Use of Geo-Information in Environmental Policy: Limitations, Advantages and Challenges

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ABSTRACT

To date, use of the full potential of geo-information is not often applied in the daily practice of policy makers. The main questions explored by this research are: Why is geo-information not widely used in policy and how can this be improved? A conceptual framework was developed to evaluate the use of geo-information. For five cases, the use of geo-information was evaluated by means of this framework. The results of the evaluation, as well as the usefulness of the framework, are discussed. Recommendations on spatial thinking and practice, availability and quality of a spatial data infrastructure and implementation of new geo-applications in policy-making are also made.

INTRODUCTION

Geo-information is still not used to its full potential within the domain of environmental policy-making (Desai, et al., 2008). In reference to the use of geo-information, the use of spatial data and information beyond the use of static maps alone is meant. This includes spatial analysis using topological- and spatial relationships between spatial features. Nevertheless, geo-information and environmental policy are strongly linked and most of the information used during decision-making in the environmental domain is spatial information. Many researchers have stated that Geo-Information Systems and applications could improve the decision-making process (Obermeyer, 1998; Vonk et al., 2007) and can be used to enhance understanding of the complex interactions occurring around us, between Society, environment, and place (Yeager & Steiger, 2013). Although, a number of potentially very interesting applications of geo-information for environmental policy-makers are described in literature (Schouten et al., 2013; Sun et al., 2012; Nasiri et al., 2012; Schirpke et al., 2013), few applications seem to be actually used in policy-making. Often, discussion or conclusions...
merely mention that the described application, or method could have great benefits for policy makers, but that this is in pilot or demonstration phase, or that a number of adjustments need to be made first (Schouten et al., 2013; Sun et al., 2012; Nasiri et al., 2012; Schirpke et al., 2013). Despite a significant increase in the use of spatial information in various domains in Society (car navigation, Google, Bing maps and augmented reality (e.g., www.layar.com)), it is difficult to understand why this is not yet common practice in environmental policy-making.

Another observation is that the use of geo-information within environmental policy is not often studied (Georgiadou & Stoter, 2010) and arguments requiring socio-technical research to improve our understanding of organizational- and user aspects of design and use of geo-applications are expressed (Diez, 2011). Perhaps, because researchers in spatial data infrastructures (SDI) are less concerned with the actual use of geo-information and more with access to the infrastructure (Georgiadou & Stoter, 2010).

A quick-scan has been carried out to estimate the contribution of policy related publications to the total number of publications on geo-information. For this, all publications from Elsevier’s Scopus database matching the search query:

goeinformation OR “geo-information” OR geoinfo OR “geo-info” OR geodata OR “geo-data” OR “spatial analysis” have been retrieved. This resulted in a total of nearly 21000 publications for the period 1960-2012. The number of hits increases exponentially with time. The subset of publications also containing policy related words (e.g., policy, politics, decision making, government, governance) in the title, keywords, or abstract follows this trend and varies roughly from 10% to 15% of the total number of publications on geo-information, geo-data or spatial analysis. However, none of these publications explicitly refer to the ‘policy cycle’, i.e., an iterative abstraction of the four principal policy stages: policy description, policy design, policy implementation, and policy evaluation (e.g., Vullings et al., 2012) in the abstract, title or keywords. Although this quick-scan is very limited in scope, it seems to confirm that geo-information is probably not optimally integrated in policy making.

Firstly, the context of this paper will be sketched and conceptual framework and the policy cycle introduced, i.e., an iterative abstraction of the four principal policy stages. Secondly, the policy cycle will be illustrated by means of five case studies and the impact of use of geo-information discussed for these case studies. The five cases are evaluated within the conceptual framework. After discussion, some concluding recommendations on the usage of geo-information in environmental policy are drawn.

**CONTEXT**

**Conceptual Framework**

The use of geo-information in environmental policy is not thoroughly studied, as was also stated by (Georgiadou & Stoter, 2010). They developed a conceptual framework for the study of use of geo-information in Government. Their people-centered conceptual framework disaggregates the phenomenon of geo-information use into manageable aspects: values, practices and rules. They describe and analyze how two contrasting lenses - market and policy - influence the way that they study how people use geo-information in the real world. In this paper, their conclusions from a polis (political-discursive) perspective social aspects play an important role in values, practices and rules are taken on board.

Literature research shows that when evaluating the use of geo-information in general, only objectives, division of roles, authority structure and legal rules or the formal aspects are evaluated. However, informal or social aspects often play an important role, but in practice are rarely taken into account during an evaluation (Chan & Williamson, 1999; Chircu & Hae-Dong Lee,
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