDGs and targets, and to assess trade-offs between interventions. The aim is to go beyond various sustainable development interpretations, by exploring how they perceive and approach implementation of the goals, taking the complexity of this substantial task into account. The paper surveys the theoretical economic underpinning of the 2030 Agenda and the role of neoclassical economic theory in this context. Implementation routes for sustainable development interpretations based on other theoretical frameworks are briefly sketched for comparison. The analysis leads to the claim that it is questionable whether interpretations of sustainable development founded on neoclassical economic theory – as the 2030 Agenda – are applicable in relation to every aspect of sustainability.

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Introduction

Humanity confronts a multidimensional, global crisis that seriously threatens human societies at large and our life-supporting biosphere. World development is on an unsustainable track. Global sustainability is a vision of a world, where poverty is ending, all lives are transformed, and the planet is protected. – The 2030 Agenda for Sustainable Development (SD), adopted in 2015, addresses vital global issues which all have to be solved. It comprises 17 sustainable development goals (SDGs), and represents a big step forward on a long road toward global sustainability. The SDG Framework offers an indispensable platform for this journey, and implementation of the goals has been brought in the fore through a number of targets specifying each goal.

Against this background it is worth scrutinizing the 2030 Agenda, in order to identify strengths and weaknesses of the SDG Framework in relation to implementation of the goals and to attaining sustainable development. Since 2015, initiatives on many levels have been devoted to the application of diverse implementation approaches, and by 2017 a number of countries presented to the *High Level Political Forum* (HLPF)[1] implementation plans for realizing the SDGs at the national level. They all attempt to integrate the three dimensions of sustainability, and – taking point of departure in the SDG goals and targets – try to cope with the numerous possible interaction among these goals and targets, while at the same time acknowledging that the SDGs constitute an integrated entirety, requiring a holistic approach in developing implementation strategies.

The paper discusses the theoretical underpinning of the concept of sustainable development, especially in relation to follow-up and review, including *ex post* evaluation of progress. The purpose is to explore methodological aspects of applied approaches to the implementation process, e.g. ways to unravel possible interactions among the numerous SDGs and targets, and to assess trade-offs between interventions. – The aim is to go beyond various interpretations of sustainable development, by exploring how they perceive and approach implementation of the goals, taking the complexity of this comprehensive task into account. The paper takes a special interest in addressing the theoretical economic underpinning of the 2030 Agenda.

The structure is as follows: Section 1 sketches briefly the background and content of the 2030 Agenda and the reason why the SDG Framework can be seen as an indispensable common platform for promotion of sustainable development, nationally and globally. The next section examines some critical voices contesting the 2030 Agenda and the SDGs from diverse perspectives. Critics address e.g. internal inconsistencies, unaddressed issues and the underpinning economic model. Section 3 presents some general considerations on the process from goals to implementation. Section 4 examines the significance of the three dimensions of sustainability, mentions the political and the instrumental side of the 2030 Agenda, and outlines briefly diverse interpretations of sustainable development, including

[1] High Level Political Forum for Sustainable Development, a body under UN's ECOSOC

such based on ecological economics and complexity economics. Some concluding remarks are found in Section 5.

1 The Sustainable Development Goals: a big leap forward

In September 2015 the UN General Assembly notably adopted the Agreement *Transforming our World: The 2030 Agenda for Sustainable Development*,[2] containing the Sustainable Development Goals (SDGs). In a way this event signifies a renewal of the vision of sustainability, and represents a temporary culmination of a conceptual evolution over 25 years of sustainable development (SD), – a key term appearing in the Rio Declaration (1992). This declaration lists 27 principles intended to guide future SD around the world, but as an entity it is not very specific about the content of SD. During the period however, the concept has played an important role as bearer of general *values* ascribed to *inter alia* economic, social and environmental aspects of societal changes. The instrumental side of SD has most of the time in the period played a less dominant role, until 2015. With the adoption of the 2030 Agenda this changed significantly: The sustainability vision became specified through 17 goals appointing key thematic areas, and the implementation aspect came into the fore through 169 action prescriptive targets.

Since 2015, a wide spectrum of parties engaged in the sustainability issue regard these goals as an eminent platform for countries for setting a common course aimed at attaining sustainable development at national and global level. – The Agenda framework has until now gained much more public attention than its predecessor on global action within the UN, the Millennium Development Goals (MDGs, 2000-2015), – due to e.g. a more holistic approach and expansion of scope and organization. Some decisive features of the 2030 Agenda are:

- 2030 Agenda constitutes a universal agenda (time frame 2015–2030). All countries should in this context be regarded as 'developing countries'
- The SDGs act as joint frame of reference for countries, although their present state in terms of relevant knowledge, institutional back-up, and level of progress differ significantly
- There is a common understanding, that national governments – formally responsible for realizing the SDGs within their own territory – will not be able to attain the national tasks alone. It is necessary, that all categories of actors at all levels – local authorities, business world, civil society organizations (CSOs), scientific communities, and other stakeholders – are mobilized and that they contribute
- A special UN body was formed in 2013, named 'the high-level political forum (HLPF) on sustainable development'. HLPF is working under the auspices of ECOSOC and is the United Nations central platform for follow-up and review of the

[2] United Nations (2015)

> 2030 Agency, incl. the Sustainable Development Goals, and the forum provides for the full and effective participation of all States Members of the United Nations and States members of specialized agencies.

The present activity emanating from the SDGs concerns follow-up on realizing the goals. The implementation of the SDGs represents an enormous challenge in terms of extent and urgency, and it involves governments, businesses, financial institutions, academia, local authorities, the education sector, civil society organizations, social and environmental movements, and other stakeholders. There is a call for promoting adequate political decisions and launching effective, practical actions at all levels. The 17 SDGs and the 169 targets should all be achieved, while they comprise a complex network of interacting objectives and must be treated as a whole. Thus a crucial task for all actors is to ensure, that pursuing one single goal does not occur at the expense of one or several of the other goals. This issue is addressed by e.g. Barbier and Burgess (2017).

Many countries have developed – or are in the process of preparing – action plans for realizing their part of the SDG-implementation. This work will typically include application of adequate indicators for each of the targets in order to make it possible for national authorities and international institutions to evaluate progress. In many countries this task requires production of new statistical material. The UN assists countries in establishing national readiness to provision and use of indicators in their SDG action plans.

An important tool in the SDG implementation is the availability of a joint and universally applicable *Indicator Framework*, directly related to the SDGs via the targets. The UN Statistical Commission is engaged in developing such a framework, assisted by the Inter-Agency and Expert Group on SDG Indicators – the IAEG-SDG. The work was from the outset organized by associating one or more indicator(s) to each of the 169 targets in the 2030 Agenda. The present version of the framework includes a list consisting of 232 generally agreed indicators.[3] The framework was presented to the UN Statistical Commission by March 2017.

Status of the UN-lead engagement in the implementation work is that 44 countries in July 2017 presented their so called Voluntary National Contribution (VNC) to the SDG-implementation process at a meeting of the high-level political forum (HLPF), under the auspices of ECOSOC. Similar meetings are scheduled to take place over the next years with new groups of countries.

[3] The complete list of the 232 indicators, cf. Inter-Agency and Expert Group on Sustainable Development (2017).

2 Some critical voices

It came as a surprise to many sceptics that 193 heads of state in 2015 adopted the agreement on the UN 2030 Agenda and the SDGs. Furthermore, many influential international organizations and other parties, including international economic institutions and international financial institutions, have welcomed the agreement. Having observed this, it is important to acknowledge, that there exists a broad and diverse landscape of organizations and individuals with a critical stand to the 2030 Agenda and the SDGs. The spectrum of critics is stretching from voices that present unfavourable judgements of certain specific conceptual weaknesses, to more general criticism concerning e.g. politically sensitive issues or the systemic context in which the SDGs are embedded. The spectrum also encompasses radical positions that express pure rejection or even ridicule of the entire SDG-approach.[4] – Thus it is necessary be cautious and accurate in selecting those critics, which deserve attention.

There are objections that address some more or less obvious internal tensions between two or more of the SDGs, and questions are raised concerning how to reconcile such opposed goals. As an example take the trade-off between SDG-1 (End poverty in all its forms, everywhere) and SDG-10 (Reduce inequality within and among countries). – Poverty reduction has to address even extreme poverty for all (cf. target 1.1). If the number of people living below the international poverty line (1.25 USD pr. day, 2005 level) should be lifted above this line, the world GDP has to increase 15-fold, according to (theoretical) scenarios that describe conditions reflecting economic growth rates and inequality trends from the last 30 years.[5,6] Taking into account the extremely low efficiency of the world economy in terms of wealth distribution (cf. the debate on 'the top 1%'), it seems obvious that business-as-usual economic strategies leaves SDG-1 and SDG-10 in considerable conflict, and further reinforces the requirement to decouple natural resource use and economic growth (to be addressed later). Such issues have to be solved and require new economic strategies and other measures.

Another type of criticism of the SDGs is of a more subtle character, which might be described as *unaddressed issues*. An example is the role of the financial sector and the structural changes in the world economy (the so-called 'financialization' of the economy[7]), that has taken place over the last decades, driven by e.g. neoliberal ideology, business-friendly fiscal policies, and insufficient public regulation concerning tax avoidance and tax evasion.[8.] These

[4] e.g. Easterly (2015)

[5] cf. Pogge & Lahda (2015); Woodward (2015)

[6] The most recent number of the group of people living in extreme poverty is ¾ billion (2013). The number represents a reduction of global extreme poverty rate from 28 pct. in 1999 to 11 pct. in 2013, cf. United Nations (2017): 16.

[7] e.g. Dore (2008)

[8] e.g. Martens (2017)

and other factors imply a growing influence of international financial institutions (IFIs), mediated through their strategy of giving highest priority to investments with a narrow focus on creating shareholder value. Thereby IFIs indirectly reduce the volume of investment capital accessible for broader purposes, including production of common goods, as e.g. low-carbon energy facilities or promotion of climate–friendly consumer equipment. This observation is based on *status quo*, and thus neglects the underlying mechanisms that might have led to the present situation. Over the years, this change has resulted in relatively weakened states and larger and more powerful transnational corporations, and the development implies a shrinking economic and political space available to governments in securing provision of public goods. This will in the long run counteract and possibly prevent progress towards sustainability.

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A second example: The preamble of the 2030 Agenda states that "We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations". The climate question is actually addressed within the SDG-framework (SDG-13) – but it is indeed treated more thoroughly through the special Climate Agreement[9] (adopted by 197 UN member states at COP 21 in Paris, December 2015). In contrast, the questions concerning planetary degradation and planetary boundaries, and the needs of future generations are not explicitly addressed through targets referring to the SDGs. In other contexts the issues of planetary boundaries and ecological ceiling have been extensively described,[10] but in relation to these perspectives the 2030 Agenda is rather vague, and is neither analytical helpful nor directly practically applicable.

Thus, critical planetary degradation and the needs of future generations[11] are cases of *unaddressed issues* in relation to the SDGs. And surely, there exist more than these two examples. However, the intention in this section has been to call attention to the existence of relevant criticism of the 2030 Agenda and the SDGs, including tensions among the goals, and to present examples of other goals that could have been worthwhile to include among the

[9] United Nations (2015c)

[10] e.g. Rockström et al. (2009a), Rockström et al. (2009b); Steffen et al. (2015); Raworth (2017)

[11] e.g. Read (2012)

SDGs. This underlines that the 2030 Agenda should not be protected against criticism.

The reader might think, that it is a futile exercise to criticize a broadly covering framework as the 2030 Agenda, including 17 SDGs specified by 169 targets, for unaddressed issues. Some considerations on this question are included in the next section.

3 From goals to implementation

This section presents a closer look at the 2030 Agenda Framework, including the SDG's and the Indicator Framework, and outlines the underlying interpretation of sustainable development, with a view to how the documents provides guidance for the transition from the SDGs to implementation of the goals in practice. The nature and the internal relations of the main notions – goals, targets, and indicators – are also explored.[12]

The three dimensions[13] *of sustainable development*
Since 1987 the term 'the three dimensions of SD' has been established as part of a common understanding of the vision of sustainable development, expressed in different language, as e.g.

- " … interaction among three systems: the biological (and other resource) system, the economic system, and the social system" (Barbier, 1987: 104)
- "… integration of environment and development is required in all countries, rich and poor". (Brundtland, 1987: 48)
- "In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process, and cannot be considered in isolation from it" (Rio-declaration: principle 4)[14]
- "At the core of sustainable development is the need to consider "three pillars" *together*: society, the economy and the environment. No matter the context, the basic idea remains the same – people, habitats and the economic system are inter-related"[15]
- "The 17 Sustainable Development Goals and the 169 targets … are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental" (2030 Agenda: Preamble)

As will be explained later, these expressions can be seen as representing a certain inter-

[12] As a general reference, see United Nation System Task Team (2013).

[13] In everyday language and in the sustainability vocabulary the notion of 'dimension' reflects a wide range of diverse meanings, as e.g. system, thematic area, key aspect, policy 'sphere', 'pillar', field, scope, etc. These expressions are often used as synonyms.

[14] United Nations (1992)

[15] Strange & Bayley (2008): 27

pretation of the notions 'sustainable development' and 'sustainability'. A Venn diagram illustrating the three dimensions and the perception of sustainable development in relation to the dimensions is shown in Figure 1 below. .

The conceptual history of SD through the last three decades reflects a requirement for a clear description of approaches to practical and political *implementation* of the SD vision, – approaches that makes it possible meaningfully to exceed the borderlines between the three dimensions / the three systems. Such approaches are needed for several reasons: to facilitate deeper insight in transboundary issues, to suggest methods for systematic exploration of priority options, to evaluate and possibly reconcile potential disputes on priority criteria, and to create a basis for policy advice related to implementation practice.

At present, the requirement for an implementation approach is emphasized by the 2030 Agenda, where the sustainability vision is detailed through the many goals and implementation targets. Together with the Indicator Framework this clarification takes the vision closer to a phase where implementation aspects are in the fore. At the same time it also represents a significant increase in the degree of complexity as regards possible interactions between factors within the three systems. This leads to a correspondingly complex landscape of implementation options and potential priority tensions. Barbier & Burgess (2017) offers an approach to address this challenge.

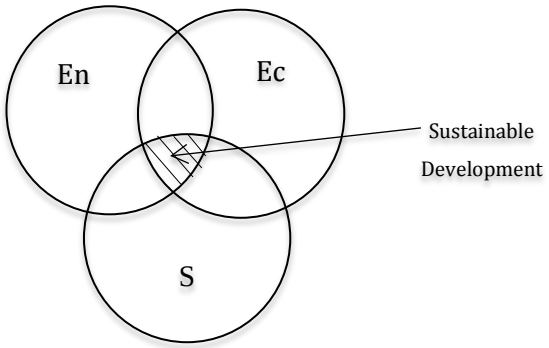

Figure 1. Venn diagram – a visual or graphical metaphor – illustrating sustainable development as represented by the area marked as the intersection of the goals attributed to the three dimensions or systems, represented by three circles [En: environment, Ec: economy, S: society]. (Inspired by Barbier (1987), Barbier and Burgess (2017), and several other sources)

Goals, targets and indicators[16]

The *17 goals* are value-oriented and written with high ambitions, and they identify and unfold important issues, – which is laudable. At the same time, it is important to know the background: The 2030 Agenda document reveals a comprehensive international agreement,

[16] Terminology brief: *Goals* express values and overall policy directions; *targets* identify not-yet-achieved action-oriented objectives associated with specified goals; *indicators* show *ex post* outcome evaluations or measurements

and it was developed during a creative and consultative process over several years. The preparatory work has been driven by an expected acceptance and final adoption by a group of more than 190 decision-makers at the UN General Assembly in 2015. Inevitably such a document will reflect that the entire context has been taken seriously into account.

This has several implications: One is that some issues deliberately have been left out (and are thereby staying unaddressed). An example is the question of consequences of global population dynamics. What is the impact of this phenomenon on the SDGs and their implementation ? – Another implication is, that through their framing, the goals refrain to a large extent from targeting deeper, underlying mechanisms that reinforce or even contribute to cause the identified issues. A concrete example was mentioned previously[17], concerning the role of the financial sector. There are cases where the SDGs focus on issues that obviously can be perceived as 'symptoms', while root causes are not addressed, – not even mentioned. An example: SDG-12 ("Ensure sustainable consumption and production") draws attention to e.g. "sustainable management and efficient use of natural resources" (target 12.2). No mentioning of possible natural resource constraints.

The overall picture of the SDGs is a set of goals, all are seriously relevant and absolutely needed as guidance for attaining sustainable development, but leaving out important issues – including systemic issues – that might have apparent impact on the anticipated progress of the 2030 Agenda implementation. In addition, the goals are formulated in rather general terms and none of them are operational *per se*. This is the rationale behind supplementing the goals with targets.

To each goal there are associated several *targets*, in total 169, i.e. about 10 targets pr. goal in average. The 169 targets constitute an integrated part of the 2030 Agenda agreement and they represent important steps on the road from goals toward implementation. They are meant to unfold the visions of the SDGs by identifying goal aspects along more action-oriented lines. The targets have different forms. Some are numerically specified while others are verbally expressed in terms of e.g. quality improvement, change in conditions for certain groups, etc. – Each target serves the aim of challenging preconceptions of what is possible to attain in relation to the goal in question, taking the context into account. Thus targets have been formulated with the purpose of balancing idealistic thinking in accordance with the goals and the perceived reality. All targets are adequately deriving implementation aspects related to their goals (not unexpectedly), and they comply with the very framing of the goals. Against this background targets may encourage diverse groups of stakeholders to conduct concerted action. On the one hand this facilitates *ex post* monitoring and makes review and evaluation more concrete. On the other hand, known but neglected aspects and possible emerging issues will probable not be visible in the monitoring process, and may be forgotten.

The overall picture of the 169 targets is that goals and targets together give a solid basis for and impetus to promotion of implementation of the SDGs. Though they may leave the reader

[17] cf. section 2

with the impression that targets to a large extent address aspects of the issues unfolded by the goals, that are intrusive, but also are symptom oriented, and that targets only indirectly refer to possible root causes.

The third group of notions in the two source documents comprises the *indicators*. The present version of the Indicator Framework encompasses 232 generally agreed indicators. Indicators are outcome-oriented and created for tracking progress, globally, locally – and across countries. Each target is associated with at least one indicator. A few indicators are ascribed to more than one target. Indicators have to capture the essence of their target, or – in cases with more indicators pr. target – some of its central aspects. Indicators shall ideally be measurable, easily interpreted, and adequate data shall be accessible. Regularly (annually) evaluation or measurement of indicator levels constitutes a basis for useful assessment of progress in relation to (aspects of) the target in question. Progress in this context is understood as listing positive as well as negative changes in measured levels.

The close connection between the indicators and the targets ensures an easy access to verbal or numerical *ex post* evaluation of whether the outcome of conducted actions represents an actual move toward that target or not. Together, the goals, targets and indicators constitute a forceful platform for realizing the vision of sustainable development.

Overview

A wide range of critical problems confronts the world society, and the SDGs and the set of targets represent a unified and promising attempt to provide a basis for solving these. But the task to overcome the challenges might seem almost insurmountable. The extent and the urgency of the actions needed to create transition to sustainability are overwhelming. In that perspective, the time frame to 2030 seems daunting close. – However, the 2030 Agenda and the Indicator Framework provide – together with comprehensive, supportive engagement from several UN bodies – a constructive platform for this grand global enterprise, by expressing bold goals and precise targets for realizing the goals in practice. Furthermore, technical assistance, including generally agreed tools for monitoring and on-going evaluation of progress, is available. – The 2030 Agenda and the Indicator Framework constitute a backbone for implementation of the SDGs.

Will the 2030 Agenda goals, targets and indicators remain unchanged in the period to 2030? Hardly. The journey from 2015 to 2030 will probably display many examples of unforeseen challenges in terms of decisive changes in global conditions. Such changes may concern e.g. the peace and security architecture, mitigation development, unexpectedly fast and irreversible ecosystems changes, and other emerging global issues. Events of this character might invoke adjustments of the 2030 Agenda goals and/or targets and indicators. Similar considerations can be made in relation to today's unacknowledged and unaddressed issues that during the period might gain visibility and general importance in terms of apparent public and political attention.

4 The three dimensions, complexity and sustainable development interpretations

The background for introduction of the terms 'three dimensions' and ' integration of the three dimensions' may be found in the fact, that since the beginning of post-WWII era the discourse on societal changes in developing as well as developed countries tacitly embraced economic as well as social progress, and there was no need for explicitly denoting the economic and social aspects as 'the two dimensions' of development, or to formalize a requirement of 'integration' of the two. However, from the 1980ies and henceforth the issue of environmental quality has been broadly acknowledged as a still more decisive factor in processes of development, locally as well as globally. Since 1987 the concept of 'development' in its then meaning has – in many contexts – gradually been replaced by 'sustainable development', and this is highlighted in professional and everyday language through attention to the three dimensions – the economic, the social and the environmental – and to the requirement of their integration.

The 2030 Agenda is political as well as analytical/instrumental

The 2030 Agenda continues and reinforces the vision of the 1980s of sustainable development, – now in a form that more explicit displays the implementation aspect. The Agenda carries – as most international agreements – two distinct functions: a political and an analytical/instrumental.

The *political* importance of the Agenda must not be underestimated. It creates the foundation for concerted action by the many countries in the world, and similarly for a diversity of actors within the countries, i.e. governments, local authorities at all levels, business world, academia, civil society organizations, universities and think tanks, local communities and citizen groups, individual scholars, etc. The many actors may be encouraged to contribute to a common worldwide transition to a new development direction for humanity, which is facing tremendous challenges in terms of extreme poverty and unsustainable development. Adequate political decisions informed by the vision and described as in the Agenda are much needed. A further aspect of the political function of the Agenda is that debate on the goals in a wider non-specialist public can take place on an informed ground, and will contribute to raise the general awareness in still larger parts of the populations in all countries of the urgent need for realizing sustainable development and the longer-term prospects.

The *analytical/instrumental* function of the Agenda lies in its potential to provide guidance to implementation of the vision in practice, supported by the Indicator Framework to facilitate monitoring and progress evaluation. Ever since the UN Conference on Environment and Development (Rio 1992)[18] there has been a pronounced request for a unified framework that could enhance the operational aspects of the vision of sustainability, including proposed methods for assessing interactions between different factors ascribed to the three

[18] United Nations (1992)

dimensions.[19] Successful global and local implementation requires a common interpretation of the 2030 Agenda and a common approach to promotion of the many targets by concrete action. The enormous task of implementation takes its point of departure in the toolbox consisting of SDGs, targets and indicators. In this light the 2030 Agenda provides a relatively effective guidance.

Systemic approach to implementation; hierarchy between dimensions

In a previous section the following statement from the Agenda preamble was quoted: "The 17 Sustainable Development Goals and the 169 targets … are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental". This quotation epitomizes two key challenges related to the implementation issue: (a) The SDGs and targets are integrated and indivisible, and (b) the goals and targets balance the three dimensions: the economic, social and environmental.

(a) The first part of the quotation emphasizes the rich *interconnectedness*, i.e. an internal network of relations between the many goals and targets, and correspondingly between a large number of possible interventions that are outlined in the descriptions of goals and targets. This internal network of relations constitutes the basis for implementation. The inner network opens up to numerous possible interactions – or interlinkages – between these interventions. – If an intervention is directed toward one specific goal or target, the anticipated changes might generate changes in a number of other goals and targets. These might in turn cause changes in other targets, and so on. The complex patterns of interactions that emerge should be addressed by any implementation approach. An illustration of the complexity of the possible interlinkages between 16 of the SDGs is shown in Figure 2.

The complexity of the interaction patterns calls for application of a *systemic* approach to implementation of the SDGs, in the sense that the implementation has to address the totality of the SDGs and targets in an i*ntegrated* way. One possible option for doing so is to put analytical focus on the entire network of interactions among goals and targets. Such a network analysis approach has been adopted by Le Blanc (2015). Another path for pursuing this objective has been developed by Coopman et al. (2015), who present methodologies to analyse the implications of the *indivisibility* of the SDGs. The core is a method for identifying interlinkages and assessing their strength. These two approaches leave space for taking into account the dynamical aspects of the interactions. It is not unlikely that several other approaches might be found in the literature that addresses the 'integrated and indivisible' character of the SDGs.

[19] cf. OECD (2001)

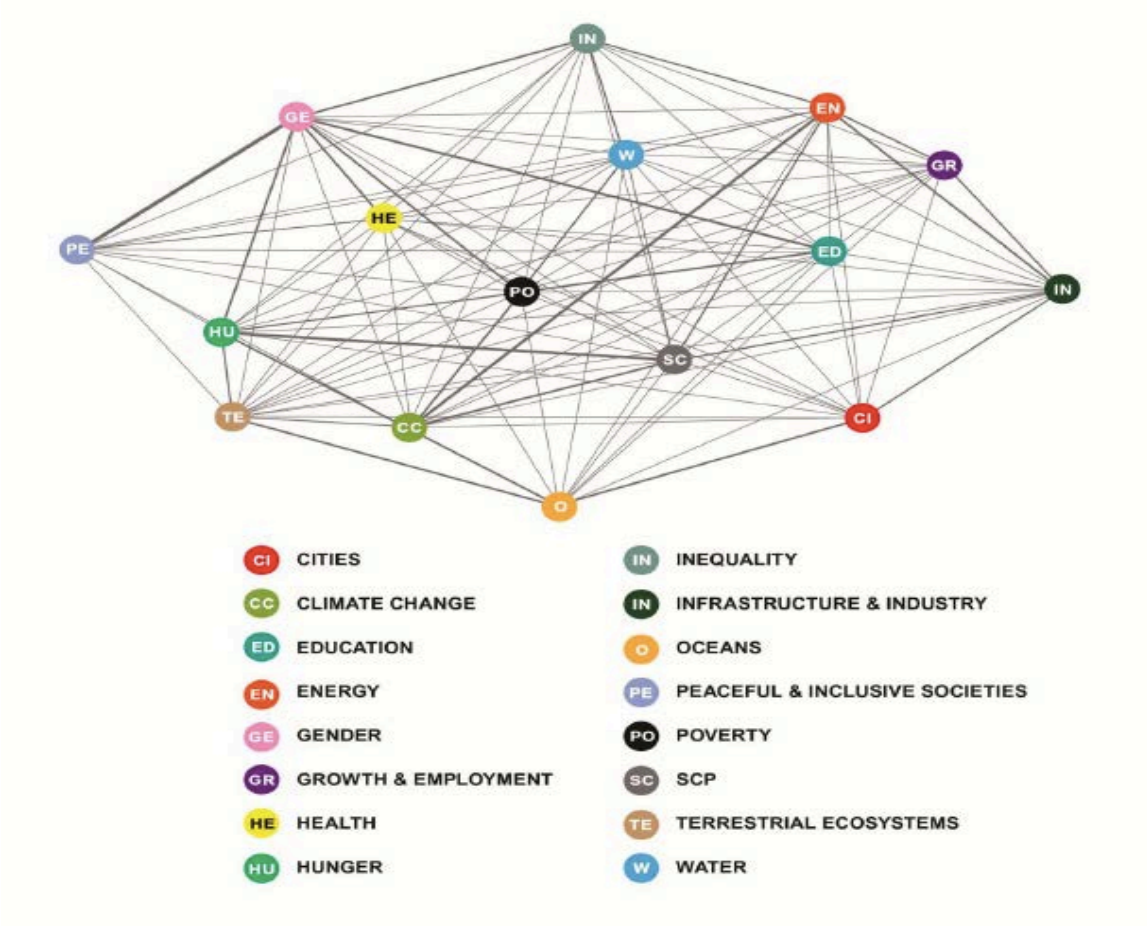

Figure 2. A graphical illustration of possible interlinkages among 16 of the SDGs (SDG-17 is left out). Source: Global Sustainable Development Report 2015[20]

(b) The goals and targets are assumed to balance the three dimensions: the economic, social and environmental. The emphasis on *"goals and targets balance the three dimensions"* in the very definition of *sustainable* development implies indirectly the claim, that the economic, social and environmental dimensions are mutually supportive. Thus the requirement to an implementation approach analysis is to set the three dimensions "in such relationship that policy settings in any one field will not undermine future outcomes in any other and will, hopefully, enhance them".[21]

In the literature, the 'environmental dimension' is sometimes named the 'ecological dimension' or the 'biophysical dimension' (the latter refers to the biosphere). These names remind us of a logical internal hierarchy between of the three dimensions: The economy is embedded in society, and both are embedded in the biosphere. This implies that the

[20] United Nations (2015b): 22

[21] OECD (2001): 5. In this source the terms 'pillar' and 'field' are used for 'dimension'.

ecological dimension is considerably different from the social and the economic. Numerous observations and scientific evidence pinpoint the fact that there are boundary conditions defining the stability of life-supporting ecosystems, – locally as well as globally. Such conditions are neither of social nor economic character. It is contested whether such boundaries may set limits to economic growth.[22] This is not the place to settle this question, but it is worth maintaining the importance of including possible implications of the internal hierarchy of the three dimensions in the analysis of how 'balancing' can take place in practice.

The 2030 Agenda is underpinned by neoclassical economic theory

One of the criticisms raised against the 2030 Agenda is the adherence to the goal of continued economic growth. This objective is explicitly – and intricately – formulated in SDG-8 ('Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all'), and it turns up several times in the 2030 Agenda document. When you single out the economic growth part of SDG-8 ('promote sustained and sustainable economic growth'), and further observe other references to this issue in the document – it seems obvious, that the 2030 Agenda is firmly attached to neoclassical economics theory, including support to the earlier mentioned contested claim of 'decoupling' (cf. target 8.4). – However, it is not economic growth as an isolated objective, which is at the centre of this criticism of the 2030 Agenda and the SDGs. A deeper concern draws attention to the underlying economic model that pervades the 2030 Agenda (cf. next subsection).

In sustainability contexts statements like 'integration' of the three dimensions or 'balanced in an integrated manner' are at most rather vaguely defined, – if specified at all. Nevertheless the very formulation may leave readers with the perception, that the three systems do interact in a clear way, that 'integration' is conducted more or less easily by use of common sense, and that the three dimensions should be treated on an equal footing. But by getting closer to 'integration', practical experience often reveals tensions or overt conflicts between aspects of sustainability attributed to the three dimensions. Consider e.g. the economic and the environmental system: there is a tension between sustained economic growth (GDP growth, SDG-8) and climate change ('Take urgent action to combat climate change and its impacts', SDG-13). Growth is mediated through increasing consumption of natural materials and energy and – related to this – is leading to a higher outlet of greenhouse gases in the atmosphere. Issues of this character may be traced back to opposing interests or priority regimes between the three dimensions, and further back to corresponding relations between professional knowledge derived from the underlying disciplines – as in the above case – between economics and environmental science.

[22] One position claims technological innovations and adequate regulation of markets will succeed in 'absolute decoupling' growth (i.e. growth in economic output, including material welfare) from natural resource use and environmental degradation. A second orientation emphasizes that there are limits to the rates at which natural resources can be appropriated to serve human purposes, and hold that this implies limits to material growth.

Diverse interpretations of sustainable development

An increasing amount of literature addresses the implementation of the SDGs, based on a broad spectrum of interpretations of sustainable development, including SD-goals and associated approaches to implementation (henceforth called 'SD-models'). The 2030 Agenda document itself displays an interpretation with three important properties

(1) the economic, social and environmental dimensions (the three dimensions) are explicitly in play
(2) the intertwined SDGs are treated as integrated and indivisible – an 'indivisible whole' – i.e. the rich interconnectedness is taken into account
(3) neoclassical economics theory constitutes the economic underpinning of the entire framework

Items (1) and (2) above do certainly comply with the prevailing thinking of sustainable development since 1980s. However, there are some disquieting features of SD-models founded on neoclassical economic theory (NET). These features include basic NET claims/assumptions, as e.g.

* markets are self-regulating
* the economic system is ergodic
* rational economic man is a representative agent
* the economy is treated as being separate from society
* sustainable development is driven by growth
* sustainability is predictable

At this place the concern is to establish a foundation for evaluation of sustainable development strategies and implementation approaches as described through the SDG Framework. Taking into account the connective complexity of the SDG-target system and expected non-linear dynamical character of interactions between goals and targets (dynamical complexity), it is questionable whether NET, including the above-mentioned claims/assumptions, is applicable as a general frame for comprehensive analyses of sustainability issues. – It is therefore desirable that alternative SD evaluation bases become available, underpinned by other economic frameworks than NET.

Other models of sustainable development

Actually there are other SD-models serving the same purpose as 2030 Agenda in its actual form, complying with property (1) and (2), but underpinned by different economics schools,[23] including

[23] There are minor variations in the vocabulary, cf. note 12

* Ecological economics, cf. Daly (1992, 2005)
* Complexity economics, cf. Fontana (2008), Dolphin (2012), Hallsworth (2012), Arthur (2013)
* Economics for a finite planet, cf. Jackson (2009, 2011)
* Doughnut economics, cf. Raworth (2017)

Ecological economics takes ecological constraints to sustainable development as a condition of primary concern that cannot be reduced to externalities. The discipline further rejects economic growth as the dominant development objective. – *Complexity economics* put focus on a systemic – sometimes denoted as organic – approach, addressing evolutionary aspects of SD, discarding the equilibrium assumption, and acknowledging the loss of certainty and of generality. – *Economics for a finite planet* (sustainability economics) redefines prosperity, and refuses to accept propositions in defence of growth and the claim of decoupling. – *Doughnut economics* draws attention to definition of an ecological ceiling and a social foundation and suggests going beyond the following seven issues that often are taken for granted in traditional economics: GDP as a goal, self-contained markets, rational economic man, mechanical equilibrium, unevenly balanced distribution, regeneration of nature by growth, and growth addiction.

Still other SD-interpretations are based on different types of theoretical frameworks or modes of thought, e.g. as described as

* Economy-in-Society-in-Nature, cf. Costanza, (2012)
* Network analysis, cf. Le Blanc (2015)
* Better balance between the three dimensions, cf. Cutter (2015)
* Interactions between Sustainable Development Goals, cf. Coopman (2015), Nilsson et al. (2016)
* Social-ecological resilience and biosphere-based sustainability science, cf. Folke et al. (2016)

The latter two groups of approaches to the SD-vision and its implementation (i.e. SD-models) will expectedly provide other guidelines or approaches for realizing the 2030 Agenda than those emanating from NET-based SD-models.

A diversity of SD-models is a prerequisite for continued exploration of and debates on development. Try-out of a multitude of methods on how to realize the 2030 Agenda is desirable. Thus there is a call for interdisciplinary cooperation, involving knowledge and practical experience from many fields, as e.g. economics, ecology, climatology, computer science, complexity studies, earth science, sustainability science, political science, anthropology, sociology, etc.

The SD-models sparsely outlined in this section deserve a more detailed account. Such an account should review sustainability goals and implementation approaches, based on

scientific knowledge, and examined through the lenses of possible policy implications. Exploration of this kind should be informed by experience from the science on science advice (science and technology studies, STS) [24]. However these topics fall beyond the scope of this paper.

5 Concluding remarks

The 2030 Agenda represents a big leap forward

- 2030 Agenda is a constructive attempt to address the goals and targets as a whole
- The combination of goals with targets, gives impetus to concrete actions for promoting realization of the vision of sustainable development.
- A generally agreed Framework of Indicators is available for all actors to support review and monitoring of progress
- The Agenda emphasizes that national governments cannot realize the implementation alone. National stakeholders of all categories are encouraged to contribute
- Nevertheless some criticism is worth considering

2030 Agenda has a political and an analytical/instrumental side

- The 2030 framework (incl. SDGs and targets) is an excellent platform as basis for public awareness raising and debate among stakeholders on implementation strategies and sustainability policies
- On the instrumental side the 2030 Agenda has some shortcomings due to its underpinning economic model, the neoclassical economic theory (NET), which includes e.g.
    - assuming that markets are self-regulating and that the future in path-independent
    - assuming that economic decisions are rational
    - disregarding the embeddedness of the economy in society
    - assuming that sustainable development is driven by economic growth, but at the same time disregarding capacity constraints of life-supporting ecosystems
    - NET may not accept the view that evolution of a dynamic system is unknowable
    - NET-based methods for quantitative assessment progress may assume that sustainability is predictable, disregarding possible emerging challenges

***Future exploration of approaches for implementation of the SDGs**

A wide landscape of SD-models is presently being explored concerning implementation approaches with focus on diverse methodologies for treating the SDGs and the associated targets as an indivisible entirety, and for monitoring and evaluating progress. These SD-

[24] Jasanoff (2013)

models include promising system-based approaches that acknowledge the complexity of the implementation elements.

There is a call for interdisciplinary cooperation, involving scholars from many fields. – Careful comparisons between various SD-models are desirable, with a view to the broader question of sustainability strategies and implementation approaches, examined through the lenses of possible policy implications and informed by experience from the science on science advice.

References

Arthur, Brian W. (2013). Complexity Economics: A Different Framework for Thought. Santa Fe Institute. SFI Working Paper 2013-04-012. https://www.santafe.edu/research/results/working-papers/complexity-economics-a-different-framework-for-eco

Barbier, Edward B. (1987). The Concept of Sustainable Economic Development. *Environmental Conservation* 14(2) 101-110. https://www.cambridge.org/core/journals/environmental-conservation/article/div-classtitlethe-concept-of-sustainable-economic-developmentdiv/33A3CD3BD12DE8D5B2FF466701A14B4A

Barbier, Edward B. and Joanne C. Burgess (2017). The Sustainable Development Goals and the systems approach to sustainability. Economics Discussion Papers, No.2017-28, Kiel Institute for the World Economy. http://www.economics-ejournal.org/discussionpapers/2017-28

Brundtland, Gro Harlem (chairwoman) (1987). *Our Common Future*. Report of the World Commission on Environment and Development. http://www.un-documents.net/wced-ocf.htm

Coopman, Anna, Derek Osborn and Farooq Ulla (2015). *Seeing the Whole: Implementing the SDGs in an Integrated and Coherent Way*. A research pilot by Stakeholder Forum, Bioregional and Newcastle University. http://lcn.pascalobservatory.org/pascalnow/pascal-activities/news/seeing-whole-implementing-sustainable-development-goals-integrated-

Costanza, R., G. Alperovitz, H.E. Daly, J. Farley, C. Franco, T. Jackson, I. Kubiszewski, J. Schor, and P. Victor (2012). *Building a Sustainable and Desirable Economy-in-Society- in-Nature*. Report to UN Conference Rio+20. New York: United Nations Division for Sustainable Development. http://press.anu.edu.au/publications/building-sustainable-and-desirable-economy-society-nature

Cutter, Amy et al. (2015). *Sustainable Development Goals and Integration: Achieving a better balance between the economic, social and environmental dimensions.* Stakeholder Forum. http://www.stakeholderforum.org/index.php/news/617-sustainable-development-goals-sdgs-and-integration-achieving-a-better-balance-between-the-economic-social-and-environmental-dimensions

Daly, Herman (1992). *Steady State Economics*. Earthscan.

Daly, Herman (2005). Economics for a full world. *Scientific American* 293:100-107. https://www.scientificamerican.com/article/economics-in-a-full-world/

Dolphin, Tony (2012). Macroeconomic policy in a complex world. In: Dolphin, Tony and David Nash (eds). (2012) *Complex New World. Translating new economic thinking into public policy.* Institute for Public Policy Research. Published by as part of IPPR's New Era Economics programme, 70-81.

Dolphin, Tony an David Nash (eds). (2012) *Complex New World. Translating new economic thinking into public policy.* Institute for Public Policy Research. Published by as part of IPPR's New Era Economics programme.

Dore, Ronald (2008). Financialization of the global economy. *Industrial and Corporate Change*, 17(6): 1097-1112. https://academic.oup.com/icc/article/17/6/1097/751321/Financialization-of-the-global-economy

Doubleday, Robert and James Wilsdon (eds.) (2013). Future Directions for Scientific Advice in Whitehall. A collection of Essays. http://www.csap.cam.ac.uk/events/future-directions-scientific-advice-whitehall/

Easterly, William (2015) The SDGs should stand for Senseless, Dreamy, Garbled. *Foreign Affairs*, September 28. http://foreignpolicy.com/2015/09/28/the-sdgs-are-utopian-and-worthless-mdgs-development-rise-of-the-rest/

Folke, Carl et al. (2016). Social-ecological resilience and biosphere-based sustainability science. *Ecology and Society* 21(3): 41. http://dx.doi.org/10.5751/ES-08748-2103415

Fontana, Magda (2008). *The Complexity Approach to Economics: a Paradigm Shift*. Working paper No. 1/2008. Department of Economics, University of Torin http://www.cesmep.unito.it/WP/2008/1_WP_Cesmep.pdf

Global Policy Forum et al. (2017). *Spotlight on Sustainable Development 2017. Reclaiming policies for the public*. *Privatization, partnerships, corporate capture, and their impact on sustainability and inequality – assessments and alternatives.* Report by the Civil Society Reflection Group on the 2030 Agenda for Sustainability 2017. https://www.2030spotlight.org/en

Hallsworth, Michael (2012). *How complexity economics can improve government: rethinking policy actors, institutions and structures*. In: Dolphin, Tony and David Nash (eds). (2012) *Complex New World. Translating new economic thinking into public policy.* Institute for Public Policy Research. Published by as part of IPPR's New Era Economics programme, 39-49.

Inter-Agency and Expert Group on Sustainable Development (IAEG-SDG) (2017). *Report on the Sustainable Development Goal Indicators* (E/CN.3/2017/2), Annex III https://unstats.un.org/sdgs/files/meetings/iaeg-sdgs-meeting-05/2017-2-IAEG-SDGs-E.pdf

Jackson, Peter (2009, 2011). *Prosperity without Growth. Economics for a Finite Planet*. Earthscan, London, Washington

Jasanoff, Sheila (2013). *The Science of Science Advice*. Doubleday, Robert and James Wilsdon (eds.) (2013). In: Doubleday and Wilsdon (eds.) (2013). Future Directions for Scientific Advice in Whitehall. A collection of Essays, 62-68.. http://www.csap.cam.ac.uk/events/future-directions-scientific-advice-whitehall/

Le Blanc, David (2015). Towards integration at last? The sustainable development goals as a network of targets. UN Department of Economic and Social Affairs. DESA Working Paper No. 141. ST/ESA/2015/DWP/141
http://www.un.org/esa/desa/papers/2015/wp141_2015.pdf

Martens, Jens / Global Policy Forum (2017) *Reclaiming the public (policy) space for the SDGs*. Global Policy Forum et al. (2017). *Spotlight on Sustainable Development 2017. Reclaiming policies for the public. Privatization, partnerships, corporate capture, and their impact on sustainability and inequality – assessments and alternatives.* Report by the Civil Society Reflection Group on the 2030 Agenda for Sustainability 2017, 11-18. https://www.2030spotlight.org/en.

Nilsson, Måns et al. (2016). *Map the interactions between the Sustainable Development Goals*. *Nature* 534(15 June): 320-322.
https://www.nature.com/news/policy-map-the-interactions-between-sustainable-development-goals-1.20075

OECD (2001). Sustainable Development. Measuring what? Background paper for the OECD Roundtable on Measuring Sustainability. Paris, 16. December.
https://www.oecd.org/sd-roundtable/papersandpublications/39370725.pdf

Pogge, Thomas and Alnoor Lahda (2015). The Sustainable Goals: A Siren and Lullaby for Our Times. Occupy.Com (25 September).
http://www.occupy.com/article/sustainable-development-goals-siren-and-lullaby-our-times

Raworth, Kate (2017). *Doughnut economics*. Random House Business Books

Read, Rupert (2012). *Guardians of the Future. A Constitutional Case for representing and protecting Future People*. Published by Green House (UK think tank).
http://www.greenhousethinktank.org/page.php?pageid=publications

Rockström, Johan, et al. (2009a). Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society* 14(2): 32.
https://www.ecologyandsociety.org/vol14/iss2/art32/

Rockström, Johan et al. (2009b). A safe operating space for humanity. *Nature* 461: 472–475 (2009). http://dx.doi.org/10.1038/461472a

Steffen, Will et al. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science* 347(6223).
http://science.sciencemag.org/content/347/6223/1259855

Strange, Tracey and Anne Bayley (2008). *Sustainable Development. Linking economy, society environment*. OECD Insights.
http://www.keepeek.com/Digital-Asset-Management/oecd/environment/sustainable-development_9789264055742-en#page1

United Nations (1992). *Rio-declaration on Environment and Development*. United Nations Conference for Environment and Development (UNCED) Rio 1992.
http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm

United Nations (2013). *Mainstreaming of the three dimensions of sustainable development throughout the United Nations system.* Report of the Secretary-General, General Assembly. http://www.un.org/ga/search/view_doc.asp?symbol=A/68/79&Lang=E

Economic and Social Council; 9. May 2013. Document A/68/79-E/2013/69. http://www.un.org/ga/search/view_doc.asp?symbol=A%20/68/79&Lang=E

United Nations (2015a) *Transforming our World. The 2030 Agenda for Sustainable Development*. https://sustainabledevelopment.un.org/post2015/transformingourworld

United Nations (2015b). *Global Sustainable Development Report.* Advance Unedited Version 2015. https://sustainabledevelopment.un.org/globalsdreport/2015

United Nations (2015c). *The Paris Agreement.* UN Framework Convention on Climate Change. http://unfccc.int/paris_agreement/items/9485.php

United Nations (2017). *The Sustainable Development Goals Report 2017.* UN publication issued by Dept. of Economic and Social Affairs (DESA). https://www.unodc.org/documents/commissions/CND_CCPCJ_joint/2030Agenda/The_Sustainable_Development_Goals_Report_2016.pdf

United Nations Department of Economic and Social Affairs (2017). *United Nations Sustainable Development Knowledge Platform* https://sustainabledevelopment.un.org/hlpf

United Nations System Task Team (2013). *Statistic and Indicators for the post-2015 development agenda*. 10 September, New York. http://www.un.org/en/development/desa/policy/untaskteam_undf/them_tp2.shtml.

Woodward, David (2015). Incrementum ad Absurdum. Global growth, Inequality and Poverty Eradication in a Carbon-Constrained World. *World Social and Economic Review* 4: 43-62. http://wer.worldeconomicsassociation.org/papers/incrementum-ad-absurdum-global-growth-inequality-and-poverty-eradication-in-a-carbon-constrained-world/