Editorial

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1. Introduction

The four contributions to this second issue of Volume 6 of *Water Economics and Policy* represent the multitude of scales and approaches to address questions of water economics and policy as well as the global scope of this journal. They touch upon aspects of project assessment as well as institutional, environmental and behavioral economics. All four studies expand the frontier of scientific insight by offering methodological advancements and contributing to challenges, which are of high scientific as well as practical relevance in the field of water management. The latter is assisted by real world applications from all five continents, illustrating the findings.

Three papers offer comprehensive assessment approaches regarding (a) the performance of utilities and water providers, (b) environmental water recovery projects, and (c) the provision of (water-related) ecosystem services. They show that reliance on standard methods could miss relevant aspects, which may lead to erroneous conclusions. This point is supported by the presented applications for which the suggested approaches come to diverging and sometimes surprising conclusions. The fourth paper advances our knowledge on the behavior of households towards contaminated drinking water, which is an important cause for a persistent high prevalence of diarrhea and other water-borne diseases, mainly in the developing world.

All papers derive conclusions and policy implications of high relevance, which will be synthesized in the third section of this editorial note after the innovations and main findings presented in each paper have been highlighted in the following section.

2. Overview of the papers in this issue

2.1. “Assessing Performance Using Key Performance Indicators (KPIs) for Water Utilities: A Primer” by Sanford V. Berg

This paper deals with the problem of benchmarking of water utilities, which is an important tool for regulators and policy makers to monitor, evaluate and incentivize operators to improve performance in terms of cost efficiency and service provision. The author argues that an assessment based on a set of well-selected Key Performance Indicators (KPIs) constitutes a viable tool with lower data-requirements compared to more technical empirical benchmarking approaches. It also facilitates communication between analysts and policy makers without technical background. This makes performance evaluation based on KPIs especially applicable in a developing country-context, where data availability and reliability is often lacking and resources for data-collection and are very limited.

Besides providing guidance for practitioners for the development of reliable and comprehensive information systems, the paper is also very relevant for analysts and researchers by providing an assessment of the strengths and weaknesses of KPIs and overall performance indices (OPIs) derived from them. The author also points out caveats such as overgeneralizing results by ignoring special circumstances of utilities that affect costs such as topography as well as age and maintenance of water networks.

The main part of the paper covers three dimensions related to the establishment of performance assessments based on KPIs: The first section discusses problems related to aggregation when computing OPIs. Suggested methods to curb these problems are: choosing relevant underlying indicators, calculating relative performance rather than rankings, weighing indicators reflecting priorities, considering trends when evaluating the performance of utilities, accounting for special conditions single utilities are operating in, and finally, presenting the comparison between utilities in a clear and comprehensible way to target audiences.

The next section provides guidelines on how to establish reliable data-systems on KPIs as a basis for benchmarking. To help the problem of limited data availability often persistent in developing countries, several recommendations are provided, which include making data-collection and sharing a requirement to receive external funding, investing in capacity building or leaving the

data-collection with donor-agencies, thereby the author also points at the very useful global IBNET database (www.ib-net.org) established by the World Bank. This section is complemented with several examples from low and middle-income countries, showing how benchmarking based on KPI-derived incentives significantly improved the performance of the targeted water utilities.

The third section provides recommendations for establishing a set of reliable KPIs pointing out the need for reliable quantitative evidence to base decisions on. Thus, indicators should be chosen when they are indeed “key” i.e. relevant and cover a wide range of different performance parameters.

The author closes by defining a set of seven principles of good governance, emphasizing that there is also the possibility of misuse of KPIs by policy makers. In conclusion, it is highlighted that while pitfalls and problems in applying KPI-based assessments exist, their advantages over current practices in providing a sound basis for policy decisions clearly prevail.

2.2. “Evaluating Adaptive Efficiency in Environmental Water Recovery: Application of a Framework for Institutional Cost-Effectiveness Analysis” by Graham R. Marshall

Australia, where the case presented in this paper is located, has been hit by unprecedented periods of drought in recent years. This paper is a very timely contribution. It provides a first empirical application of a comprehensive approach to systematically capture and compare the cost efficiency of projects that serve to reallocate water to the environment.

The Institutional Cost-Effectiveness Analysis-framework, which has been developed by the author, takes into account five cost categories: (1) transaction and (2) abatement costs, which occur from operating the (water recovery) system, (3) institutional as well as (4) technological transition costs which occur due to the institutional change required in establishing the system and finally (5) the institutional lock-in costs, which are expressed as loss of quasi-option value from taking up a specific water recovery scheme. The aggregated total costs are then related to the recovered quantity of water to derive an estimate of cost-effectiveness.

This framework thus also captures implicit costs, which are often not considered. By systematically accounting for path-dependency through lock-in costs, this framework allows for an evaluation of the adaptive efficiency of policy and project options. In times of increasing global uncertainty with respect to climate extremes and water supply, this metric for economic evaluation is expected to grow in importance.

The framework is applied to the analysis of a water-saving pipeline-project in the Murray-Darling River Basin in Australia, comparing its cost-effectiveness to five other projects implemented in the same region. A particular finding of the case analyzed in this study, which diverges from previous economic assessments, suggests that investments in water saving infrastructure may be more cost-effective than market-based approaches such as buy-back schemes of water rights.

The analysis provided may serve as an example case and guide for researchers and practitioners in the water management sector (and beyond) to apply this metric more generally. The study provides a detailed discussion of the underlying transaction cost concepts and their calculations and also describes the caveats and limitations of applying the suggested framework. For example, as pointed out by the author, the quantification of lock-in costs is a challenge that still needs to be addressed by further research.

2.3. “‘Adapted’ Habitat Evaluation Procedure and Choice Experiment: substitutes or complements?” by Nathalie Dumax, Anne Rozan and Bénédicte Rulleau

This study provides another promising methodological contribution to environmental project-assessment, which complements the previous study. While the Institutional Cost-Effectiveness Analysis-framework by Marshall (Section 2.2) is focused on the cost side of a project, the approach presented by Dumax, Rozan and Rulleau looks at the benefits from environmental water projects by quantifying changes in the provision of ecosystem-services.

The authors argue that in the planning and decision-making process with respect to natural areas, all benefits derived from ecosystem services should be taken into consideration. Yet, conventional economic valuation approaches based on preferences, such as discrete choice experiments (CE), capture primarily well-perceived benefits and values. When it comes to benefits which cannot be easily given a monetary value as they are not in the focus of the surveyed population but still contribute to welfare, possibly in a more indirect or complex way, these methods fail. This has led to the development of alternative non-monetary valuation approaches based on ecological indicators and less anthropocentric metrics such as the “adapted” Habitat Evaluation Procedure (HEPa).

To get a more comprehensive picture, including all benefits (and losses), of an intervention in an ecosystem the authors propose an integrated approach, in which a conventional monetary valuation method (CE) is combined with a non-monetary alternative method (HEPa). As a first step towards this aim, the authors apply both methods to the case of a wetland restoration program at the Rhine river in France.

Their intention is to find out whether these two types of methods actually complement each other such that an integrated approach would indeed improve the comprehensiveness of a project or policy assessment.

The results confirm that the two methods do assess diverging sets of benefits. The results of the CE indicate that the local population perceives ecosystem services such as improved water quality positively only if high levels are obtained, which is expressed in a significant positive willingness to pay (WTP). The HEPA can also quantify the benefits of smaller water quality improvements. The WTP for the establishment of flagship wetland species is found not to be significant. However, the occurrence of these species results in a genuine ecological gain, which can be captured using the HEPA. On the other hand, a strongly improved flood-protection yields a positive WTP and a negative WTP is associated with a high number of days the study-area becomes inaccessible due to flooding. These aspects cannot be considered by the HEPA-approach. Thus, it can be said that indeed both approaches (partially) complement each other. The authors therefore conclude that a combined CE-HEPA-approach would improve the assessment of ecosystem services as a larger set of benefits can be quantified. Thus, such a framework would allow for a better integration of ecosystem services in the planning process and decision making with respect to natural areas.

Further research is still needed in order to develop a joint framework including both methodologies, while avoiding overlap and double counting. Also approaches which take into consideration heterogeneity between users and possible conflicting uses as well as trade-offs need to be further studied.

2.4. “Water Quality Avoidance Behavior: Bridging the Gap between Perception and Reality” by Samrat B. Kunwar and Alok K. Bohara

Even in normal times, the lack of access to safe drinking water, especially in developing countries, has severe health implications. The consumption of contaminated water is a main cause for the spread of diarrheal diseases, which also negatively affects food security as well as educational opportunities, and ultimately economic development. At the time of writing in April 2020, with a pandemic infectious disease spreading throughout the globe for which a cure yet has to be found, the problem of access to safe water (and sanitation) is even more aggravated. Adequate hygiene behavior is of highest relevance in order to contain the further spread of the Covid-19 virus. Yet, as of 2017, 29% of the global population did not have access to safely managed drinking water and four out of 10 households did not have soap and safe water available on their premises (WHO, 2019). In such situations of having no access to safe water, in-home water treatment such

as boiling or filtering can be an effective means to reduce contaminants. However, the widespread prevalence of water-borne diseases in the developing world shows that this is not a general practice.

Previous studies investigated the impact of information provision and households' perception of water quality as individual causes for risk reducing behavior such as water treatment or purchasing from other sources. This study poses the question whether a deviation between perceived and actual water quality may influence the adoption of risk-averting behavior. Based on a household survey conducted in Nepal, taking *Escherichia coli* as an indicator for drinking water contamination, Kunwar and Bohara apply a household production function-approach to empirically analyze this question. They find that indeed households with a divergence between perceived and measured water quality are less likely to treat their water. On the other hand, in households where perception and actual water quality converge, the water is treated more often.

The authors therefore emphasize the importance to close the information gap in order to align perception and reality and allow households to make informed decisions towards the handling of their drinking water. To achieve this, several policy measures focused on improving the provision of information as well as households' perceptions are proposed. These measures include raising awareness of citizens on safe practices for water, sanitation and health in order to reduce false perceptions, provision of information in a culturally salient way or engaging the local population as citizen scientists in measuring the water quality.

3. Synthesis and policy implications

All four papers point out instances in which common and established approaches in the analysis and management of water resources are insufficient to provide a comprehensive picture of the issue at hand. All studies provide methodological enhancements in order to overcome these limitations and use case studies to provide illustrative examples.

There is high potential to apply the suggested frameworks also in other contexts in terms of regional focus and in scope, applying them even beyond the water sector. This holds, for example, when it comes to the study of risk-averting behavior of households in other contexts (e.g. in dealing with the current pandemic) and the evaluation of ecosystem services as well as investment projects outside the water sector. Also benchmarking is equally relevant in other sectors with limited scope for direct competition (e.g. local public transport).

With respect to policy implications it can be concluded that policy makers often would benefit from a wider basis for decision making, in order to derive optimal

management decisions as “you manage what you measure” as Berg (Section 2.1) puts it in his paper (p.20). Thereby, pure market or preference-based approaches may not always yield the most efficient outcomes in case of indirect costs and complex interactions.

References

- WHO (2019): World health statistics 2019: Monitoring health for the SDGs, sustainable development goals. World Health Organization, Geneva, Switzerland, <https://apps.who.int/iris/bitstream/handle/10665/324835/9789241565707-eng.pdf>.