



Research article

Does problem complexity matter for environmental policy delivery? How public authorities address problems of water governance

Sabrina Kirschke ^{a,*}, Jens Newig ^a, Jeanette Völker ^b, Dietrich Borchardt ^b^a Leuphana University of Lüneburg, Scharnhorststr. 1, 21335 Lüneburg, Germany^b Helmholtz Centre for Environmental Research, Brückstr. 3a, 39114 Magdeburg, Germany

ARTICLE INFO

Article history:

Received 1 November 2016

Received in revised form

22 February 2017

Accepted 26 February 2017

Keywords:

Complex problems

Complex problem solving

Diffuse source pollution

Point source pollution

Water Framework Directive

Wicked problems

ABSTRACT

Problem complexity is often assumed to hamper effective environmental policy delivery. However, this claim is hardly substantiated, given the dominance of qualitative small-n designs in environmental governance research. We studied 37 types of contemporary problems defined by German water governance to assess the impact of problem complexity on policy delivery through public authorities. The analysis is based on a unique data set related to these problems, encompassing both in-depth interview-based data on complexities and independent official data on policy delivery. Our findings show that complexity in fact tends to delay implementation at the stage of planning. However, different dimensions of complexity (goals, variables, dynamics, interconnections, and uncertainty) impact on the different stages of policy delivery (goal formulation, stages and degrees of implementation) in various ways.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

Complexity is a notorious suspect to account for deficient environmental policy delivery. Researchers increasingly argue that environmental problems are exceptionally complex or ‘wicked’. This regards climate change adaptation and mitigation policies (e.g. Amelung and Funke, 2013; FritzGibbon and Mensah, 2012; Head, 2014) as well as the management of natural resources such as waters and soils (e.g. Cilliers et al., 2013; Metz and Ingold, 2014; Pahl-Wostl et al., 2012; Patterson et al., 2013; Termeer et al., 2015). Addressing these complexities appears a particularly challenging endeavour. In the field of water management, for instance, diffuse source pollution by nutrients and micro pollutants is hugely challenging given the diverse interconnections of socio-ecological systems, system dynamics and differing interests of stakeholders, just to name a few (Metz and Ingold, 2014; Pahl-Wostl, 2007; Patterson et al., 2013).

The claim that problem complexity hampers effective environmental policy delivery has, however, hardly been substantiated by

empirical evidence. Claims on the effects of complexity mainly rest upon case studies, which are difficult to compare given incompatible understandings of ‘complexity’. This lack, however, hinders systematic, comparative analyses of governance for complex environmental problem solving. If we do not know how complexity effects environmental policy delivery, how can we suggest convincing strategies to address environmental problems in practice? Take, for instance, the often proposed strategy of participation to cope with complexity in decision-making (e.g. Head and Alford, 2013; Steyaert and Jiggins, 2007). This strategy would be far more convincing if it responded to evidence-based barriers to complex problem solving such as ignorance, inefficient, or symbolic policies of problem solvers.

Against this background, we empirically investigate the relationship between problem complexity and policy delivery by public authorities. Within this relationship, we trace the general impact of complexity and the impact of various dimensions of complexity on goals and actions to address problems. Our empirical data refer to 37 pollution-related problems of German water governance. These problems have been officially identified and defined by German water authorities as priority issues in implementing the European Water Framework Directive (WFD). In order to assess the complexity of these problems, we conducted 65 in-depth expert interviews with water managers and policy experts. Data on how problems were addressed were provided by relevant authorities in the course of legal reporting mechanisms. This research design

* Corresponding author.

E-mail addresses: sabrina.kirschke@posteo.de (S. Kirschke), newig@uni-leuphana.de (J. Newig), jeanette.voelker@ufz.de (J. Völker), dietrich.borchardt@ufz.de (D. Borchardt).

constitutes a unique opportunity to comparatively assess the impact of problem complexity on policy delivery, keeping the overall context fairly constant.

Following this introduction, Section 2 details our conceptual and theoretical starting points. Drawing on literature on complex problem solving in psychology and public policy analysis, we present our multi-dimensional understanding of problem complexity and policy delivery, and discuss possible causal relationships between the two. Section 3 describes the studied water governance problems, the qualitative and quantitative data sources, and methods for data analysis. Section 4 presents our findings on problem complexity and policy delivery of the 37 water problems, and a statistical analysis of how they are related. Section 5 discusses the findings in the light of theoretical assumptions and applied methodologies, and outlines avenues for further research. Section 6 concludes on the findings of our study.

2. Theoretical background

2.1. Concepts

2.1.1. Problem complexity as a five-dimensional concept

Environmental problems can be more or less complex. In the field of water management, for instance, problems such as an integrated management or diffuse source pollution are reasonably described as highly complex problems (Metz and Ingold, 2014; Pahl-Wostl et al., 2012; Patterson et al., 2013). However, other problems such as the functional removal of migratory obstacles for fish seem rather simple to be addressed even though there may be conflicts between economical benefits and ecological goals.

Analysing these varieties in a comparative way requires a detailed operationalization of problem complexity. Psychology research provides here some promising avenues for public policy scholars. Based on widespread discussions in this literature, ‘problem’ refers to a discrepancy between a desired target state and the current state, which is difficult to overcome (e.g. Frensch and Funke, 2014). Complexity refers to a set of structural dimensions that may predict how challenging the solution to a problem is (e.g. Dörner, 1996; Quesada et al., 2005). With Funke (2012), we differentiate five core dimensions of complexity:

1. *Goals*, including their number and relationship with each other;
2. *Variables*, referring to the number of factors that characterize the problem setting and which potentially influence goal achievement;
3. *Dynamics* of these variables, meaning how strongly their values change over time;
4. *Interconnections* of the variables, describing the extent to which the variables are interrelated;
5. *Informational uncertainty*, referring to how much information is missing for problem solving.

Each of these dimensions can vary from simple (0) and more complicated (0.5) to complex (1), depending on how challenging the solution to these problems is. Complexity dimensions can thus be not challenging at all, they can pose a manageable challenge, or they can overburden problem solvers capacities. In terms of *informational uncertainty*, for instance, a problem is *simple* if the relevant information is available; it is *complicated* if information is lacking but could in principle be gathered; and it is *complex* if fundamental information deficits prevail (e.g. Dörner, 1996; Funke, 2012; Quesada et al., 2005).

Fig. 1 illustrates these possible variations, based on generic examples of problems. It shows how our understanding of problem complexity allows to systematically compare problems in terms of

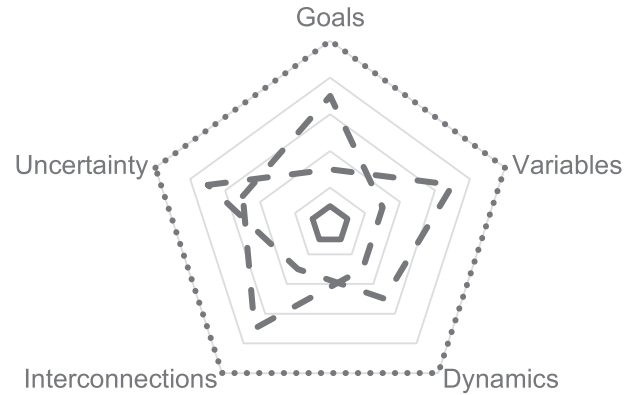


Fig. 1. Variations of problem complexity across five dimensions. Depicted are four generic examples of complex (dotted line), complicated (dashed lines) and simple (solid line) problems.

different dimensions and degrees of complexity. This, again, provides a basis to analyse relationships between different features of complexity and policy delivery.

2.1.2. Policy delivery: goal formulation and implementation of measures

Policy delivery through public authorities can vary tremendously. In water management, for instance, public water authorities can be more or less active in setting pollution-related problems on the agenda; or goals may be more or less fully implemented on the ground (e.g. BMU, 2013).

In order to analyse these variations of policy delivery, there is a need for a clear understanding of policy delivery and its dimensions. In line with classic works on public policy-making, we understand policy delivery very broadly as the performance of public policy-making along policy cycles (Howlett et al., 2009; van Meter and van Horn, 1975). Given our empirical focus on the implementation of the WFD, we focus on the ‘secondary’ policy cycle induced by the WFD, to implement the goal of ‘good water status’ (Newig and Koontz, 2014). This includes two stages of policy delivery, allowing for a nuanced analysis of the relation between complexity and delivery:

1. *Goal formulation*, referring to the formulation of concrete objectives to implement problem-oriented measures;
2. *Implementation*, referring to actions to implement problem-oriented measures.

In analysing these stages of policy delivery, we give priority to the extent to which these aspects of delivery are present (“the more the better logic”, e.g. number of goals formulated and number of measures implemented) instead of their substance (e.g. impact of measures on water quality), efficiency (e.g. low costs of measures) or acceptance (e.g. by stakeholders). This avoids important measuring problems related to complex problem solving such as i) lacking agreements on both the current and the target state (e.g. Hoppe, 2011; Voss et al., 2007) and ii) untraceable side effects of actions (e.g. Funke, 2012; Rittel and Webber, 1973).

2.2. Hypothesizing on the relationships between problem complexity and policy delivery

2.2.1. General relationships between complexity and policy delivery

Taking stock of literature in the field of complex problem solving, relations between complexity and policy delivery can vary

Download English Version:

<https://daneshyari.com/en/article/5116643>

Download Persian Version:

<https://daneshyari.com/article/5116643>

[Daneshyari.com](https://daneshyari.com)