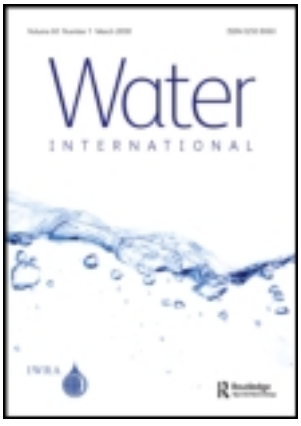

Water International
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rwin20

Towards systematic comparative water and health research

Daphne Gondhalekar[a], Peter P. Mollinga[b] & V.S. Saravanan[a]
[a] Center for Development Research (ZEF), University of Bonn, Bonn, Germany
[b] School of Oriental and African Studies, University of London, London, UK
Published online: 25 Nov 2013.

To cite this article: Daphne Gondhalekar, Peter P. Mollinga & V.S. Saravanan (2013) Towards systematic comparative water and health research, Water International, 38:7, 967-976, DOI: 10.1080/02508060.2013.857141

To link to this article: http://dx.doi.org/10.1080/02508060.2013.857141

Water International, 2013
Vol. 38, No. 7, 967–976, http://dx.doi.org/10.1080/02508060.2013.857141

Towards systematic comparative water and health research

Daphne Gondhalekar[a]*, Peter P. Mollinga[b] and V.S. Saravanan[a]

[a]*Center for Development Research (ZEF), University of Bonn, Bonn, Germany;* [b]*School of Oriental and African Studies, University of London, London, UK*

(*Received 15 October 2013; accepted 16 October 2013*)

The cases in this issue cover a range of water and health challenges in various socio-political and geographical contexts. Past attempts to bring more analytical rigor to the field of comparative water and health research or to integrate various methods systematically have not yet been very successful. Drawing from the collection of papers in this special issue, an approach for future systematic stepwise small-and-medium-*N* comparative water and health research is developed.

Keywords: systematic water and health research; comparative methodology

Opportunity for comparative research in water and health studies

The introductory paper to this special issue concluded that a systematic comparison of various types of interventions and their outcomes could be a useful method to address the United Nations Millennium Development Goals more effectively. Whilst socio-political and geographical contexts vary widely in terms of a range of characteristics, the development pressures they face seem to have resulted in similar outcomes, i.e. challenges with respect to water and health risk, for example wide-spread informal urban development and lack of adequate water and sanitation infrastructure (rendering water access unsafe), and thus the exposure of large parts of urban, rural and peri-urban populations to certain water-related health risks. Given the similarity and severity of these outcomes, we must not only speed up our learning; we must also urgently become more systematic in our research approaches in order to be able to learn from other cases as well as to be able to transport knowledge to them by identifying overall structures that render certain outcomes. The contributors of this concluding paper believe that the comparative method is a useful tool to enable an increase in the speed of learning in order to tackle water and health issues more effectively. This concluding paper will emphasize the significance of comparative research by drawing on the papers in this issue as a means to support knowledge creation on water and health issues.

In an earlier review of the use of comparative methodology (Mollinga & Gondhalekar, 2012), two of the present authors concluded that despite many efforts in the last few decades of water studies to make comparison more systematic, an interdisciplinary systematization of the use of the comparative method has so far largely evaded water researchers. Scholars seem to disagree on whether to use quantitative or qualitative methods, on whether to use a large or a small number of cases for comparison, on the

*Corresponding author. Email: daphnegondhalekar@gmail.com
Daphne Gondhalekar is now at the Climate Change Adaptation Department, Technical University Munich, Munich, Germany.

unit of comparison and the indicators chosen to compare them, and whether to focus on similarities or differences. Hence, social scientists have remained polarized in quite separate groups in the past decades. Maybe partly because of this, quantitative comparison, for example as a means of ranking countries internationally in terms of economic growth, has remained a dominant form of analysis.

However, we also found that a number of scholars advocate combining methods in social sciences research, and when we look at comparative analyses conducted in intensive and focused water resources management studies, we see that these tend to use a combination of methods, partly for practical reasons such as data uncertainty. Nonetheless, although the objective of comparative analysis is specifically to form new knowledge and apply it to practical and policy problems, this often seems lacking, and there is little explicit comparative method development and discussion in the field of water resources management research, nor a commonly accepted approach.

As Wescoat, a consistent advocate and practitioner of comparative water analysis, has observed (Wescoat, 1994), comparative geographic research on water management systems is still at a rudimentary level today. However, with the huge advances in water-related research, the growth of internet resources on the topic and the increase in access to scientific and policy information in the last decade alone, "there is no longer any excuse for ignoring the wealth of international water management experience", although the comparability of different international cases remains an ongoing challenge (Wescoat, 2005, p. 8). In our view, the plethora of water resources management studies which have been conducted in the past decades may provide a rich basis for conducting small-and-medium-*N* comparative research, based on Levi-Faur's stepwise approach (2004, 2005, 2006; see Mollinga & Gondhalekar, 2012, for a detailed argument).

The comparative method may offer several opportunities to bring more academic rigor to water resources management research, specifically in order to address the pressing water and health issues that many developing country contexts are facing. Wescoat stated that the most effective comparative studies are those driven by immediate water problems (2002, p. 326), and comparative analyses become more practical when they focus on water resources management "successes" and "failures" for their potential relevance beyond the places and times where they have been observed (2005, p. 2). The papers in this issue aim to be a collection of such cases.

Taking our earlier findings into account and focusing specifically on water and health research, this paper discusses how comparison can enrich water and health research and considers implications for future comparative water and health research.

Use of the comparative method in this issue

The contributors to this issue have a wide range of professional backgrounds in a variety of different countries in Africa, Asia, Europe and Latin America. They include practitioners, members of non-governmental organizations (NGOs), and academics. This contributor diversity, and the variety of cases they contribute, offer the opportunity for different types of practitioners and academics who are dealing with similar issues to learn from each other. All the cases were chosen because the contributors felt a pressing need to address water and health issues in the case-study locations.

The contributors make use of comparative methodology in a variety of ways. Not only do the contributions aim to highlight in parallel issues pertaining to water and to health and to show interlinkages between two topic areas commonly treated separately, they also aim to line up next to each other a variety of cases in order to infer a broader spectrum of

implications than could be deduced from only one case. The common hypothesis across the papers is that the processes leading to several outcomes will be similar in kind even if cases have different characteristics, and the contributors set out to prove this hypothesis by choosing cases which have certain similarities but also profound differences. Like much of the intensive and focused water resources management research mentioned above, the papers in this issue use a combination of methods. However, the "how" of comparison, that is, *how* use is made of individual cases in order to derive results, varies across the papers, as follows.

Saravanan illustrates how contested institutions integrate to allow the breeding of water- and vector-borne diseases in rapidly urbanizing societies such as Ahmedabad, India. Correlating the distribution of water- and vector-borne diseases with the population density and population of slums, he argues that diseases are rapidly urbanizing. Saravanan analyzes all six administrative areas of Ahmedabad City to show that water- and vector-borne disease are concentrated in highly dense areas and in slum pockets, but that vector-borne diseases are spreading out across the city even in middle- and higher-class residential areas as a result of poor environmental hygiene and poor health care practices. The paper highlights that the complexity of urban health is due to the historical rootedness of urban management in the colonial town's planning regulations, which are exploited by post-colonial actors who make the crisis worse. These have reduced the role of the state to mere crisis-driven interventions that are either technocentric or overemphasize social solutions in addressing the growing health insecurities.

Johansen et al. focus on epidemic dengue fever in a county in Brazil. Using national data, the urban area was overlaid with a 250 m × 250 m grid, inside which the number of dengue cases per 100 people was tabulated. Next, cluster analysis and the local Moran index were used to analyze the relationship of these incidence rates to the spatial distribution of water and environmental sanitation services. The title indicates that the contributors compared intra-urban areas, which are in fact not spatially distinct areas but map-based aggregates of environmental sanitation coverage. The contributors find that dengue cases are more concentrated in the cluster with the best environmental sanitation coverage. Thus, they conclude that not the mere distribution of such services but their quality, and especially that of water supply services, is key to understanding dengue incidence.

Gondhalekar et al. compare two small towns, one in India and one in China, both located in ecologically vulnerable Himalayan mountain regions and facing large-scale development pressures from the growth of tourism. For the primary case, in India, they conducted a questionnaire survey of 200 households and 318 hotels and guesthouses, conducted semi-structured interviews with various stakeholders, and analyzed medical data from the past 15 years. The contributors use geographic information systems (GIS) to assess the possible pollution of freshwater resources. In the Chinese town, 10 semi-structured interviews were conducted with local government representatives and farmers. The contributors use the two cases to illustrate local decision-making processes. However, the comparison is not systematic. Completely different types of data are used to argue that although the two cases are situated in very different socio-cultural contexts, the processes driving the implementation of "business as usual" water and sanitation technology options (with not necessarily good health and sustainability outcomes) are very similar.

Babalobi compares the behaviour of pupils in four schools in a slum of Lagos City in Nigeria. The contributor uses focus-group discussions, in-depth interviews, spot observations and mapping of water and sanitation infrastructure to determine hygiene behaviour. Although Babalobi's case is a slum, much of the comparison in the text does not focus on

comparison of the sub-cases, the schools, which instead are used as a data-collection basis. Rather, comparison with the findings of other studies that looked at urban and rural areas in Nigeria is used as a framework in which to situate the findings of his study. Babalobi concludes that although pupils are generally fairly knowledgeable about safe water, sanitation and hygiene practices, they still largely practice unsafe behaviour in this respect because of poverty, lack of appropriate water and sanitation infrastructure and poor governance generally.

Narain et al. compare the water access of local communities in a number of peri-urban locations of four cities in three Asian countries, namely Bangladesh, Nepal and India. Focus-group discussions were conducted, and in total 1328 households in 15 villages were surveyed using semi-structured interviews to determine how urbanization impacts water security and human well-being. Whilst the cases seem to try to cover a certain geographical area and several types of peri-urban locations in South Asia to collect a "critical mass" of data with a certain number of sub-cases, reasons for the choice of cases are not given. The cases are discussed in parallel and result in separate conclusions. The contributors conclude that a combination of the outcomes of each case, that is of local mobilization, lobbying with local service providers and high-level advocacy, is needed to enable long-term sustainable planning in terms of water security in peri-urban areas.

Carino and Xie compare six villages in two provinces in south-western China to analyze the effectiveness of implemented water and sanitation projects, especially in terms of reducing recurring cases of diarrhoea. In total, 135 households as well as local stakeholders were interviewed. The cases were chosen on the basis of certain differences: more-rural areas versus more-developed areas with a higher population density and greater access to urban areas; and upstream versus downstream. However, these potential comparisons are not made explicit or elaborated. The contributors conclude that protection of water resources and systematic water-quality testing is urgently needed in many of China's rural areas that are being affected by industrialization and urbanization processes. Villages where water and sanitation projects have been implemented experienced a sharp decline in the incidence of diarrhoea. However, the contributors argue, improved education of local populations and increased involvement by NGOs is needed for successful long-term water-quality management.

Zimmermann uses an empirically grounded modelling approach to compare rural and peri-urban areas in terms of major health hazards stemming from the usage of unsafe water sources in central northern Namibia. More than 60 open and focused interviews on the provision, acquisition and utilization of water were conducted with 53 regional stakeholders to identify key system variables and their interrelations in order to understand the respondents' perceptions of water-related issues. The contributor uses the findings to reach a comparative conclusion, rather than explicitly setting up the study with a comparative approach; he concludes that in peri-urban areas, which are mostly informal settlements, major water-related health risks are usually due to sanitary conditions (particularly during floods), whilst in rural areas these are mainly caused by the usage of open surface waters and water-quality issues.

As shown, the contributions in this issue utilize a broad range of methods. Further, the studies tend to utilize only a limited number of carefully chosen cases. Although such guidelines were not discussed prior to the finalization of the papers in this issue, this supports our earlier finding that intensive and focused water resources management studies tend to combine methods and to employ small- and medium-*N* comparisons in undertaking in-depth analysis.

Looking at how comparisons were specifically conceived and carried out in the contributions to this issue, it is apparent that most of the comparisons are quite loose: there is often no common set of indicators or any other method defined to compare the cases systematically within each of the papers. Sometimes multiple sites are chosen within one case study, whilst other studies have taken on several cases. Further, some papers do not compare the cases at all but simply analyze them in parallel and aggregate the results. However, in view of the pressing issues facing the chosen case-study locations and the contributors' awareness of this, all papers have chosen a certain "critical mass" of cases or sub-cases with the apparent aim of using these to derive results not specific to only one case but with wider potential applicability.

Towards more systematic comparative research

In this section we try to formulate an approach for future water and health research by discussing how to extend the limited scope of comparison in this issue to a more systematic approach. As will become evident, what we suggest in terms of an approach to comparative analysis is very tentative, if not speculative, which we hope will solicit responses. Professor David Bradley of the University of Oxford offered some very valuable comments on our initial paper on comparative water studies with respect to water and health research. According to him, the comparative method is integral to health research, particularly in trying to determine the efficacy of certain interventions, for example treatment with certain drugs. In water and health research, Bradley suggests, conducting an unbiased "double-blind controlled clinical trial" (Devereaux & Yusuf, 2003; Kirkwood & Sterne, 2003; Kunz & Oxman, 1998) may be problematic. Therefore, public-health interventions should be carried out at the community level and researched using "community randomized trials" (e.g. Donner, 2009; Hayes, Alexander, Bennett, & Cousens, 2000; Shipley, Smith, & Dramaix, 1989); but these will often require at least a dozen villages to attain statistical significance. Where this is unfeasible, a "step-wedge design" over time may be an option – not only comparing village populations before and after the interventions but also comparing villagers who have received the intervention with those who will receive it in future – although to those in the health sector, any relaxation of the randomized-controlled-trial methodology may cause concern (e.g. Kramer, 2003; Luby et al., 2006; Wu & Sullivan, 2009). Another option may be to combine a few or many trials, whether of a particular intervention or those aiming to answer the same question, as has been addressed by the Cochrane Collaboration in health research (e.g. Clasen et al., 2010) – which led to the formalization of methods for "meta-analysis" – or to combine the results of several trials, with appropriate weighting, for a pooled result (e.g. Egger & Davey Smith, 1997; Fewtrell et al., 2005; Hunter, 2009). Essential to all this, however, is the definition in advance of the inclusion criteria for studies. Systematic review of health literature (e.g. Curtis & Cairncross, 2003; Dickersin, Scherer, & Lefebvre, 1994) can be very powerful when the research question addressed is relatively narrow (e.g. Steinmann, Keiser, Bos, Tanner, & Utzinger, 2006). In water research, much of the literature may be grey or too old to be digital, making it difficult to review systematically. Rigorous application of certain selection criteria may also reduce the initially large numbers of relevant papers resulting from web searches to a very small sample size, rendering it questionable whether asking simple questions of very heavily contextualized and complex problems will actually give helpful answers (e.g. English, Schellenberg, & Todd, 2011). In looking at issues of risk in a comparative manner, epidemiologists tend to use either cohort studies of two or more human

populations that vary in the putative risk factors but are relatively comparable in variables not relevant to the questions under study over time. Alternatively, the (usually retrospective) case-control study takes a group of people with the disease under investigation and matches them with another group, similar in non-relevant variables, and then records the frequency of putative risk factors in the two groups. This tends to be faster and cheaper, but less precise (Bradley, cited in Mollinga & Gondhalekar, 2012).

While the positivist approach to research, modelled on the experimental method of natural science and summarized above, has proven very powerful for epidemiological questions, it is less appropriate for the study of the dynamics of open systems – such as the urban and rural socio-ecological and socio-technical systems of which the water and health questions addressed in this issue are part. These systems are complex, both in the ontological sense (consisting of heterogeneous elements and relations) and in the societal sense (harbouring different interests and perspectives that are actively contested). Generalization from a diversity of water and health cases, as presented in this collection, cannot, we suggest, operate at the level of identifying factors that empirically explain regular outcomes across all cases, but has to focus on the commonality and diversity in structures and mechanisms that generate diverse, and evolving, sets of water and health outcomes. Such generalization has to be done in relation to a question. Echoing the introductory paper, one such research question, as a point of departure, is: How do urbanization and industrialization influence water-related health, particularly in slums and other marginal areas?

In our previous work (Mollinga & Gondhalekar, 2012, forthcoming), we advocated the use of a stepwise, systematic small-and-medium-*N* comparison based on Levi Faur's work (2004; 2005; 2006). The two key, interconnected, elements of Levi-Faur's small-and-medium-*N* approach are: (1) emphasis on the process of case definition and redefinition (as against simply case selection, as cases are not "given"); and (2) stepwise and systematic development of cases by adding and redefining in multiple ways, and thereby theoretically informed expansion of the scope of comparison. The approach we advocate can be divided into four steps and summarized as illustrated in Figure 1.

Building on the experiences with comparative methodology in this issue, we try to show how stepwise small-and-medium-*N* comparative water and health research could be developed systematically.

Step 1. A set of primary "similar cases" are taken in order to develop a conceptual model of a structure and its emergent properties (in our context, the structural configurations that generate particular sets of water and health outcomes in the context of industrialization and urbanization), and differences between these cases are highlighted along a number of predefined crosscutting themes. Key indicators for each case, and those common to all cases, are identified.

Step 2. Secondary similar cases are compared to assess the robustness of the conceptual model in other situations where it is also expected to apply.

Step 3. The conceptual model is compared to qualitatively different secondary cases, in order to develop a typology.

Step 4. Finally, the similarities in all the cases discussed are highlighted in order to develop a theory encompassing the structured diversity mapped by the typology.

This issue's collection is the result of a group of researchers' meeting and discussing several times from a common point of departure. Inside our water and health theme, water supply and sanitation, as well as water-related health issues, were sub-themes. The geographic regions (Africa, Asia and Latin America) were also predefined. The causal

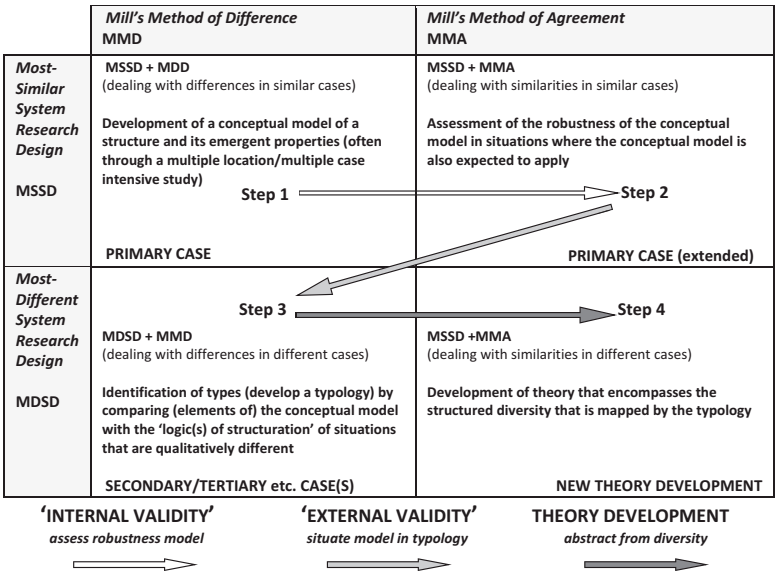

Figure 1. Step-wise comparative analysis for theorizing structured diversity.

Note: For the notion of 'logic of structuration' see Kontopoulos (1993); on structuration see Giddens (1984).

relation assumed and confirmed in the different papers is that in addition to the generally acknowledged importance of the *quantity* of domestic water supply, the *quality* of water supply and sanitation is a significant causal factor in determining health outcomes. However, there are several methodological complications in theorizing this relationship beyond this general observation. Some contributors focused on only urban areas, and some only on rural or peri-urban areas; only Zimmerman set out to compare the peri-urban with the rural. Perhaps most importantly, contributors set out with different goals, analytical scopes and possibilities in terms of "health". Whilst some focused on one particular water-related disease, as did Carino and Xie (diarrhoea) and Johansen et al. (dengue), others like Saravanan looked at a range of water-related health issues; Zimmerman kept health as a general concept, and Narain et al. focused more on well-being. The concept of health is a good example of what difficulty in comparison may look like. For example, the understanding of what constitutes diarrhoea varies widely in different socio-cultural contexts. Whilst diarrhoea is regarded as a major health issue in Europe, in many development contexts it is accepted as a fact of life because it is so frequent, and few people visit a doctor for treatment. Nonetheless, diarrhoea can be lethal, and is regarded as one of the biggest killers of young children. Further, even with a socio-culturally tuned definition in hand, it may be easier to conduct research on diarrhoea in one context than in another. In China, for example, Carino and Xie acquired detailed data on diarrhoea by questionnaire survey, whereas in Leh, India, questions on diarrhoea had to be removed from the questionnaire because it was found that local people were not comfortable discussing it (this is not mentioned in the article, however). As a result, health is a key element of the central question of each paper in this issue but actually has very different connotations in different papers. Therefore, the cases in this issue, although they all depart from the same broad research question, are too diverse to be compared systematically. In order to make meaningful comparison possible – to specify relationships

between health and water supply and sanitation (WSS), beyond the general finding that they *are* connected – a more precise conceptualization of "health" would be one requirement. Depending on how "health" is understood (and WSS, on the other side of the connection), a series of causal mechanisms of connection would be identifiable across the cases. The similarities and differences amongst these cases would then be further studied around the question of to what extent these mechanisms can (or cannot) be analytically generalized. For this, a larger number of cases than are included in this issue would probably be required.

We try to describe some of the contours of such a research exercise by extracting more precise research questions from the papers in this collection. Babalobi suggests that although knowledge on water-related health-risk prevention is fairly good, poverty prevents marginal populations from being able to act on this knowledge, and ineffective governance is at the root of the failure to achieve the Millennium Development Goals targets pertaining to WASH. Carino and Xie postulate that sustainable implementation of water resources conservation projects requires not only active community participation but also adequate legislative and policy support to integrate various government departments and facilitate civil-society engagement. Gondhalekar et al. argue that even in regions where implementation of decentralized water systems may be a good alternative for sustainable development and water-related health-risk reduction, efforts to implement such infrastructure may be hampered by fixed ideas of "modernity" on the local, national and international levels. Johansen et al. show that not only disribution of water and sanitation infrastructure but especially the quality of water provision is key to addressing water-related health risk. Narain et al. show that as peri-urban areas experience decrease in quantity and quality of water access (with implications for human health) in the process of urbanization, they are not adequately protected by policy. Saravanan argues that the state is currently not strong enough to address water-related health risks effectively. And Zimmermann shows that poverty is the major factor impacting human health.

A first effort at a conceptual model of the WSS–health connection extracted from this collection might look as depicted in Figure 2. Each of the cases would yield a different version of this frame, in the specification of the boxes and in the specification of the arrows (the causalities at play). The question would then have to be asked whether these conceptual case specifications are different instances of one kind or identify configurations that are qualitatively different in kind. Whether the case specifications together form one "primary case" that requires establishment of robustness (Step 2) or we have the beginnings of the development of a typology of qualitatively different configurations (Step 3) can be explored through comparison with other cases available in the literature (and additional original research). The questions are, first, whether certain configurations of causality can be held to be common across certain types of situations and when not (or only to a limited extent), and what are the qualitatively different features of types of situations and configurations (e.g., different mechanisms being at work in urban versus rural settings, as the Zimmermann paper suggests). Whether or not a more encompassing theory (Step 4) would be possible would remain to be seen. In the first instance, the analytical outcome is likely to be a plurality of theoretical constructs addressing different types of situations and different concerns. Possibly, however, that plurality would avoid both the "every situation is unique" and "the same mechanisms work everywhere" positions, neither of which is, in our view, a useful or practical basis for future WSS–health policy.[1] The comparative analysis sketched here would help to develop less globally standardized and more regionally contextualized WSS and health policy, based on sets of intensively researched cases.

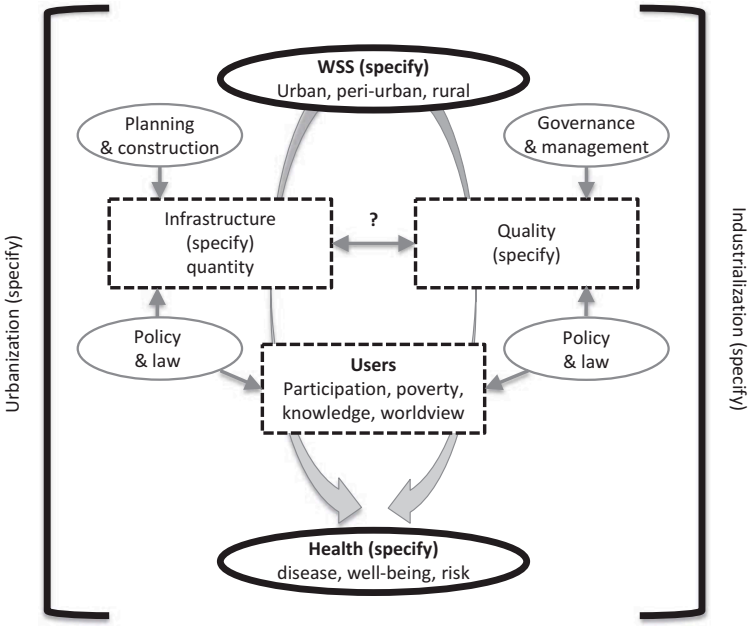

Figure 2. Template for the specification of a conceptual model for each case.

Note

1. The latter search for generally working mechanisms is something that much research to support "evidence-based policy" seems to pursue. The attraction is that if such mechanisms were found, policy could be standardized. We are sceptical about this, and suggest that the challenge lies in understanding what the contexts might be in which *particular* policies are relevant, and vice versa.

References

Clasen, T. F., Bostoen, K., Schmidt, W. P., Boisson, S., Fung, I. C., Jenkins, M. W., … Cairncross, S. (2010). Interventions to improve disposal of human excreta for preventing diarrhoea. *Cochrane Database System Review*, *6,* CD007180.

Curtis, V., & Cairncross, S. (2003). Effect of washing hands with soap on diarrhoea risk in the community: A systematic review. *The Lancet Infectious Diseases*, *3*, 275–281.

Devereaux, P. J., & Yusuf, S. (2003). The evolution of the randomized controlled trial and its role in evidence-based decision making. *Journal of International Medicine*, *254*, 105–113.

Dickersin, K., Scherer, R., & Lefebvre, C. (1994). Identifying relevant studies for systematic reviews. *British Medical Journal, 309*, 1286–1291.

Donner, A. (2009). Methodological issues in the design and analysis of community intervention trials. In R. Detels, R. Beaglehole, M. Ann Lansang, and M. Gulliford (Eds.), *Oxford Textbook of Public Health* (5th Ed.). Oxford: Oxford University Press. Chapter 6.8.

Egger, M., & Davey Smith, G. (1997). Meta-analysis: Potentials and promise. *British Medical Journal, 315*, 1371–1374.

English, M., Schellenberg, J., & Todd, J. (2011). Assessing health system interventions: Key points when considering the value of randomization. *Bulletin of World Health Organisation, 89*, 907–912. doi:10.2471/BLT.11.089524

Fewtrell, L., Kaufmann, R. B., Kay, D., Enanoria, W., Haller, L., & Colford, J. M. (2005). Water, sanitation, and hygiene interventions to reduce diarrhoea in less developed countries: A systematic review and meta-analysis. *The Lancet Infectious Diseases*, *5*, 42–52.

Giddens, A. (1984). *The constitution of society. Outline of the theory of structuration*. Cambridge: Polity Press.

Hayes, R. J., Alexander, N. D. E., Bennett, S., & Cousens, S. N. (2000). Design and analysis issues in cluster-randomized trials of interventions against infectious diseases. *Statistical Methods in Medical Research, 9*, 95–116.

Hunter, P. (2009). Household water treatment in developing countries: Comparing different intervention types using meta-regression. *Environmental Science & Technology, 43*, 8991–8997.

Kirkwood, B. R., & Sterne, J. A. C. (2003). *Essential Medical Statistics* (2nd ed.). Oxford: Blackwell. [ISBN 978–0865428713].

Kontopoulos, K. (1993). *The logics of structure*. Cambridge: Cambridge UP.

Kramer, M. S. (2003). Randomized trials and public health interventions: Time to end the scientific double standard. *Clinical Perinatology*, *30*, 351–356.

Kunz, R., & Oxman, A. D. (1998). The unpredictability paradox: Review of empirical comparisons of randomised and non-randomised clinical trials. *British Medical Journal, 317*, 1185–1190.

Levi-Faur, D. (2004). Comparative research designs in the study of regulation: How to increase the number of cases without compromising the strengths of case-oriented analysis. In J. Jordana and D. Levi-Faur (Eds.), *The politics of regulation: institutions and regulatory reforms for the age of governance*. Cheltenham: Edward Elgar Publishing Ltd.

Levi-Faur, D. (2005). A question of size? Website word version. Published as: Levi-Faur, D. 2006. *A question of size? A heuristics for stepwise comparative research design*. In B. Rihoux and H. Grimm (Eds.), *Innovative comparative methods for policy analysis* (pp. 43–66). New York: Springer.

Levi-Faur, D. (2006). Varieties of regulatory capitalism: Getting the most of the comparative method. *Governance. An International Journal of Policy, Administration, and Institutions*, *19*(3), 367–382.

Luby, S. P., Agboatwalla, M., Painter, J., Altaf, A., Billhimer, W., Keswick, N., & Hoekstra, R. M. (2006). Combining drinking water treatment and handwashing for diarrhoea prevention, a cluster randomised controlled trial. *Tropical Medicine and International Health, 11*(4), 479–489.

Mollinga, P. P., & Gondhalekar, D. (2012). Theorizing structured diversity: An approach to comparative research on the globalisation-localisation dynamics in water resources management. *International Center for Comparative Water and Development Studies (ICCWaDS) Working Paper Series*, No. 1, April 2012

Mollinga, P. P., & Gondhalekar, D. (forthcoming). Finding structure in diversity: Comparative method for water resources management research. *Water Alternatives*.

Shipley, M. J., Smith, P. G., & Dramaix, M. (1989). Calculation of power for matched pair studies when randomisation is by group. *International Journal of Epidemiology*, *18*, 457–461.

Steinmann, P., Keiser, J., Bos, R., Tanner, M., & Utzinger, J. (2006). Schistosomiasis and water resources development: Systematic review, meta-analysis, and estimates of people at risk. *Lancet Infectious Diseases, 6*, 411–425.

Wescoat, J. L. (1994). Varieties of geographic comparison in the earth transformed. *Annals of the Association of American Geographers, 84*, 721–725.

Wescoat, J. L. (2000). Wittfogel east and west: Changing perspectives on water development in South Asia and the United States, 1670–2000. In A. B. Murphy, D. L. Johnson & V. Haarmann (Eds.), *Cultural encounters with the environment: Enduring and evolving geographic themes* (pp. 109–132). Lanham, MD: Rowman & Littlefield.

Wescoat, J. L. (2002). Water rights in South Asia and the United States: Comparative perspectives, 1873–2000. In J. F. Richards (Ed.), *Land, property, and the environment* (pp. 298–337). Oakland, California: Institute for Contemporary Studies Press.

Wescoat, J. L. (2005). Water policy and cultural exchange: Transferring lessons from around the world to the western United States. In D. S. Kenney (ed.), *In search of sustainable water management: international lessons for the American West and Beyond* (pp. 1–24). Cheltenham, UK: Edward Elgar Publishing.

Wu, Z., & Sullivan, S. (2009). Community-based intervention trials in low- and middle-income countries. In R. Detels, R. Beaglehole, M. Ann Lansang, and M. Gulliford (Eds.), *Oxford textbook of public health* (5th Ed.). Oxford: Oxford University Press. Chapter 6.10.