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Environmental Evaluation Practices and the Issue of Scale

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Abstract

Social scientists, natural scientists, and evaluators have not properly defined the concept of scale for environmental problems. Environmental scale generally differs from social scale, which confounds the challenge of evaluating policies and governance arrangements in addressing environmental issues. Instead, social scales are generally based on traditional jurisdictional boundaries, and this complicates effective decision making. Conversely, evaluators must be able to assess innovative governance arrangements as well as the outcomes of environmental problems because the two are interconnected. This is particularly true in looking at cross-scale, social-ecological interactions. This has profound implications for policy evaluation; evaluators have to develop frameworks for connecting across various scales and levels in overcoming mismatches. Natural scientists probably need to be humbler in their ambitions, and evaluators will have to engage in interdisciplinary teams that blend the expertise of the social sciences with that from the natural sciences to assess outcomes to social and environmental scales. © Wiley Periodicals, Inc.

Environmental policy making is increasingly based on an ecosystemic, an eco-regional, or more broadly an ecological logic. This creates the need to adopt practices of policy formation and policy evaluation to

this new logic (Cowling & Pressey, 2003; Noss, 2003; Groves, 2003; Leroy & Bruyninckx, 2006). Examples can be found in water management, where river basin approaches, even on a very small scale, are increasingly the norm (Folke, Hahn, Olsson, & Norberg, 2005); in transboundary nature protection projects supported by the European Union (EU directive 79/409/EEC); or policies on migratory species, which often link distance locations on the basis of an ecological logic. These policies do not follow the classic territorial boundaries of policy making. To the contrary, they involve “natural” geographic delineations, multiple (overlapping) policy institutions, and often unfamiliar funding constructions. In addition, they increasingly are based on collaboration between state actors at different levels, civil society actors and market actors. They are, in other words, what are nowadays known as governance arrangements (Spaargaren, Mol, & Bruyninckx, 2006).

These new governance arrangements are creating challenges for existing institutions and practices, because they are functioning at different “scales.” The need for serious evaluations of these arrangements is strong for several reasons. Policy arrangements that are supposedly more properly adapted to the ecological-scale level are based on the promise of leading to better performance. It is only normal that they are assessed with regard to those promises (Spaargaren, Mol, & Buttel, 2006). Also, given the emphasis on environmental rationality for the scale of the social intervention, more attention is going to environmental outcomes, whereas environmental (policy) evaluations are usually preoccupied with the institutional aspects (Gysen, Bruyninckx, & Bachus, 2006).

In the first part of this chapter, the meaning of the scale concept is explained. This first step is necessary because the concept is generally underdefined and underspecified. The second part makes the link with environmental policy making. Starting from the assumption that scale is indeed an important concept, it is vital to think about the possible consequences for policy makers and stakeholders. Third, I pay attention to the impact for environmental evaluators. The chapter ends with a number of ideas about the further use of scale as a concept, including possible consequences.

The Concept of Scale in Environmental Policy Making

If scale is not adding anything to our understanding of environmental problems, the societal responses that we have formulated to deal with them, or our capacity to evaluate these two matters, then the concept has little use (Goertz, 2005). To the contrary, adding a redundant concept might make debate more difficult (Sartori, 1970). By using scale as a key to effective policy responses and allocation of resources, we are taking a clear position: scale is adding something to our understanding. It has an impact on defining issues, collecting data at the appropriate level, identifying resources and stakeholders that function at this particular scale, and formulating policy.

Although numerous subfields define scale, I limit the debate to what is crucial for environmental policy evaluation: environmental scales and scales of social organization.

A *social definition* of scale refers to levels of social organization relevant to understand the driving forces and societal responses to environmental issues. We use the concepts of driving force and societal response based on the DPSIR model (Driving forces–Pressures–State of the environment–Impact–Responses) in use by the EU (EEA, 2001). Through a logical chain, it links social phenomena to ecological issues. It thus refers to systems of production and consumption and to types of social intervention, including policy making, to remediate or solve environmental problems. An *ecological definition* of scale is based on the environmental unit of analysis. Determining the relevant unit on the ecological scale is crucial, according to ecologists and environmental scientists, in determining the appropriate matching unit of analysis of understanding or intervention on the social scale.

There are different *levels* along each scale. For example, on the ecological scale there is the global eco-systemic level and also the plant level. Similarly, on the scale of social organization we can, for instance, distinguish the level of globalized social practices and also the household level. We can thus scale up or scale down levels on a scale.

Problems of Scale and Environmental Policy Making

Institutional Fit Problem: Scale Mismatch Between Ecological and Social Scales. The incompatibility of scale refers to the fact that the scale of the environmental problem does not coincide with the social scale (i.e., level of the policy intervention). When this is the case, some authors refer to the necessity of scaling the problem up or down (Young, 2002; Gupta, 2005). One can ask about the added value of using scale to discuss political or administrative levels in this case. More appropriate concepts seem to be available (e.g., centralization and decentralization, devolution, local, sub-national, national, or international policy levels). However, incompatibility of scales refers not only to specific levels (being points along the scale) but to the disjointed nature of alignment between spatial and social scales as well. At a more fundamental level, our knowledge systems, policy models, environmental models, and social organization have been dominated by an approach that separates these scales (Homer-Dixon, 2002).

Scale mismatch needs to be taken seriously. In nearly all international policy documents on environmental problems, the issue of scale plays a central role. The choice of policy level—the one at which participation is to be organized, or the level of understanding of driving forces—is an important matter. Making the wrong choices can have serious consequences for the effectiveness and efficiency of social interventions (Young et al., 2006). Most of the literature references regarding scale are about the level of governance, or in other words, the social scale. The link with the ecological scale is much

less explicit. Much more attention will have to go there in the future if we want to overcome the problem of institutional fit.

Mismatch Between Policy Scale and the Scale of Knowledge Creation. Cash and Moser (2000, p. 235) describe mismatch as “discordance between the scale of scientific analysis and assessment and the scale for which scientific information is needed to usefully inform management and policy makers.” Although elaborate measuring and monitoring schemes are present in most OECD countries, and modeling capacity for complex environmental issues and database management techniques and reporting initiatives exist, there remains a problem of mismatch between the available information and the information needed to create a better match between ecological and social scales.

Creating more adapted knowledge seems rather easy, yet it is more complex than it appears. The knowledge and information systems that feed into policy decisions are mostly embedded in institutionalized practices of monitoring, measuring, analyzing, and reporting. Changing these systems involves technical changes and costs. More fundamental is that scaling knowledge production up or down requires serious epistemological rethinking and constructing new explanatory models (see also Kennedy et al. in this issue). Linking ecological scale to social scale assumptions requires bridging natural and social science knowledge and searching for essential epistemological connections. Given the possible difficulties and the costs, as well as the potential societal benefits, public support for this type of exercise would seem appropriate.

Cross-Scale Interactions. Interactions between environmental scale levels are one of the core dynamics studied by ecologists. Interactions between scales and actors operating at different social scale levels are the essence of the concept of multilevel and multiactor governance. Horizontal and vertical integration of social practices in the field of the environment and sustainable development are now standard expectations (Bruyninckx, 2006). These issues of cross-scale interactions make policy arrangements even more complex.

New governance arrangements of driving forces and responses, operating on the basis of multiactor and multilevel dynamics, seem to be our best answer. Innovative, more flexible instruments and the so-called networked organization of societal responses are in my opinion mostly still in the experimental phase. Much needs to be done in this domain, and according to important sociologists our capacity to create fundamental synergies between our social scale responses and the ecological scale will be necessary if we want to have a chance in light of the enormous environmental challenges (Castells, 2000; Urry, 2003).

Scale and Environmental Policy Evaluation

Expectations of higher efficiency and effectiveness are formulated because interventions are (supposedly) more adapted to appropriate scale levels. The difficult task of demonstrating whether this is the case is the task of the

evaluator. The challenge for evaluators is to develop innovative methodologies for assessing effectiveness and efficiency.

In addition, evaluators *can* play a role in tackling some of the more essential problems outlined here. By entering into the core debate about scales, including fit, mismatch, and interaction problems, evaluators can become an important partner in the necessary debate regarding these issues. This assumes that evaluators acquire knowledge about these problems, realize how they have an impact on their profession, and are able to formulate goals regarding their own contribution in the debate.

To acquire more insights in this matter, it seems necessary to take a closer look at how evaluators are confronted with the essential problems of scale and policy making as outlined in the previous section.

Institutional Fit and the Mismatch of Scale. In the case of mismatch between the environmental scale and the social scale, evaluators can play a pivotal role in creating a better institutional fit. High-quality evaluation both on the side of the environment and of the social and policy processes can potentially provide essential information about the lack of institutional fit and the necessary steps to be taken to create a better match. The problem of mismatch of scale prompts us to ask questions about the necessity to make more explicit linkages between ecological approaches of evaluation and policy approaches. Too often these follow separate trajectories, cater to different audiences, and hardly know of one another's existence. However, there is generally little holding back in ambitions: policy evaluations often use elements of ecological scale without much background knowledge, and ecological approaches to environmental evaluation include institutional claims and suggestions for institutional or policy change. This is generally based on common sense, experience, or underestimation of the institutional complexity and societal dimensions of environmental problems. The same is true when it comes to explicit evaluation of economic driving forces, or possible economic uses (e.g., market instruments), in policy making. Conceptualizing economic mechanisms as an essential component of the driving forces or the responses is a difficult task requiring specialist knowledge.

This leads to a call for more serious efforts to do interdisciplinary evaluations. I realize that this call is controversial, for several reasons. It has been around for some time and has not produced much in terms of results. It also goes against the basic knowledge tradition of which we are a part. Yet environmental issues are almost by definition complex and multidimensional and require interdisciplinary approaches. To support those policy efforts, evaluators will have to follow. Although it may be bold, I dare to say that evaluators can do more than follow. By bridging disciplinary barriers in their work, they can demonstrate leadership in examining how multidisciplinary approaches can uncover weaknesses in policy making and in fit.

Creating Knowledge at the Right Scale Level. Although the issue of knowledge creation at the relevant scale level might seem less of a responsibility or an issue for the evaluator, there are a number of issues

related to evaluation with regard to knowledge creation and knowledge adaptation (Leroy and Bruyninckx, 2006).

Data gathering, which is a key element for evaluation of environmental policy, becomes more complex when innovative policy arrangements across typical political and administrative scales are set up. In many cases, the systems for data gathering are in line with the scale of the dominant social scale levels: countries, provinces or states, or municipalities. A serious shortage is the gathering of data that link the driving forces explicitly to the environment. Another problem, especially when needing data for transboundary policy interventions, is the *comparability of data*. Evaluators working for different counties, states, or provinces have experience in this matter. Even when it is not their explicit task to look at data comparability, they often have better knowledge of these differences in data gathering than the actors themselves. Yet probably the most fundamental problem is that the *relevance of data* often depends on mostly implicit definitions of both ecological and social scale that have served as the context for the policy. When the context changes (e.g., from a provincial scale to a watershed), the chance that the existing data, or the data gathering systems, are relevant is small. In thinking about solutions for this problem, I believe that two elements seem crucial. First, much closer attention should be paid to the fundamental questions regarding the type of knowledge we need. The challenge is to furnish knowledge that is relevant for the scale of the problem and the scale of the social intervention. This presupposes better understanding of both social and environmental dynamics and the interplay between both. Environmental evaluators could permit insights into the processes and dynamics of current systems in order to improve them.

These three essential problems will require increased attention in the future. Evaluators are well placed to detect possible problems because they need specific information to do their evaluations in a sound methodological way. By reporting and explaining existing problems, they can be triggers for change. Moreover, the collaboration between ecological and social scale evaluators seems fundamental to get a comprehensive understanding of the necessary knowledge.

Cross-Scale Interactions. Cross-scale interactions are probably the most difficult for evaluators. The difficulty of doing decent evaluations at one scale and one level is already a challenge. When asked to evaluate the dynamics that exist across scales, in function of better societal responses, one can mention several problems. Linking scales means the evaluator needs an understanding of those scales and the interactions between them. This adds to the knowledge requirements and the capacities of evaluators. Only in rare instances will all of this be present in a single individual. This means that interdisciplinary teamwork has to become the norm. It probably means that evaluators will have to set up flexible networks for generating knowledge and applying methods that can impart the necessary combination of professional expertise and skill.

An additional but second-order problem for the evaluator is the fact that those responsible for policy interventions along different scales are usually not very much organized to absorb recommendations aimed at cross-scale interactions. Our model of policy organization, based on compartmentalized policy domains, separate policy levels, and bureaucratic organizations, seems contradictory to tackling the effects of cross-level interactions.

Other Issues for Environmental Policy Evaluators. There are consequences of more scale-conscious evaluation practices for the demand side of evaluations. Agencies, bureaucracies, foundations, etc., have to be aware of the issues of scale that have been discussed. Again, evaluators have a role to play, or even a responsibility. “Educating” the demand side (including the client) might be an important component of precontract negotiations. Shaping new agendas for environmental evaluation is a difficult task, requiring knowledge about the substantive environmental issues, about the policy processes or intervention strategies, and about evaluation. Most often, the client does not combine all of this. The evaluator can help to understand new demands, shape new agendas, make arguments for funding, etc. This is a slow and iterative process, requiring active interaction—for example, through forums that link academic communities to commercial evaluators and government actors, all excellent arenas to have this sort of discussion. The Environmental Evaluators Network, in essence a coordinated effort by the EPA and the NFWF to bring together representatives from those three communities to exchange publications that cater to those three audiences, is another possibility. Flexible boundaries in career paths also help. Because in-house evaluators are increasingly part of policy-making institutions, chances are they will end up in the private sector or pursue advanced graduate work according to their experience. In the other direction, experienced evaluators can be hired by the government, as is increasingly the case for those with advanced academic training. Important also is the potential role of the NGO sector; a vital part of the methodological innovation in evaluation stems from their demands and their attention for more scale-adapted analyses.

The *institutionalization* of evaluation at other than the standard or regular policy level is a challenge of its own yet is, in my opinion, the most important decision to be made regarding evaluation. Institutionalization means that environmental evaluation will be part of the normal, standard policy-making process, and this happens at the relevant levels of the ecological and social scale. This is far from evident, even at some of the dominant scales of environmental policy making, i.e., the national level and the state or provincial level (the highest subnational level). Only when policy evaluation becomes fully institutionalized will it be seen as an integral part of policy making. At this time, it is mostly conceptualized after policies are in the phase of implementation and perceived as an additional add-on. It rarely belongs to the core of policy making and policy learning.

Conclusions

I have demonstrated that questions of scale are relevant for environmental policy making. The next question, then, is whether this has an impact on the work of environmental evaluators. In my opinion, it does. It complicates the task of evaluators as new and fundamental problems surface when taking scale more carefully into account; problems of fit, mismatch, and interaction all apply. This is a rather uneasy conclusion; environmental evaluation as we know it today is already struggling with conceptual issues, epistemological foundations, sound methodologies, complexity, and interdisciplinarity. Adding the issue of scale might be a bit overwhelming.

One has to realize two fundamental realities, however. First, the issue of scale has always been implicitly present, and making it explicit will in the end make things easier by forcing us to come up with better approaches. Second, paying closer attention to issues of scale can and will make the work of evaluators and their results even more relevant than today. However, this prompts evaluators to become more conscious, more professional, more interdisciplinary, and more aware of the complexity of things. I have tried to demonstrate that the reality of evaluation work is such that three main actors will have to be included in order to overcome these challenges: (1) evaluators as the professionals in the field; (2) natural and social scientists with particular expertise in studying the environment and ecosystems because they possess the fundamental knowledge used by evaluators to shape their methodologies; and (3) users of evaluations because they know in the end which types of evaluation really further the processes, actions, programs, or other intervention they are managing and implementing.

In conclusion, I offer four concrete elements for evaluators to start thinking about scale in their own work. First, ask yourself at what level along the social or environmental scale you are doing your evaluation, and make it explicit. Second, pay attention foremost to the problem of fit. Giving policy advice for a scale level that does not fit is a waste of time and resources because it does not contribute to better policies. Third, think about what you can contribute, through your expertise as an evaluator, to the fundamental debate on the knowledge we need to make more “scale-conscious” policies, and the type of cross-scale interactions. Finally, confront yourself with your own limits: Are you able to grasp all of this by yourself, or do you need to see yourself as a member of a team of “scale-knowledgeable” evaluators?

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