1.3. Environmental governance and institutions of Environmental Governance
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In his analysis of institutions of environmental governance, Jouni Paavola (2007) rightly noticed "*new institutional research on environmental governance has been phenomenally successful in terms of its volume growth and policy impact. Yet its potential is far from exhausted…*". The key words here are *environmental governance* and *institutions of environmental governance*. Their promotion to buzz words of environmental policy literature occurred mostly because these concepts worked well for creating integrative perspectives. Furthemore, conceptualising nature-human interactions, including environmental conflicts, as interactions of institutions dealing with specific environmental issues or governing natural resources, is a relatively simple yet comprehensive way to understand the policy process and structure all the complexity of human-nature interactions. The success of *institutions* as a research concept can also be also attributed to the fact that it was very well elaborated in social science (or rather institutional economics) literature, and therefore it was easy to pick up and apply in environmental studies by social- and policy science-trained scholars increasingly dominating the field.

The objective of this chapter is to guide through the literature on institutions and environmental governance and through the related terminology and concepts, and to demonstrate the diversity of mainstream approaches to defining and researching them. We take a closer look on adaptive governance and institutions of adaptive governance as areas of possible application.

1.3.1. Institutions of environmental governance — ways of conceptualization, definitions and properties

In relation to social organizations and practices, the term '*institution*' was used since at least the 14th century (Merriam-Webster, 2012). However, the origin of social institutions themselves is still a highly debated issue (e. g. Urpelainen, 2011). Some scholars (most notably, Hobbes, 1651; Locke, 1689) believed that their origin was in a social contract. Others (e. g. Smith, 1759; Hayek, 1960) ex-

plained it by the adaptive behaviour of individual agents. Although there is no complete agreement about what the concept of institution stands for, most scholars emphasise the role of constraints and rules in their definitions (Urpelainen, 2011).

In environmental literature, one of the most commonly cited definitions of institutions comes from Elinor Ostrom (1990), who defined *institutions* as "*working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals depending on their actions*". In her research of governing common-pool resources (CPR), she also suggested what characteristic of institutions would make them successful in governing such resources; these characteristics are also known as *institutional design principles*:

(i)   clearly defined boundaries of resource systems;
(ii)   fair appropriation and provision rules;
(iii)   collective choice arrangements providing for participation in decision-making;
(iv)   monitoring by monitors accountable to resource users;
(v)   graduated sanctions for violators;
(vi)   accessible mechanisms for conflict resolution;
(vii)   a minimal recognition of rights to organize;
(viii) organisation in the form of nested enterprises.

A similar approach to defining *institutions* was taken by the Institutional Dimension of Global Environmental Change (IDGEC) Project. The main difference was in putting forward *social-practices* as a way to understand institutions (Young, 1999), which we therefore defined as "*systems of rules, decision-making procedures, and programs that give rise to social practices, assign roles to the participants in these practices, and guide interactions among the occupants of the relevant roles*" (Young, 2002).

Making a stronger emphasis on the role of *institutions* as objects creating interfaces of human-nature interactions, Folke et al. (1998) described them as humanly devised formal and informal constraints and their enforcement characteristics. Institutions, according to them, provide a link between human and natural systems allowing for a co-evolutionary development of the both systems, but at the

same time, they are capable of suppressing adaptive responses and creating confusion in management. Adopting a similar perspective, Adger et al. (2003) argued that institutions can be instrumental in resolving environmental conflicts by finding a right balance between divergent interests by "*...either establishing, reaffirming or redefining entitlements in environmental resources*".

This standpoint (i. e. seeing the issues of nature recourse use as *environmental conflicts*) brings us from understanding environmental problems as an explicitly economic issue, to the dimension of *social justice*, where welfare-related incentives are interacting with *norms* and *values* (Paavola, 2007). *Norms* rule what solutions are legitimate (in a formal or informal sense), while "*...values influence what resolutions of environmental conflicts are considered just*" (Paavola, 2007). Introducing *norms* and *values* to a policy analysis framework helps to understand why and how decisions are taken, most of all in the situations when incentive-based logic fails to explain the decision-making process. The same author further argues that legitimate environmental decisions shall incorporate both *distributive* and *procedural* aspects of environmental justice, with implications that wealth incentives might be able in many situations to compensate for compromised values (i.e. fair distribution), and that "*…those whose interests are not endorsed by a particular environmental decision that their interests can count in other decisions*" (i.e. the procedure does not give a sense of being excluded from the decision-making process) (Paavola, 2007).

1.3.2. Environmental governance — properties and functions

Environmental governance, although it was mentioned quite a few times before, deserves to be introduced separately as one of the core (and increasingly popular) concepts of environmental discourse. *Governance* is often confused with *governing*; the key difference is that *governing* refers to those social activities which make a "*…purposeful effort to guide, steer, control, or manage (sectors or facets of) societies*", while governance concerns "*the patterns that emerge from the governing activities of social, political and administrative actors*" (Kooiman, 1993: 2), or in other words "*the ways and*

means in which the divergent preferences of citizens are translated into effective policy choices, about how the plurality of societal interests are transformed into unitary action and the compliance of social actors is achieved" (Kohler-Koch, 1999: 14).

A universal and relatively concise definition of *environmental governance* was suggested by Jouni Paavola (2007), who described it as "*...the establishment, reaffirmation or change of institutions to resolve conflicts over environmental resources*"; Karl Folke with co-authors gave a somewhat broader view, where *environmental governance* concerned with "*…creating the conditions for ordered rule and collective action or institutions of social coordination; the structures and processes by which people in societies make decisions and share power*" (Folke et al., 2005).

In the context of these definitions it is important to see the difference between the governance by the state, which is the ability of a state to meet its governance objectives and governance in its broader sense, i. e. the system that functions even in a situation of a deregulated economy, where governmental actors or rules set by the government do not exist or have limited influence.

In policy analysis it can be important to understand the difference between *governance frameworks* and *governance regimes*. Governance frameworks are usually set by pieces of legislation (or other norms) created to establish or to modify policies. Examples include EU directives (e. g. EU water management policies regulated by the Water Framework Directive), UN conventions (e. g. Montreal Protocol providing a framework for global ozone policy) etc. Different frameworks may interfere, especially if they originate from different contexts (e. g. forestry, water management, biodiversity conservation), and their combined action, alongside with contribution by many more agents (both affected by the frameworks and acting/existing independently), create a new contexts and institutional environments that can be conceptualised as *governance regimes* (Paavola et al., 2009). Their scale may range from local (e. g. a regime emerged over governing a lake) to global (e. g. governance of the global climate change).

Interaction between the physical system and the society is often conceptualised through the analytical problems of *fit*, *interplay*, and *scale* in environmental governance.

The problem of *fit* emerges from the argument that the effectiveness of institutions is a function of match between institutions and biophysical systems, that is to say, the better the match the more effective the institution. However, the closest fit is not always the best one, as it is very case (time/place) specific. Changes in biophysical system may impact the performance of institutions (Young, 1999). According to Young (2002), institutional misfits (mismatch) occur through imperfect knowledge, institutional constraints, and rent-seeking behaviour. The fundamental assumption of the concept of fit is that the society and its institutions can achieve a very close match with the biophysical system; this assumption can be easily challenged, however it helps to explain how certain social constructs or management models can be inappropriate in specific ecosystem conditions.

Folke et al. (1998) recognise spatial, functional, and temporal misfits. *Spatial mismatches* occur where the boundaries of management do not coincide with the boundaries of the ecological entity. The nest discussed examples include mismatches between administrative borders and boundaries of ecosystems or river basins managed within these borders. *Functional mismatches* are mostly mismatches of scope, arising when users with very specific needs and narrowly defined management actions fail to take into account the complexity of managed systems, e. g. when a water management body is also assigned to manage biodiversity. *Temporal mismatches* may occur when environment is rapidly changing, but social systems are slow to respond and have cultural inertia and organizational rigidity. Very common instances of such mismatches occur in situations when an administrative procedure takes longer than a biophysical or social cycle it is dealing with, e. g. in many countries the management of national parks or biosphere reserves involves so many bureaucratic procedures that management responses to natural disasters or seasonal changes are often delayed and delivered not in a timely manner.

Institutions cannot be perceived as autonomous arrangements. They interact with other institutions both horizontally and vertically. *Horizontal interplay* features interactions occurring at the same level of social organization. *Vertical interplay* is a result of cross-scale interactions or links involving institutions located at different levels of society (Young, 2002).

The problem of *scale* refers to the transferability of generalizations and inferences from one level to another in spatial and temporal dimensions; it has to do with an ability to generalise knowledge about institutions (Young, 1999). In a very simplified form this problem can be summarised as following: "the scale of a problem and the scale of institutions set up to solve the problem shall be the same". In a reality most problems have a multi-scale nature that obviously requires multi-scale approaches for solving them.

1.3.3. Multilevel environmental governance

The discussion on the scale of problems is related to the notions of *multilevel* or sometimes also *polycentric governance*. They are based on the observation that environmental change and increasing complexity of societal interactions act as triggers for proliferating institutional arrangements dealing with environmental issues and also for their increased interconnectedness (Young, 2002). This ultimately leads to the dispersion of central government authority, which process is referred to by Hooghe and Marks (2001) as *multi-level governance*. Ostrom et al. (1961) described this process as *polycentric governance*, where many centers of decision-making that are formally independent of each co-exist and collectively deal with an environmental issue or natural resources (McGinnis, 1999).

Increasing prominence of non-state actors in political decision-making is commonly described as a core feature of *multilevel* (*polycentric*) *governance* (Bache & Flinders, 2005). For this reason *multilevel* (*polycentric*) *governance* is also argued to support flexible and competent decision-making (e. g. Bromley et al., 1992; Folke et al., 2002; Ostrom, 2005), which is, being fed by multiple centers of authority (including multiple sources of expertise), contribute to the solution of complex problems (McGinnis, 2000).

Multilevel environmental governance, however, became a reality only with proliferation of multilateral environmental agreements (MEAs) and development of a substantial body of EU directives on environmental matters (Paavola, 2008). Even in governance contexts where governance by the state is hierarchical and decision-making is very top-down, MEAs may play an important role in supporting alternative centers of governance.

Otto et al. (2011) show how in Belarus, where the national administrative culture is very top-down, NGOs carve their way to participation in policy discussions or in decision-making about management of national parks through appeals to international organisations, both governmental and inter-governmental (UNESCO, European Council) and non-governmental (such as WWF). This study further demonstrates that if the issue or the protected areas in question are not of a very high concern to international counter-parts, or if the national government does not value the material or symbolic benefits associated with cooperation with and appreciation by the international partners, then such appeals may not work. Such situations, although to a smaller extent, are also typical for many Western democracies, including EU member-states. Although cooperation of government bodies with multiple stakeholders, including local communities and NGOs is embedded in most environmental EU directives, the state actors are often unwilling to accept the emerging agency beyond the state.

1.3.4. Implementation deficits

A very special applied issue emerging in the context of multilevel governance is *transposition of environmental policies* from higher policy level to the action ground and related *implementation deficits*.

As such, the problem of *implementation deficits* is not new. The first comprehensive analysis of the issue came from Pressman and Wildavsky (1973), who set the objectives and boundaries of implementation studies as a research field, and offered a critical assessment of causal linkages between policy goals and the actual outcomes. They brought forward the notion of "*implementation chain*" consisting of interlinked implementing agencies. Their assessment framework is based on the assumption that the degree of cooperation between the agencies required to create the links should be close to one hundred percent, and if the percentage is considerably lower in many instances, the small deficits accumulate over the chain that results in compromised or unsuccessful policy outcomes. In other words, development of conditions for a coordinated *collective action* is essential in order for the policy to be effective.

To support this point, in their analysis of implementation and re-development perspectives of the Great Lakes Water Quality Agreement, McLaughlin and Krantzberg (2011) argue for the policy that is aware of the complexity of governance and biophysical systems and the deficiencies of traditional policy-making approaches (including the unwillingness to guess and experiment under large uncertainty and information deficiency — see section 2 for information on adaptive co-management and governance approaches) still dominating natural resource management agencies and based on a simplistic understanding of social-ecological systems and their management, while in the reality the society and its interactions with ecosystems is neither under control nor entirely predictable. Evans and Klinger (2008) demonstrate that even at the action ground the implementation process can be easily constrained by oversimplistic understanding of ecosystem management. They further identify two specific barriers preventing user groups from achieving ecosystem management objectives: (1) deficit of information (e. g. due to the lack of specific management expertise) and (2) inadequate investment to management activities (mostly due to underestimation of the complexity and size of the management action).

Problem framing (see more on the framing issues in the Section 2) is one of the key factors that determine the success of policies, or their "*tractability*". As Dupuis and Knoepfel (2013) show for adaptive policies in Switzerland and India, their efficiency varied depending on whether the problem was framed as "climate change adaptation", "climate variability adaptation" or "vulnerability-centred adaptation". They argue that the "climate change adaptation" track is more prone to tractability issues due to pre-required (and not available at all the decision-making and management levels) in-depth understanding of the atmospheric system and climate projections, while "vulnerability-centred adaptation" addresses specific issues and requires the expertise, which is broader available at all the levels (in particular the management level). The authors further argue that at the meso-scale the "climate change adaptation"-oriented policies are very likely to be compromised by conflicts of "intra-policy coordination" (here this is terminologically equal to the *institutional interplay* as discussed in 1.3.2) due to innovative, large-scale, or intense policy solutions they utilize and promote, the kind of solutions usually as-

sociated with most other vertically-integrated policies, such as sustainability policies. At the micro-level the authors find that in contrast to other framings, the globally formulated and coordinated "climate change adaptation" policy stream does not fit the local institutions of environmental governance, whereas "climate variability adaptation" and "vulnerability-centred adaptation" have a wider scope that is more likely to appeal to the needs and interest of implementation actors.

In complex administrative set-ups, such as federal states or the EU, where the same legislation can be offered to a diversity of federal subjects or even independent nations with different management cultures, institutional and biophysical contexts, the policy implementation process is challenged even more. Lampinen and Uusikylä (1998) show that even in the relatively homogeneous EU of 1995, the implementation success of EU directives in different member states significantly varied, with Denmark, Netherlands and the UK most successful, and Greece, Portugal and Italy failing to implement most of the directives. The study concluded with the assumptions that "*countries with effective and stable political institutions and a corporatist system that integrates interest organizations into political decision making, would have the best capability to implement EU directives*", and "*it is easier to implement EU directives in countries where the political system has high legitimacy, people are satisfied with democracy, the degree of social fragmentation is low, individual rights are highly respected, and attitudes towards the EU are positive*" (Lampinen & Uusikylä, 1998: 248).

With the EU accession of Central and eastern European countries, the European biophysical and governance landscapes became even more diverse, and so became the landscape of implementation deficits. Leventon and Antypas (2012) had demonstrated the difficulties Hungary faced with the implementation of the EU Drinking Water Directive. On one hand, local geological conditions cause high concentration of arsenic in groundwater in a significant part of the country. On the other hand, regional governments and local communities do not have institutions of joining resources for a common cause, and involving non-governmental actors in the matters related to municipal management, while the Directive is very much based on the assumption that such institutions might exist. As a re-

sult, the deficits occurred at all the administrative levels, and their cumulative effect led to the overall implementation failure. Apparently, some of the deficits were related to wrong (not suitable for this specific social-ecological system) assumptions laid in the Directive, while the others are rather related to actors' choices and behaviour.

Leventon and Antypas (2012) had identified the instances of implementation deficits and classified them in regard to the failures oriented either to policy goals (e.g. adoption of an EU Directive and all the necessary sub-laws for completing the formal implementation process) or policy problems (the extent to which the actual problem is solved), and to policy outputs (creation of policy infrastructure) or policy outcomes (specific management actions demanded by the outputs). In simplified form the classification used to describe the implementation of the Drinking Water Directive (DWD) in Hungary is set in the Table 1.1 (Leventon & Antypas, 2012: 255):

Table 1.1

Implementation deficits in the EU policy system in Hungary
(Leventon & Antypas, 2012)

Failure	Impact	
	Policy output	Policy outcome
Orientation to policy goals	A. There is no Hungarian legislation to enact the EU drinking water directive	B. The actions outlined in Hungarian legislation cannot achieve the EU arsenic limits
Orientation to policy problem	C. The EU DWD is not the most effective option for managing arsenic in drinking water in Hungary	D. The arsenic limits set in EU legislation do not protect public health from the impacts of geogenic arsenic

1.3.5. Decomposing environmental governance

One of the ways for understanding a system's complexity is to decompose it on components that explain the system's dynamics as a combination of certain aspects. For such a complex system as environmental governance, such decomposition may, for instance,

follow generic environmental governance functions identified by Paavola (2007):

1) exclusion of unauthorized users;
2) regulation of authorized resource uses and distribution of their benefits;
3) provisioning and the recovery of its costs;
4) monitoring;
5) enforcement;
6) conflict resolution;
7) collective choice.

The assumption is that for successful functioning of a governance system, all of these need to be checked through, so there are working governance solutions behind each of the functions. As such, this can be used as a template for an analytical framework, in particular for studying liveability of governance set-ups.

Earth System Governance global research alliance (http://www.earthsystemgovernance.org/) approached the problem of decomposition through *analytical problems of Earth System Governance* (ESG).

The concept of *Earth System Governance* (ESG) was formulated by Biermann (2007) to provide a platform for merging governance theories with earth system science. The concept of governance — often implying some form of self-regulation by actors, private-public cooperation, and multilevel policy approaches — was used instead of a narrower management concept to eliminate connotations to hierarchical steering, planning and controlling of social relations by the state (Biermann et al., 2009).

ESG is defined by Biermann et al. (2010) as "*the interrelated and increasingly integrated system of formal and informal rules, rule-making systems, and actor-networks at all levels of human society (from local to global) that are set up to steer societies towards preventing, mitigating, and adapting to global and local environmental change and, in particular, earth system transformation, within the normative context of sustainable development*".

There are at least five *problem characteristics,* which make ESG a special and unprecedented governance challenge for both researchers, decision makers and justify it as broadly applicable way to analyse environmental governance systems (Biermann, 2007):

(i) persistent analytical and normative *uncertainties* associated with global environmental change and response options to it;

(ii) *intergenerational dependencies* resulting from the temporal separation of causes and effect of earth system transformation;

(iii) *functional interdependence* between policy domains linking response strategies in one problem area to a number of other areas;

(iv) *spatial interdependence* caused by the earth system potential to transform local environmental changes into changes that affect other localities and the ability of global social system to transform local environmental degradation into regional or global socioeconomic crises; and

(v) an *extraordinary degree of harm* existing governance systems are not entirely prepared for.

From these characteristics of earth system transformation, Biermann (2007) derives *governance principles* of credibility, stability, adaptiveness, and inclusiveness. Following these principles, the ESG Project (Biermann et al., 2009) put forward five interdependent *analytical problems* (these problems are often referred to as *5 As of ESG*):

(i) the overall *Architecture* of ESG,

(ii) *Agency* beyond the state and of the state,

(iii) the *Adaptiveness* of governance mechanisms and processes,

(iv) their *Accountability and legitimacy*, and

(v) modes of *Allocation and access* in ESG.

Biermann (2007) argues that the research efforts should be refocused from single institutions to the overall *Architecture* of ESG in order to account for stability, credibility, and inclusiveness. By governance architecture, he understands clusters of regimes, norms, principles, and other institutions in a problem area. Architecture can also be described as a meta-level of governance (Biermann et al., 2010).

Governance institutions increasingly tend to include non-state actors from different levels. These actors often acquire *Agency* by means of active participation and ability to set their own rules; which leads to a formal recognition of a difference between actors and agents. The actors are individuals, organizations, and networks involved in decision-making, while the agents are the authoritative

actors. In this discussion the authority refers to a legitimacy and capacity to exercise power, and the power is a capacity to influence outcomes (Biermann et al., 2010).

The ESG Project (Biermann et al., 2009) uses *Adaptiveness* as an umbrella term for a number of concepts describing the changes society is making in response to environmental change. These concepts include adaptive capacity, resilience, adaptation, and vulnerability. Adaptiveness includes both adaptive governance to social-ecological change and the processes of adaptation taking place within governance systems.

Accountability and legitimacy are intervening variables determining overall effectiveness of institutions. With the emergence of international and subnational levels of governance, legitimacy and accountability are not concerns of national governments alone. Intergovernmental institutions and agents indirectly obtain their legitimacy through governments, which are accountable to their voters, while the legitimacy of private agents may come from accountability to their members and donors (Biermann et al., 2009).

An effective ESG is possible only if all the stakeholders perceive it as fair and equitable (Biermann, 2007). A fairness of *Allocation and Access* has to do with both the way their objectives are defined and the means selected to achieve them. The problem of access is directly linked to human rights and freedom of information. The allocation refers to the distribution of risks, responsibilities and benefits between actors.

Although ESG was designed as a global research plan, the 5 As also work fairly well for analysing social-ecological systems at a local scale, as an increasingly growing body of literature demonstrates (Werners et al., 2009; Shkaruba & Kireyeu, 2013).

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