The role of research when implementing European environmental legislation at the national level

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Abstract

The role of research in devising and implementing rules and regulations at both the international and national level is analysed on the basis of three contrasting policy issues, i.e., the EU habitat guideline, the EU nitrate guideline and the Dutch policy to reduce the risks of future river flooding.

The required *implementation* of the EU habitat and nitrate guidelines at national level has been cumbersome in the Netherlands as evidenced by protesting and highly reluctant stakeholders. Both guidelines were established with relatively little input from the Dutch government, which underestimated their potential impact. Once established by EU law, stakeholders were not involved in *policy preparation* and this has been one reason why they experienced the guidelines as being top-down and arbitrary in character. In response to this, the government has attempted to soften the impact of the habitat guideline but the European Court has overturned such modifications three times. Seven years after establishment of the nitrate guideline, national *implementation* legislation on mineral bookkeeping was introduced in terms of a mineral bookkeeping system that was only indirectly related to groundwater quality, the main focus of the nitrate guideline. The bookkeeping system, together with additional measures, has been reasonably successful to cut back fertilization rates but not sufficient to satisfy EU requirements. As the bookkeeping rules were enforced, farmers and scientists jointly developed innovative systems of manure production and handling, which were not accepted, as they did not fit within the rules. Thus, the opportunity was missed to allow farmers and scientists to 'design' innovative management systems that could satisfy the groundwater quality criteria.

In contrast to the above cases, a modern policy approach is being followed when dealing with the risk of future river flooding at a time when European legislation has not yet been established. Here, proactive *signalling* is being followed by *policy preparation* including intensive interaction ('joint learning') with all stakeholders. A number of options for solutions are being explored including economic, social and ecological trade-offs for each option. This can serve as a solid basis for the *decisions* to be made later, and to be followed by *implementation*.

Active involvement of researchers in *policy preparation* and *implementation* but not in *decision-making* is seen as an attractive manner to guard the independence of science and make it more effective and visible when dealing with societal problems.

Additional keywords: environment, manure, flooding, global change, environmental policy, participatory research

Introduction

Increasingly, EU environmental laws and regulations are devised in Brussels to be followed by implementation at the national level by national governments. Non-compliance leads to stiff fines, which is experienced as being quite upsetting because governments were used to make their own laws and were solely responsible for their implementation. Particularly in the Netherlands, many laws were rather loosely applied allowing quite some flexibility to land users and other stakeholders. The phrase 'gedogen' (letting people get away with it) is typically Dutch and can hardly be translated! The more impersonal but inescapable enforcement at EU level comes as a shock, but is also seen by some as a welcome way to make more rapid progress in solving environmental problems at the national level.

Be that as it may, the question can be raised as to the role of research in devising and implementing rules and regulations at both the international and national level. The relation between research and policy-making used to be rather simple according to the 'linear' or 'hierarchical' model of research: once a particular environmental problem was recognized, research projects were initiated to study the problem and to recommend corrective measures. Results of research were next applied by governmental agencies in terms of rules and regulations to be enforced. The associated political processes were such, however, that researchers often complained about the incomplete manner in which their results were ultimately reflected in such regulations. Sometimes they felt that results were only used in a selective manner reflecting the political attitudes of the time, ignoring what were felt were substantial results and insights of research. Still, as the research community was rather self-centred and mainly focused on writing scientific papers, researchers usually moved on to the next research project without being really concerned about the way their results were used.

Major changes have occurred during the last decades. First, more emphasis was placed on interdisciplinary work in environmental research reflecting the complexity of modern environmental issues requiring input from both the 'hard' and 'soft' sciences. In Wageningen, 'delta' research was initiated combining expertise from 'alpha', 'beta' and 'gamma' sciences (e.g. Tress & Tress, 2001; Tress *et al.*, 2001). In addition it became increasingly clear that long-time involvement of stakeholders was essential to make sure that research was truly understood and appreciated by those being affected by the particular problems being studied. Only then, implementation of proposed measures came within reach. For researchers to simply present research results, whether interdisciplinary or not, and then move on to the next problem did not result in effective measures (e.g. Gibbons, 1999). Surprisingly little attention has

so far been paid to the interaction between research and policy-making and this has led to mutual stereotyping. Policy-makers all too often consider researchers to be academic and not in-tune with real world problems. This opinion leads to lack of understanding and to a feeling that 'solving problems is more a matter of using available knowledge more effectively than generating new knowledge' and to budget cuts. Researchers on the other hand consider policy-makers to be all too often opportunistic and insensitive to the arguments they consider being crucial for the problems at hand. This is unfortunate because future environmental problems become more complex and insecure. Citizens involved can directly observe local soil, water and air pollution and they can appreciate measures that visibly improve environmental conditions. Environmental policies of the last decades have, in fact, been quite successful in solving several of these problems (Anon., 2003). Modern problems like climate change, water shortage and biodiversity decline have, however, a much longer time scope, their effects are less visible, they are international in character and they affect everybody. There is much uncertainty as to causes and effects. These modern problems justify renewed attention to environmental policy-making in future and to the role of research, including interaction processes. In addition, 80% of environmental laws within the European Union are made in Brussels to be enforced at national level. This creates an extra and quite serious complication.

The objective of this paper is, therefore, to explore relationships between environmental policy-making (at EU level, followed by implementation at national level) and research, using modern 'multi-actor' forms of policy-making that have been developed over the last decade. We will use three case studies to illustrate processes involved and the various degrees in which innovative forms of both policy-making and research have been successful. The 'Habitat' guideline of the EU is used as an example of the linear approach. The nitrate guideline initially followed the same approach but research has by now resulted in alternative, innovative approaches to solve the groundwater pollution problem that, unfortunately, do not fit into the established regulatory framework. Flooding risks by rivers that are likely to discharge increasing amounts of water in future due to climate change are analysed as an example of a modern international environmental problem. We realize that the three case studies have a different character. The first two studies do not threaten life, the third one does and this provides a major difference. Still, finding a joint basis for action is common to the three studies. The third case study follows a multi-actor approach. This approach will now first be analysed.

The 'multi-actor' policy approach

In a policy cycle the following functions can be distinguished:
(1) The *signalling* function, which recognizes the existence of new problems in a very early stage;
(2) The *policy preparation* function, which – once a new problem has been recognized as being serious – defines the problem and explores a wide range of possible solutions each considering characteristic trade-offs among ecological, economic and socio-politi-

cal aspects. Here, interaction between researchers, policy makers and stakeholders is important. Stakeholders are particularly involved because of their input based on experience, often referred to as 'tacit knowledge';
(3) The *decision-making* function, where the government accepts a given solution and specific objectives are defined that have to be realized;
(4) The *implementation* function, which – ideally – ensures that the proposed solutions materialize, and
(5) The *evaluation* function, which – at some point in time – evaluates the entire chain of events with the objective to improve the procedures (e.g. Van Der Graaf & Hoppe, 1989).

The term 'functions' is used here and not 'phases' because in reality functions are not smoothly successive. Often, new insights or new approaches to policy preparation interrupt the decision-making process. Still, the bottomline is that somehow new problems have to be recognized, policies have to be formulated and decisions have to be taken and implemented. So lumping all functions together and considering the entire process as a group activity where policy makers, industrialists, various stakeholders, scientists and non-governmental organizations sit and argue together may be conceptually attractive but may pose serious problems in practice. More importantly, each of the different functions requires quite different inputs from scientists and the scheme can therefore help to clarify relationships between science and policy-making. In comparison with the linear model, research has a more diverse function here.

The *signalling* function increasingly involves international networks of excellent researchers who share data and models to maximize research efficiency. The scientists working with the Intergovernmental Panel for Climate Change (IPCC) form an example. Here, governmental interference is less desirable, while, certainly initially, involvement of stakeholders is bound to only distract the attention of the scientists and is to be avoided. A country can only contribute scientists that are invited to be part of such teams. This has been realized for the Netherlands in the area of climate change. Support for basic research in other key areas is essential to produce top expertise that is accepted by other experts to take part in the international *signalling* process. Being part of this is quite favourable for any country in the end when the signalling process leads to policies with major implications for daily life.

Policy preparation ideally involves 'joint learning' of researchers, policy makers and stakeholders exploring all possible options that can be considered for solving the problems at hand, including ideas that may seem odd initially. Science has lots of room here. Again, a particular role for stakeholders is to contribute 'tacit' knowledge based on experience, which can inspire research into unexpected directions. Researchers have a facilitating role in the 'joint learning' process, which, however, goes beyond listening to stakeholders and also involves introduction of innovative ideas based on science and of debunking of ideas that do not withstand scientific scrutiny.

Decision-making is ultimately a responsibility to be taken by government because discussions about possible solutions can drag on too long. Researchers should assist here if needed but they should never try to occupy the position of government. Some distance to the decision-making process is advisable and scientific independence should be cherished.

Implementation again invites an active role of research but now the objectives of decisions should be clear and only different ways to reach those objectives can still be explored making use of the innovative input of the stakeholders. Here, 'joint learning' is again desirable, the only difference with function (2) being that now the objectives are set.

Evaluation is included to jointly evaluate the entire process at a later date to further improve processes in future. We tend to move on to the next problem without taking the time to learn from mistakes made in the past.

Three case studies

The EU Habitat guideline

Originally initiated in 1979 (Anon., 1979) the EU Habitat guideline was initiated by Northern European countries that were upset by migrating birds being killed in South European countries. Rules were made in Brussels and mainly NGOs were involved. The Dutch Government paid relatively little attention and rapidly approved the new guidelines as they had a generally high 'feel-good' character. As the years went by, however, the guideline was strengthened and requirements were also included for minimum areas of bird sanctuaries in the various EU countries, which now amount to 400,000 ha in the Netherlands. There is increasing opposition from land users as these measures significantly restrict their options. To a certain extent, the Government was increasingly receptive to these complaints over the years but the Government has been taken to court three times by now and the European Court has each time imposed fines. Clearly, approval of the laws has proceeded too easily. *Signalling* and *policy preparation* occurred without substantial involvement of our national government and stakeholders, which resulted in a complete lack of understanding once these laws were *approved* (at European level) and had next to be *implemented* at the national level. More involvement of the government at the *signalling* function and participation of the stakeholders in *policy preparation* might have resulted in a more balanced *implementation* process.

The EU nitrate guideline

Already in the 1980s it became clear that excessive manuring and fertilization of land in the Netherlands led to unacceptable nitrate pollution of groundwater (e.g. Henkens & Van Keulen, 2001). Numerous measures were taken to reduce nitrate pollution, such as the restriction of manure-application periods during the year and guidelines for lower manuring rates. However, these rules were difficult to enforce for some 100,000 farmers, the more so since the urgency of the groundwater pollution issue was not broadly felt and little was done in terms of education. The EU introduced the nitrate guideline in 1991 in terms of a maximum allowable fertilization rate, aimed to safeguard groundwater quality in terms of nitrate content (Anon., 1991). In 1998, the Dutch Government presented guidelines in terms of differences between inputs and

outputs of nitrogen at farm level. These so-called 'proxy' values are only remotely related to groundwater quality (e.g. Bouma *et al.*, 2002). The EU has been critical because in its perception the Netherlands somewhat arrogantly followed their own implementation procedure. Under pressure from the EU, additional measures for manure trading were introduced in 1999 but they did not quite match with the other guidelines, leading to confusion and an ever-higher administrative load for the farmers. In addition, considerable funds were invested to buy farmer's production rights, thus reducing the surpluses of manure. All this has certainly resulted in progress but the EU guidelines are not met and the Advocate General of the EU has now formally condemned Dutch manure policy. The farmers are by now rather confused and this is increased because, oddly, environmental laws for water and air have been developed separately and are also separately enforced. Farmers are now also confronted with restrictive legislation on ammonia volatilization from manure.

While all this happened, some farmers, working with scientists, have been active in designing innovative farming systems which could satisfy environmental quality criteria by, for example, new ways of feeding the cows which, in turn, produced manure with less nitrogen to volatilize and leach. Also techniques were developed to adapt manuring rates as a function of different weather and soil conditions, resulting in less leaching. Some of these farmers have been fined because they did not observe the rigid Dutch guidelines, which focus on 'means' to reach the objective of groundwater and air quality rather than the quality itself. Recently, research on precision agriculture has, in addition, indicated that by fine-tuning fertilization to the needs of the crop, using modern information and communication technology, considerable savings in fertilization can be reached while groundwater quality is protected at the same time because there is little fertilizer left to be leached (e.g. Bouma *et al.*, 2002).

A major mistake was made in 1991 when the Netherlands was hardly involved during the *signalling* phase. Our Ministry of Agriculture has been struggling ever since to handle the strong guideline of 170 kg organic nitrogen from manure per hectare. This would have been the moment to put water quality up-front in the regulations and leave implementation of regulations to attain those quality goals up to national governments. Matters worsened when farmers were hardly involved with *policy preparation*. As a result, there was no real support in the field for *implementation* of the EU guidelines, which were experienced as top-down measures of questionable character. This rigidity worked also the other way by not allowing innovative processes to play their part. Not only the Dutch Government is at fault here, though, as researchers could have taken a much more pro-active role. The primary objective has always been the protection of groundwater (and air) quality and this can be reached by innovation in the *implementation* process, where researchers and farmers can effectively work together. Strict guidelines have suffocated this process. *De facto* application of the linear policy model with all its conflicts has been very unfortunate here. The problem observed could have led to an early formulation of a win-win condition. Knowledge in the early 1990s was adequate to show that less fertilization, to be fine-tuned to different weather and soil conditions, in addition to other management measures, could satisfy the groundwater quality criterion (e.g. Hack-Ten Broeke *et al.*, 1999). Too much know-how, both scientific and tacit, has not been used in a timely manner during the last

decade. Proper and timely attention to interactive *policy formulation* and *implementation* could have made a difference.

Flooding by rivers following climate change

A near disaster in 1995, when the dykes of the river Rhine almost collapsed due to very high water levels in the river, made people in the Netherlands aware of risks involved. Moreover, expectations of even higher water levels in future due to global change, strengthened the awareness.

Water agencies in the Netherlands made computer simulations of future discharges and the associated flooding risks and costs. This occurred while no studies had yet been made at EU level, which are likely to be made in future. Thus, in contrast to the two studies described above, the national government played a pro-active role in its *signalling* function. *Policy preparations* are now in full swing, as some decisions for action have to be taken shortly. Again, in contrast to the two above studies, participatory processes play a central role here. Many discussions with stakeholders in areas to be affected have been held, emphasizing a new approach to the problem. The water is not, in traditional terms, seen anymore as an enemy that has to be contained within dykes but as a factor that has to be accommodated. Several options have been worked out; each of them contributed to the *policy preparation* process by different stakeholders but also by researchers:

(1) Making the river bed deeper by dredging and selling the sand and gravel obtained;
(2) Building higher and stronger dykes;
(3) Create 'green rivers' by designating areas beyond the current dykes (and by building new dykes inland to 'green-river' areas) that could occasionally conduct water at times of very high discharges;
(4) Defining compartments of current polders that would be flooded, rather than entire polders;
(5) Designating 'emergency areas' that could be flooded when all other measures would fail.

Also other opinions were expressed. Some participants felt that the problems were not serious and could reasonably be ignored. Others were convinced that upstream Germans should shoulder their responsibilities by solving the problems before the water reached the Netherlands. Still others felt that a general effort should be made to improve water infiltration into soils of the watersheds along the entire course of the river, thereby reducing rapid runoff, which is one of the causes of flooding peaks. There even was a suggestion to use excess water to be infiltrated into the sandy soils in the eastern part of the Netherlands, which suffer from a water shortage.

The *policy preparation* function requires that each option should be taken seriously and should be characterized by hydrological modelling to assess risks of flooding and by an assessment of the associated economic, social and ecological impacts. The latter is crucial: all trade-offs should become visible. Judgements play no central role during *preparation*. We want all options on the table but each option should include all implications, warts and all. No room here for one-sided environmental or economic scenarios.

The intention of the above listing of options is not so much to discuss the particular problem at hand but more to illustrate the procedure being followed when dealing with *policy preparation* after a particular problem has been *signalled* and placed on the policy agenda. All voices are welcome and have to be listened to. Even what appears to be nonsense at first sight deserves its place.

One issue has already emerged. A special committee has dealt with option (5): emergency areas. They have identified a number of areas that could be used, after an open discussion also with all those directly involved. Of course, inhabitants of these areas are far from happy but looking at all the alternatives a convincing case can be made. In its report the committee focused only on its topic and did not consider the entire list of options. This is fine, in principle, because its report is one element to be considered in *decision-making*. But when decisions are made, *all* options should be on the table and each one should be characterized and compared with the other ones in terms of its economic, socio-cultural and ecological implications. This provides right away input for a sustainability analysis that also considers these three parameters in terms of Profit, People and Planet.

In fact, when *making decisions,* options are not of equal weight in this case. For instance, options (4) and (5) with major implications for inhabitants involved, should only come into play if other options cannot adequately reduce the calculated risks, which, incidentally, was the case here. The tendency of each of the stakeholder groups to focus on their particular 'favourite' option, ignoring unattractive side effects and attractive aspects of alternative options, should be suppressed when making the decisions. This calls for a chairperson with high abilities.

Conclusions

In the last case study a modern participatory policy is being followed. The decisions to be made by the government are likely to obtain support (be it grudgingly in some quarters) because it has been shown that risks for flooding are significant and that all possible options to deal with the problem have been thoroughly explored and compared involving all stakeholders. Perhaps most importantly, stakeholders feel that they have been treated seriously and not as abstract subjects to be governed. This is in contrast to the first two studies where stakeholders have hardly been consulted and where a feeling was prevalent that top-down rules and regulations were unilaterally imposed. Being part of processes described in the third case study enables modern research to again earn its proper place in society, which is currently being challenged because science is perceived by many to be too remote from current problems of society and too closely tied to their paymasters. Science can play an uninhibited role in *policy formulation* and later, after decisions have been made, in *implementation*. This can help to reduce concerns that science is increasingly drawn into the political debate, loosing its independence. That is why *decision-making* should remain a purely political process. Currently relations between research and *policy-making* are not good. The fact that an enormous quantity of research on soil nitrogen transformations during the last decades has somehow not effectively been translated into measures satisfying both

farmers and EU bureaucrats should be of considerable concern to both researchers and policy makers.

Note

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