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Achieving the Sustainable Development Goals:

Theoretical insights and case studies for making sustainability governance more integrative

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Abbreviations and Acronyms

ASEAN	Association of South East Asian Nations
APEC	Asia Pacific Economic Cooperation
CBDG	Common But Differentiated Governance
CO2	Carbon dioxide
DRR	Disaster Risk Reduction
EGA	Environmental Goods Agreement
EGS	Environmental Goods and Services
EIF	Enhanced Integrated Framework
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GVCs	Global Value Chains
IDE	Institute of Developing Economies
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ITA	Information Technology Agreement
LDCs	Least Developed Countries
MDG	Millennium Development Goals
MFN	Most Favored Nation
MoI	Means of Implementation
OECD	Organization for Economic Cooperation and Development
PCSD	Policy Coherence for Sustainable Development
Ppm	Parts per million
SCM	Subsidies and Countervailing Measures
SDGs	Sustainable Development Goals
SE4All	Sustainable Energy for All
TEEB	The Economics of Ecosystems and Biodiversity
TFEC	Total final energy consumption
TRIPs	Trade-related aspects of Intellectual Property rights
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USD	United States Dollars
VRF	Visiting Research Fellow
WBCSD	World Business Council for Sustainable Development
WTO	World Trade Organization

Abstract

It is widely recognized that governance is a vital condition for implementing the Sustainable Development Goals (SDGs) in Japan and elsewhere. However, we can see that prevailing forms of governance seem unable to address unsustainability effectively.

Therefore, the main research question in this report is: What can be some theoretical insights that can provide guidance for governing the implementation of the SDGs?

The findings together form the basis for a new approach to sustainability governance: Integrative Sustainability Governance (ISG). The ensuing ISG framework includes indicator frames within the theoretical pillars of power, knowledge and norms. Other main findings are that the transformation of crisis into transitions needs to find a place in risk management; that systems thinking can be helpful for addressing wicked problems; and that insights from behavioural science can play a crucial role in successful transitions.

Finally, three case studies on key topics in development research are discussed to illustrate these ideas: one on energy efficiency and the SDGs, one on the water-energy-food nexus, and one on trade and the SDGs.

1. Introduction

The Sustainable Development Goals (SDGs) were adopted in September 2015. The SDGs or 'Global Goals' are a follow-up of the Millennium Development Goals (MDGs). The SDGs are set to determine the global development agenda for the coming decades and thus deserve the attention of all stakeholders involved in (sustainable) development.

There are significant differences between the MDGs and the SDGs: the SDG agenda is more comprehensive (especially in terms of its environmental dimension) and is universal (all countries committed to achieving it). The SDGs are also much more integrated; the linkages between different goals and targets are both implicit and explicit. For example, some targets relating to thematic areas such as health cannot only found not only under their namesake Goal (SDG 3 on healthy lives and well-being), but across other goals as well (e.g. Goals 2, 6, 11, and 12). The SDGs are in fact so integrated that they could be seen as a "network of targets". (Le Blanc, 2015: 3) This opens perspectives for cross-sectoral, integrated and more effective implementation in the longer term. At the same time, the size and breadth of the SDGs presents a sobering challenge for governments and other development actors.

1.1 The importance of governance for the SDGs

Scholars have defined governance in many ways without reaching a consensus on the core elements of this broad concept. (Adger and Jordan, 2009) According to Young (1994: 15), "governance involves the establishment and operation of social institutions (in the sense of rules that serve to define social practices, assign roles, and guide interactions among the occupants of these roles) capable of resolving conflicts, facilitating cooperation, or, more generally, alleviating collective action problems in a world of interdependent actors." At times it is challenging to distinguish politics from governance as governance is often closely linked with politics and state relations.[1]

[1] Politics in general is understood to be more of a normative activity than governance as it is often associated with power struggles (Sharp, 1990), distribution of resources (Laswell, 1936) and the threat and application of physical force (Weber, 1919). The dimension of "politics" denotes the actual process side of governance where individual and collective actors with diverging views and interests interact. Controversy over problems, solutions, and rules of the game and the (power) struggle of actors to get their view established as the "common view" are relevant in this dimension. Howlett et al. (2009) propose to use power as a key factor for distinguishing governance arrangements in the politics dimension.

Although it is not the purpose of this report to give an all-encompassing definition of governance, some main characteristics of governance may be clear from existing definitions: governance is a collective enterprise aimed at solving problems, making decisions and creating opportunities; it can involve institutional, procedural, instrumental and organisational aspects; it is contextual and dynamic as its meaning changes from one policy setting to the other; and it is often closely linked with politics and government but non-public sectors are increasingly involved.

Governance will play a crucial role in achieving the SDGs. The importance of governance in sustainable development in general has been emphasized frequently. For example, the Foresight Process organized by the United Nations Environment Programme (UNEP) identified "aligning governance to the challenges of global sustainability" as the most urgent emerging issue related to the global environment (UNEP, 2012). Similarly, a 2014 United Nations Development Programme (UNDP) report argued that "the quality of governance plays a defining role in supporting the SDGs (UNDP, 2014).

The SDGs that are explicitly focused on governance are SDG 16 and SDG 17. The following targets are among the most relevant for the institutional, instrumental and procedural aspects of governance:

Goal 16, and herein especially "build effective, accountable and inclusive institutions at all levels":

- Target 16.6 "develop effective, accountable and transparent institutions at all levels";
- Target 16.7 "ensure responsive, inclusive, participatory and representative decision-making at all levels"

Goal 17, on "Means of Implementation":

- Target 17.14 "enhance policy coherence for sustainable development";
- Target 17.16 "enhance global partnerships (…) Complemented by multi-stakeholder partnerships (…)"

Among the thematic SDGs 1–15, the targets referring to governance aspects, or financial or other means of implementation (MoI), are indicated by letters a., b. and c. Examples include:

- Mobilization of resources to implement programs (1.a.);
- expand capacity-building support for various technologies (6.a.);
- strengthen the participation of local communities (6.b.);
- strengthening development planning (11.a.);
- implementing integrated policies and plans (11.b.);
- strengthen scientific and technological capacities (12.a.);
- implement tools to monitor sustainable development impacts (12.b.); and
- raising capacities for planning and management (13.b.).

Stakeholders interested in the governance aspects of the SDGs may well refer to these targets in their deliberations.

1.2 The contents of this report

The primary purpose of Chapter 2 of this report is to offer an elaboration on different theories and other insights that are relevant for governing change towards achieving the SDGs . The main research question for Chapter 2 thus is: what is the 'state of the art' in terms of theories that are relevant to governing the implementation of the SDGs?

The SDGs are regarded as a set of interlinked sustainability transitions in this report. Extant theories and their cross-cutting issues are meant to serve as the basis for the novel concept of 'integrative governance for the SDGs' as proposed here. As such, this report can function as theoretical 'scaffolding' from which further work on governing the implementation of the SDGs can be done. However, providing an exhaustive overview of theories related to sustainability governance is beyond the scope of this report.[2] Chapter 2 starts by suggesting some reasons why a multiplicity of theories will continue to be needed for achieving the SDGs. Next, it explores five promising theories on sustainability governance:

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[2] A good overview of transition studies can be found in the recent state - of - the - art book (Grin et al, 2010). Hale and Held (2011) give a comprehensive account of transnational and networked governance. Metagovernance is outlined in Meuleman (2008) and the website of the Workshop in Political Theory and Policy Analysis (http://www.indiana.edu/~workshop/) provides numerous materials on polycentricism. Sabel and Zeitlin (2012) describe experimental governance.

- Transition theory
- Metagovernance
- Polycentricity
- Network governance
- Experimentalist governance

Then, Chapter 2 draws linkages between the different theories and seeks to show synergies and lacunae across the theories. Chapter 3 suggests some key areas (in particular power, knowledge and norms) where indicators for governance of the SDGs could be developed. This is in line with the research question "Which theoretical pillars (cross-cutting themes) and indicator frames can be drawn from existing literature on the areas in which 'Integrative Governance for the SDGs' should be more encompassing than sustainability governance?" Chapter 4 takes the findings from Chapters 2 and 3 one step further by suggesting three actions that can be taken to increase the effectiveness and coherence of transition governance at both the individual and the collective (community, organization, institution, societal etc.) levels. These inferenced actions are:

- Inference 1: Considering behavioural insights
- Inference 2: Addressing complexity through systems deliberations
- Inference 3: Mobilizing 'crisis' for change and collective action

Chapter 5 goes beyond theoretical insights by means of case studies that show the linkages between the SDGs and topics that are critical for sustainable development: trade, energy efficiency, and the water-energy food nexus. Chapter 5 also presents some cross-cutting findings from the case studies and suggests improvements for the conceptual and analytical framework. Chapter 6 concludes by summarizing the findings.

2. Combining theories of sustainability governance for achieving the SDGs

The consideration of a 'bouquet' of theories instead of limiting this report to the consideration of one theory can have the following benefits.

First of all, research on sustainability governance is historically prone to theoretical multiplicity. (Davidson and Frickel, 2004). Analysing and steering societal developments in areas as complex as sustainability is unlikely to be successful when only one conceptual perspective or theory is used, especially when the relevant time frame extends over one or more generations (Termeer and Dewulf, 2012).

Secondly, theoretical multiplicity can raise more realistic and holistic insights in the multiple challenges that present themselves.

And thirdly, clarifying conceptual differences between varieties of theories helps creating a more complete picture of societal relations and transitions, provides a map of possible strategies to intervene and offers practitioners in sustainability governance tools for reflection (De Caluwé and Vermaak, 2004). A range of governance strategies, styles, and approaches is needed to address the need for "Common But Differentiated Governance" (CBDG) (Meuleman and Niestroy, 2015). The principle of CBDG holds that, while there are common and universal goals, including universal principles such as rule of law, the ways to achieve the SDGs need to be differentiated because universal governance prescriptions alone are not going to work. This is due to the observation that every country has a different "starting point" and preference for a governance style, due to constitutional settings, traditions, culture, political practice, geography and resulting environmental, social and economic circumstances (ibid.).

The choice of the theories that will be discussed in the following rests on their foundational character and explicit focus on sustainability governance, on the potential of these theories to be useful for governance for the SDGs, and on their mutual compatibility.

2.1 Transition theory

To understand structural, change an interdisciplinary field of studies has emerged that focuses on 'transitions', most commonly defined as long-term, non-linear processes of

social change in which a societal system is structurally transformed (Grin et al. 2010, de Haan and Rotmans 2011, Geels and Schot 2007, Loorbach, 2007).

Frantzeskaki (2011) identifies three types of transitions: institutional transitions, social-ecological transitions and socio-technological transitions. Transitions can take place at several levels: while households and individuals can transition to sustainability, some speak of a "Great Transition", and envision "the advent of a new development paradigm redirecting the global trajectory toward a socially equitable, culturally enriched, and ecologically resilient planetary civilization" (Tellus Institute - Great Transition Initiative, 2015).

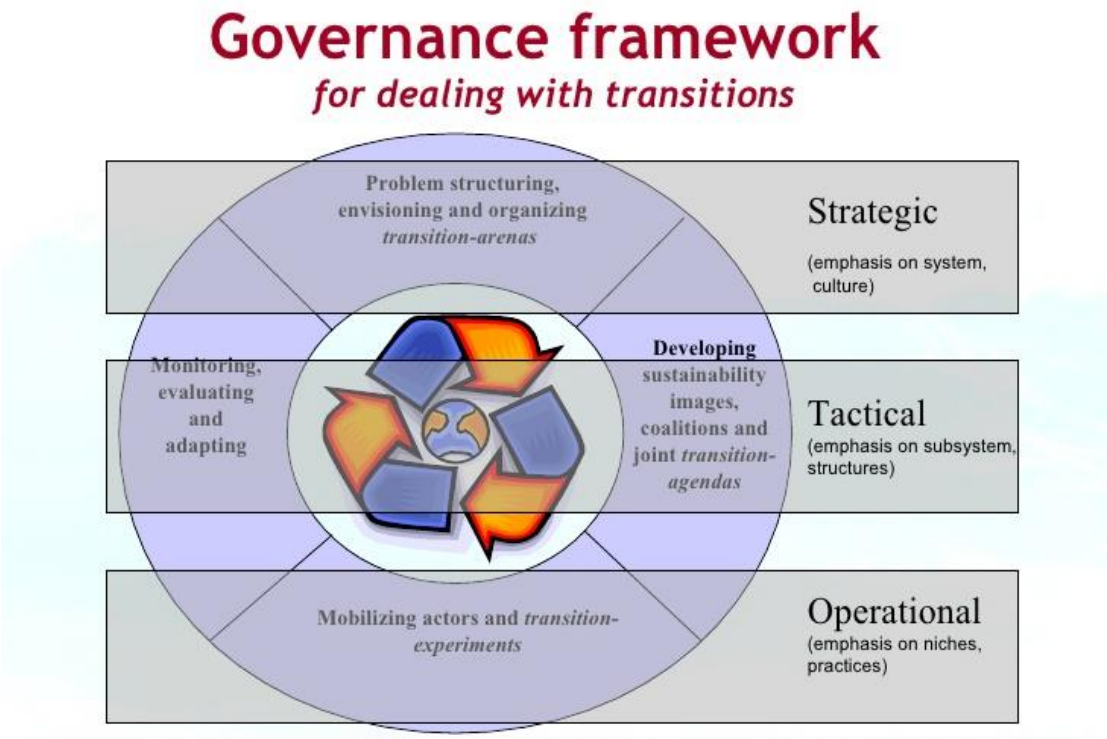
A *sustainability* transition generally refers to a "radical transformation towards a sustainable society as a response to several persistent problems confronting contemporary modern societies" (Grin et al. 2010: 1). Such a transformation process is "long-term, multi-dimensional, and fundamental" (Markard et al., 2012), comprises "radical change in incremental steps" (Loorbach and Rotmans, 2010: 145), and shifts established socio-technical systems to more sustainable modes of consumption and production.

The understanding of transition dynamics in social systems requires a holistic view on the interactions between human and non-human aspects (not only social, cultural, institutional, and political, but also economic, ecological, and technological). Guidance and governance are essential for sustainability transitions (Smith et al., 2005).

Transition management "tries to utilize the opportunities for transformation that are present in an existing system" by "joining in with ongoing dynamics rather than forcing changes" (Rotmans et al. 2001). Transition management is about understanding how actors such as Japanese Stakeholders (can) influence transition processes (Loorbach 2007) in an iterative, reflective and explorative way of governing (Frantzeskaki et al., 2012).

The 'transition management cycle' (figure 1 below) is an operational governance design that combines transition 'arenas' with various systemic transition instruments in a cyclical four-step transition management process (Loorbach 2007:115, Kemp et al. 2007). The transition management cycle serves to organize a participatory stakeholder-process that is aimed at envisioning, learning, and experimenting (Loorbach, 2007:115) and that is focused upon 'long – term sustainable solutions'. (Loorbach and Rotmans, 2010)

FIGURE 1 TRANSITION MANAGEMENT CYCLE



(Source: DRIFT, 2012)

Transition management considers traditional command and control governance unable to address persistent sustainability problems. Instead one can 'manage' these problems in terms of adjusting and influencing the choices of both individual actors and of the societal system by organizing a joint searching and learning process.

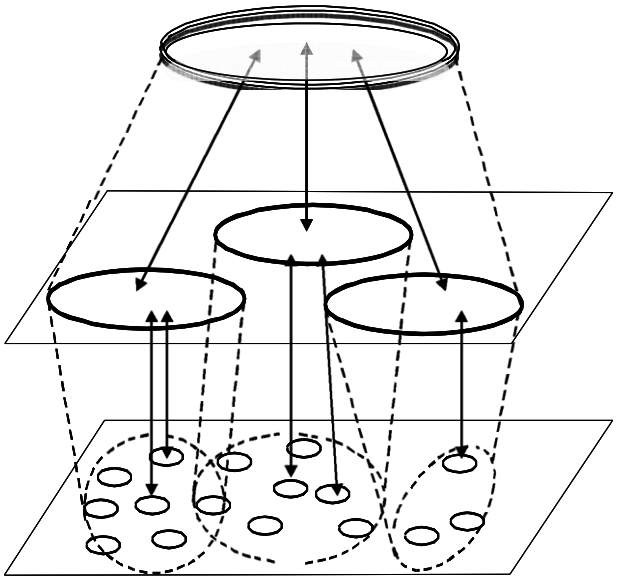
2.1.1 Analyzing transitions: multi - level, multi - phase, and driving forces frameworks

To analyse transition dynamics, transition theory developed the 'multi-level', 'multi-phase' and 'multi-pattern' frameworks (Grin et al., 2010).

The multi - level frameworks

The static multi-level framework (figure 2 below) is one of the most central concepts in transition studies (Geels, 2005). The multi-level framework serves to analyse a transition process as an interaction) between different levels of functional aggregation through time: the 'Landscape' (macro), 'Regimes' (meso), and 'Niches' (micro) levels.

FIGURE 2 STATIC MULTI-LEVEL FRAMEWORK



Macro-level: *Landscape*
(e.g. global economic developments, climate change, nuclear disaster)

Meso-level: *Regimes*
(e.g. legislation, dominant industries, economic rules, social conventions)

Micro-level: *Niches*
(e.g. innovative companies, specific market or application domain)

(Source: Geels and Kemp, 2000)

The transition theory concepts of 'Landscape', 'Regime' and 'Niche' will be described in the following. The Landscape refers to the surroundings of a societal system under study, where one sees macro-trends with a relatively slow progress and developments with a high autonomous character. In transition theory, the 'Regime' is the most 'dominant' societal constellation that shares a set of rules and that can control the stable functioning of a societal system and defends the status quo (e.g. fossil fuel industry).

Niches refer to those arrangements in which non-conformism and innovation can develop. Niches are part of the societal system, but they can deviate from the dominant structures, cultures and practices within that system. Niches can cluster (or network) outside of the Regime and form an emergent Regime or 'Niche-Regime'. Such a Niche-Regime can become more powerful as the incumbent Regime is weakening, and finally the Niche-Regime can take over the incumbent Regime. Niche-Regimes have the capacity to replace old resources by new ones and to transform the extant distribution of resources.

Because Regimes dominate the societal system, an important condition for a transition is that Regimes are either transformed or replaced by new Regimes. The idea

in transition management is that the Regime resists radical change through incremental adaptation and innovation. But as top-down pressure from the Landscape and bottom-up influence from the Niche-level increase, the Regime starts breaking down. To this end, in transition management practice Niches are typically created and empowered as open, multi-actor networks. Such networks contain representatives of different sectors who are committed towards the transition goal and approach.

Processes within the regime can also lead to an integration of innovations from the niche level into the regime (Rotmans and Loorbach, 2010). In developments at 'the edges' of the regime can accelerate regime destabilization (Bosman et al., 2014).

2.2. Metagovernance

2.2.1 The nature of metagovernance

Meuleman (2008:11) defines metagovernance as: "the totality of interactions of governments, other public bodies, private sector and civil society, aimed at solving societal problems or creating societal opportunities." Meuleman sees metagovernance as an approach, which aims to design and manage sets of situational preferences for a mix of institutions, instruments and processes with elements from the main modes of hierarchical, market, and network governance. Broadly speaking, government depends on hierarchical governance, the private sector on market governance and civil society on network governance. Each of the government modes exist on their own, but metagovernance can help understand how they are related, interact and can be coordinated. (ibid.)

Governance thus is different from government because the term governance can represent new forms of regulation that go beyond traditional hierarchical state activity, and it can include new processes, dynamics and forms of interaction between actors (e.g. self-regulation, new forms of multilevel policy, and private–public cooperation). Governance for the SDGs and the water-energy-food (WEF) nexus (also see section 5.2) requires a variety and dynamical mixture of approaches, ranging from centralised to decentralised; from legally binding to voluntary; and from hierarchical to network and market styles of governance. This allows for variation in time, in place, and in the roles of different actors (Meuleman, 2010). Metagovernance represents dynamic mixtures of hierarchical, network and market governance styles and seems suitable to involve the different sectors in the achievement of the SDGs.

The three key *qualifications* for successful metagovernors that Meuleman (2008) identified were:

- Willingness (the intention, drive or readiness of an actor to reflect on what is the best governance mix per the situation);
- Discretion (or 'agency' - one must be able and be allowed to do what is necessary, and be prepared to use this discretionary space up to its limits); and
- Capability (the responsible public managers can take multiple perspectives, taking a helicopter view).

There are two factors for how metagovernors dealt with the situation.The first *factor* is dealing with the framework conditions offered by the governance environment. The second factor comprises the application of three intervention strategies:

1.) *Combining* styles: Sometimes, one style was used to solve conflicts and another to develop better solutions. It may be possible to deploy all three governance styles at the same time. For example, hierarchies can be useful for structuring networks and to safeguard outcomes. Network governance can bring legitimacy, and marketing can be used to ensure public awareness.

2.) *Switching* from one style to another.

3.) *Maintenance*, for example introducing hierarchical elements like 'house rules' in a network to improve its functioning.

Also, important for metagovernance is the type of problem (the "policy" dimension): This co-determines which style would serve best as the dominant style. If the policy problem is defined as an urgent matter (a crisis or emergency), the rationale is to choose a hierarchical approach; if it is a routine issue that should be dealt with as efficiently as possible, market governance seems to work best, and for wicked problems, network governance mostly is appropriate. A metagovernance approach deliberately takes a situational view, determining what would be the most suitable governance approach on the basis or a range of factors (Meuleman, 2008).

2.2.2 The benefits of metagovernance

Ideally, metagovernance improves democratic decision making and participation, steering or the coordination of collective action through (a combination of) different forms of governance. Metagovernance can improve coherence between the increasingly

fragmented forms of governance, as new governance bodies are created at different scales and with different mixes of policy mandates (Haughton and Allmendinger, 2008).

In contrast to other governance models, metagovernance has a better potential to coordinate in a context-specific manner, because it can take a situational view, take local concerns into account and determine what is 'best' based on a range of different factors (institutional, environmental, social, etc.) (Meuleman, 2008). It is the coordination potential of metagovernance that can make it valuable for addressing the complexity of sustainable development.

Japanese governance traditionally has been characterized by a strong hierarchical style. (Tinsley, 1998) However, in the example of governance for the SDGs and the involvement of all Japanese stakeholders beyond government, only a hierarchical approach is seemingly not in line with the need for a pluralistic approach, partnerships and 'bottom-up' action that numerous stakeholders in the field of sustainable development usually thrive on. Therefore, one of the biggest questions in SDG governance in Japan is how to harmonize global agreement and target setting with local implementation, and how to combine bottom-up with top-down approaches.

At the same time, Japan has demonstrated that partnerships can improve human well-being. Responding to a health and environmental crisis in the late 1960s that included the PCB (polychlorinated biphenyls) contamination of food, Japan enacted many laws aiming at environmental and health protection. One of these laws was the Chemical Substances Control Law (CSCL) enacted in 1973. The lesson learned in Japan from the PCB crisis is that the participation of stakeholders, especially industry, is critical to national policy development and successful chemicals management. In Japan, regulation of persistent, bioaccumulating and toxic (PBT) chemicals was based on pilot programs in local governments and voluntary industry Responsible Care initiatives (UN DESA, 2011).

2.3 Network governance

Network governance deserves more attention as one of the governance modes in metagovernance and as an upcoming mode of governance that could be crucial for Japanese stakeholders to complement hierarchical governance to be effective and to create impact. In the context of complex, interconnected and adaptive challenges related

to sustainability, insights from network governance could contribute to less formalised forms of governance and multi-level analyses (e.g. by Ostrom, 2009; and Ekstrom and Young, 2009). The rise of network governance is expected to continue, accelerate and spread geographically over the next few decades. (EU, 2012) The network society will become a global reality in which international, transnational and trans-local relations will coexist in a persistent process of globalization. (ibid.) Therefore it is timely for Japanese stakeholders to assess how networks can be best designed or modified to effectively address sustainable development.

The following network characteristics can be derived from the different definitions and insights from governance, policy and complexity theory, which are of relevance for the creation of an analytical framework: the network structure consists of relatively stable, mutually dependent and reductionist (sustainable) relationships; a variety of actors is involved that are interdependent but autonomous; interaction is happening in a horizontal way; actors share common purposes and frameworks and aim at governance; there can be flexible and creative adaptation to changing environments; network policy processes are complex because of the variety of actors, perceptions and strategies; and an exchange is taking place both within the network (flows of energy, information, finance, ideas, meaning and substances) and between the network and its environment (Castells 2004: 36).

2.3.1 Transnational governance networks for the SDGs

Transnational networks may be understood as informal institutions linking actors across national boundaries and carrying on various aspects of global governance in new and informal ways.[3] Transnational networks are growing rapidly. For instance, globally over 14,000 sub- and non-state actors have joined international climate change-related initiatives between 1990 and 2012 (Andonova et al., 2014). In their transgovernmental[4] form, networks exhibit "pattern[s] of regular and purposive relations among like government units working across the borders that divide countries from one another and

[3] Hale and Held (2011: 12, 15) see transnational governance as "the processes and institutions, formal and informal, whereby rules are created, compliance is elicited, and goods are provided in the pursuit of collective goals" when the actors involved are sub- and non-state actors from different countries.

[4] Keohane and Nye (1974: 39) defined transgovernmental relations as "direct bureaucratic contacts among governmental sub-units". Such relations have the potential to "create opportunities for international organizations to play significant roles in world politics" (ibid.: 42) and are an important component of international relations.

that demarcate the 'domestic' from the 'international' sphere" (Slaughter, 2004: 14). They allow domestic officials to interact with their foreign counterparts directly, without much supervision by foreign offices or senior executive branch officials (Raustiala, 2002).

Networks create a global situation, in the sense that people and institutions are ever more 'interconnected'. Types of *sustainability* governance networks vary greatly. Advocacy networks (e.g. the Climate Action Network) are loose alliances which want to achieve a common set of objectives; business networks (e.g. the World Business Council for Sustainable Development - WBCSD) combine resources and capabilities; and global public policy networks are the collaborations between actors from different sectors (both public and private). Government networks provide platforms on which governments cooperate while transgovernmental networks (e.g. local government. Public-private partnerships bring government(s), businesses and sometimes civil society and scientists together.

2.4 Experimentalist governance

Experimentalist governance has been defined as "a recursive process of provisional goal-setting and revision based on learning from the comparison of alternative approaches to advancing them in different contexts" (Sabel and Zeitlin, 2012: 169). It is an upcoming form of coordination and governance which may be considered pragmatic or experimentalist in the sense that it systematically provokes doubt about its own assumptions and practices. It treats all solutions as incomplete and corrigible. It produces an ongoing reciprocal readjustment of ends and means through learning from committed comparison of local efforts to advance general goals. (ibid.)

Global or *transnational* experimentalist governance is "a form of adaptive, open-ended, participatory, and information-rich cooperation in world politics, in which the local and the transnational interact through the localized elaboration and adaptation of transnationally agreed general norms, subject to periodic revision in light of knowledge locally generated" (de Burca et al., 2013: 4). Global experimentalist governance affords autonomy to lower-level or locally situated units to adjust the implementation to local contexts, which leads to new forms of accountability and evaluation. Experimentalist governance gives structure to apparently fluid practices of 'network governance'.

Experimentalist governance in its most developed form involves a multi-level architecture, which is open to participation of relevant stakeholders in a non-hierarchical process of decision-making. The five constitutive elements of experimentalist governance are linked in a deliberation-fostering, iterative cycle (see figure 3 below).

FIGURE 3 THE EXPERIMENTALIST GOVERNANCE CYCLE

(Source: Sabel and Zeitlin, 2012)

First, stakeholders reflect and discuss based on a broadly shared perception of a problem. Secondly, they articulate a framework understanding with open-ended goals (such as making forestry sustainable) and a combination of "central" and "local" units sets provisional metrics for evaluating their achievement - in consultation with relevant stakeholders. Experimentalist actors broadly know what outcomes they desire. However, they are uncertain about how these objectives can be realized. Third, local units are free to pursue these goals in their own way. These "local" units can be public, private, or hybrid partnerships. Fourth, in exchange for autonomy, these units must report regularly on their performance and participate in a peer review in which their results are compared with those of others. If the local units fail to make progress against the agreed indicators, they need to demonstrate that they are taking sufficient corrective measures, informed by the experience of their peers. The result of reporting and peer review is the fifth step: the establishment of practices, involving peer review, for revising goals, rules and practices. This can again inform step 1., etc. (Sabel and Zeitlin, 2012). The process as explained above could prove to be useful for the implementation of the SDGs as it provides for a model of learning by doing.

3. Theoretical pillars and indicator frames: fusing the findings

This Chapter suggests some key areas where indicators for governance of the SDGs could be developed. This is in line with the research question "Which theoretical pillars (cross-cutting themes) and indicator frames can be drawn from existing literature on the areas in which 'Integrative Governance for the SDGs' should be more encompassing than sustainability governance?"

The outcome is a unique integrative view on the attributes, capabilities and competencies that are required for making governance for the SDGs more effective, cooperative and coherent in the face of wicked sustainability problems. A warning is warranted here against seeing the breaking down of governance silos as an absolute must for achieving sustainable development. Governance silos indeed can play an important function, for example when they assign clear mandates responsibilities. Therefore, the concept of 'making silos dance' (or engage constructively) might be more useful and realistic to achieve than to completely break down institutional silos. (Meuleman and Niestroy, 2016)

The indicator areas or 'frames' in this Chapter are grouped around the three theoretical pillars of power, knowledge and norms because the literature review, interviews and case studies together show the importance of (the interplay between) these themes as ultimate drivers for SDG implementation.[5] However, there is not much research available on sustainability governance that considers the role of all three of these theoretical pillars.

3.1 Theoretical pillar 1: Power

Governance for the SDGs needs to address issues of power, a largely neglected topic in sustainable development research so far. It is important to realize that "discussions about governance issues are often sensitive and always passionate, as they relate to who holds

[5] Conventional strategies for sustainable development operate on the 'proximate drivers' of governance, namely technology, demographics, and institutions. These proximate drivers are mainly responsive to short-term intervention. The ultimate drivers for sustainable development are power, knowledge, norms and culture. (Raskin et al., 2002) These drivers are subject to long-term systemic processes.

power and information".[6] Power can be used to enforce sustainable development solutions, but is also used to block transitions.

Power is one of the most disputed concepts in social and political theory. The definitions of power[7], are manifold and highly diverse.[8] Max Weber understands by "power" the chance to realise one's own will in a communal action even against the resistance of others who are participating in the action. (Coser, 1977) Parsons (1967:193) takes a broader view by seeing power as "the capacity of a social system to mobilise resources to realise collective goals".

Overall, it is important to distinguish between power and 'influence' or 'impact'. One of the most convincing distinctions between power and 'influence' is given by Morriss, who concludes that power "always refers to a capacity to do things (…) whilst 'influence' sometimes (and typically) does not" (1987:282).[9]

3.1.1 Power indicator frame 1: Leadership

Leadership is a critical success factor in the context of sustainability governance. In particular, at the global level leadership is required for advancing the 2030 Development Agenda (including the SDGs). For Najam et al. (2006: 73), "there is probably no better investment in global environmental governance reform than an investment in leadership". Meanwhile, Pascal Lamy pondered on the question "what then are the specific challenges of global governance?" and argues that "the first challenge stems from the difficulty to identify leadership".[10]

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6 UN-REDD Programme. Joining Forces for Tackling Difficult Governance Issues in Indonesia. http://www.unredd.net/index.php?option=com_docman&task=doc_download&gid=8233&Itemid=53 (accessed on 16 December 2016).

7 Power, knowledge and norms are examples of family resemblance concepts. The term family resemblance concept originates in Wittgenstein's philosophy of language. (Haugaard, 2002:3) A typical example of a 'family resemblance concept' is the word 'game': its meaning inherently depends on the context in which it is used. The 'playfulness' of a card game played at home starkly contradicts with the 'seriousness' of a political game. All possible meanings of the word 'game' partly overlap and partly contradict each other, hence making it impossible to agree on *one* all-encompassing definition.

8 This is also due to the fact that whereas "power" in the English language mostly covers a number of meanings, in other languages such as Dutch, German and French, there are separate words for these separate meanings. Dutch language for example in general distinguishes between "macht" (might) and "kracht" (force).

9 Further, influence and impact can be arbitrary and unintentional. This is related to the distinction between *affecting* and *effecting*. While 'affecting' refers to altering or impinging on something in *any kind of way*, 'effecting' is about *accomplishing* something.

10 https://www.wto.org/english/news_e/sppl_e/sppl142_e.htm

Most research on sustainability leadership is about the type of individual leadership, competencies and abilities that are required to handle challenges that appear across population issues, water scarcity, food security, and climate change. The idea of sustainability governance embodies a specific social steering logic as sustainable development requires goal-directed interventions (Meadowcroft, 2007: 6) combined with a process of self-steering (ibid.: 7). Because both sustainable development and the issues that the SDGs address are frequently described as 'wicked', 'systemic' and 'meta' problems, they require systemic approaches.

3.1.2 Power indicator frame 2: Relations

Relations and 'having a network' are key power resources. Power must be understood in relational terms (Nye, 2011) and connectedness has become the measure of power (Slaughter, 2009: 94).[11] Actors that are 'hubs'[12] in networks for example have an advantage over other players (Thompson, 2004: 413).

One way to categorize power in relations between people, is to distinguish between *conflictual* and *consensual* power.

Another way is to differentiate between power *over, with, to* and *within*. First, power can consist of the capacity to mobilise *people*, thereby possibly exercising power 'over' them. This can create relations of dependence, for example between the aviation, fossil fuel and financial industry on one side and governments on the other. Power *with* refers to collaborative power. Power *to* is productive power to effect something. And power *within* is a person's self-knowledge and self-actualization. (Pantazidou, 2012)

Furthermore, actor A can have 'more' power than actor B, in the sense that A can mobilise 'more' resources than B can. This can lead to cooperation if actors have collective goals or competition if they have mutually exclusive goals.

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11 For Castells (2009), power is exercised through networks. He sees four different forms of power:
1. Networking Power: the power of the core actors and organizations included in the networks
2. Network Power: the power resulting from the standards required to coordinate social interaction in the networks.
3. Networked Power: the power of social actors over other social actors in the network.
4. Network-making Power: the power to program networks according to the interests and values of the programmers.

12 Actors with a higher than average number of 'links' with other actors.

Finally, there are different types of power: person A can mobilise different resources, or mobilise resources in a different way, then B does. For example, the fossil fuel industry is exercising reinforced power, while many renewable energy companies are supposed to exercise innovative power, or one country exercises economic power, while another country exercises geo-political or military power, etc. If the different power exercises by actors enable and support one another, there is synergy, whereas there are antagonistic power relations if different power exercises restrict, resist or disrupt one another.

3.1.3 Power indicator frame 3: Empowerment

Like power, empowerment has no agreed-upon definition and is often used to capture "a family of somewhat related meanings" (Thomas and Velthouse, 1990: 666). Empowerment refers to a person's belief that "he or she can direct organizational events towards desired ends" (Elmes and Smith 2001: 34). Rappaport (1987: 122) defines empowerment broadly as a 'process' or 'mechanism' by which people and organizations "gain mastery over their affairs" and Moser (2005) sees it as increasing the capacity of individuals and groups to make choices and to transform these choices into desired actions and outcomes.

Empowerment has also been defined in more psychological terms (Spreitzer et al., 1999: 511) such as "perceptions of control" (Keller and Danserau, 1995: 129), and intrinsic motivation[13] (Thomas and Velthouse, 1990) instead of *extrinsic* motivation.

Empowerment is important because it is not only power, but indeed (a sense of) *powerlessness*, that forms the main obstacle to transformative change (cf. Avelino, 2011). Beyond actual influence, empowerment means that actors need to be aware of the extent to which they themselves know and *believe* that they have influence and power.

Empowerment is related to scaling and global posturing (e.g. claiming that climate change is a global problem that requires global solutions). By focusing too much on a global framing of sustainability governance, local politicians and citizens sometimes may not feel empowered to take the important measures which can be taken at a local

[13] Intrinsic task motivation "involves positively valued experiences that individuals derive directly from a task" resulting from the cognitions about a task that produce motivation and satisfaction (Thomas and Velthouse, 1990: 668).

level, especially in terms of reducing vulnerability. (Ostrom, 2014: 107) Cooperation between cities on the SDGs the other hand can empower the local governance level.

3.2 Theoretical pillar 2: Knowledge

3.2.1 Defining knowledge

As Bertrand Russell's "Theory of Knowledge" illustrates, it is difficult to define knowledge. According to the Oxford Dictionary, knowledge is "a familiarity with someone or something, which can include facts, information, descriptions, or skills acquired through experience or education. Knowledge refers to the practical or theoretical understanding of a subject. It can be implicit (as with practical skills or expertise) or explicit (as with the theoretical understanding of a subject)."

Some transdisciplinarity scholars (e.g. Pohl and Hirsch Hadorn, 2007; Jahn et al., 2012) distinguish between three types of knowledge that are relevant for sustainability transitions. For them, systems knowledge is the knowledge necessary to understand an issue, i.e. in the case of transitions, their dynamics, drivers and barriers. Target knowledge is about the vision of, and motivation for the system aimed for. Transformative knowledge is about the "how", or the practical ways and means of realizing the desired state of a specific system. Rauschmayer et al. (2015) hypothesize that any informational and scientific basis for transition governance should comprise all three of these types of knowledge. Systems, target and transformational knowledge then should be grounded both *at* the societal and at the individual levels and furthermore conceptualised as a bridge *between* individual and societal levels.

3.2.2 The role of knowledge in governance for the SDGs

Knowledge and facts are more important in sustainable development than in many other areas. (Najam et al., 2006) Knowledge is relevant, first, in the form of scientific information that plays a major role in the monitoring and verification of SDG implementation.

Overall, the assumption that knowledge can be transferred directly to the policy domain and the broader expectation that knowledge can direct governance can be questioned for several reasons.

First, 'evidence-based policymaking' in the context of sustainable development is often not based on factual, undisputable knowledge and on rational models of problem-solving (Hertin et al., 2009). 'Evidence' regarding complex natural systems (climatic systems) is often rare and assessments of planetary boundaries cannot be based

exclusively on scientific knowledge-claims but require science-society and transdisciplinary deliberations. (Schmidt, 2013) The IPCC process[14] for example is based on a network-type consensual process within the science community. However, the results from IPCC deliberations seem to be weighed by politicians[15] and the media on the parameter of classical scientific authority. (Meuleman, 2012a)

Secondly, it is challenging to get decision-makers to consider sustainability science and its complexities, and the presentation of data has little *direct* impact on governance practice (e.g. the Economics of Ecosystems and Biodiversity (TEEB) reports did not have much impact on policy-making, even according to interviewees[16] who work in the TEEB Secretariat). And even though the IPCC has expressed a clear consensus on the urgency of addressing climate change (e.g. in its Assessment Reports), it is unclear if and how this has influenced the climate negotiations.

Thirdly, there are several neuro-psychological phenomena at play in humans that may still prevent action even when the level of conscience and knowledge of the complexities around negative effects of climate change is increased (for further explanation of the behavioural aspects of sustainability governance see Monkelbaan and Brosch, forthcoming). The lack of consistency between scientific knowledge and our direct experiences and tacit knowledge can be a barrier to effective climate action (the "knowledge-action paradox"). (Naustdalslid, 2011) Science may increasingly uncover the dynamics and threats of climate change, but it is difficult for laymen to perceive these threats in their daily lives. Recent research shows that at the individual level perceptions of climate change risk in fact decline as scientific literacy and numeracy increase. (e.g. Kahan et al., 2011 and Kahan et al., 2012) Higher educated people are more inclined to be individualistic and oppose egalitarianism, and use their scientific knowledge to defend their status quo. The implication is that providing more information on climate change

14 IPCC assessment reports are compiled and reviewed by leading scientists, but the politically more relevant 'Summaries for Policymakers' (SPMs) have to be agreed upon by all delegates from participating countries.

15 Meuleman (2012a) sees in this context the statement of a former Dutch Environment minister as illustrative when she says that "I will not accept any more mistakes from the IPCC. As a politician, I must be able to have blind trust in what science says."

16 Interview with anonymous interviewees of the TEEB Secretariat in Geneva on 4 September 2014.

will not necessarily succeed in strengthening climate action. (World Development Report, 2015)

Fourth, we may be able to measure the ecological details of pollution and overfishing or changes in climatic patterns, but scientific facts are ignored for political reasons. The broad scientific consensus on climate change and its causes and effects is often put in doubt (mainly by vested interests in carbon intensive industries), which has severe consequences for both mitigation and adaptation action. Also, facts can easily be twisted and the seed of doubt (for example on the anthropogenic causes of climate change) can easily be sown if people experience an information overload and have trouble selecting the facts that are in line with the scientific consensus.[17] As interviewee Pier Vellinga put it, "we live in an information-rich but knowledge poor world."[18]

3.2.3 Knowledge indicator frame 1: Knowledge cooperation (knowledge sharing and learning)

Governance relates to social systems and these systems learn continuously, with the support of experience, knowledge, revelation and so on. Because complex sustainability problems often are unpredictable, it is important to have a culture of learning, rather than a fixed strategy. (Beinhocker, 2006) Where each governance actor has a limited view of a large sustainability issue, learning between different actors can foster the collective cognition that is necessary to take on policy-making functions of greater complexity. (Huppé and Creech, 2012) Sustainability learning is not merely about knowing 'more', but about developing and putting in practice a qualitatively *different type* of knowledge. (Tabara and Chabay, 2013) Cooperation between different actors and knowledge sharing[19] can contribute to more qualitatively diverse knowledge of sustainability. The

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17 For one of many investigations on whether a scientific consensus exists on climate change, see Oreskes (2004): http://www.sciencemag.org/content/306/5702/1686.full

18 Pier Vellinga (Urgenda), phone interview of 2 July 2013

19 Gramsci contended that the *modern* prince 'cannot be a real person or concrete individual' but 'can only be an organism, a complex element of society in which a collective will, which has already been recognized and has to some extent asserted itself in action, begins to take concrete form'. (Hoare and Nowell-Smith, 1971: 129) Similarly, Olsson et al. (2014) suggest that a theory on the role of agents in sustainability transformations may involve moving the focus from the role of individual leaders to interacting key individuals. Mental and social learning processes could further trigger public participation in collective cultural change and a mass transformation of human understanding through public participation and improved decision making. Cognitive science and philosophy of science is exploring in this context the concept of "distributed cognition" (Giere and Moffat, 2003; Hutchins and Klausen, 1996; Nersessian, 2006),

first knowledge indicator frame therefore is 'knowledge cooperation', which covers both learning and knowledge sharing. This indicator frame shows the need for recognizing 'knowledge relations' in addition to power relations.

3.2.4 Knowledge indicator frame 2: Adaptiveness and resilience

Adaptiveness and adaptive capacity in governance cover a set of related concepts such as vulnerability, resilience, risk management, robustness, responsiveness[20], adaptive capacity and social learning. (Adger, 2006) Adaptive capacity in the context of vulnerability to climate change is associated predominantly with governance. (Brooks et al., 2005) Adaptiveness can apply to processes of change and adaptation within governance systems. (Biermann et al., 2010) More 'polycentric' structures and balance between bottom-up and centralised top-down approaches (also called 'vertical integration') have in general turned out to indeed lead to sustainability of resource regimes and higher levels adaptability and resilience. (Pahl-Wostl, 2009; Huppé and Creech, 2012) Vice versa, adaptability and resilience are crucial for enabling transition management and network governance. Moreover, in network societies it is also easier to instill collective action. (ibid.) Adaptiveness is one indicator frame under the theoretical pillar of knowledge because knowledge represents both a powerful determinant and indicator of adaptive capacity. (Williams et al., 2015)

Because wicked problems such as climate change cannot be 'solved' (Hulme, 2009), they call for an adaptive 'dealing with' approach. The sustainability transitions that the SDGs represent require adaptive governance in order to be flexible to adjust to our ever-changing world, including new actors, contexts, and challenges. (Boons et.al., 2009) In a complex, interconnected and rapidly changing world, there is a need for adaptation to reduce vulnerability. (Young et al., 2006)

Governance can have an impact on adaptation to climate change, for example through managing infrastructure development.[21] Vice versa, the challenges of climate change affect political processes and necessitate the adaptation of governance practice to

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which means that collective learning can take place through objects occurring outside individual minds, (for example using a computer) to address complex problems more distributive.

20 Legitimacy, broadly understood, can rest on a range of qualities and characteristics including law, but also authenticity, responsiveness, and problem-solving capacities. (Ansell 2011: 149-50)

21 Interview in person with Christophe Dossarps (director of the Sustainable Infrastructure Fund) in Geneva on 20 August 2013.

changing circumstances and demands from citizens. A system which is too stable can become rigid and unadaptable; meanwhile a system which is too changeable may become fragile. Herein lies the paradox of the need for both adaptability and resilience of some existing practices and for the radical transformation of other habits. Only a robust governance type that combines the dual needs for stability and change can perform well in the face of uncertainty and rapid change. This makes the challenge of coping with the tension between institutional flexibility and stability a crucial one for policymakers. (Duit and Galaz, 2008) Knowledge then becomes even more important in order to distinguish between what needs to be preserved and what needs to change. A balance between robustness and change is difficult to achieve, especially if existing legal frameworks stand in the way of change that is based on progressing insights.[22]

Resilience

Resilience is "the capability to flexibly adapt one's course in response to frequent and uncertain changes without losing identity" (Termeer et al., 2013: 6).

Resilience allows a system to adapt flexibly to uncertainties and the constantly changing conditions surrounding wicked problems. Resilience is a property of a system that defines its robustness and reliability but it does not imply resistance to change. For ecological systems, resilience is desirable and can be associated with sustainability.

Resilience also is the ability to self-organize, and learn, and is the bridge between adaptive governance and disaster risk reduction (DRR) (Djalante et al., 2011). Resilience is the goal of disaster risk reduction (DRR). DRR is recognized and advanced in the Sendai Framework as well as the specific opportunities to achieve the SDGs through reducing disaster risk. For example, by reducing exposure and vulnerability of the poor to disasters or building resilient infrastructure. Direct references to DRR and building

[22] The rule of law is in general considered as important for sustainable development, but legal frameworks can conflict with adaptive approaches. E.g. Kemal Derviş (former head of UNDP and member of the IMF mission to Greece) in a meeting in Geneva in May 2015 said that even though the Troika approach to the financial crisis in Greece was understood not to work much earlier, there were agreements that had to be respected so that it was difficult to perform adaptive governance.

resilience are made in the SDGs and targets related to poverty[23], ending hunger[24], ensuring healthy lives[25], education[26], sustainable management of water[27], building resilient infrastructure[28], resilient cities, climate change[29] and marine and terrestrial ecosystems[30].

Resilience can relate to multilevel governance, as for example energy systems are organized in a centralised or hierarchical way that "can account for only a limited number of connections and linkages between energy subsystems and scales, thus being unable to respond to simultaneous challenges effectively." (Goldthau and Sovacool, 2012: 237) Centralised arrangements can be expected to be rigid and static (Cherp et al., 2011) and thus less prone to resilience. In interviews, utility experts[31] explained that existing power utilities prefer centralised forms of renewable energy such as major off-shore wind and solar installations (e.g. Desertec) as they fit into their existing business models.

Resilience and adaptation are related concepts as they both relate to the dynamics of a system, or a closely related set of systems. Networks for example can enhance learning and innovation, which can improve resilience. (Djalante et al., 2011) Adaptability is the *capacity* of actors in a system to influence resilience. (Walker et al.,

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23 E.g. Target 1.5, which relates to building the resilience of the poor, further strengthens the position of DRR as a core development strategy for ending extreme poverty.

24 E.g. Target 2.4, supports the immediate need to advance actions in mainstreaming DRR and climate adaptation into agriculture sector planning and investments to promote resilient livelihoods, food production and ecosystems.

25 E.g. Target 3.d, which relates to strengthening early warning and risk reduction of national and global health risks presents an opportunity to further actions to promote resilient health systems.

26 E.g. Target actions 4.7 and 4.a, focusing on building and upgrading education facilities and promoting education for sustainable development, contribute significantly to resilience-building in the education sector.

27 E.g. Target 6.6, which relates to protecting and restoring water-related ecosystems, will significantly contribute to strengthening the resilience of communities to water-related hazards.

28 Targets 9.1 and 9.a, related to developing sustainable and resilient infrastructure development are vital not only to protect existing infrastructure but also future infrastructure investments.

29 Target actions under SDG 13 on climate change, focusing on strengthening resilience and adaptive capacity, capacity building and integrating climate change measures into policies and plans, awareness raising on climate adaptation and early warning (Targets 13.1 to 13.3 and 13.a to 13.b) provide opportunities to strengthen the integration between disaster and climate resilience to protect broader development paths at all levels.

30 Target action 14.2, focusing on the sustainable management and protection as well as strengthening resilience of marine and coastal ecosystems, can contribute to reducing disaster risk and increase in demand for healthy marine and coastal ecosystems.

31 E.g. Jan Ossenbrink, interview in person with Roland-Jan Meijer (Global Solar Council) in Brussels on 16 October 2013

2004) Vice versa, increasing the resilience increases the possibility to adapt to new circumstances.

The resilience approach to governance explains how social-ecological systems behave when confronted with external pressures or internal stresses. When resilience has been eroded, threshold effects[32], crises, surprises (black swan events), tipping points[33], and cascading effects[34] can push the system over a threshold into an alternative state. (Kofinas, 2009)

3.2.5 Knowledge indicator frame 3: Reflexivity

Reflexivity (or in Giddens' terminology 'reflexive monitoring'[35]) is concerned with the human competence to reflect, learn, and to adapt. Reflexivity also enables people to learn from any source, experience, practice, information, knowledge, theory, and so on, and to re-orientate behaviour subsequently. (In 't Veld et al., 2011: 72) For Jessop (2003: 7) more specifically, reflexivity is "the ability and commitment to uncover and make explicit to oneself the nature of one's intentions, projects, and actions and their conditions of possibility; and, in this context, to learn about them, critique them, and act upon any lessons that have been learnt." Self-reflexivity has two main dimensions: cultural[36] (collective) and psychological (individual).

At a more structural level, reflexivity is linked to the transformation of the governance system itself and the search for innovative solutions to social problems by moving beyond surface manifestations to uncover systemic underpinnings. The term reflexive governance is not only an acknowledgment of the importance of learning and

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32 Small events that trigger changes that are impossible to reverse.

33 Gladwell (2000) defines a tipping point as "the moment of critical mass, the threshold, the boiling point" and describes three types of people that are crucial in the creation and spread of social tipping points: Connectors, Mavens and Salesmen. Connectors are the social equivalent of computer network hubs; they know people across social, cultural, professional, and economic communities, and introduce people who function in different circles. Mavens are information specialists and knowledge brokers. Salesmen are charismatic people with strong negotiation skills who can persuade others.

34 Events that produce immense consequences across scales, systems, and time.

35 The term "reflexivity" is used by Giddens to refer to the ability of an agent to consciously alter his or her place in the social structure; thus globalization and the emergence of the 'post-traditional' society might be said to allow for "greater social reflexivity". Social and political sciences are therefore important because social knowledge, as self-knowledge, is potentially emancipatory

36 Cultural self-reflexivity is the critical examination of the collective, cultural, or intersubjective elements of the worldview that one is embedded in.

adaptiveness, but also of *complexity* in the govern*ing* and the govern*ed* systems. (Frantzeskaki and Loorbach, 2009)

Reflexive governance is overarching and covering both adaptive management and transition management. (Voss and Bornemann, 2011) Adaptive governance is based on adaptive management and is suggested as an approach for governing complex problems such as disasters (Djalante, 2012). Adaptive management is an approach to resource and ecosystem management that refers to functionally defined social–ecological systems with a regional scope, such as natural parks, river basins, mountain ranges, and so forth. (Voss, 2011). Adaptive management accounts for the inherent complexity and unpredictability of ecosystem dynamics. (Pahl-Wostl, 2007) Adaptive management is based on an idea of learning by doing and is a type of management that integrates science and local knowledge with deliberative and experimental practices. (Voss and Bornemann, 2011; Norton, 2015) Processes of learning by doing and 'doing by learning' have been the results of co-operation and dialogue between different disciplines and between scientific, policy and civil society actors on managing complex systems. (Verbong and Loorbach, 2012)

Reflexivity can help to appreciate a variety of perspectives on a sustainability challenge, to continuously reconsider dominant problem frames, to bring about a redefinition of action perspectives, and to avoid tunnel vision (Schön and Rein, 1994). The interviews[37] showed that governors are often adequately informed on climate change, but also that they see the issue from different perspectives and in different contexts. According to Hulme (2009), this diversity of viewpoints is the main reason for disagreement on climate change. Indeed the lack of *common* understanding of both the meaning and substantial value of sustainable development and of the extent of authority and power that should be imbued in governance can be a barrier to implementing sustainability. (Huh, 2014)

3.3 Theoretical pillar 3: Norms and values

3.3.1 Defining norms and values

The purpose of this section is to identify fundamental norms, values and ethical perspectives related to sustainability governance, and to embed these perspectives in both

[37] e.g. Ambassador Steffen Smidt (interview in Geneva on 23 July 2013), Ambassador Faizel Ismail (interview in Geneva on 30 July 2013), Michel Rentenaar (interview in Bonn on 3 November 2014)

ethical philosophy and political theory. Whereas norms are standards of behaviour that are typical or accepted within a group or society, values are:

- abstract ideals and prescriptive convictions about what is right and wrong and what is important (what is valued?);
- social and psychological concepts, rooted in cognition and emotion; and
- dynamic and forged by deliberation. (Krasner, 1983: 2)

Values define or direct us to goals, frame our attitudes and views, and provide standards against which human behaviour can be judged. (Leiserowitz et al., 2006) Values can have strong practical implications when socialised values lead to norms that regulate human behaviour.

Values that are lived constitute culture. (In ‘t Veld, 2013: 284) Although values may differ from culture to culture and can evolve over time, there are also claims on 'global' or ‘universal’ sustainability values, for example in the Millennium Declaration and in the Earth Charter. Norms are the outcome of discourses. (Dryzek and Stevenson, 2012) Morals are values with a greater social element, and distinguish ‘good’ from ‘bad’. Ethics is a theory or a system of moral values.[38] Ethics determines our purpose as individuals and as a society, and our vision of the future.

The importance of norms and values in governance for the SDGs

It is posited here that the SDGs could be essentially seen as a set of norms and values. According to AccountAbility’s Sustainability Leadership survey, commitment to sustainability values is more than ever the biggest factor in determining sustainability leadership.

Values are important first because all characteristics of wicked problems are symptoms of underlying value *conflicts*. (Norton, 2015) Secondly, "the only way to develop a more sustainable society is through a process of fundamental reflection on our current values and societal Regimes". (Verbong and Loorbach, 2012: 15-16) Third, consideration of norms, values and shared conceptions allows for an understanding of how social structures shape policy processes. (Clemens and Cook, 1999) Fourth, Lee

[38] The three major strands in the Western philosophy of ethics (García-Rosell and Moisander, 2008):
- consequentialism/utilitarianism (ends can justify a certain action);
- virtue ethics (the action is justified because a specific person is acting); and
- deontology (an action is justified through the way it is implanted).

(2007: 162) argues that "policy coherence alone will not avoid the reality of power politics." Promoting coherence among actors and regimes which differ in terms of their power then is unlikely to challenge the dominance of powerful interests without corresponding normative realignment around ambitions for sustainability. And fifth, in sustainability governance, science often plays a crucial role. However, the illusion of value-free science can enable the (mis-)use of expertise in policy-making and policy prescription, which can start at the moment problems are framed based on ethical judgments. (Hulme, 2009) Therefore, it is difficult to separate science from values in many cases as changing scientific models often involves changing values and assumptions.[39] (Norton, 2015) The relation between the knowledge systems of science and ethics must be better recognized and balanced to help us understand not only how to reach the SDGs, but also *why* we aim for sustainability in specific ways. (Dahl, 2010) The emphasis on the scientific side of the SDGs is not necessarily meant to disregard the importance of values, but it can place science in such a dominant role that it weakens its contribution to value problems. (c.f. Clark and Dickson, 2003)

3.3.2 Three indicator frames for norms and values

Here it is hypothesized that the main norms and values in the context of transition governance can be differentiated into three indicator frames, each of which involves a different level of analysis:

1. Universal or 'meta' norms and values refer to principles that guide overall behaviour in societies (e.g. justice and equity, sustainable development, gender equality, etc.)
2. Norms and values that smoothen overall human cooperation processes and build social capital (e.g. general trust, mutuality and reciprocity)
3. 'Regulatory norms', or rules, delimitate the conduct of individuals and groups and indicate obligations and prohibitions. This includes values that can be considered to be important specifically for traditional forms of top-down governance (e.g. trust as expressed in legitimacy and accountability). (Hufty, 2011)

[39] Ethics are important in scientific research (research ethics). Whereas the origins of research ethics lie in medical science and are based on protecting a weaker research object (patient) from a powerful doctor, in social science the roles can be reversed often when a researcher has powerful objects as research subject.

In the following these three indicator frames are discussed, starting with justice and equity, followed by the second category of trust which covers both cooperation values ('horizontal trust') and the specific governance values of legitimacy and accountability ('vertical trust'). Finally, inclusiveness (pluralism and respect for diversity) is presented as the third indicator frame for norms and values.

3.3.3 Norm indicator frame 1: Equity – Justice and fairness

No study on governing sustainability transitions such as the SDGs would be complete without a consideration of the relevant justice and equity aspects. Whereas justice is an end to be achieved, equity in climate governance is a means to reach that objective. The Oxford Dictionary equates equity with "being fair and impartial". In governance practice, equity is closely linked with information sharing, meaningful participation and accountability in decision-making.

In fact, for Rauschmayer et al. (2013), sustainability transitions are societal phenomena that target to improve justice. Sachs and Santarius (2007) argue that considerations of justice award legitimacy, and that justice considerations can be a unifying principle that may be useful for making climate policies socially acceptable, implementable and effective. Perceived justice and fairness are affected both by policy features and individual perceptions, and can strongly affect responses to policies. (Dreyer and Walker, 2013)

Justice is "the practical expression of awareness that, in the achievement of human progress, the interests of the individual and those of society are inextricably linked." (Baha'i International Community, 1995) Further, "justice is not merely about trying to achieve, or dreaming about achieving, some perfectly just society or social arrangements, but about preventing manifestly severe injustices." (Sen, 1999: 21)

Justice is a good example of a topic where more convergence among disciplinary discourses can engender collective action. Sociologists speak of social justice, social psychologists of perceptions of justice, lawyers call it equity, resource analysts talk of access, economists of distribution, geographers of environmental justice, and political scientists of fairness.

The SDGs are grounded in human rights norms and are intended to be universally applicable. Human rights law recognizes that humans are entitled to individual 'access to

justice'. In this context, formal justice (e.g. equal treatment), procedural justice[40], distributive justice[41], corrective justice, and equity are relevant. (Petersmann, 2012)

3.3.4 Norm indicator frame 2: 'horizontal' and 'vertical' trust

Trust refers to the positive expectation that other actors will refrain from opportunistic behaviour, even when they have the opportunity to do so. (Edelenbos and Klijn, 2007) Thus, trust is "the expectation that arises within a community of regular, honest, and cooperative behaviour, based on commonly shared norms, on the part of other members of that community" (Fukuyama, 1995: 26). Trust is thought to be especially important when dealing with complexity because vertical means of control are difficult given the interdependencies between actors. (Klijn et al., 2010) Two types of trust which are relevant to governance for the SDGs can be identified. The first is 'horizontal' trust, or social capital. This is the trust between equal partners which enables cooperation on implementing the SDGs. The second type of trust is 'vertical' trust (accountability and legitimacy).

3.3.5 Norm indicator frame 3: Inclusiveness and pluralism

Through global change, the overall production of culture and of societies is transforming towards growing interconnectedness, chaos and complexity in a multidimensional, dynamic, deterritorialised, and ephemeral reality. (Appadurai, 1996) Global governance can lead to inclusiveness and diversity if it involves a 'multi-actor governance system': NGOs, activist groups, business associations, policy research institutes, networks of scientists, companies (e.g. through the Global Compact and WBCSD), and IGOs are all enriching the governance field.

Transition management, metagovernance and experimentalism in themselves are inherently engaged with the ways in which the diversity of scales, institutions, sectors, norms, and understandings of sustainability contribute to the need for studying pluralism in sustainability governance (Davidson and Frickel, 2004).

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40 Procedural justice is concerned with fairly including people and communities in decision-making about energy systems.

41 Distributive justice entails equitably sharing the benefits and burdens of e.g. energy production and consumption across individuals and societies.

The relevance of inclusiveness and diversity for governing sustainability transitions

Inclusiveness and diversity have a great number of benefits for governing implementation of the SDGs. First, inclusiveness and diversity can provide for the multitude of different observations and reflexive approaches in various function-systems which allows society to adapt. (Van Assche et al., 2010) Diminishing this diversity would lead to de-differentiation and would not be able to address ecological questions at the same level of complexity.

Second, diversity and differentiation need to be safeguarded as they enable adaptation and innovation.[42] Thus, inclusiveness and diversity further help confer resilience and robustness. (Stirling, 2011)

Third, diverse, polycentric governance systems of multiple decision centres and overlapping jurisdictions may offer possible solutions to the governance challenges created by heterogeneity of beliefs, values, identities, preferences and endowments in a world transformed by globalization and an ongoing technological revolution. Although such diversity may increase complexity, progress on climate change will require critical analysis of assumptions and beliefs, a goal best reached through engaging with a complex diversity of voices and ideas. (Nisbet, 2014)

Fourth, Hahn et al. (2014) find that organizations that include managers from different cognitive types are more successful in managing sustainability issues.

Fifth, diversity has benefits as it facilitates the diffusion of ideas, norms, strategies and practices (Andonova and Mitchell, 2010) and offers benefits for sustainable development (Kemp et al., 2005: 15). It is a source of learning and "the fuel for evolution" (ibid.) and a resource base for adaptation and reorganisation (Rammel and van den Bergh, 2003). For Landemore (2013: 103), "it is often better to have a group of cognitively diverse people than a group of very smart people who think alike." Therefore cultural

[42] Studies on product development (e.g. Lester and Piore, 2004) show that radical innovation involves combinations across different fields (e.g. smart grids draw on ICT and traditional network technologies, medical devices draw from basic life sciences and clinical practice, aviation technologies draw from defense and aerospace technologies). Friction between different systemic frames and discourses can thus challenge the status quo. (Stark, 2009) Engagement between different fields can also support innovation by redistributing risk and enabling innovation by communal absorption of risks taken by innovative actors. But this tool also has limits, as the example of innovative banking in the financial crisis shows.

diversity can be important for enhancing the capacity for adaptation and transformation (also see O'Brien, 2009; Jessop, 2003: 8). Also in system theory (e.g. Luhmann, 1995) it is held that diversity promotes resilience and uniformity breeds fragility.[43]

The relevance of cultural diversity for governing SDG implementation

Appreciating cultural diversity in governance has its own set of benefits. Institutions, instruments, processes and actor involvement should be based on compatibility of values and traditions. The meaning of 'sustainable development' (also see chapter 1) which originates in individualist, Western countries may have very different meanings in other, more collectivist societies.[44] Similarly, it is important to note that 'short term versus long term' thinking (one of the barriers to transition governance that was identified in chapter 4) and more generally the concept of time can be understood differently from culture to culture and can be difficult to integrate in human behaviour.

The importance of diversity for sustainability was confirmed in a letter that a group of almost 240 scientists and conservation leaders published in the journal Nature, requesting increased diversity in environmental governance. (Tallis and Lubchenko, 2014) This diversity could result from embracing all plausible conservation actors, from corporations to governmental agencies, faith-based organizations and interested individuals (the writers of the letter emphasize gender equality). Lack of diversity among individual climate change practitioners has been identified as one reason why climate change fails to engage a more diverse set of stakeholders. (Pearson and Schuldt, 2014)

At the same time, the diversity of arguments that exist in environmental debates is given as exactly the reason why these debates are unresolvable (Myerson and Rydin, 1996: 30; Hulme, 2009). A plurality of interests can cause conflicting goals, also between different parts of the same government and lead to policy incoherence and legislative or bureaucratic stalemates. (Hoberg, 1992)

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43 Luhmann (1995) distinguished three types of social systems: interactions (conversations), organizations, and function systems (the systems of communication that fulfil a function in (global) society at large, e.g. law, economy, politics, religion, science and education). This conceptualization of social systems rejects the idea that systems should be based on hierarchical relations and control from higher levels. Luhmann argues that society is a polycentric collection of interacting social systems.

44 Many well-known models of value patterns, like Maslow's hierarchy of human needs, have a strong Western bias. In Maslow's model, individualist self-actualization constitutes the top of the pyramid, whereas in collectivist countries (e.g. China) the basic need is belonging, and self-actualization concerns societal needs (Gambrel and Cian-ci, 2003). The individualist/collectivist divide is one of the five indexes with which intercultural differences have been explained by Hofstede (2001).

From a metagovernance point of view, one problem of an exclusive use of hierarchical governance is that it does not necessarily match with cultural preferences. If culture is "the values, attitudes, beliefs, orientations, and underlying assumptions prevalent among people in a society" (Huntington 2000: xv) and cultures are a dynamic pattern of assumptions in a given group (Schein 1987: 9), then hierarchical, network and market forms of governance are also reflections of cultures. Governance for the SDGs may be more successful if it is based on the consideration of culture and cultural diversity as an indicator for optimal combinations of hierarchical, network and market governance. (Meuleman, 2012b: 45)

4. Inferences on improving integrative governance for the SDGs

In previous sections the main theories were analysed and key indicator frames for effective and coherent transition governance were identified. In line with the research question "which inferences can be drawn from existing literature and the case studies together on the areas in which Integrative Governance for the SDGs should be more encompassing than sustainability governance?", this chapter takes these findings one step further by suggesting three actions that can be taken to increase the effectiveness and coherence of governance for the SDGs at both the individual and the collective (community, organization, institution, societal etc.) levels. These inferenced actions are:

- Inference 1: Considering behavioural insights
- Inference 2: Addressing complexity through systems deliberations
- Inference 3: Mobilizing 'crisis' for change and collective action

These inferences are highly complementary with the theoretical pillars and indicator frames in the previous chapter and in fact build on them.

4.1 Inference 1. Considering behavioral insights: the human dimension of governance

So far, research on sustainability governance has focused largely on institutional actors and on the proximate drivers of governance (e.g. technology and demographics). Decision-making and behaviour at the individual level which ultimately drive societal change have received much less attention. (Clayton et al., 2015) It can be argued that it is crucial to examine the role of psychological research[45] in order to understand human behaviour and motivations that can lead to effective sustainability governance. In the case studies and especially the interviews and observations it became clearer that governance emanates both from organisations and institutions and *through* individuals. Well-functioning institutions require the inputs from capable individuals. Also, sustainability transitions are highly dependent on both collective action and the individual leadership and choices that constitute collective action. Therefore, any integrative social science study at some point needs to take human nature into account if it wants to reflect the functioning of human agency realistically in the light of structural, deterministic

[45] Psychological research applies empirical methods to investigate individual perceptions and cognitions, individual and collective behaviors, and psychological well-being. This research incorporates physiological, cognitive, affective and interpersonal processes, as well as factors in the social, cultural, biophysical and environments of individuals. (Clayton et al., 2015)

limitations to sustainability governance. Many governance theories meanwhile disregard the role of the individual and assume that humans have sufficient agency to govern society towards sustainability. This section questions that omission and argues that an understanding of behavioural barriers, human will, self-interest and other insights in human functioning are critical for strengthening the effectiveness and coherence of transition governance.

Therefore, sustainability governance and international relations can no longer avoid the findings of neuroscience and psychology that human thinking is 'predictably irrational'. Brosch et al. (2014) indeed argue for integrating concepts from several branches of the behavioural sciences such as economics, social psychology and affective science into the study of how decision-making and behaviour related to energy use as affective and cognitive processes are closely entwined. Emotions may play an important role in individual decisions and behaviours related to sustainable energy, over and above considerations of utility, beliefs, and behavioural norms.

Barriers to action on sustainable development

While the SDGs are too broad and young for analysis of their behavioural aspects, behavioural insights related to climate change have been well documented over recent years. Humans for example are inclined to denialism, and this can be a barrier to climate action (cf. Norgaard, 2011). The phenomenon of disattention to the impacts from climate change is particularly prevalent in communities struck and threatened by climate-related disasters.[46] Marshall (2014) finds that communities recovering from disasters tend to have a high spirit of cooperation and communal endeavour, and they do not want to be confronted with the possibility of future calamities from climate change. They become intolerant of divisive issues like climate change, which they see as a threat to the reestablishment of normality.

[46] In Florida (the US state most susceptible to rising sea levels), state environmental officials are ordered not to use the terms "climate change" or "global warming" in any government communications, emails, or reports.(http://www.miamiherald.com/news/state/florida/article12983720.html#storylink=cpy)

Climate change evokes fear, guilt[47] and helplessness. The 2015 Human Development Report (UNDP, 2015) acknowledges this and dedicates a full chapter to the behavioural[48] and cognitive aspects of climate change governance. The chapter states that inertia in behaviour related to climate change arises both from economic incentives and psychological and ideological sources. Recent research further shows that perceptions of climate change risk decline as scientific literacy and numeracy increase. (e.g. Kahan et al., 2011 and Kahan et al., 2012) Therefore, knowledge alone may not be as strong a driver for sustainability transitions as it is often believed to be.

Besides the irrationality of much of human behaviour, a primary reason why sustainability-change initiatives often fail to achieve their goals is that they fail to change the underlying culture, thought patterns, outlook and behaviour of stakeholders. (Doppelt, 2003)

Gifford (2011) and Leggett (2013) discuss some other key categories of psychological barriers that can be linked to climate governance. Amongst these are a limited cognition about the problem of climate change (ignorance, endowment effect[49], environmental numbness, uncertainty, loss aversion, judgmental discounting[50], optimism and status quo biases, ideological worldviews (e.g. capitalism, system justification[51] and technosalvation) that tend to preclude climate action, discredence toward experts and authorities (mistrust), perceived risks, and positive but inadequate behaviour change (e.g. rebound effects).

More specifically, Stavins (2015) sees behavioural barriers to adoption of energy efficiency measures in inattentiveness and salience, myopia and short-sightedness,

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47 One interviewee (Pier Vellinga) suggested that the reason why the Netherlands is the biggest donor for UNEP and why Norway is the biggest donor for forestry/REDD+ projects is that they feel 'guilty' about their fossil fuel production and energy intensive industries/trade activities.

48 Behavioral sciences deal with the activities and interactions of all organisms in the natural world. Psychology is a subheading under behavioral sciences that is focused on mental processes and behaviors.

49 In psychology and behavioral economics, the endowment effect is the hypothesis that people ascribe more value to things merely because they own them. (Roeckelein, 2006)

50 Discounting here refers to the undervaluing of distant or future risks.

51 System justification refers to the tendency to defend and justify the societal status quo. In other words, system justification is about the way in which people counter such unease and "are motivated to justify and rationalize the way things are, so that existing social, economic and political arrangements tend to be perceived as fair and legitimate" (Jost and Hunyady, 2005).

bounded rationality and heuristic decision-making, prospect theory[52], and systematically biased beliefs.

Markowitz and Shariff (2012) further identified six reasons why, "unlike financial fraud or terrorist attacks, climate change does not register, emotionally, as a wrong that demands to be righted." Among those reasons are 1.) the abstractness and cognitive complexity of climate change, 2.) the blamelessness of unintentional action (we all contribute to climate change), 3.) guilty bias which provokes self-defensive bias, 4.) uncertainty of climate science breeds wishful thinking, 5.) moral tribalism (the politicization of climate change fosters ideological polarization), and 6.) long time horizons and faraway impacts of climate change. Markowitz and Shariff argue that tapping into existing, emotionally positive moral values and social norms is a psychological strategy that can be used to bolster the recognition of climate change.

Finally, psychology as a 'hub' discipline with origins in physics, physiology and philosophy allow it to span disciplinary boundaries between social and natural science, and humanities. (Clayton et al., 2015) As such, psychology may offer opportunities for interdisciplinary collaborations and provide insight about organizational dynamics that can enhance the effective functioning of multidisciplinary teams. (ibid.)[53]

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[52] Prospect theory (Kahneman and Tversky, 1979) states that humans have an irrational tendency to be less willing to gamble with profits than with losses. This implies that losses are perceived as being bigger than gains of equal size.

[53] One example of a psychological approach that may be useful for both individually and collectively dealing with the complexity and dynamics of sustainability governance is Gestalt psychology. Gestalt theory is based on understanding our ability to acquire and maintain meaningful perceptions in a seemingly chaotic world. The central principle of Gestalt psychology is that the mind (just like society) forms a global whole with self-organizing tendencies instead of just collections of simpler and unrelated elements. This principle maintains that when the human mind (perceptual system) forms a percept or gestalt, the whole has a reality of its own, independent of the parts. Gestalt therapy aims to let a person deal with change by letting him become what he is already, instead of forcing change within the classical hierarchical therapist-patient relationship. It is claimed that gestalt theory can also be applied to social systems, that orderly change within dynamic and fragmented social systems is in the direction of integration and holism. This requires that the system becomes conscious of alienated fragments within and without so it can bring them into the main functional activities by processes like empowerment of the individual. This should lead to communication with other subsystems and facilitate an integrated, harmonious development of the whole system. Confronted with a pluralistic, multifaceted, changing society, the individual is left to his own devices to find stability. He must do this through an approach that allows him to move dynamically and flexibly with the times while still maintaining some central gyroscope to guide him. He can no longer do this with ideologies, which become obsolete, but must do it with a change theory, whether explicit or implicit. The goal of Gestalt therapy becomes not so much to develop a good, fixed character but to be able to move with the times while retaining some individual stability.

When the motivation for more sustainable behaviour is exclusively extrinsic, people will focus on maximizing rewards, gaining competitive advantage and avoiding sanctions instead of sharing knowledge and collaborating for addressing a common interest or public good. Intrinsic motivation on the other hand can improve transition governance by building up values such as trust, collaboration, shared motivation and commitment to public goods. (Bao et al., 2013)

4.2 Inference 2. Addressing complexity through systems thinking

The transitions which are required for implementing the SDGs are characterized by complexity, the diversity of stakeholders that need to be involved, and the adaptation of established development expectations. If 'civilization' was the major idea underpinning social and political thought in the 19th century, and was developed into the metanarratives of "development" and "modernization" in the 20th century, then a prominent narrative underpinning the reconsideration of governance in the 21st century is the concept of "complexity". (Walters, 2004)

There is a difference between problems that are merely complicated and those that are genuinely complex. Complicated tasks such as building a hospital can be broken down into individual steps or components that can be managed, top-down, to achieve the objective. Complex problems will not yield to such a strategy. Within the SDG agenda there are a mix of both types of problem so it is vital to distinguish between the two and adopt the most appropriate strategies.

Complex problems need to be approached holistically and through a more integrated approach which is propounded in this report. For example, the challenges of sustainable urbanisation (SDG 11) include elements of infrastructure, employment, public services and environment all of which need to be drawn together to truly address the challenge of creating successful, liveable cities.

The complexity paradigm originates in mathematical studies of organic systems and has entered the field of social studies, including theories on governance and leadership. Whereas complicated systems are composed of different interacting parts whose behaviour follows a precise logic, repeats itself and is predictable, complex systems are subject to dynamics that are often beyond control, do not follow regular patterns, and are not reducible to the interactions at the level of the system's composing parts (they are 'emergent'). (Probst and Bassi, 2014) Both metagovernance and

transition studies are based on the complexity paradigm. (De Haan and Rotmans, 2011; Meuleman 2008)[54]

4.2.1 The benefits of systems thinking in governance for the SDGs

According to Dahl (2012) and Capra (2002), sustainability problems are the result of failures of holistic thinking.[55] Many aspects of our unsustainability are due to the failure to consider the environmental consequences of our consumption and production patterns which are dismissed as "externalities". Systems thinking can assist in viewing complex systems from a broad perspective that includes seeing overall structures, patterns and cycles in a system, rather than only individual events.

The systems concept highlights the fact that a broad variety of elements are tightly interrelated and dependent on each other (cf. Finger et al., 2005). System-level problems, such as most sustainability challenges, require "a different policy approach: a long-term, integrated approach addressing problems of uncertainty [56], complexity, and interdependence" (Kemp and Loorbach, 2003: 3). This makes strong policy coordination necessary that can integrate innovation, economic, environmental and other policy areas. (Scrase and Smith, 2009: 718)

Thinking systemically is performed through a dynamic cycle of action, observation/reflection and consultation among stakeholders. It means thinking about the different aspects of a system or process, and integrating all the dimensions and their

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[54] There are three levels of dynamics in complex systems: the agent level; the system level; and the context level. These levels bear strong similarities with the three levels of landscape, regimes and niches in transition management's multi-level framework.

[55] One example that Dahl gives of the lack of holistic thinking is the global financial crisis of 2008. The financial crisis is widely acknowledged to have been caused by an overconfidence in scientific tools of risk assessment for each financial product without considering the overall behavior of the system. Risk assessment indeed should be separated from risk management. Whereas the former addresses the question "what are the likely consequences?" and can be based on science, the latter asks "what should we do about it?" and is normative. Technical information is not enough for making choices about the social consequences of sustainability governance. (Gregory et al., 2006)

[56] As Frantzeskaki (2011: 3) explains, there is a difference between complexity and uncertainty when referring to systems and their processes: "Complexity refers to the characteristic of the subsystems of a system and it is a property of the system. When we know the subsystems and functions of a system but its interdependencies and processes are too nested and too intertwined to disentangle, the system is characterized as complex. Uncertainty refers to the inability to foresee how processes or phenomena will develop over the long-term and/or the unknowability of these processes. The distinction between complexity and uncertainty relies on the dimension of time: uncertainty relates to the time dimension whereas complexity as a property is indifferent or, better, unrelated to time."

interactions. (Sterman and Booth Sweeney 2002: 32) Systems thinking enables breaking down complexity into sub-systems and exploring interlinked information loops of feed-back and feed-forward. Systems thinking both allows for and necessitates crafting the procedural and substantive conceptual framework which is envisioned in this report. Systems thinking further offers a framework for distinguishing exogenous and systemic forces for transitions.[57] There is growing evidence that perceptual processes are influenced by culture. Westerners tend to engage in context-independent and analytic perceptual processes by focusing on a salient object independently of its context, whereas for Japanese it is more natural to engage in context dependent and holistic perceptual processes. In other words, for Japanese it may be more straightforward to apply systems thinking by appreciating the relationship between the object and the context in which the object is located. (Nisbett and Miyamoto, 2005)[58]This may have important implications for implementing the SDGs.

4.2.2 A structured method for (collective) systems thinking

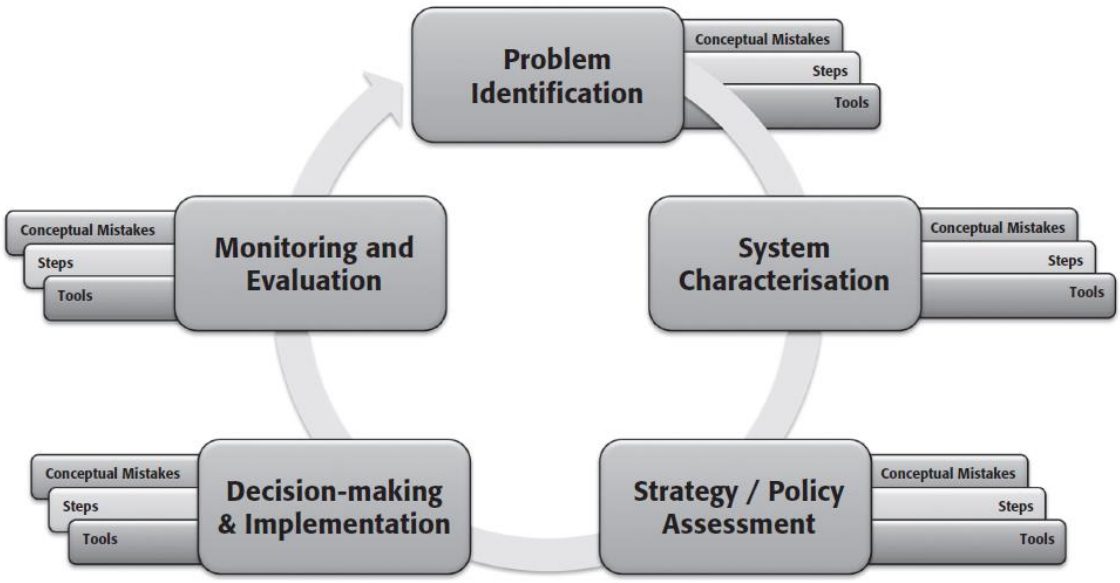
Probst and Bassi (2014) discuss systems approaches[59] to complexity governance and propose a decision-making cycle which is very similar to the experimentalist governance and the transition management cycle in terms of the problem identification, decision-making and monitoring steps. However, Probst and Bassi add two steps in the process: system characterization and strategy/policy assessment (see Figure 3 below).

[57] Systemic forces are exercised and/or act within the system, while exogenous forces are present and exercised upon the system (from outside the system).

[58] http://webcache.googleusercontent.com/search?q=cache:4ivAOdrVFewJ:smash.psych.nyu.edu/courses/spring10/lhc/materials/nisbett.pdf+&cd=1&hl=ja&ct=clnk&gl=jp

[59] The systems approach is based on the observation that, when each part of a system performs as well as possible, the system may not perform as well as possible. This follows from the fact that the sum of the functioning of the parts is seldom equal to the functioning of the whole. Accordingly, the synthetic mode seeks to overcome the often-observed predisposition to perfect details and ignore system outcomes." (Blanchard and Fabrycky, 2005: 15-16) The fundamental conceptualization in systems thinking is that by understanding the structure of the system its behavior can be explained.

FIGURE 4 THE DECISION-MAKING PROCESS BASED ON SYSTEMS THINKING



(Source: Probst and Bassi, 2014)

The first additional step, system characterization, is needed for going beyond simple causal models to solve complex problems. (Damer, 2009) Decision makers across different sectors and expertises need to engage continuously and effectively in order to avoid overlooking the dynamic complexity of implementing the SDGs.

The second additional step, strategy or policy assessment, should be based on the premise that "the system always kicks back" (Gall, 1986: 27)[60], that governance of complex systems should be adaptive, and that solutions should consider a system's learning capabilities. Carrying out an integrated assessment of strategies and policies can be done in three steps (Probst and Bassi, 2014):

1. Designing potential interventions (based on the system characterization and in the form of investments, (dis)incentives (e.g. taxes and subsidies) and regulations/standards);
2. Assessing interventions (e.g. through scenario building and envisioning); and
3. Selecting effective and efficient intervention options (e.g. through a cost-benefit or multi-criteria[61] analysis) and indicators.

60 http://books.google.ch/books/about/Systemantics.html?id=DT4mAQAAMAAJ&redir_esc=y

61 E.g. the costs of inaction in terms of economic, biophysical, social and cultural damage across the different systems elements.

4.2.3 Policy Coherence for (Sustainable) Development

The EU and the OECD have started to respond to calls for dealing with complexity and creating more coherence in sustainable development policy by promoting the concept of 'Policy Coherence for Development' (PCD)[62]. PCD is an effort to deal with complexity in governance practice, and entails:

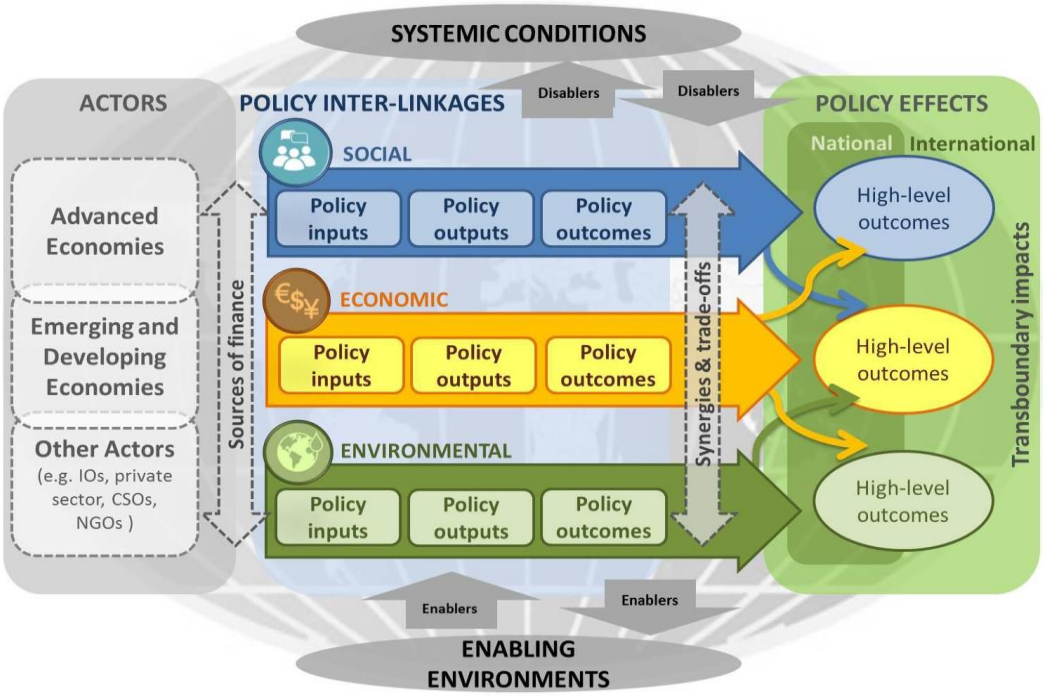
- ensuring that the interactions among various policies in the economic, social, environmental, legal and political domains support countries on their pathway towards inclusive sustainable growth;
- putting in place institutional mechanisms, processes, and tools to produce effective, efficient, sustainable and coherent policies in all sectors;
- developing evidence-based analysis, sound data and reliable indicators to inform decision making and help translate political commitments into practice; and
- fostering multi-stakeholder policy dialogue to identify the barriers to, and the catalysts for, change. (OECD, 2015)

More recently, the OECD has used the term Policy Coherence for *Sustainable* Development. The analytical framework below provides the basis for the OECD's (2015)[63] definition of policy coherence for sustainable development (PCSD). It can help facilitate the design and implementation of policies to consider the:

(i) diversity, roles and responsibilities of different actors as well as sources of finance – public and private, domestic and international;
(ii) policy inter-linkages across economic, social and environmental areas, including the identification of synergies and trade-offs;
(iii) non-policy drivers, i.e. the enablers and disablers at global, national, local and regional levels for sustainable development outcomes; and
(iv) policy effects, i.e. transboundary and temporal impacts.

62 According to the PCD approach, governments need to design more effective policies that not only avoid impacts that adversely affect the development prospects of other countries but that also enhance capacities to exploit synergies across different policy areas (e.g. trade, investment, agriculture, environment and development co-operation).
63 www.oecd.org/development/pcd/Note%20on%20Shaping%20Targets.pdf

FIGURE 5 ANALYTICAL FRAMEWORK FOR POLICY COHERENCE FOR SUSTAINABLE DEVELOPMENT



(Source: OECD/PCD-Unit, inspired by UNECE/OECD/Eurostat:

Task Force on measuring sustainable development)

4.3 Inference 3. Mobilizing 'crisis' for change and collective action

4.3.1 Crisis in the context of climate change and sustainable energy

According to Bachmann (2013) emergency response action has been one of the prime 'sources' of environmentalism. However, as observed by the author, there has been a taboo on arguing that large-scale disasters are needed for moving towards effective climate governance. The tide is changing though, and the interviews[64] confirmed that practitioners realize that disasters can bring about paradigm shifts.

Confino (2015) claims that it will take a disaster of unprecedented proportions to wake business leaders up to the need to take radical action on sustainability.[65] Although awareness of sustainability has grown with CEOs, many business executives and

64 E.g. Interview in person with Maryke van Staden (ICLEI) in Geneva on 3 July 2013

65 theguardian.com/sustainable-business/2015/jan/13/business-leaders-not-taking-sustainability-seriously

investors are still ignoring the reality of climate change, resource scarcity, social injustice and biodiversity collapse. (Kiron et al., 2015) Indeed, Polanyi (1944) suggests that enterprises in a capitalist economy cannot change their environmental practices far or fast enough to avert environmental crisis (not even forced by more active government regulation). The environmental crisis has gone so far and is progressing so quickly that regulatory measures—at least those that are politically and economically feasible today – are unlikely to materialize anytime soon. The Stern Report, for example, estimated that reducing CO2 emissions any faster than 1 percent a year would precipitate economic recession. (Stern, 2007: 231–232)

The widely-perceived assumption that crisis is needed as a driver of transitions is largely since governance systems are virtually impossible to change because such change requires substantial changes in power and dominant resource structures. The scale of the challenges such as climate change requires radical rethinking of existing governance systems. The change in power, knowledge and norms that is required for decarbonisation is so profound that it is very unlikely that in a business-as-usual scenario either climate change or financial instability will be addressed up to the level that severe future disruption is averted.[66] Efforts to reform oversight of financial markets shows how banks can hold governments at ransom by threatening to sell (or stop buying) government bonds. Likewise, fossil fuel companies can argue that radical action on climate change may cause the carbon bubble (i.e. locked-in investments in the fossil fuel industry that may become worth less) to burst, taking the global economy down in their slipstream.

Crisis is inherent to transitions, as transitions often are pursued in response to problems or crisis.[67] Galaz et al. (2008: 174) argue that crises can trigger change given that they "can open up space for new interactions". Crises may not be desirable and they may not be a necessary precondition for positive change as incremental improvements in sustainability need to be pursued even if at times crisis seems necessary for creating the

[66] Vice versa, it is suggested that environmental shocks can expose and topple governments that are corrupt, unresponsive, elitist or inefficient (Pelling, 2011). This is important as Flagg (2015) hypothesizes that corrupt states that are led by small elites tend to ignore the public good and are less likely to make climate pledges.

[67] Grin et al. (2010:1) define a sustainability transition as a "radical transformation towards a sustainable society as a response to several persistent problems confronting contemporary modern societies".

momentum for systemic transitions. However, crises can be one source[68] of change and the "constructive destruction" of the societal system. (Scott, 1998: 97) Crises can function constructively for political actors that initiate or propose the implementation of institutional change as a response to these crises.[69] (Razin, 2004) In a seminar on climate change in Geneva in July 2015, one World Bank economist argued that "when a situation becomes salient, we see what is doable and the innovativeness that is innate to people comes to the fore".

4.3.2 Example of crisis driving change: Japan's 2011 tsunami

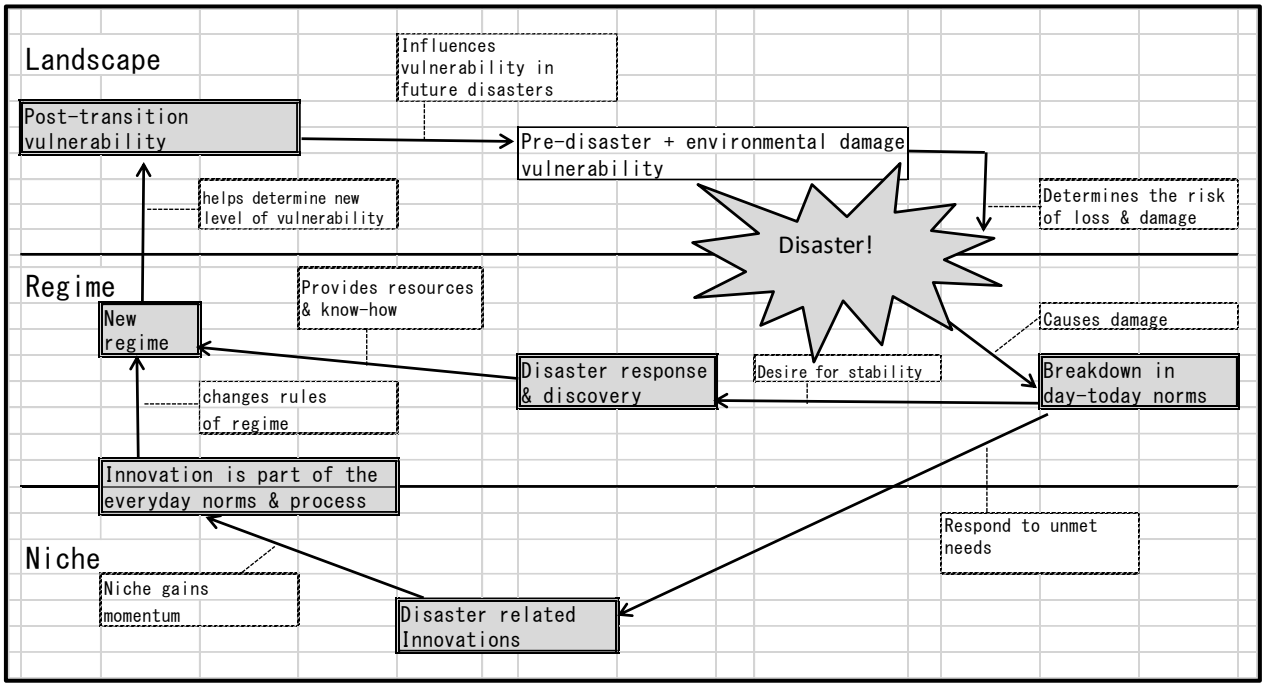
The author made a Visiting Research Fellow (VRF) study visit to Sendai to understand the disaster of the tsunami better that hit the Miyagi coast on March 11, 2011. The author was interested in the reconstruction of the area, and in the ways that the area has become more resilient for future disasters (especially with an eye on a rising sea level due to climate change).

The author was especially curious to understand the disaster from the perspective of transition theory (also see section 2.1 above). He was interested to know whether the tsunami of 2011 could have triggered some transitions in Miyagi prefecture. To understand what had happened, the author produced Figure 5:

[68] Osborne and Brown (2005) in fact accept that the cause of emergent change in public organizations is limited to two critical factors: politics and crises.

[69] Despite this enthusiasm over the potential for crisis to evoke change, it is important to realize that institutional theorists and political theory scientists have the tendency to use the term 'crisis' as an umbrella concept to describe any type of inefficiency or pathology of the system, or any type of unanticipated events. (Frantzeskaki, 2011) Therefore, it is important to distinguish between different types of triggers for collapse, namely: system failures or institutional failures to describe discrepancies (inefficiency, ineffectiveness), exogenous events to capture events exogenous to the system that influence its operation and crisis that are uncertain events of high impact that shock the system. (ibid.) From a transition perspective, collapse differs from adaptation or regime shifting in the sense that there is no institutional response and a lack of initiative from actors (as manifested by the presence of Niches or new practices).

FIGURE 6 THE 2011 TSUNAMI DISASTER EXPRESSED IN A MULTI-LEVEL TRANSITION FRAMEWORK



(Source: the author.)

The explanation of Figure 5 is the following: The Landscape (top left) refers to the surroundings of the societal system under study, where one sees macro-trends with a relatively slow progress and developments with a high autonomous character. 'Regime' (middle left) here is the most 'dominant' societal constellation that shares a set of rules and that can control the stable functioning of a societal system and defends the status quo (e.g. nuclear power industry).

Niches (bottom left) refer to those arrangements in which innovation can develop. Niches are part of the societal system, but they can deviate from the dominant structures, cultures and practices.

Based on this theory and on the Figure above, the author asked 1.) what were the disaster-related innovations (in the niches); 2.) how did these innovations affect every day governance and the regime; and 3.) how did these changes affect the region's resilience and lower its vulnerability.

The answer from the Prefecture was that there has been institution building rather than reform of existing procedures and institutions. For example, at the national level a Ministry of Disaster Recovery was created. This made me doubtful about the theory that

disasters trigger transitions, as I had expected that the 2011 disaster would have triggered some transitions. Probably more in-depth research is warranted on this issue.

The author then asked what the drivers and barriers for the recovery and reconstruction are. In terms of drivers, the government spokesperson explained that international support and the cooperation between different levels of government had been very important. In terms of barriers, it has been difficult to consult with citizens for several reasons. Mainly, the solutions offered by the government may not be the solutions that the population prefers. For example, the idea of sea walls that the government prefers to prevent future flooding has been unpopular with the population (e.g. because the walls block the view of the ocean that residents have traditionally enjoyed).

The author finally asked whether the impacts from climate change and adaptation to a rising sea level have been considered in reconstruction effort. This seems not to be the case. This raises the question: if a highly-advanced country like Japan cannot integrate climate change adaptation in its planning based on a systems thinking approach (also see section 4.2 above), then are there any other countries that can do this?

5. Case studies

5.1 Case study 1: Energy efficiency and the SDGs

SDG number 7 to "Ensure access to affordable, reliable, sustainable and modern energy for all" contains three targets, i.e.: i.) doubling the global rate of improvement in energy efficiency by 2030, ii.) doubling renewable energy in the global energy mix; and iii.) provide universal access to affordable, reliable and modern energy services. Of these three elements, renewable energy and energy access has typically been prioritized compared to energy efficiency. However, the prominence of energy efficiency has risen on global, regional, national and sub-national agenda's reflecting the low cost and array of multiple benefits on offer.

Doubling the rate of improvement in energy efficiency means that the energy intensity (primary energy demand divided by GDP in real terms; see also footnote 12) needs to be raised from a baseline over the period of 1990-2010 of 1.3 per cent per year to an average annual 2.6 per cent improvement between 2010 and 2030 (IEA and WB, 2015).

It is widely recognized that improving energy efficiency is a vital condition for implementing global mandates that are both directly and indirectly related to the SDGs, such as those provided by the Paris Climate Agreement, the Sustainable Energy for All (SE4ALL) initiative [70], and the Clean Energy Ministerial [71], among others. The prominence of energy efficiency has grown in recent years and there is a need for clarifying the linkages with the other SDGs. This paper addresses that need by identifying the linkages between energy efficiency and the achievement of some specific SDGs. The main research question that this section addresses is:

What contributions can energy efficiency make to achieve the SDGs?

This question will be addressed through answering the next sub-questions:

- What are key terms and concepts related to energy efficiency?
- What are the drivers and barriers for energy efficiency?

70 http://www.SEforall.org/
71 http://www.cleanenergyministerial.org/

- How can energy efficiency be a conceptual 'vector' for connecting different SDGs?
- Which governance approaches and tools are available for increasing the likelihood that energy efficiency will contribute to achieving the SDGs in a coherent manner?

The topic of energy efficiency is relevant for Japan because Japan has long been known as a global leader in the area of energy efficiency improvement in sectors such as industry, transport, buildings, machinery, and household appliances. Beyond domestic efforts and major improvement in energy efficiency, the Japanese government promotes investments and sharing of expertise in energy efficiency programs in the developing world with funding from its Official Development Assistance (ODA).

5.1.1 What is energy efficiency?

The International Energy Agency (IEA) defines energy efficiency as "a way of managing and restraining the growth in energy consumption."[72] A common operational definition of energy efficiency is "using less energy to provide the same service" (Lawrence Berkeley National Laboratory). The term 'sustainable energy' generally includes both energy efficiency and renewable energy.

5.1.2 Barriers to improved energy efficiency

The barriers and drivers for improved energy efficiency are well known and so are the required economic and technological tools. The barriers are usually divided in six main categories: economic impediments (e.g. investment risks, fossil fuel subsidies, and low cost of energy); gaps in knowledge and awareness; cultural and behavioural barriers (e.g. public apathy and inertia); governance (e.g. lack of leadership and institutional barriers); aesthetic and environmental challenges; and technical barriers.

5.1.3 Drivers for improving energy efficiency

Some main drivers for implementing energy efficiency measures can be pointed out. Awareness of benefits for both individuals and society plays a crucial role (Reddy, 2013). Although educational and promotional activities are important, a high level of awareness is usually not sufficient to attract private investment and guarantee market success.

[72] Also see: https://www.iea.org/topics/energyefficiency/

Economically, the price of a technology is an important factor to determine its market penetration. Behavioural factors (e.g. appeal of a technology) play a role as drivers as well.

There are many co-benefits on offer from of energy efficiency beyond traditional energy savings and emissions reductions at the national and consumer level. At the national level, the co-benefits include improved air quality, positive impacts on public budgets and job creation among others (IEA, 2014; Puig and Farrell, 2015).

Finally, environmental regulations can drive investments in energy efficiency. Environmental regulations (e.g. taxing carbon emissions) can force producers and consumers to internalize externalities such as climate change into the price of their energy goods and services, and drive energy efficiency.

5.1.4 Energy efficiency across the SDGs

Those concerned with SDG7 on sustainable energy must take into account targets that refer to other goals, which may provide stronger incentives than in the past for cross-sector, integrated work. Energy is a crucial input that is required for achieving virtually all SDGs. While we commence with examining SDG7 on sustainable energy, what follows is an indication of how energy efficiency is important in achieving several other SDGs.

SDG 7 Ensure access to affordable, reliable, sustainable and modern energy for all

Within its 'own' SDG, number 7, energy efficiency plays an important role in relation to renewable energy. Implementing energy efficiency measures and renewable energy options together contributes significantly to both increasing the renewable energy share in total final energy consumption (TFEC) and accelerating the rate of annual energy intensity[73] improvements. Examples are very high insulation levels as prerequisite for

[73] Declines in energy intensity (EI) are a proxy of the efficiency with which an economy is able to use energy to produce economic output. EI can indicate efficiency improvements, provided a) energy intensity is represented at an appropriate level of disaggregation to provide meaningful interpretation, and b) other explanatory and behavioral factors are isolated and accounted for.
Energy efficiency refers to the activity or product that can be produced with a given amount of energy. At the level of a specific technology, the difference between efficiency and energy intensity is insignificant-one is simply the inverse of the other. At the level of the aggregate economy (or even at the level of an end-use sector) energy efficiency is not a meaningful concept because of the heterogeneous nature of the output.

positive energy buildings and the use of renewable electricity in electric cars and heat pumps. (IRENA and C2E2, 2015)

SDG 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Globally, the agri-food chain consumes 30 per cent of the world's available energy – with more than 70 per cent consumed beyond the farm gate. (FAO, 2012) Target 2.3 sets out to double global agricultural productivity and incomes of small-scale food producers by 2030. In developing countries, implementation of these objectives will often require mechanisation (replacing manual labour, where relevant) and industrial processing, which both call for increased energy efficiency and energy productivity.[74]

Target 2.4 aims at ensuring sustainable food production systems by 2030. Primary food production and the food supply chain contribute approximately 20 per cent of total greenhouse gas emissions (GHG) each year (FAO, 2012). An additional 15 per cent of GHG emissions results from land use changes, particularly changes linked to deforestation brought about by the expansion of agricultural land. (IPCC, 2007) Target 2a. opens opportunities for improving energy efficiency in the agricultural sector as it calls for increased investment in rural infrastructure such as irrigation systems, distributed electricity networks and food storage facilities.

SDG 3: Health and Well-being

Target 3.6 aims to halve the number of global deaths and injuries from road traffic accidents by 2020. A number of energy efficiency initiatives have transitioned street lighting to LEDs to increased safety.

According to Target 3.9, we need to "substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination" by 2030. Energy efficiency can reduce pollution that affects public health

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74 Energy productivity is the total value gained from using a unit of energy. Energy productivity considers the total value proposition to the user and the broader economy by better applying energy, not just the energy efficiency of plant and equipment. While energy intensity considers the energy required for generating one unit of GDP, energy productivity focuses entirely on achieving greater economic output from each individual unit of energy. In this way energy productivity, can serve economic growth and lessen global environmental impact at the same time. (UNEP DTU, 2015) Energy productivity can be an integrating concept as it captures total value and, thus, argues for the integration of energy end-use policy with industry/urban/agriculture policy and planning.

(Buonocore et al., 2016). According to the IEA (2014), both supply-and demand-side energy efficiency can help reduce the need for additional generation thereby reducing local pollutants.

SDG 8 Promote inclusive and sustainable economic growth, employment and decent work for all

SDG 8 contains targets aimed at sustaining economic growth (target 8.1[75]), achieving higher levels of economic productivity (target 8.2[76]) and job creation (target 8.3). At the same time, target 8.4[77] foresees improving resource efficiency so that economic growth can be decoupled from environmental degradation.

There is a strong correlation between energy consumption and GDP (economic output). (Tverberg, 2015) Although energy use seems to precede economic growth, yet there is no consensus on the causal link between energy consumption and GDP. However, Baranzini et al. (2013) argues that even in a highly industrialized and services-based economy like Switzerland, economic growth has historically induced greater demand for energy. On the other hand, energy consumption (except for heating oil) does not stimulate economic growth. Only more recently, energy consumption appears to have started to decouple from economic growth in Switzerland. (ibid.) This indicates that energy conservation policies do not necessarily impede economic growth.

Economic benefits of energy efficiency

Most energy efficiency measures are cheaper, and pay for themselves faster, than most kinds of renewable energy generation. (Lawrence Berkeley National Laboratory) Many investments in energy efficiency could generate at least a 10 per cent return on investment (McKinsey, 2010). When spread out over an annual USD 170 billion energy efficiency market potential, McKinsey suggests an average 17 per cent return across those investments. (McKinsey Global Institute, 2008)

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75 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries.

76 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors.

77 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavor to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programs on sustainable consumption and production, with developed countries taking the lead.

At the global level, the World Energy Outlook 2012 (IEA, 2012) highlighted the potential for energy efficiency to save 18 per cent of the 2010 global energy consumption by 2035 – while increasing global GDP by 0.4 per cent. Enhanced energy efficiency investments could boost global cumulative economic output by USD 18 trillion until 2035, increasing growth by 0.25–1.1 per cent per year. (IEA, 2014)

Maximising output per unit of energy increases GDP and can provide other macroeconomic benefits, including higher economic growth, job growth, a better trade balance, lower energy prices and greater security of supply. (Ayres and Warr, 2009; D. Stern, 2011; Warr and Ayres, 2012; IEA, 2014; Yushchencko and Patel, 2016) Energy efficiency increases output because it frees up resources for other, more productive investments, which is why the IEA estimates that efficiency measures yield benefits up to 2.5 times the avoided energy costs. Furthermore, energy efficient industries and countries have a competitive cost advantage, particularly in the face of the increased application of emissions pricing. (McKinsey, 2008).

Employment benefits of energy efficiency

The manufacture and installation of energy efficient equipment and materials is a relatively labour-intensive activity. Because of their relatively high levels of labour intensity, energy efficiency measures are widely seen in the literature as creating more jobs than new energy generation, which tends to be much more capital intensive. Per million euros of investment, energy efficiency could create up to three times as many jobs as investment in new energy generation (IEA, 2012). A stimulus to employment may also arise as a result of the export potential of energy efficiency activities and/or the substitution of imported energy.

Investment in energy efficiency

In previous sections, the importance of investment in energy efficiency has been emphasized. According to the IEA (2014), USD 130 billion was invested in energy efficiency in 2013. However, total annual investment necessary globally is approximately USD 650 billion for energy efficiency and USD 650 billion for renewables. Compared to current levels, this implies a need to grow energy efficiency investments by five times and renewables investments by about 2.5 times in the 2012-2030 period.

SDG 9 Build resilient infrastructure, promote sustainable industrialization and foster innovation

Some targets in SDG 9 focus on the development of sustainable and resilient infrastructure (target 9.1[78]), and on infrastructure and industry that is more resource-efficient through clean and environmentally sound technologies (target 9.4[79]).

Development factors like urbanization and industrialization are crucial to SDG 9 and can substantially affect energy intensity. However, little is known about *how* urbanization and industrialization affect energy intensity in developing countries. Sadorsky (2013) argues that higher industrialization increases energy intensity in both the short-run and the long-run.

In terms of innovation, R&D investments in energy efficiency should be increased substantially. This need for innovation, particularly in developing countries, is reflected in targets 9.5[80] and 9.7[81]. Governments should support energy efficiency-related research and promote innovation activities.

SDG 11 Make cities inclusive, safe, resilient and sustainable

Currently, more than half of all people live in an urban area. By 2050, the share of the world's urban population is expected to increase to 66 per cent, with 94 per cent of that increase occurring in developing countries. (UN, 2014) Cities now consume about two-thirds of the world's energy, and are responsible for about 70 per cent of the world's GHG emissions. (ESMAP, 2016) The net impact that urbanization has on energy intensity is difficult to predict in theory. On the one hand, urbanization increases economic activity

78 Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.

79 Target 9.4: By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries acting in accordance with their respective capabilities.

80 Target 9.5: Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.

81 Target 9.b: Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities.

through a higher concentration of consumption and production and expansion of basic infrastructure and municipal services. At the same time, urbanization also leads to economies of scale and provides the opportunity for increased energy efficiency. (Sadorsky, 2013) Buildings are the world's largest consumers of electricity, but the IEA (2012) estimates that 80 per cent of the energy efficiency potential of buildings is untapped. In this context, targets 11.3[82], 11.6[83], and 11.9[84] call for improved sustainability, resilience, and resource efficiency in cities.

SDG 12 Ensure sustainable consumption and production patterns

Industrial energy efficiency is included in SDG 9, but it is also closely related with SDG 12 on sustainable consumption and production (SCP), and in particular its target 12.2[85], 12.6[86], 12.8[87], and 12.a. SDG 12 is more of a cross-cutting SDG (Le Blanc, 2015). Energy efficiency policy in OECD countries has focussed primarily on increasing the energy efficiency of buildings, appliances, vehicles, and industrial operations. Less attention has been devoted to changing consumer behaviour, e.g., encouraging people to drive less or buy fewer/smaller vehicles, appliances, or homes. (Geller et al., 2006) Consumer behaviour can be influenced by offering convenient alternatives, using financial incentives, increasing awareness, providing feedback on energy consumption, and changing attitudes. (ibid.)

SDG 13 Take urgent action to combat climate change and its impacts

Target 13.2 calls for integrating climate change measures into national policies, strategies and planning. From a climate perspective, improving energy efficiency is a crucial element of national policies, strategies and planning as energy efficiency is a proven way to reduce GHG emissions cost-effectively. The IPCC calls energy efficiency measures "a

82 Target 11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

83 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

84 By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels

85 By 2030, achieve the sustainable management and efficient use of natural resources.

86 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

87 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

key mitigation strategy" in scenarios that keep atmospheric CO_2e levels at 450–500 ppm by 2100, emphasising their ability to deliver near-term energy demand reductions cost-effectively. (IPCC, 2014) To stay on a 2°C path, the IEA shows the energy intensity of GDP would need to decline by around 60 per cent by 2050 compared to 2015, i.e. by 1.5 % p.a. (IEA, 2015) This would allow economic output to triple with only a 20 per cent increase in primary energy use. Of the total energy-sector GHG reductions needed by 2050 for a 2°C instead of a 6°C pathway, the IEA envisions 38 per cent coming from improved efficiency in end uses. (IEA, 2016) Besides mitigation, energy efficiency also can contribute to adaptation to climate change. Energy efficiency can address some of the energy sector's vulnerabilities to climate change impact (e.g. reduce peak loads through efficient air conditioning).

5.1.5 Coherence in energy efficiency governance

The main issues related to energy efficiency that are addressed in the literature are related to finance, technology, and awareness. What has received much less attention is the governance barriers at a more underlying, systemic level. Fragmentation of governance along the vault lines of governance scales, academic disciplines, levels, sectors, interests, and approaches is an important barrier to implementing global frameworks for sustainable development, including improvement of energy efficiency. (Monkelbaan, 2015)

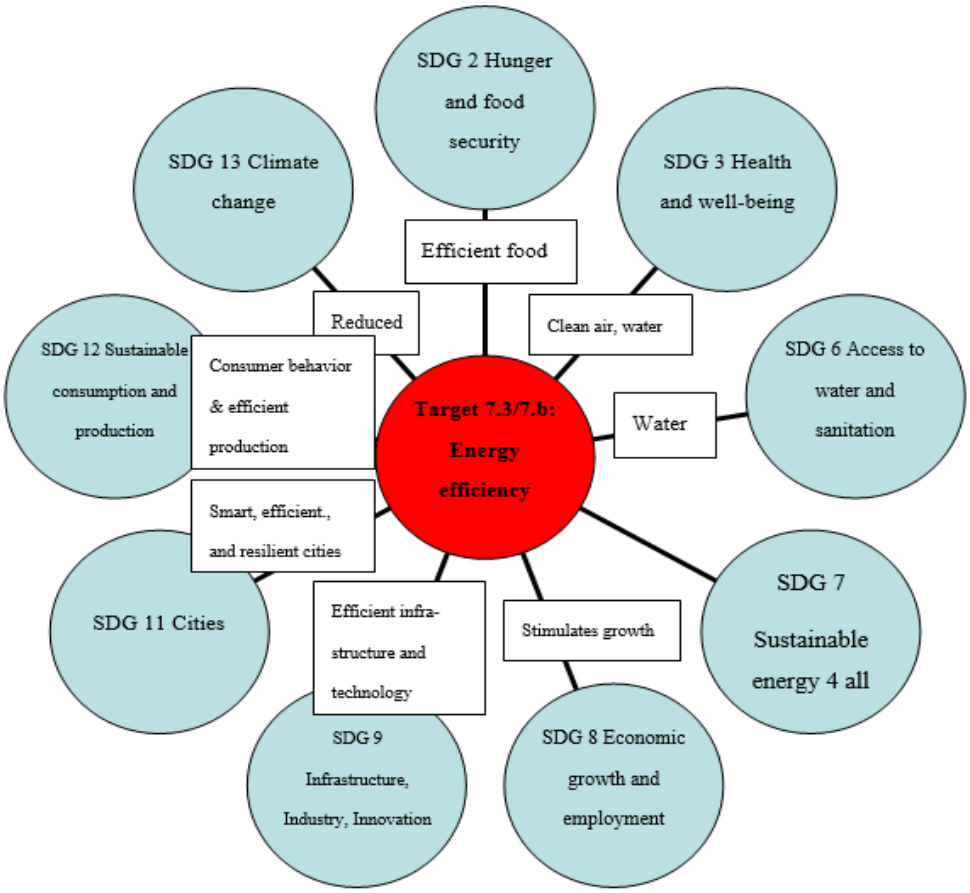
Increasing the efficiency with which energy is extracted or captured, converted, and utilized not only requires improved and transformative technologies. Energy efficiency also requires a sound enabling framework; clear strategies and plans; institutional operational capability; integration across all levels; and objective evaluation of progress. (UNECE 2015) What follows is an overview of three tools that could be used for improving the coherence in addressing SDG Target 7.3 on energy efficiency.

Tool for coherence 1: systems thinking

Systems thinking was suggested in section 4.2 as an important way to address complexity in governance for the SDGs. The systems thinking approach is a perspective which views an event or a system in a holistic manner by placing explicit emphasis on the relationships and interactions between its various elements and constituents (Senge, 1990). Although the interest in systems thinking in the domain of governance is rising, we continue to administer, organise, analyse, manage, and govern complex energy systems as if they

were a collection of isolated parts. In response to the question "How can energy efficiency be a conceptual 'vector' for connecting different SDGs?" Figure 6 below demonstrates some of the main linkages between energy efficiency and explored in this review.

FIGURE 7 ENERGY EFFICIENCY AS A CONCEPTUAL 'VECTOR' FOR CONNECTING DIFFERENT SDGS



(Source: the author)

Chai and Yeo (2012) recognized and considered a multifaceted energy efficiency adoption system that takes into consideration the interplay of barriers to energy efficiency internal and external to the company, as well as the influence of the actions of different stakeholders in the process of energy efficiency adoption. Chai and Yeo argue that there is a lack of consideration for interactions among barriers, which is why barriers persist despite the efforts of trying to remove them. Barriers to energy efficiency cannot be properly studied by looking at them in isolation. Systems thinking could help identify

possible relationships among the (groups of) barriers and among the different SDGs where energy efficiency is most relevant.

One aspect of energy efficiency, and a potential barrier, that requires a more sophisticated systems view is the rebound effect. The rebound effect needs to be examined in more detail both at the macro- and micro-level. At the macro level, indirect rebound effects are far from fully understood. At the same time, understanding at the micro level is required as rebound effects vary widely between different technologies, sectors and income groups. Where rebound effects are expected to be large, there may be a greater need for policies that increase energy prices.

In sum, a systems perspective to energy efficiency governance may increase coherence as it allows better management of the complex cause and effect relationships between social and technological phenomena. The application of systems analysis is no *panacea* in the face of vested interests, concern about impacts on competitiveness and wealth, and political ideologies, but it does offer a tool to clarify the consequences of our actions, identify our options, and extend our foresight.

5.2 Case study 2: The 'WEF-Climate nexus' approach as a framework for systems thinking

By 2050, the FAO predicts 70 per cent increased demand for food production (100% in developing countries), and the World Energy Council expects a 100 per cent increase in energy demand by that time. Almost all this increase will come from non-OECD countries. Biofuel demands could already double by 2030. (IEA, 2012) As farming remains the largest user of water, food must be produced sustainably to ensure future supplies of food and water. Water scarcity already affects more than 40 percent of the world's population, largely because too much water is used to produce food. Japan's potential water resources per capita are less than half the world average.[88] Likewise, Japan is dependent on imports to fulfil its needs in terms of energy and food.

This case study describes the three issues or 'sectors' of water, energy, and food, and the strong linkages between them. Activities in any of these three sectors may drive or limit economic growth in the two others.

[88] http://www.mlit.go.jp/river/pamphlet_jirei/bousai/saigai/kiroku/suigai/suigai_3-1-1.html

Water-energy-food (WEF) nexus approaches also hold the promise of greater policy coherence by integrating governance across energy, water and food sectors and scales. Extant policy-making in 'silos' therefore needs to be complemented by nexus approaches that reduce trade-offs and build synergies across sectors. A nexus approach can also help to avoid 'sunk costs', i.e. investments that lock development into non-sustainable pathways. The guiding principles of the nexus are like those that underpin the SDGs, namely ensuring access to resources for the most vulnerable, promoting efficiency in resource use, and ensuring sustainability. (Weitz et al., 2014)

The SDGs show the need for a systemic nexus approach to sustainability challenges. Whereas the MDGs fell short in terms of identifying sectoral goals with little consideration of how efforts to attain a goal in one sector would affect efforts in another sector (Weitz et al., 2014), the SDGs open up the opportunity for integrating goals across sectors in order to make implementation more efficient and cost-effective and to consider trade-offs between goals.

The WEF nexus can serve as a framework for systems-thinking among different stakeholders, rather than being directly implementable as such. SDG 7 (on sustainable energy) can be closely connected with SDG 2 (food and agriculture) and SDG 6 (water and sanitation). Climate change (SDG 13) can put additional pressure on the connections within the WEF nexus. For example, climatic changes may affect rainfall and thus water and energy use for food production. The nexus approach highlights these interdependencies and the need to address interconnected policy sectors and resource systems not in isolation but through integrated management approaches that cut across multiple domains.

Guillaume et al. (2015) suggests five ways in which systems theory can support understanding of nexus issues:

1.) mapping nexus issues and their interlinkages;

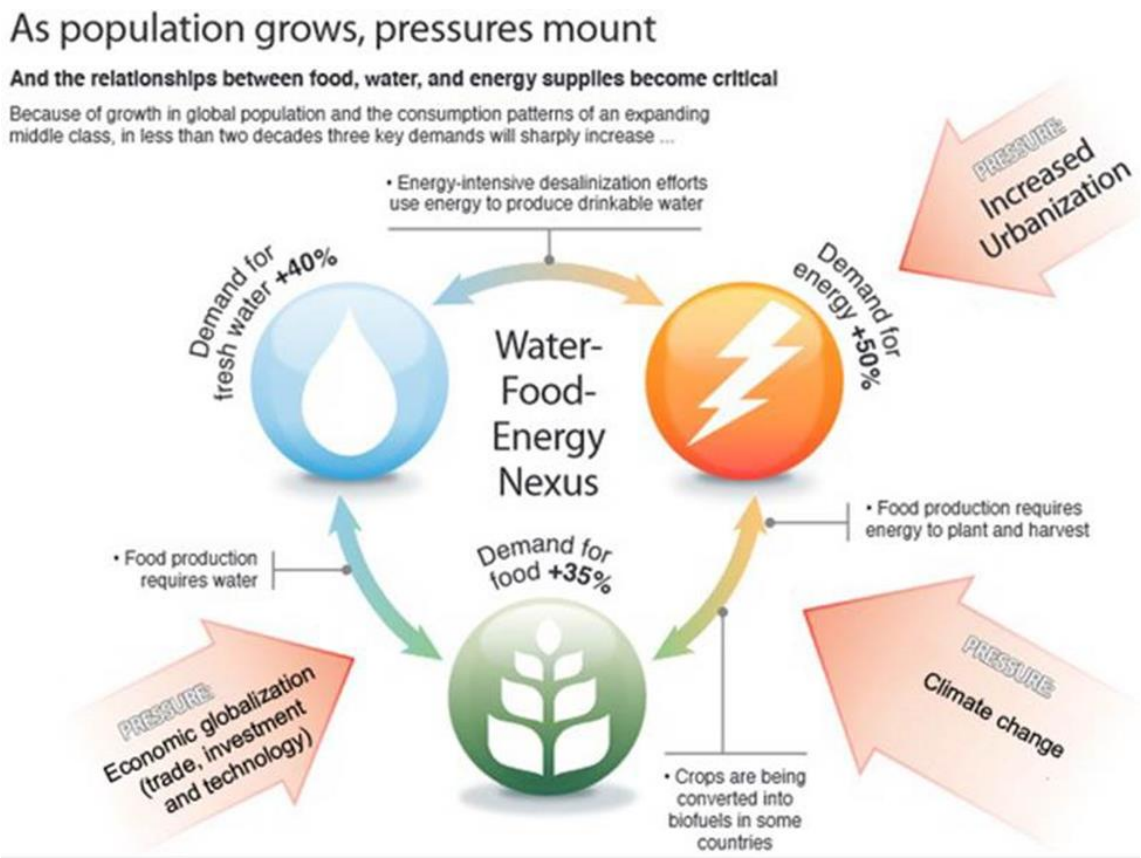
2.) finding the most important linkages;

3.) using models for systems models;

4.) appreciating the rebound effect from a systems perspective; and

5.) crafting system-level solutions.

FIGURE 8 THE WATER-ENERGY-FOOD NEXUS AND THE MAIN PRESSURES ON IT



(Adapted by the author from CNA, 2014)

5.2.1 Linkages within the nexus and between SDGs 2, 6, and 7

There are numerous examples of linkages between two of the three nexus sectors, for example the water-energy nexus (e.g. hydropower, power plant cooling and groundwater pumping). Water and food are linked through irrigation and rainwater harvesting. Thinking of the energy-food nexus, usually biofuels versus crops trade-offs come to mind.[89] Moreover, the full food production and supply chain is responsible for around 30 per cent of total global energy demand. Energy accounts for almost 55 per cent of the operating costs of water utilities (IRENA, 2015), and 70 to 90 per cent of water used by humans is for food production (FAO, 2011).

However, it is more challenging to find examples of how all three issues jointly are affected. For a true nexus approach, the three interrelating sectors must be brought

[89] Moreover, fossil phosphorus reserves could be depleted within 50 years if the world were to replace 10 per cent of its energy requirements with biofuels. (Davis, 2011)

together, including those that are currently considered separately and in isolation. This is easier said than done. Examples include groundwater irrigation, water desalination for food production[90], and biogas production from wastewater, where residues are used as fertilizer.

Beyond screening simply for interactions between SDGs and targets, Weitz et al., 2014 suggest exploring the nature of these interactions. The main three types of interactions are

1.) interdependence (one target must be achieved for another to be viable);

2.) imposing conditions, constraining (e.g. sustainable agriculture constrains the use of irrigation) or counteracting (e.g. boosting consumption and economic growth may increase pollution); and

3.) reinforcement (synergies between goals, e.g. providing access to electricity reinforces water-pumping and irrigation).

5.2.2 Governance challenges and needs for the WEF Nexus

There is growing awareness of the need for policy measures to address the institutional dimensions of the water-energy-food nexus. Regulation and collective action can help to guide investments and innovation to minimize negative externalities and share benefits equitably.

Fragmented approaches to planning and policy implementation are common in environmental governance, particularly in developing countries. Fragmented approaches arise from competition among urban and rural local governments for funds, overlapping jurisdictional boundaries and inadequate management coordination among line departments and ministries. Institutional fragmentation is also supported by weak feedback loops from environmental resource users, making it difficult to design interventions that respond effectively to feedback from citizens.

Considering (‘internalizing’) resources that previously had been externalized is the essential nexus challenge. The nexus concept poses opportunities for innovation, participation and experimentation to explore what these externalized resources are and how to take them into consideration. Equitable integrated water and land resources planning and management therefore should include: secure property rights; transparency

[90] Global desalination capacity currently stands at 45 million cubic meters per day, half of which is in the MENA region, where a growth by 500 per cent is projected up to 2030. (IEA, 2009)

and accountability; participation through informed consent; and effective anti-corruption measures.

Governance could focus further on providing incentives for innovation focused on improving resource use efficiency. Economic instruments for stimulating investment include, e.g., pricing of resources and ecosystem services, water markets and tradeable rights, and payments for ecosystem services. Inversely, this means abolishing subsidies which incentivize the unsustainable use of resources, for example fertilizer, irrigation and fossil fuel subsidies.

Overall, the complexity that is inherent in governance of the WEF nexus requires a solid knowledge. There is a need for a coordinated and harmonized nexus knowledge-base and database indicators and metrics that cover all relevant spatial and temporal scales and planning horizons. Full life-cycle analyses across the nexus are also needed. Such an improved nexus understanding could underpin new decision- and policy-making. New nexus indicators/metrics which address sustainable resource use, human well-being and equity as well as integrated assessments of water, energy and food sectors, are required for future quantitative trade-off analyses. System thinking, robust analytical tools, including life cycle analysis, and consistent data sets across the water, energy and food sectors are essential for building synergies, avoiding tensions, and to monitor and inform policies and regulations across the nexus and across the SDGs.

Adaptive management

Adaptive management (AM) was briefly discussed in section 3.2.5. AM is an approach to resource and ecosystem management that refers to functionally defined socio–ecological systems with a regional scope, such as natural parks, river basins, mountain ranges, etc. (Walters 1986, Voss, 2011). With foundations in ecological systems theory and evolutionary theory (UNEP, 1978), AM has been postulated as a critical alternative to conventional rationalistic concepts of ecosystem management (Berkes et al. 2003 Holling 2003) as it accounts for the inherent complexity and unpredictability of ecosystem dynamics. (Folke et al., 2005; Olsson et al., 2004; Pahl-Wostl, 2007)

According to Heifetz (1994), leaders are confronted with two types of problems. Technical problems can be solved by expertise and traditional, top-down management (‘technocracy’). But wicked, “adaptive” problems, such as trade-offs between water,

energy and food supply, require innovation and learning, because when beliefs and values come into play technocratic "fixes" tend to exacerbate the problem.

The SDGs and the WEF nexus are examples of concepts that are focused exactly on wicked problems related to sustainability and poverty. The success of policies and actions will eventually be judged for their contributions to achieving the pre-determined SDGs in an efficient[91] manner. This appears to be in line with the traditional sustainability approach of optimizing existing systems. Efforts were made though into making the SDG process more participative than the MDG process. A more adaptive and transformative approach would be to accept uncertainty and pay attention to procedure, system behaviour and social learning at all governance levels and across nexus sectors. Therefore, it would be useful if the SDG process would allow for ongoing examinations of goals and targets at local, national and global levels as the world keeps on changing in the years after the adoption of the SDGs. One area of attention would be monitoring the linkages between the SDGs, which may in the end be sound individually but incompatible with each other.[92] Besides in the WEF nexus sectors, there are trade-offs between eradicating poverty (as in developing countries' expansive sustainability discourse), providing access to energy for all, and reducing resource consumption and emissions.[93][94]

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91 According to Walker and Salt (2006: 7), "Though efficiency per se is not the problem, when it is applied to only a narrow range of values and a set of interests it sets the system on a trajectory that, due to its complex nature, leads inevitably to unwanted outcomes." (Walker and Salt, 2006, p.7) One example of the application of a narrow set of economic criteria is cost-benefit analysis, which was deployed for example by the Copenhagen Consensus Center for assessing the draft SDGs.
http://www.copenhagenconsensus.com/publication/preliminary-benefit-cost-assessment-final-owg-targets

92 Whereas the Mebratu's sustainable development model of concentric circles with the environmental dimension as the overall concern was suggested as the basis for the SDGs, in the adopted SDGs, the social-economic dimensions are connected well with each other but not with the environmental dimension.

93 Looking at the SDGs from the traditional perspective of three partly overlapping dimensions, the economic and social dimensions seem interlinked in the SDGs, but the environmental dimension is treated largely separately. From the perspective of the new paradigm of sustainable development as the three dimensions constituting a nested hierarchy, the SDGs do not fully appreciate that progress on the socio-economic front eventually depends on the environment.

94 Climate change and sustainable energy are issues that are closely linked with the environmental, social and economic pillars of sustainable development, and in fact show that these pillars may conflict with each other. Trying to keep atmospheric carbon-dioxide levels to 450 parts per million seems to be at odds with giving access to electricity to the billions of people that are left without access to reliable sources of energy. Research shows the strong correlation between per capita energy consumption and human development (e.g. Wu et al., 2012 http://cdn.intechopen.com/pdfs/31594.pdf). The 'access to sustainable energy for all' discourse argues for a world with accessible, secure low cost energy for all. If fossil fuels cannot deliver such a world, ensuring 'access to sustainable energy for all' will bring about decarbonization on a massive scale in the long term as it would have to be based on bringing the price of clean energy down. Thus,

5.2.3 Geopolitics and transnational coherence: trade and the WEF nexus

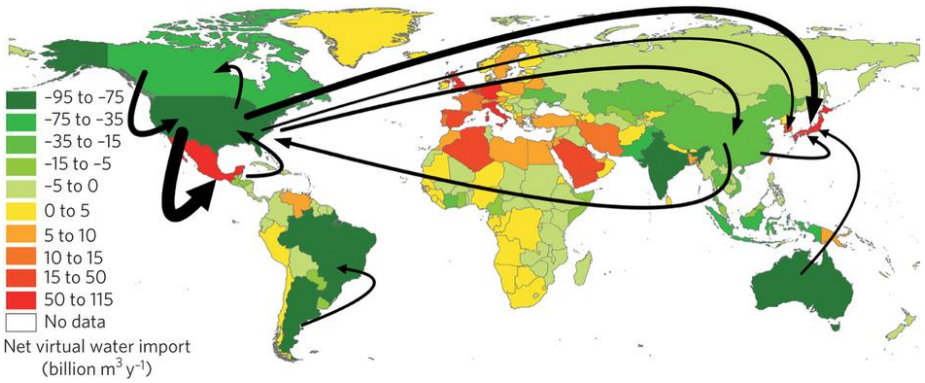
Water, energy and food security have become global issues that are no longer contained within territorial national or river-basin boundaries. As trends, such as human population growth, economic development and globalization accelerate, the interdependence of countries and regions becomes more and more evident. This can lead to either more resource competition and potential conflict, or increased collaboration and co-management. Many river basins are transboundary, with upstream water and land uses affecting downstream water, energy and food availability. The Syr Darya river provides an example of a temporal mismatch between upstream and downstream water demands: upstream Kyrgyzstan releases water for hydropower production primarily in winter for heating, while downstream Uzbekistan needs water in summer for irrigation. Like in other transboundary river basins there is a lack of strong regional institutions for integrated management and governance across the nexus.

Trade and investment are rapidly becoming geopolitical issues. There is intensive trade in energy and in food, and moreover, in products with 'embodied' water or energy. International trade in water-intensive commodities can generate water savings in the countries that import those commodities. One example would be trade in wheat from Canada or Russia to Saudi Arabia. In the period from 1997 to 2001, Japan (the largest net importer of water-intensive goods in the world) annually saved 94 billion m3 by not using its domestic water resources. This volume of water would have been required, in addition to its current water use, if Japan domestically produced products instead of importing them.[95] (Chapagain et al., 2006) Yet by externalizing their water footprints, importers of embodied water are in a weak spot of water dependency, which could be costly from the political and social perspective. Pushing for self-sufficiency may harm sustainability though in the longer run.

framing clean energy as a development opportunity can provide a more acceptable journey to the same objective of lowering emissions. Reframing low-carbon transitions around energy and equity may sound appealing, but it needs to be worked out how it can be driven by effective governance. It will require leadership and able management to use development as leverage for an accelerated energy transition while not allowing carbon-dioxide levels to get much higher.

[95] Similarly, Mexico annually saved 65 billion m3, Italy 59 billion m3, China 56 billion m3, and Algeria 45 billion m3.

FIGURE 9 VIRTUAL WATER BALANCE PER COUNTRY AND LARGEST VIRTUAL WATER FLOWS RELATED TO INTERNATIONAL TRADE



(Source: Hoekstra, 2014)

Note: In the countries, colored green, water use for producing export commodities exceeds the water use behind imported products (net virtual water export). In the countries colored yellow to red, the opposite is true (net virtual water import). The thickness of the arrows represents the comparative quantity of water being traded.

Trade in agricultural and other commodities thus may help to address local scarcities. By 2050 about half of the world population, mostly living in poor water scarce countries, is expected to rely to some extent on food imports, unless productivity increases and/or cropland expansion can keep up with increasing demand. (Rockström et al., 2012) Trade can also increase overall resource use efficiency if trade flows follow productivity gradients, i.e. from high-productive to low-productive regions. However, gradients of resource productivity may not have the same direction for different production factors (water, energy, land) and furthermore, subsidies often direct trade against productivity gradients.

Trade also creates dependency: importing countries depend on international markets which in turn rely on a small number of source regions and countries, North and South America and Australia for agricultural commodities. Food exports may shrink, for example from the US, where groundwater resources in the Midwest are over-exploited and a significant proportion of food production has recently been abandoned in favor of biofuel production (35% of the US corn crop is for biofuel).

Investment in physical assets has been rising together with trade. A recent example of investment in productive land which affects the nexus is land grabbing. Land

grabbing can affect human rights as it can lead to dispossession of pastoralists and local food scarcity because of (foreign) investment in land to produce (water-intensive) biofuels and food that is destined for exports. Sassen (2014) has branded growing income inequality, unemployment, and accelerating environmental destruction that result from land grabbing for example as a type of corporate expulsion from professional livelihood, living space, and from the biosphere.

Energy security itself is often framed as a geopolitical issue in terms of supply dependence, such as the reliance of the EU on natural gas from Russia, or global dependence on oil from unstable political regions. Water scarcity can turn into national and geopolitical security threats (e.g. in Yemen), but joint water agreements can also foster broader trans-boundary collaboration. For example, regional power sector integration and grid extensions (e.g. the EU's creation of the Energy Union[96] which is partly driven by conflicts with Russia) can increase economic integration and trade, as well as mutual trust and understanding.

5.3 Case study 3: Trade and the SDGs

5.3.1 Introduction: general overview

The purpose of this case study is to explore how trade policies can contribute to sustainable development in general, and to the SDGs. Thereby it gives the example of trade in environmental goods and services (EGS) and of the Environmental Goods Agreement (EGA). The linkages between trade and sustainable development are varied and nuanced. In the case of climate change, the UNEP-WTO report on trade and climate change[97] demonstrates some of the key linkages. Besides the physical impacts that climate change can have on trade (e.g. through changed patterns in agricultural production), trade and economic activity affects the climate (e.g. through the scale,[98]

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96 Also, see http://ec.europa.eu/priorities/energy-union/index_en.htm

97 WTO-UNEP (2009), Trade and Climate Change, Accessed on 29/09/2015, available at http://www.wto.org/english/res_e/booksp_e/trade_climate_change_e.pdf

98 The scale effect means that more efficient allocation of resources within countries shifts out the global production possibilities frontier, raising the size of the industrial pollution base, resulting in greater global emissions other things being equal.

composition,[99] technique[100] and direct[101] effects). There are also the legal and policy linkages between climate change and trade governance, and the competitiveness impacts that these can have (also see Figure 9 below). Specific trade-related policies can be both conflicting with and mutually supportive of climate action.[102]

On the one hand, the number of WTO disputes and other trade-related tensions in renewable energy has been increasing rapidly. These disputes are mainly focused on the question whether the support that governments give to their renewable energy industry in the form of subsidies or market protection is admissible under WTO rules. Such tensions can have an impact on climate change if they hamper the development of sustainable energy technologies (SETs) – including renewable energy and energy efficiency technologies. Trade and investment play an increasingly important role in the development and diffusion of SETs. Trade policies and disputes related to renewable energy that can affect climate change by hampering trade in SETs are reflected as the black arrow in Figure 9. These specific interlinkages reinforce the need to address the overall relation between trade and climate action in a systematic way.

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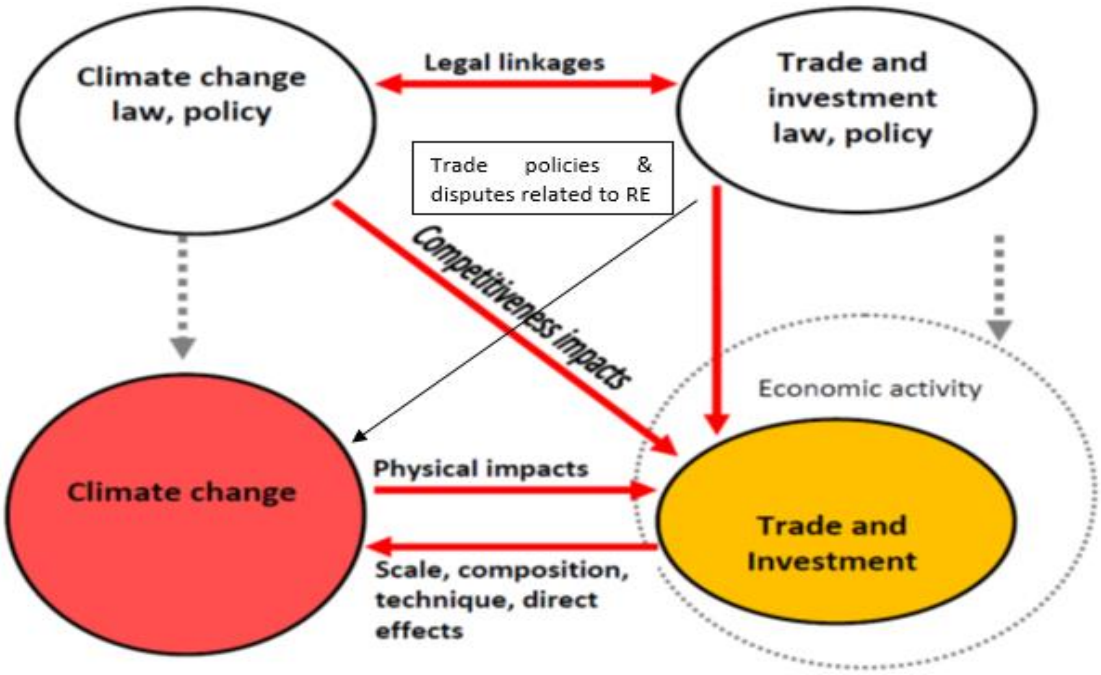
99 The composition effect measures changes in emissions arising from the change in a country ‘s industrial composition following trade liberalization. If, for example, liberalization induces an economy ‘s service sector to expand and its heavy industry to contract, the country ‘s total emissions will likely fall since the expanding sector is less emission intensive.

100 The technique effect refers to the numerous channels through which trade liberalization impacts pollution through changes in the stringency of environmental regulation in response to income growth or the political climate surrounding regulation. The technique effect also includes technology transfer facilitated by trade.

101 Direct effects include emissions and environmental damage associated with the physical movement of goods between exporters and importers, resulting for example from international transport (also see the case study on aviation and climate change in the second part of this chapter).

102 The climate treaties call for the minimization of trade impacts ("jurisdictional delimitation" - Oberthür and Gehring, 2006: 335-339) but do not clarify which regime has regulatory authority in the case of climate-related trade measures. At least for now that creates the appearance that the two regimes co-exist harmoniously and that there are no normative conflicts, as is often popularly portrayed. Behavioral interactions mean that behavioral effects triggered by one institution have an influence on the effectiveness of another institution.

FIGURE 10 TRADE AND CLIMATE CHANGE LINKAGES



(Adapted by the author from Cosbey, 2008)

Explanation: examples of legal linkages between climate change law (left top) and trade law (right top) is climate change legislation that contains provisions on the limitation of imports of carbon intensive products. On the other hand, WTO rules could affect the design of climate change legislation that foresees in support for domestic renewable energy industries.

5.3.2 Trade and the SDGs

Trade is not considered to be an end in itself under the SDG framework but rather a means of implementation ('MoI'). Examples of trade-related targets in the SDGs are:

- **SDG 2 on hunger and food security** includes a call to correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect.[103]

[103] Target 2.b: correct and prevent trade restrictions and distortions in world agricultural markets including by the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round.

- **SDG 3 on ensuring healthy lives and promoting wellbeing** includes the target of providing "access to affordable essential medicines and vaccines". It recalls the 2001 Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right to use to the full the provisions in the TRIPS Agreement regarding flexibilities to protect public health, and provide access to medicines for all.[104]
- **SDG 7 on sustainable energy** calls for substantially increasing the share of renewable energy in the global energy mix. This is likely to require ongoing support from governments. However, clean energy subsidies have repeatedly been challenged under the WTO dispute settlement system. Some of the legal uncertainty around these subsidies could be removed by clarifying key concepts in the SCM Agreement in the context of clean energy subsidies as well as clarifying the applicability of the General Agreement on Tariffs and Trade (GATT) Article XX General Exceptions provisions to the SCM Agreement; agreeing on a time-limited and conditional "peace clause" preventing WTO disputes being taken against certain carefully selected categories of climate-related subsidies; and re-introduction of the category of "non-actionable subsidies" under Article 8 of the SCM Agreement to provide leeway to certain types of clean energy subsidies. (Das and Bandyopadhyay, 2016)
- **SDG 8 on economic growth and employment**: calls on improving Aid for Trade support for developing countries, especially for LDCs, including through the Enhanced Integrated Framework for trade-related technical assistance (EIF).[105]
- **Goal 9 on industry, innovation and infrastructure** notes the need for quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure and increasing the integration of small-scale industrial and other enterprises, in developing countries, into value chains and markets.

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104 Target 3.b: Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all.

105 Target 8.a: increase Aid for Trade support for developing countries, particularly LDCs, including through the Enhanced Integrated Framework for LDCs.

- **Goal 10 on reducing inequality** stresses the importance of special and differential treatment for developing countries, in accordance with WTO agreements.[106]
- **Goal 14 on conserving maritime resources:** The ocean absorbs more than a quarter of CO2 emissions and therefore plays a key role in climate regulation. It is also a key source of food, medicine, minerals and renewable energy.
- **SDG 14** calls for disciplining (rich countries') fishery subsidies. This can have major consequences for Japan's fishing fleet. But the ocean is threatened by numerous other environmental issues as well. Oil spills, i.e. when fossil fuels spill from containers and/or from drilling operations on the ocean floor, these can cause widespread environmental damage by killing or maiming a large proportion of the local marine life. More mundane threats include the millions of tonnes non-biodegradable plastic dumped into the ocean every year, which often kills marine animals that inadvertently ingest them, and phosphate pollution that cause algae blooms. Much of the damage is the result of poor implementation and enforcement of existing ocean governance clauses.
- Maritime transport is essential to the world's economy as over 90 per cent of the world's trade is carried by sea and it is, by far, the most cost-effective way to move goods and raw materials around the world.
- **Goal 15 (sustain life on land; target 15.c):** Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities
- **Goal 17 (strengthening the means of implementation and the global partnership for sustainable development)** includes language on the importance of:
    - a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the WTO[107]

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106 Target 10.a: Implement the principle of special and differential treatment for developing countries, least developed countries, in accordance with World Trade Organization agreements

107 Target 17.10: promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the WTO including through the conclusion of negotiations within its Doha Development Agenda.

- significantly increasing developing countries' exports, including doubling the share of LDCs by 2020[108]
- timely implementation of Duty-Free and Quota-Free market access on a lasting basis for all LDCs and ensuring that preferential rules of origin are transparent, simple and contribute to facilitating market access[109]

A cost-benefit analysis of the SDGs conducted by the Copenhagen Consensus Centre reveals that trade-related goals are "phenomenal" in terms of return on investment compared to other means of implementation.[110]

5.3.3 Trade in environmental goods and services

As the previous section demonstrates, both trade and technology are acknowledged as important drivers for achieving the SDGs. An important way of improving access to technology that is required for reaching the SDGs is through increasing the diffusion of environmental goods and services (EGS). Removing trade barriers to access such goods could be one aspect of the international cooperation referenced in the targets described above.

The environmental-social-economic win-win-win situation of trade in environmental goods and services (EGS) is typically given as the prime example of how trade can contribute to sustainable development.[111] Japan is a global leader in the innovation, production, and trade in EGS. In Japan, annual estimates of the market and workforce for EGS are made regarding the OECD classification of the environmental

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[108] Target 17.11: Significantly increase the exports of developing countries, with a view to doubling the least developed countries' share of global exports by 2020

[109] Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access

[110] www.copenhagenconsensus.com/publication/preliminary-benefit-cost-assessment-final-owg-targets

[111] E.g. in the WTO-UNEP report on trade and climate change, available at: http://www.wto.org/english/res_e/booksp_e/trade_climate_change_e.pdf Another, upcoming example of how trade can contribute to sustainable development is through resource efficiencies, especially in water, flowers and meat.

goods and services industry. Estimates for 2012 indicate a market of about 86 trillion yen and a workforce of about 2.5 million people.

The WTO's Doha Ministerial Declaration of 2001 includes the mandate[112] to negotiate the liberalization of trade in environmental goods and services. Due to several reasons[113], it was difficult to finalise these negotiations.

Sustainable energy technologies (SETs) for example, as any technologically advanced products, are produced through complex global value chains (GVCs).[114] Value chains for solar panels for example run across developed and developing countries.

The development of SETs will require both global and local markets which are based on a supportive enabling environment and on clear and coherent governance regimes for related goods and services. Even though environmental technologies are trade intensive, there is currently no specific framework or policy process for facilitating trade in SETs. This is highly unfortunate as the creation of global markets for SETs can spur a global energy transition. (World Bank, 2015)

Several targets in the different UN outcome documents on the SDGs refer to increased international cooperation to improve diffusion of, and access to, environmental goods and services. One of the specific means of implementation (MoI) identified under proposed goal 6 on water and sanitation is the expansion of "international cooperation and capacity-building support to developing countries" around water and sanitation activities and technology.

Similarly, SDG 7 on sustainable energy is relevant. First, SDG target 7.an includes an MoI around enhanced "international cooperation to facilitate access to clean energy research and technologies". Several of the cross-cutting means of implementation under proposed goal 17 also relate to technology, including promoting the transfer,

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112 Doha Ministerial Declaration, paragraph 31

113 The main reasons for deadlock in in the EGS negotiations was overall lack of progress in the Doha Round (which is negotiated as a 'single undertaking, meaning that no issue is agreed upon until there is agreement on all topics in the Round), and disagreement over the identification of environmental goods and coverage of the agreement.

114 Imagine for example only harbor systems as good representations of complex systems; harbor governance ''systems encompass local community planning, as global logistical planning. Thus, a considerable number of actors with different stakes, strategies and operating procedures attempt to influence port governance processes'' (Teisman et al., 2009: 77). Also, the popularity of global value chain perspectives and "added value" in trade shows the need for analysis at the local level (Hoekman, 2014).

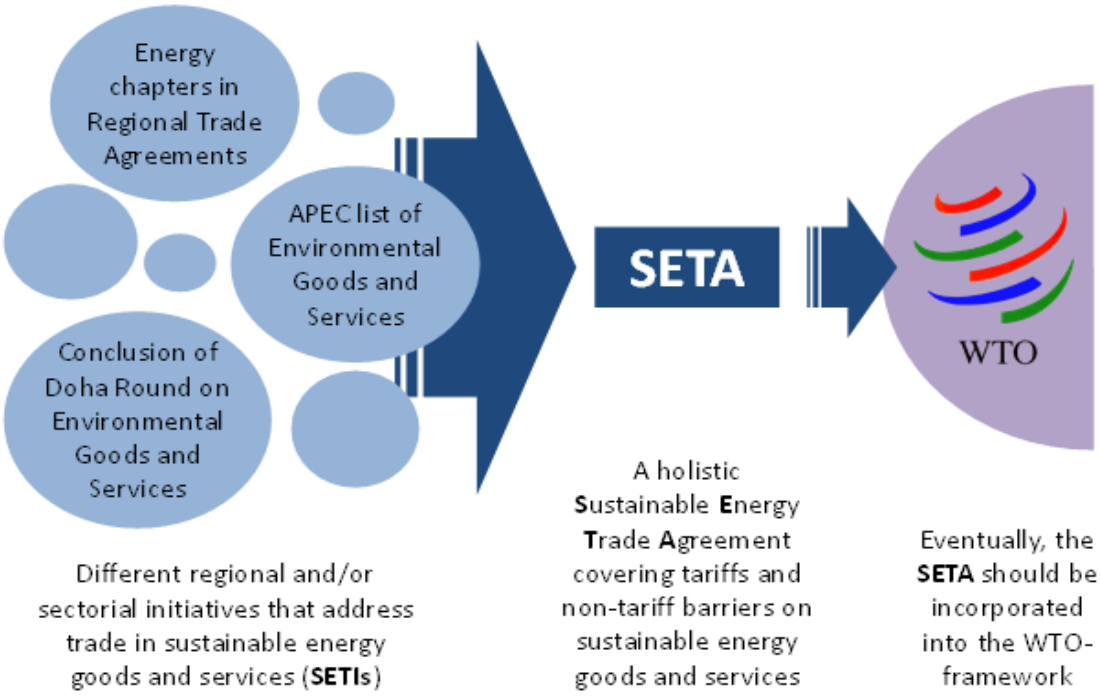
dissemination, and diffusion of environmentally sound technologies to developing countries on favourable terms, as mutually agreed.

5.3.4 The origins of the Environmental Goods Agreement (EGA)

As the number of trade disputes related to renewable energy started growing after 2011, the Swiss think tank ICTSD (where the author worked from 2009 until 2014) realised that there was a need for so-called Sustainable Energy Trade Initiatives (SETIs). ICTSD started to develop a conceptual framework for different options for SETIs including a holistic Sustainable Energy Trade Agreement (SETA).[115] (Figure 10 below)

[115] The concept of a SETA originates from the Global Agenda Council of the World Economic Forum. Its analytical case has been developed since 2011, primarily by ICTSD and its partners, the Global Green Growth Institute and the Peterson Institute of International Economics. In 2012, a public-private partnership, the SETI Alliance, was launched. The SETI Alliance works constructively to support policy action in trade in SETs to realize benefits for both the public and the private sector. In 2013, the SETI Alliance merged with the Alliance for Affordable Solar Energy (AFASE), creating a network of more than 1800 companies, think tanks and several governments.

FIGURE 11 THE OPTIONS FOR AND RELATIONS BETWEEN SETIS, A SETA AND THE WTO



(Source: ICTSD, 2016)

The first progress in line with the SETI idea came in November 2011, when Asia Pacific Economic Cooperation (APEC) economies[116] issued a declaration[117] that they would liberalise trade in a list of environmental goods. Applied tariffs on these goods should be reduced to 5 per cent or less by the end of 2015. In addition, the declaration states that APEC economies should "... eliminate non-tariff barriers, including local content requirements that distort environmental goods and services trade." In September 2012, the member economies agreed to such a list, covering 54 tariff lines. Meanwhile, the EU negotiated chapters related to (sustainable) energy in its regional trade agreements with some members of the Association of South-East Asian Nations (ASEAN)

116 Member Economies of APEC include: Australia; Brunei Darussalam; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; The Philippines; Russia; Singapore; Republic of Korea; Chinese Taipei; Thailand; the United States; and Viet Nam.

117 http://www.apec.org/Meeting-Papers/Leaders-Declarations/2012/2012_aelm/2012_aelm_annexC.aspx

(Singapore[118], Malaysia and Vietnam), and is reportedly planning likewise for upcoming trade agreements with the US and Japan.

Because China (also a member of APEC) has such strong interests in avoiding trade conflicts and smoothening trade in SETs (e.g. because of energy security, access to technology, environmental sustainability, exports and employment – also see Monkelbaan et al., 2012; Monkelbaan, 2014), it had become supportive of the idea of negotiated agreements in this area.

The constructive developments in APEC had resulted in 14 countries[119] getting together to discuss options for building upon the APEC-agreement. In July 2014, these WTO Members (calling themselves 'Friends of EGS') indeed launched negotiations on a global EGA.

The EGA is expected to have a status like the successful Information Technology Agreement (ITA) in the WTO. This means that the agreement would be based on the 'most favoured nation' (MFN) principle. This means that the benefits of the agreement (in terms of market access to the countries negotiating) would be shared with all WTO Members, even those who do not sign up to the agreement.

Trade negotiations on SETs should not be limited to trade *per se* as climate, innovation, and investment governance are some other important factors that can have real impacts on the development of SETs.

5.3.5 Economic Impacts

The size of the global market for environmental technologies is expected to amount to USD 1,9 trillion by 2020 (UNEP, 2014), and a major part of that market can be linked with sustainable energy. Trade and investment allow for comparative advantages to be exploited and for global competition which drives prices of sustainable energy down. (Jha, 2013)

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118 See http://trade.ec.europa.eu/doclib/docs/2013/september/tradoc_151742.pdf for an example of the chapter on energy generation in the EU-Singapore FTA.

119 The fourteen original members are the EU, US, China, Costa Rica, Canada, Australia, New Zealand, Norway, Switzerland, South Korea, Japan, Hong Kong (China) and Singapore. Israel joined the negotiations formally in January 2015 and Turkey and Iceland joined in March 2015.

The European Commission's Directorate General for Trade has performed an analysis of the potential growth in trade from the EGA. This was based on the APEC + Friends list, and some additional products which have been under discussion for inclusion in the EGA, provided by the EU negotiation team. This list is referred to here as the Chair's list. Baseline data on the total exports in goods under relevant HS6 subheadings is EUR 2.4 trillion, with the G-17 imports, being those trade flows that will ultimately be liberalised, representing EUR 1.9 trillion of that total.[120]

Most the trade in environmental goods takes place between developed countries, but many developing countries are catching up. For example, in the period 2001-2012, Malaysia increased its exports of EGS from less than EUR 1.8 billion to more than EUR 6.2 billion, while Thailand saw an increase from just over EUR 0.9 billion to more than EUR 5.3 billion, and India an increase from less than EUR 0.9 billion to above EUR 4.4 billion.[121] Due to high growth rates, and large baseline market potential, countries such as Brazil, Russia, Malaysia, Thailand and India are increasingly significant actors in the trade in EGs.[122]

In summary, a successful conclusion of an EGA between the 17 negotiating parties, which included a broad range of identified environmental goods could lead to up to a 1.1 per cent or a EUR 21 billion increase in the value of trade worldwide.

A small but significant impact on the price of environmental goods could be achieved through the successful passage of the EGA. A 0.9 per cent decrease in the price of environmental goods is anticipated under the scenario where tariffs are reduced for products under the APEC List + Friends List + Chair's List. (Monkelbaan et al, 2016)

Then there is the impact of the EGA on employment (SDG 8). Many different definitions of green jobs exist, however there is general agreement that the rise in

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120 The trade data used for this figure comes from UN COMTRADE importer notifications from the years 2012 and 2013. An average of these years was used to calculate a recent and robust representation of annual trade flows. 2014 data was not submitted by all countries at the time of the simulation, therefore more recent data was not available at the necessary scale.

121 WTO. "Trade to remain subdued in 2013 after sluggish growth in 2012 as European economies continue to struggle".

122 WTO. "Trade to remain subdued in 2013 after sluggish growth in 2012 as European economies continue to struggle" accessed on 09/09/2015: https://www.wto.org/english/news_e/pres13_e/pr688_e.htm.

environmental regulation and concern for environmental conservation is leading to the rise of new industries and opportunities for innovation.

The shift towards a greener economy has already had impacts on employment. A 2012 report by the Green Jobs Initiative estimated that tens of millions of green jobs have already been created around the world in industrialised countries as well as in emerging and developing economies. The report predicted that between 15 and 60 million additional jobs could be created annually if a shift towards a greener economy was to be made. The renewable energy sector is expected to see the biggest job growth in the coming years[123]. Similar trends can be observed in the EU. Because of the implementation of the 2030 climate and energy framework an estimated 700,000 jobs have been created – most notably in the renewable energy and energy efficiency sectors. An additional 5 million jobs could be retained and/or created by 2020 in the EU through the implementation of energy efficiency measures and the development of renewable energy sources[124].

A recent joint UNIDO-Global Green Growth Institute (GGGI) study looking at renewable energy and energy efficiency industries, showed that in five geographically diverse counties[125] new investments in energy efficiency and renewable energy will consistently generate more jobs for a given amount of spending than maintaining or expanding each country's existing fossil fuel sectors.[126] In the renewable energy sector alone, the IRENA estimates that renewable energy employed 7.7 million people, directly or indirectly, around the world in 2014 (excluding large hydropower). This is an 18% increase from the number reported in 2013.[127]

By promoting exports and increasing the efficiency of the EGS market, the EGA could have significant impact in furthering this trend of job creation in EGS sectors.

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123 ILO (2012), Working towards sustainable development: Opportunities for decent work and social inclusion in a green economy

124European Commission (2015), European Semester Thematic Fiche: Green Jobs Employment Potential and Challenges, accessed on 18/02/2016: http://ec.europa.eu/europe2020/pdf/themes/2015/green_jobs.pdf

125Included in the study was: Brazil, Germany, Indonesia, South Africa, and South Korea

126UNIDO, GGGI (2015) Global Green Growth: Clean Energy Industrial Investments and Expanding Job Opportunities, p 24

127IRENA (2015) Renewable Energy and Jobs: Annual Review 2015, p.3, Accessed on 23/10/2015: http://www.irena.org/DocumentDownloads/Publications/IRENA_RE_Jobs_Annual_Review_2015.pdf

Through the development of complementary industries, local economies can benefit as much or more from the import of new products and services as the exporter economy can.

5.4 Cross-cutting findings in the case studies

5.4.1 The role of power in the case studies

In the case studies, in terms of power dynamics, existing institutions (e.g. WTO, IEA) and paradigms were reinforced and reproduced. In accordance with the types of power that were explained in Chapter 3, the following can be observed.

The market and technological power of business actors is part of structural power. Structural power implies that actors can both influence the formation and functioning of environmental policy, and can shape political ideologies which affect policy decisions of governments. One example from the case study on energy efficiency in which the construction industry interest is to build as cheaply as possible without regard for the long-term operational costs of buildings in terms of energy use. Another example in the case study on trade and the SDGs is that solar cell manufacturers in the US and in the EU, could convince governments to put trade restrictive measures in place on imports of Chinese solar cells even though it was not in the public interest to do so.

Overall, it became clearer from the case studies that the most powerful ministries or departments (e.g. economic affairs, finance and transport) are usually closer to industry than weaker environmental ministries and have a mandate to stimulate short term economic growth. However, framing climate change as an environmental issue rather than an economic and industrial challenge has made environmental ministries the main department responsible for climate (negotiations) in many countries.

Power in the case studies is either so widely distributed (e.g. among small renewable energy or energy efficiency companies) that policy-makers lack the ability to act or aggregated at such a high level (e.g. vested interests such as oil majors) that it is hard to conceive and implement transition governance. Sustainability issues make challenges related to power distribution more profound than other problems because of their cross-cutting nature.

5.4.2 The role of knowledge in governance for the SDGs

Knowledge and facts are more important in sustainable development than in many other areas. (Najam et al., 2006) Knowledge is relevant, first, in the form of scientific information that plays a major role in the monitoring and verification of SDG implementation.

Knowledge can play an important practical role in sustainability efforts. For example, in the case study on energy efficiency, it may be useful for people to be aware of their exact energy use through technologies such as smart energy meters. However, the assumption that knowledge can be transferred directly to the policy domain and the broader expectation that knowledge can direct governance can be questioned for several reasons.

First, 'evidence-based policymaking' in the context of sustainable development is often not based on factual, undisputable knowledge and on rational models of problem-solving (Hertin et al., 2009). 'Evidence' regarding complex natural systems (climatic systems) is often rare and assessments of planetary boundaries cannot be based exclusively on scientific knowledge-claims but require science-society and transdisciplinary deliberations. (Schmidt, 2013) The IPCC process[128] for example is based on a network-type consensual process within the science community. However, the results from IPCC deliberations seem to be weighed by politicians[129] and the media on the parameter of classical scientific authority. (Meuleman, 2012a)

Secondly, it is challenging to get decision-makers to consider sustainability science and its complexities, and the presentation of data has little *direct* impact on governance practice (e.g. the Economics of Ecosystems and Biodiversity (TEEB) reports did not have much impact on policy-making, even according to interviewees[130] who work in the TEEB Secretariat). And even though the IPCC has expressed a clear

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128 IPCC assessment reports are compiled and reviewed by leading scientists, but the politically more relevant 'Summaries for Policymakers' (SPMs) have to be agreed upon by all delegates from participating countries.

129 Meuleman (2012a) sees in this context the statement of a former Dutch Environment minister as illustrative when she says that "I will not accept any more mistakes from the IPCC. As a politician, I must be able to have blind trust in what science says."

130 Interview with anonymous interviewees of the TEEB Secretariat in Geneva on 4 September 2014

consensus on the urgency of addressing climate change (e.g. in its Assessment Reports), it is unclear if and how this has influenced the climate negotiations.

Thirdly, there are several neuro-psychological phenomena at play in humans that may still prevent action even when the level of conscience and knowledge of the complexities around negative effects of climate change is increased (for further explanation of the behavioural aspects of sustainability governance see Monkelbaan and Brosch, forthcoming). The lack of consistency between scientific knowledge and our direct experiences and tacit knowledge can be a barrier to effective climate action (the "knowledge-action paradox"). (Naustdalslid, 2011) Science may increasingly uncover the dynamics and threats of climate change, but it is difficult for laymen to perceive these threats in their daily lives. Recent research shows that at the individual level perceptions of climate change risk in fact decline as scientific literacy and numeracy increase. (e.g. Kahan et al., 2011 and Kahan et al., 2012) Higher educated people are more inclined to be individualistic and oppose egalitarianism, and use their scientific knowledge to defend their status quo. The implication is that providing more information on climate change will not necessarily succeed in strengthening climate action. (World Development Report, 2015)

Fourth, we may be able to measure the ecological details of pollution and overfishing or changes in climatic patterns, but scientific facts are ignored for political reasons. The broad scientific consensus on climate change and its causes and effects is often put in doubt (mainly by vested interests in carbon intensive industries), which has severe consequences for both mitigation and adaptation action. Also, facts can easily be twisted and the seed of doubt (for example on the anthropogenic causes of climate change) can easily be sown if people experience an information overload and have trouble selecting the facts that are in line with the scientific consensus.[131] As interviewee Pier Vellinga put it, “we live in an information-rich but knowledge poor world.”[132]

[131] For one of many investigations on whether a scientific consensus exists on climate change, see Oreskes (2004), available at http://www.sciencemag.org/content/306/5702/1686.full

[132] Pier Vellinga (Urgenda), phone interview of 2 July 2016.

5.4.3 The importance of norms and values in governance for the SDGs

According to AccountAbility's Sustainability Leadership survey, commitment to sustainability values is more than ever the biggest factor in determining sustainability leadership.

Values are important first because all characteristics of wicked problems are symptoms of underlying value *conflicts*. (Norton, 2015)

Secondly, "the only way to develop a more sustainable society is through a process of fundamental reflection on our current values and societal Regimes". (Verbong and Loorbach, 2012: 15-16)

Third, consideration of norms, values and shared conceptions allows for an understanding of how social structures shape policy processes. (Clemens and Cook, 1999)

Fourth, Lee (2007: 162) argues that "policy coherence alone will not avoid the reality of power politics." Promoting coherence among actors and regimes which differ in terms of their power then is unlikely to challenge the dominance of powerful interests without corresponding normative realignment around ambitions for sustainability.

And fifth, in sustainability governance, science often plays a crucial role. However, the illusion of value-free science can enable the (mis-)use of expertise in policy-making and policy prescription, which can start at the moment problems are framed based on ethical judgments. (Hulme, 2009) Therefore, it is difficult to separate science from values in many cases as changing scientific models often involves changing values and assumptions.[133] (Norton, 2015) The relation between the knowledge systems of science and ethics must be better recognized and balanced to help us understand not only what goals to reach in terms of sustainability and how to reach these goals, but also *why* we aim for sustainability in specific ways. (Dahl, 2010) The emphasis of sustainability science on the scientific side of sustainability is not necessarily meant to disregard the importance of values, but it can place science in such a dominant role that it weakens its contribution to value problems. (Clark and Dickson, 2003) Putnam (2004) argues that all scientific statements at least imply cognitive values (e.g. consistency, coherence or

[133] Ethics are important in scientific research (research ethics). Whereas the origins of research ethics lie in medical science and are based on protecting a weaker research object (patient) from a powerful doctor, in social science the roles can be reversed often when a researcher has powerful objects as research subject.

objectivity) that share fundamental characteristics with ethical value judgments. For Douglas (2009), some predominant cognitive values in scientific research in fact are built on ethical values.

5.5 Improvements to the conceptual and analytical framework

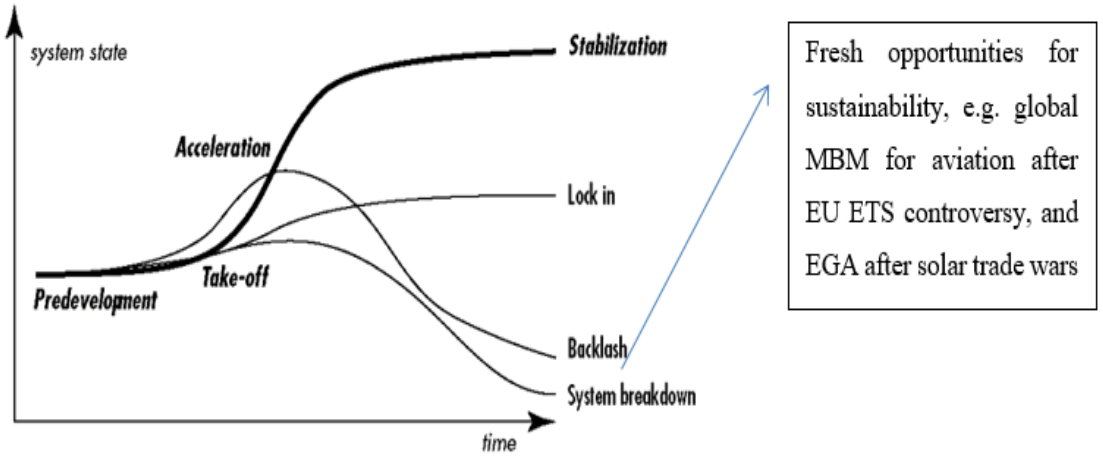
Chapter 2 gave an overview of the theories of transition management, metagovernance, and experimentalist governance. This section critically re-assesses the theories based on the case studies.

5.5.1. Improvements to transition theory

Acknowledging crisis as a driver for transition management (TM)

One main improvement that can be drawn from the case studies and the VRF visit to Sendai is that TM could take crisis better into account as a driver for transitions (also see section 4.3 above). The crisis of the solar trade wars in some ways expedited negotiations on an Environmental Goods Agreement (EGA), the oil crisis of the 1970's fostered energy efficiency in countries like Denmark and Japan, and water and food crises have made the idea of the WEF nexus more popular in places like Southern California.

FIGURE 12 MULTI-PHASE FRAMEWORK, INCLUDING CRISIS AS A DRIVER OF TRANSITION

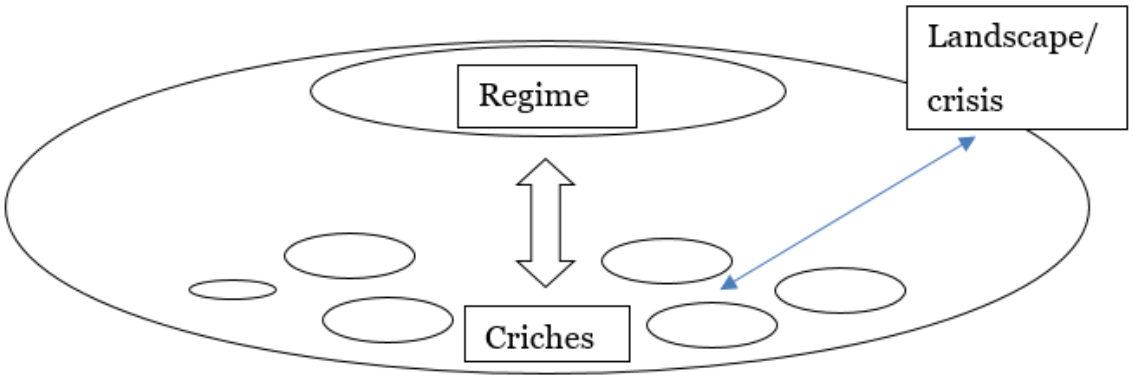


(Source: Rotmans, 2005)

If crisis can be a driver for transition governance, then crisis - equalled here with backlash or system breakdown - does not have to be the end of governance. Previous sustainability transitions and societal transformations have often been the result of

systemic breakdowns and backlashes. This research argues that breakdown can be the prime source of the transformation, as it removes barriers, institutions and customs that previously stood in the way of sustainability transitions. Niches in stable circumstances are rarely strong enough to change the Regime. However, structural Landscape developments (such as crises) can trigger transitions when innovative thinkers ('Criches', i.e. Niches that benefit from crises) can turn crises into opportunities for changing the regime. This leads to the following proposal for expressing the relation between niches, regimes and the landscape:

FIGURE 13 NEW PROPOSED RELATION BETWEEN 'CRICHES', REGIME AND LANDSCAPE



(Source: the author)

Research on the potential role of network or experimentalist (bottom-up) governance perspectives in transition management could be beneficial here. Without looking beyond, a hierarchical model, transition studies might miss the chance to capture purposive coordination across spatial levels and geographically disparate places (as happens in e.g. international networks for sustainable cities, global advocacy or policy networks, transnational corporate networks, as well as cross-regional technology and research platforms). Multi-relational models of analysis can emphasize horizontal relations between Niches, Regimes and Landscape in addition to an exclusively hierarchical approach to Landscape, Regime and Niche level interaction. The proposed concept of 'governance value chains' can provide insights into how a diversity of factors (e.g. discourses, expectations, values, institutions, practices, technologies and interest) and interacting processes shape transitions over time.

Enriching transition management with capabilities approach/practice theory

In terms of the knowledge dimension, transition management has a view on transformative knowledge (the "how" of transitions) at the niche level but lacks systems knowledge (the dynamics, drivers and barriers of transitions) at the regime level and target knowledge (vision of, and motivation for the system aimed for) at the individual level. (Rauschmayer et al., 2015) Rauschmayer et al. (2015) argue that the lack of a view at the role of the individual and of target knowledge[134] in transition management could be remedied by applying Amartya Sen's capabilities approach.[135]

The capabilities approach holds that both resources and knowledge of how to use them for sustainability governance are required for human development. The capabilities approach includes an individual, normative assessment of capabilities and freedom at the micro level that are needed for human development but it is static and cannot explain dynamic transitions. As such, the capabilities approach offers an operational approach to justice and normativity. (Sen, 2009) The capabilities approach covers the knowledge, power and norms dimensions of governance. (cf. Chapter 3 in this report) However, the capabilities approach neglects structural forces and as an individualistic approach it has no theory on societies, governance, collectives, and *group* deliberations. Here, practice theory could be useful for providing systems knowledge.[136]

Practice theory is an analytical approach that can describe social practices and changes at the societal (regime) level. Practice theory explains human action as resulting from the interaction between meaning (understanding, beliefs and emotions), material (the physical aspects of a practice, e.g. driving a car), and skills (competences and

134 Target knowledge is about the vision of, and motivation for the system aimed for.

135 Amartya Sen's capabilities approach argues that quality of life should be conceived and measured in terms of functioning's (achieving goals) and capabilities instead of resources or utility. Functioning's refer to beings or doings (achievements) that people value (e.g. safety, nourishment, and literacy). Capabilities refer to a combination of functioning's that a person can achieve which would eventually reflect the person's freedom to choose and lead a type of life or another. (Sen, 1985) The capabilities approach strengthens the idea that both resources and knowledge of how to use them for sustainability governance are required for human development. By capturing the different degrees to which individuals and institutions can enjoy substantive freedoms ('beings' and 'doings' or 'achieved functioning's'), the capabilities approach can provide for a solid basis for grounding climate justice. (Page, 2006) Sen does not think it is necessary to seek an a priori list of capabilities based on analysis or basic principles. Sen expects that judgments regarding capabilities will emerge democratically from a participatory process which gives space to pluralism and context. The capabilities approach defines a moral and intellectual space in which to discuss, deliberate, and engage in social learning and evaluate policies. (Norton, 2015)

136 Systems knowledge is the knowledge necessary to understand an issue, i.e. in the case of transitions, their dynamics, drivers and barriers.

knowledge). Practice theory can be used for describing change at the meso-level. Practice theory shifts the analytical focus onto the level of integrative practices: it sees human behaviour as embedded in a conjunction of individual, structural, cultural, and technical elements. (Schatzki, 1996) Simultaneously, practice theory allows to account for evolutions in collective and individual values, moral interpretations, lifestyles, social capital, emotions, and knowledge. (Shove et al., 2012) The assemblage of transition management, capability approach and practice theory may be conceptually useful for drawing a more complete picture of the different types of knowledge that are involved in the governance of sustainability transitions.

Building inclusiveness into transition management through deliberation

In theory, transition management is not intended to be inclusive. There is an emphasis on frontrunners, creative thinkers and entrepreneurs in transition arenas. The result is that vision-building and creativity are privileged over democracy and inclusiveness within a broader socio-political context. Public participation and consultation can raise creative ideas and foster the implementation of innovative solutions. (cf. Niemeyer, 2004)

5.5.2. Improvements to metagovernance

The right governance patchworks for addressing the issues described in the case studies requires understanding where the market, government and civil society can be the most efficient and effective actors based on improved metagovernance approaches.

First, metagovernance needs a clearer view on multiscale governance due to the challenges regarding scalar mismatching and fragmentation of scales.

Secondly, while researchers on metagovernance (e.g. Meuleman, 2009) explicitly recognise the importance of culture for their theory, they do not discuss the norms, power and knowledge implications of the division between state and market. This can be a major issue though in the face of sustainability transitions. Metagovernance approaches have started to take the importance of power and knowledge into account but these insights can be further deepened.

5.5.3. Improvements to experimentalist governance

Experimentalist governance appears particularly well-suited to transnational domains (e.g. networks on energy efficiency), where there is even in theory no overarching sovereign entity with the authority to set common goals, and where the diversity of local conditions

and practices makes the adoption and enforcement of uniform fixed rules even less feasible than in domestic settings.

As a matter of improving experimentalist governance, the concept of 'revitalization' (Termeer et al., 2013) could be further explored. Revitalization is necessary for unblocking unproductive patterns in the governance process. Defensive patterns and strategies can be counterproductive because strategies that fit within existing policy routines may have served their purpose in the past but do not result in lasting solutions for wicked problems. (Rittel and Webber, 1973) The author believes that experimentalist governance should focus on proactive revitalization or the capability of actors in a governance system to recognize and unblock counterproductive patterns in policy processes. As such, it could reanimate actors and introduce experimentalist processes needed to cope with wicked problems. Without revitalization, there is the risk of regression or of the application of routine solutions.

Secondly, experimentalist approaches can overlook the effectiveness of governance. Deliberative approaches and the concept of 'deliberative democracy' could be included in more systematic forms of experimentalist governance to contribute to the effectiveness and equity of sustainability transitions.[137] By incorporating deliberative approaches, experimentalist governance could realize its promise of empowerment by linking agency with access to knowledge, justice and participation. Deliberative approaches can also remedy the expert dominated process which experimentalism propagates to safeguard the legitimacy and accountability of sustainability governance.

[137] Experimentalist governance processes already contain deliberative aspects in the sense that they encourage the questioning of settled practices, the reconsideration of related interests, and because "questions are decided by argument about the best ways to address problems, not simply exertions of power, expressions of interest, or bargaining from power positions based on interests" (Cohen and Sabel 2005: 779)

6. Conclusions

This report has tried to demonstrate the worth, originality, and richness of diverse elements, theories and concepts that are involved in the rich academic literature on the role of governance in societal transitions toward more sustainable pathways. It seeks to apply those elements, theories, and concepts to the Sustainable Development Goals (SDGs)

The theories listed in Chapter 2 *prima facie* share some basic features. Most obviously, transition management, metagovernance, network governance, policentricity and experimentalist governance can be readily applied to implementation of the SDGs. They also have in common that they can tend towards critical realism, the main epistemological orientation of this study. Each of the presented sustainability governance bodies of theory is based on the ambition to embrace many 'sub'-theories. They are all relatively novel and dynamic fields of research, and all of them provide innovative insights on complex processes of systemic change characterised by multiple actors, diverse uncertainties and persistent problems of unsustainability. And although not all of them have been applied at the global level, at least they are all open to global developments and participation, making them relevant in the light of global governance. New modes of governance need to reflect the increasingly multiscale, multilevel and multifactor realities of governance, especially for those sustainability challenges that result from aggregates of several local and regional actions.

The theories analysed in Chapter 2 diverge from each other in some respects such as the level of analysis, the centrality of governmental actors, the manageability of change, the degree to which they focus on sustainability transitions, and their disciplinary roots. It could be argued though that insights from the different theories could cross-fertilize to fill substantive intellectual lacunae, and can together strengthen a more integrative conceptualization of transition governance.

Further, transition management lacks a proper view on cultural sensitivities, the role of individual agency as a potential driver of transitions, and the differences between network, hierarchical and market-based governance systems (as metagovernance does). Transition management together with network governance has been criticised for its potentially elitist character and its problems of democratic legitimacy and accountability. While transition studies accept the concept of multi-level governance up to some point,

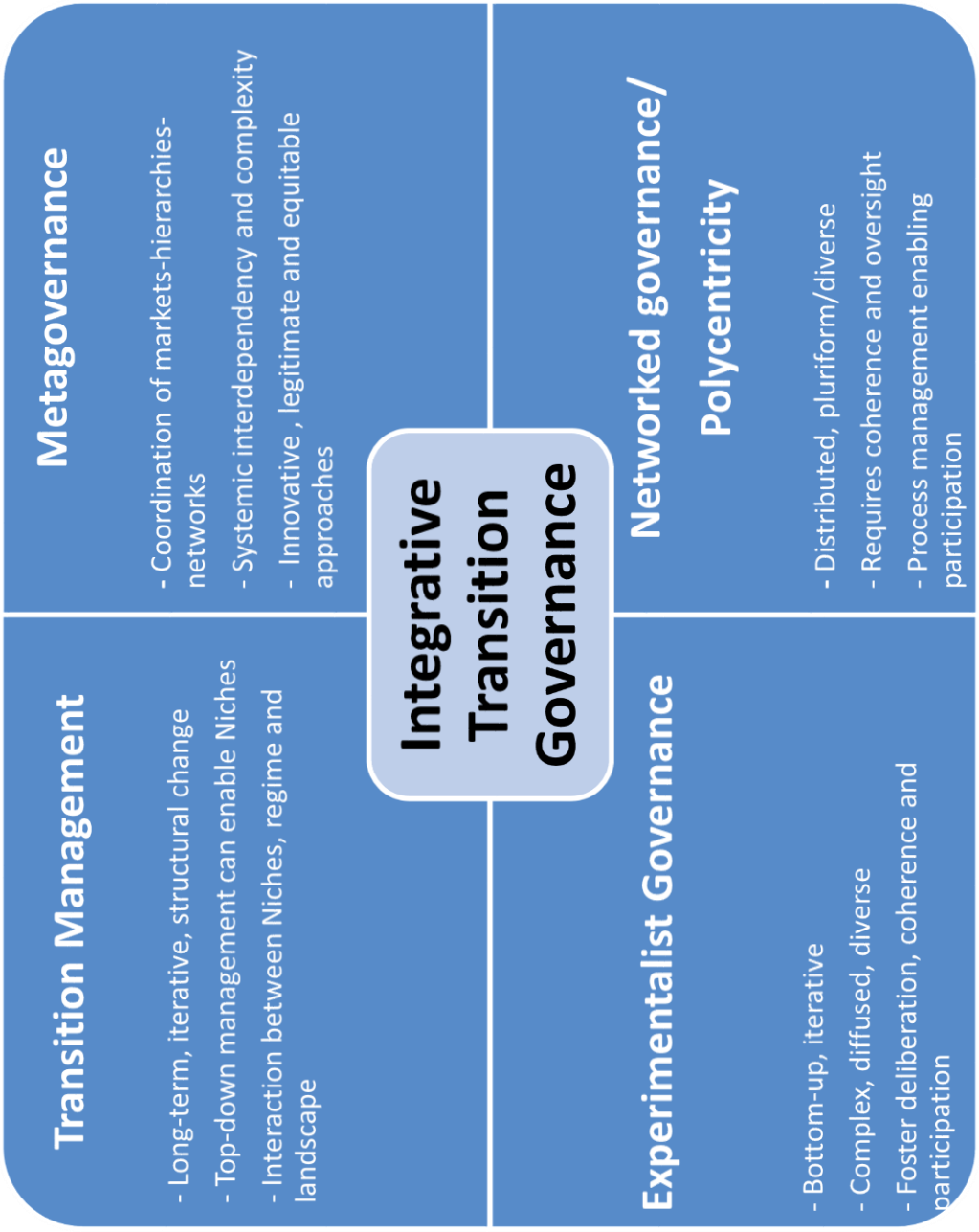
metagovernance and experimentalist governance could gain in clarity from making multi-level governance more explicit and policentricity can offer useful insight for that.

Polycentricity incorporates the reality of network governance but still must clearly point out how network governance interacts with hierarchical and market governance styles (metagovernance).

The five theories make different assumptions about the *nature of change*. They variously focus on changes in understandings, networks, structures, technologies, policies, problem domains or entire societal domains. The change that these theories aim at can be directed towards dealing with specific wicked problems or towards the wider goal of a sustainable society. Transition management is one of the more ambitious and normative theories, focusing on sustainability through structural changes in entire societal domains. Metagovernance, network governance and policentricity depend on a more static view regarding social and policy changes. These theories could benefit from the dynamism of transition management, which is focused on long term changes (one or more generations) based on its systemic ideas about non-linear changes.

Figure 14 below compares the theories mentioned in Chapter 2 on several core aspects.

FIGURE 14 KEY PROPERTIES OF THE MAIN THEORIES THAT FORM THE BASIS FOR INTEGRATIVE TRANSITION/SDG GOVERNANCE



(Source: the author)

Chapter 3 identified three theoretical pillars in transition governance: power, knowledge and norms. Within these themes, it developed some main indicator frames. For power, the indicator frames are leadership, relations and empowerment. For knowledge, the indicator frames are adaptiveness, 'knowledge cooperation' (learning and

knowledge sharing) and reflexivity. Under norms and values, the key indicator frames are justice, trust, and inclusiveness (pluralism). These indicator frames are applicable to the implementation of the SDGs at the individual, organizational and institutional levels.

Chapter 4 identified three inferences or required inputs for effectively and coherently governing for the SDGs:

- Inference 1: Applying behavioural insights
- Inference 2: Addressing complexity through systems thinking and reflexivity
- Inference 3: Mobilizing 'crisis' for change and collective action

These inferences are highly complementary and build on each other. The inferences apply from the individual to the collective and from the inherent to the contextual levels.

In terms of the behavioural aspects of implementing the SDGs, a thorough understanding of the mechanisms underlying sustainability-related decisions and behaviours requires the simultaneous consideration of the decision situation with its incentive structures, the individual and his or her beliefs, values, appraisals, and emotions, and the type of decision.

Crisis can be necessary for shifting power structures that are inert and fail to provide public goods. The main challenge related to a crisis lies in channelling the momentum that it creates towards more sustainable pathways. To be able to leverage a crisis, close attention needs to be paid to building capacity within all the indicator frames as identified in this section. In relation to power, overcoming crises requires able leadership, trustworthy relations throughout society, and empowerment of the previously disadvantaged. With regards to knowledge, learning and adaptiveness are clearly needed for leveraging crises for transitions and reflexivity is necessary to analyse what went wrong and what can be improved to avoid future crises. Norms and values are critical to crises which may result from inequities and neglected minority interests. A crisis can provide an impetus for legitimacy but also it can put pressure on governors to be accountable as major interests are at stake.

Chapter 5 presented three case studies, on energy efficiency, the water-energy-food nexus, and on trade and the SDGs.

Case study 1 on energy efficiency and the SDGs was based on SDG 7 on sustainable energy. SDG 7 provides a critical mandate for improving energy efficiency globally. Vice versa, and in response to the main research question, the examples given in Chapter 5 demonstrate that energy efficiency can make valuable contributions to the achievement of many different SDGs. However, as this article is built upon an inductive research approach through literature review and retrospective cases, the framework needs to be tested using the conventional hypothesis testing methodology (e.g. a large-scale survey) in different case studies. Future research in this direction will be needed to advance and refine the framework in specific instances (e.g. at the national level).

Case study 2 on the water-energy-food nexus demonstrates that we need to go beyond traditional sustainability thinking (in terms of optimizing existing, inherently unsustainable systems and making them more efficient). Instead, the implementation of the SDGs requires transformative approaches (transitions) based on inclusiveness, systems thinking, adaptive management (as a response to risk and uncertainty), deliberation.

Taking interactions between SDGs into account through a nexus approach may sound like increasing complexity. However, this means rather that existing complexities are exposed and better understood, to be better addressed in the long term.

Overall, it is important to remind ourselves that the WEF nexus is a conceptual framework; 'the map is not the terrain'. Therefore, it is important to distinguish conceptual levels, such as physical reality, which affects the level of policy instruments (incl. SDGs), and which is determined by governance and geopolitics. Policy, governance, trade and geopolitics in turn can have impacts on physical reality in the three sectors.

The suitability of the WEF nexus for optimally implementing the SDGs needs to be explored further, as a persistent criticism on the SDGs is that they are not coherently, and in some instances even conflictingly, formulated.

Case study 3 showed that reducing trade barriers to access environmental goods can contribute to technology diffusion. However, many other flanking policies, including enabling environments, are also required to ensure such diffusion takes place and is used in support of the SDGs.

The trade-related targets included in the 2030 Development Agenda are not fundamentally new and many, particularly those in the SDGs, tend to repeat earlier commitments included in WTO negotiations. As governments start implementing the 2030 Development Agenda, the relevance of these targets must be assessed considering recent changes in trade policies being applied in several large economies. These policy changes have revealed critical loopholes in international economic governance frameworks or at least areas where existing rules would require further elaboration and updating. The plurilateral Environmental Goods Agreement (EGA), while currently limited in scope, could pave the way for future cooperative arrangements in clean energy.

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List of Major Works

1.) ‘Energy efficiency: important lessons learned for implementing the Paris Climate Agreement and Sustainable Development Goal 7 on energy’ with Professor Martin Patel (forthcoming in Energy Policy)

2.) Community Choice Energy business models in California: identifying success factors for fostering local renewable energy. (forthcoming in Energy Policy). With Silvia Zinetti.

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4.) ‘Trade in Sustainable Energy Services’, by Joachim Monkelbaan, book chapter in: The Law and Economics of a Sustainable Energy Trade Agreement, Edited by Gary C. Hufbauer, Ricardo Meléndez- Edited by Gary C. Hufbauer, Ricardo Meléndez-Ortiz and Richard Samans. Cambridge University Press, 2016.

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