

Path Dependencies and Path Change in Complex Fields of Action: Climate Adaptation Policies in Germany in the Realm of Flood Risk Management

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Abstract The spatial and temporal repercussions of climate change are of an extremely complex nature. Coping with climate change is, first and foremost, a challenge to political decision making and, considering the long-term effects of the climate system, to planning. However, there have never been more doubts that the political-administrative system is able to meet these requirements. Although much evidence has been put forward in favor of such skepticism, sometimes, it is dangerous to overstate the existing limits. Drawing on two case studies in the area of flood risk management in Germany, the article illustrates how and why significant path change came about. In both cases, the state proved to still being a pivotal actor, due to a number of functions that cannot be assumed by other actors. However, other actor groups—such as actors from science, the media, NGOs, and citizen groups—play a significant role as well by providing relevant expertise and influencing the public discourse, thus mobilizing significant political pressure.

Keywords Climate adaptation · Flood risk management · Northwest Germany · Path change · Political steering · Policy analysis

INTRODUCTION

Floods are a natural occurrence and over time people in Europe have become more or less accustomed to them—they have always been around (Wisner et al. 2004; Schanze 2006). In some areas, they are almost an annual occurrence (e.g. flooding of the River Rhine) and, therefore, ever-present in the public awareness. The populations in the endangered regions along the coastline (storm floods) or further inland (riverine flooding) do not have to be told that

floods cost lives and cause damage to the environment and the infrastructure. Society was early to act on the threat, and for generations people have been building and maintaining dykes to hold back the flood waters. Compared with other hazards, there is, therefore, general consensus that something has to be done and preventive steps need to be taken (Wisner et al. 2004). Climate change has put an end to this general calculability. There is now the new problem of prognostic uncertainty, of lack of certitude regarding future developments. For instance, there are self-aggravating effects on the side of nature, which have to be taken into account. When in the wake of climate change the Amazon region dries up or the carbon-rich permafrost thaws, this in turn will contribute to a further enormous increase in levels of greenhouse gases in the atmosphere (UBA 2006). Ignorance or unawareness of the interplay between such apparently independent events has an additional impact on another scale level. With regard to floods, for example, human activity in places far away from the affected areas can cumulate and cause serious flooding in low-lying regions. To give just one example: deforestation in mountainous regions impairs the water retention capacity of the soil, thus increasing the danger of floods in adjacent valleys (EEA 2004). Due to the sum of these influencing factors, the German Ministry for the Environment has classified climate change as a “creeping catastrophe” (BMU 2006).

Moreover, climate change is not taking place in a space void of vested interests. The prominent concept of vulnerability developed within the context of climate adaptation policy (see IPCC 2001, 2007) refers to issues surrounding the social composition of influencing factors with immediate effect. These encompass issues of justice and distribution, the question of social inclusion in planning and decision-making processes, as well as cultural and

every-day practical dimensions (Wisner et al. 2004; Bankoff et al. 2004; Dietz 2006). In this regard, the words of Cannon (1994) “Hazards are natural, disasters not” have become a dictum, sadly confirmed in New Orleans, USA, in 2005.

In a nutshell: although the Earth’s warming is a phenomenon that covers the whole planet, neither its causes nor its effects are felt globally: they assume very different forms and take place within a context-specific spatial framework of conditions and interactions. Here, this list—by no means complete—of different parameters must suffice to illustrate just how complex the crucially necessary policy of adaptation to climate change has become. Such a policy calls for the involvement of many groups of actors, and above all the state. To promote adaptation, governments must help stimulate innovation and creativity in the diverse worlds of business and civil society. Citizen involvement is called for, with a distribution of rights and responsibilities across different levels of governance. Other crucial challenges include, for instance, the integration of related issues into sector policies, and the science-policy nexus in adapting to climate change (Mickwitz et al. 2009; Swart et al. 2009). This also means: adaptation brings us back to the issue of planning, since it involves thinking in a systematic way (Giddens 2009).

But what about the state’s capacity for action: or, to be more precise, that of the political-administrative system? To what extent have the different political-administrative actors responded to today’s changing challenges, for instance in the area of combating coastal and riverine flooding? To what extent has the changing situation actually led to new forms of risk assessment, and to what extent has political-administrative action adapted and taken on new organizational structures? To what extent have promises of safety been kept, how is the probability of failure countermanded? From the perspective of policy analysis—and in another regard from past practical experience with planners—these issues represent a veritable “minefield”. In as much as they imply changes to, or even overcoming, institutional inertia, persistence and stability, they can all be expected to founder on the rocks of the repeatedly observed path dependency of political decision-making (see North 1992; Pierson 2000; Sydow et al. 2005). In front of this backdrop, substantial adaptation in the sense of alternative path creation, analog to the debates on political steering in general and on change toward more sustainability in particular, might seem rather unrealistic.

We discuss two cases. Both of them focus on the political-administrative system (administrative officers and political authorities) as the most relevant steering authority. The first case refers to coastal protection in Northern

Germany and the issue of assessing the necessary dimensions of dykes and further protective structures in times of climate change. The other case study refers to the question how the political and administrative authorities are coping with the risk of more frequent and more intense flood events in river basins. Here, we first give a brief overview of the debate on political steering, with special attention on pessimistic and skeptical views. Then, the two cases will be presented and discussed in the light of the potential to deviate from given paths.

THE DEBATE SURROUNDING POLITICAL STEERING: PESSIMISM AND RESERVATIONS

Pessimism with Regard to Political Steering

The debate surrounding the limitations to political steering of societal development began in the 1960s. There is a broad spectrum of arguments: they range (to name just a few) from (i) reference to political and/or economic power constellations resulting in “state failure” (e.g. Jänicke 1990), through (ii) politological discourse on the politico-cultural and institutional dynamics that determine path dependency, up to (iii) sociological descriptions of the complexity and momentum of social subsystems (e.g. Luhmann 1989). These theoretical arguments were supplemented by studies providing empirical evidence of the poor implementation of political decisions (e.g. Wollmann 1979; Mayntz 1980). On the whole, the focus is on limitations of political steering, in the double sense of constraints of the state vis-à-vis societal actors and inherent restrictions placed on the capacity for steering within the state itself (Jänicke 1990). Both illustrate a permanently self-reinforcing dependency on once-adopted concepts of societal development in the sense of path dependency.

All these reservations received a new boost in the wake of the sustainability debate within the context of Agenda 21 in 1992, where the state continues to be seen as a key actor. Despite manifold differences in detail, the arguments put forward can basically be divided into two groups:

For the first group, the sustainability debate—following on the arguments put forward in the 1970s and 1980s—introduced a certain radicalization of mistrust in the political steering of societal development, referring to the complexity and the non-linear intrinsic logic of dynamic systems. In view of this mistrust, any attempt at holding on to the goal of political steering fell under suspicion of being naive. Empirical evidence of societal change, taking place nevertheless, was construed as the result of evolutionary societal dynamics rather than evidence for the ongoing relevance of political steering.

Reservations with Regard to Stronger Political Steering

A second group of arguments is of a more normative nature. Adherents of this group stress (i) either the rationalities of market-based forms of concept building and decision making or (ii) they point to the necessity of participation and the political negotiation of concept building, decision making, and the implementation of decisions on the part of non-state actors (civil society), which, for instance, occupies a prominent position in the Agenda 21. The notion common to both these variants is that cooperation between heterogeneous social actors is partially interpreted according to the motto that the greater the horizontal coordination of action between different groups of civil society, the greater becomes the democratic legitimacy of political decision-making, rather in the sense of autonomous self-administration. From this perspective, any vertical coordination of action based on decisions made at state level must appear as an authoritative top-down approach. From this point of view, any attempt at political planning and steering bears the taint of authoritarianism. A number of positions, both in political practice (represented for instance by some actors within local Agenda 21 movements) as well as in sociological literature (see, e.g. Jonuschat et al. 2007), fall within this latter category.

To sum up, whereas one group of arguments stresses the limitations of political steering on the part of the state, the other group of arguments draws on explicitly normative reservations. In other words: according to the first position, the state cannot steer; according to the second, the state should not steer, and if so, only to a limited extent (von Blumenthal 2005; Lange 2008).

As a matter of course, good reasons can be brought forward for all of these positions, and the debate is by no means over yet. However, the aforementioned positions run the risk of underestimating or even ignoring remaining capacities of political institutions to trigger substantial change. The focus is more on those factors that substantiate the argument of path dependency, and less on those that provide evidence that path creation toward change is possible, too. Against this background, we are interested in studying examples of apparent political change. Which are relevant enabling factors, and how do they relate to the special possibilities of state action? In the following, we discuss two cases, each of them in close correlation with issues concerning adaptation to climate change.

Approach and Methodology

The following description of the two case studies follows the guidelines of political process analysis (von Prittwitz 1994). The aim is to capture and explain political processes

more precisely and to reveal scopes for action ex post. This is carried out on the basis of different variables, such as the kind of actors and vested interests involved, institutional settings as well as situational factors. Since environmental problems are redefined socially and politically (Arts et al. 2000), we also draw on policy discourses. Discourses can be defined as “a specific ensemble of ideas, concepts, and categorisations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities” (Hajer 1995). Further, as Dryzek (1997) stated a discourse “enables those who subscribe to it to interpret bits of information and put them together into coherent stories or accounts”. This may include either adopting or rejecting uncertainties or risks as constitutive elements of particular policies. Thus, issues get framed in a purposeful manner (Szarka 2004) to provide answers to four W-questions: “What is the problem?”, “What information is relevant?”, “What has to be done to cope with the problem?”, “Who can do it best?”

The case studies have been part of different research projects on regional impacts of climate change in Northern Germany. The empirical basis consists of 65 semi-structured interviews that have been conducted within these projects. The interviewees included political-administrative actors in charge of different subtasks in the realm of flood risk management at all levels (local, district, and federal state) and the involved political entities in geographical respect (German “Länder” Lower Saxony and Bremen).¹

CASE STUDIES: GERMAN ADAPTATION POLICIES IN THE REALM OF FLOOD RISK MANAGEMENT

Flood Protection on the German North Sea Coast

Coastal protection in Germany (Fig. 1) is being planned and executed on the state level. The pivotal actor is the public administration in charge. Its core assignments are three fold:

- Technical maintenance of the dykes and other protective buildings (like sluices and water barriers);

¹ The projects have been conducted in 2003 (see <http://www.krim.uni-bremen.de>), in 2006 (see <http://www.innig.uni-bremen.de>) and in 2010 (see <http://www.nordwest2050.de>). The area under investigation comprises the coastline of North-Western Germany, including the rivers Weser and Elbe up to the cities of Bremen and Hamburg. Because of the low topology consisting largely of supple marine sediments the coastal area is basically prone to erosion and flooding. The interviewees were selected in way that assures a full-fledged coverage of the political-administrative system of coastal protection in the area.



Fig. 1 Map showing the coastal area under investigation (based on TUBS 2011, licensed under the Creative Commons License Attribution-ShareAlike 3.0 Unported)

- Dimensioning: assessing and fixing the necessary height, firmness and related constructive features of the protective buildings; and
- Monitoring and integrating external expertise on technical, meteorological and climate issues.

The most relevant point here is the procedure by which the necessary height and strength of the protective buildings are assessed. The procedure in force until very recently has been (exclusively) strictly empirical. The highest tide gauge ever reported has served as a reference point. All other technical data have been derived from this gauge. Over decades, the only element without a clear empirical basis has been a “safety margin” to be added to this measurement.² Flood occurrence thus is conceived as swinging within the boundaries of the highest and lowest tides ever reported. As far as changes in these boundaries are concerned, as a consequence of climate change, they were—more implicitly than explicitly—assumed to evolve in an essentially linear way, thus remaining calculable and basically not giving surprise. Therefore, the potential consequences of climate change, above all sea level rise, have been considered as not demanding any conceptual change, and the procedure that builds on this assumption (highest tide gauge ever measured plus a “safety-margin”) is seen as sufficient to provide (and guarantee) equal safety

² Actually the procedure is more complicated. For details see Lange et al. (2005, p. 31).

over time at all sections of the coastline. This is why we name it “safety discourse”. Actually, up to now, this way of assessing the necessary dimensions of flood protection facilities has worked well.

Hence, since decades, the formula “equal safety at all sections of the coastline” has become the general guideline of how to manage coastal protection successfully.³ However, it is this “safety discourse” which stands in partial contrast to the current findings of climate research (IPCC 2001, 2007). As the climate system may react in an unprecedented way, safety will become an aim that can hardly be calculated any longer on measurements of past extreme events only. Instead, and due to the absence of knowledge based on practical experience, (different) risks must be considered probabilistically and decided politically. Risk-related decisions can be seen as following a precautionary principle. In that sense, a “risk discourse” emerges that questions conventional assumptions regarding date of occurrence, frequency, extent, and regional specifics of future extreme events. Such a discourse challenges any claim of the ability to warrant equal safety and manageability of future extreme events. The subsequent questions are whether, and how, both political actors and administrative officers are ready to shift from the firmly established “safety discourse” to a “risk discourse”; and what decisions must be taken to accordingly reassess and adjust the system of coastal protection today and in the future. In other words, what can be said about the possibilities to leave a well worn path and setting a new one?

Unsurprisingly, our interviews have given evidence that the administrative officers in charge feel very uneasy in view of such widespread uncertainty. On one hand, uncertainty about what will, and what can, happen does not mesh with the specific responsibility and professional ethos of the administrative officers. They are responsible for assuring that the protective buildings will be strong enough under any conditions. It is a matter of professional self-esteem to really be able to ensure that this goal will be achieved. As the safety discourse builds on assessing the required features of the protective buildings in a retrospective and strictly empirical way, it tends to systematically repel uncertainty as core feature of model-based climate research and its probabilistic assumptions. On the other hand, the scientific debate on climate change with its emphasis on prognostic uncertainty as an ever more constitutive element cannot go ignored offhand.

Monitoring and assessing the scientific debate, as one of the three core assignments of the administration in charge (assignment 3, see above), initially was just an add-on. Its

³ On the political level, it was taken on and enacted by law becoming an official mission of the administrative units in charge of coastal protection in the region in question (Niedersächsisches Deichgesetz).

main purpose was to ensure that new information was continuously assessed in technical terms and, if necessary, utilized in improving the technical quality of the buildings. Now, being faced with the challenge to consider conceptual readjustments considering the emergence of risk instead of consistently insisting on providing for safety, the assignment of observing and monitoring the scientific debate has gained importance. Thus, the responsible units are about to moderately redirect their attention on the following:

- assessing the findings of the scientific debate on climate change more systematically, and
- filtering and picking up findings of potential importance for the coastal protection on the German North Sea Coast.

In practice, this tends to boil down to divide the findings of climate research into two brackets: findings that are given an account of relevance and findings that are denied to be of relevance. Although there is basically nothing wrong with this, the important question is: what is the criterion for ascribing or denying relevance?

Our interviews exhibited one general criterion: the degree of certainty with which data and scenarios are associated. Looking at the subunits of the administrations which are in charge of the more technical and practical dimensions of coastal protection (assignment 1), another tendency could be recognized: to only consider those findings that have been approved by their own “in-house” specialists who are in charge of monitoring and assessing the ongoing scientific debate (assignment 3).⁴ The expected practical use of this proceeding has been to reduce uncertainty in administrative planning and, thus, to avoid costly precautionary investments.

Thus, the administrative officers entrusted with coastal protection in both the subunits in charge of monitoring and assessing new scientific knowledge, as well as in the subunits in charge of more practical and technical responsibility tended to only readjust the conceptual framework of coastal protection by accepting uncertainty and risk when the findings of the general scientific debate are accepted to be sufficiently certain. Insofar, a rather paradoxical transformation of knowledge took place. It strived for precaution without accepting the element of uncertainty which lies at the core of the precautionary principle. It aimed at retaining the deterministic and empirically based safety discourse and the related routines of assessing and safeguarding coastal protection without openly rejecting the probabilistic approach of the risk discourse so dominant within the framework of today’s climate research community.

Path change in this policy area, in the sense of a new approach to take climate change into account, can be traced to 2007: it became institutionalized with the Generalplan Küstenschutz [Major Plan for Coastal Protection] (NLWKN 2007). From then on, the effects of climate change in the form of rising sea levels and an increase in the incidence of storms have been given increasingly high priority in the political-administrative system of the German Länder of Lower Saxony and Bremen (ibid., 40). As a consequence, the safety standard for dykes built in these German states was raised by an average of 25 cm over, in addition to the safety margin which takes the so-called secular rise in sea level into account (overall 50 cm). This outcome shows that the specifications prescribed for dyke building are no longer primarily oriented to empirical data; rather, decision-making has become integrated with the reports of the Intergovernmental Panel on Climate Change (IPCC) and scientific findings generated outside the political-administrative system in the narrow sense. Moreover, the respective experts on the side of officialdom merely played a subordinate role in bringing about this change. This can be conceived as a new organizational arrangement—a new path in the realm of coastal protection.

Our interviews reveal that at the decision-making level the change was clearly due to pressure from actors on the political side; in the present case, this was the Minister for the Environment in Lower Saxony. His decision did not take place in a space void of discourse and vested interests. For several years now, the consequences of climate change in the region have been researched and described (see, e.g., Schirmer 1996; Schirmer and Schuchardt 2003; Schuchardt and Schirmer 2005, 2007a, b). Above all, issues surrounding flood risk management are seen in the region in relation to the disastrous floods of 1962 (especially in Hamburg); often the flood disasters, which affected the hinterland in 2002, are also quoted (next case study). Moreover, studies have revealed that climate change receives relatively high coverage in the regional media (Martens et al. 2009) and that it is often the subject of controversial debates both within and outside the regional parliament (Lange and Garrelts 2008; Germanwatch 2009). The interviews point to the publication of the IPCC Report 2007 as an decisive contributing factor to the genesis of the Generalplan Küstenschutz, which ultimately forced existing skepticism concerning the urgency of policies of adaptation to climate change on the defensive and triggered pressure for political action on the regional level. Finally, it should be pointed out that it was possible to mobilize the necessary resources to finance measures of adaptation, supplied by the Federal government.⁵

⁴ For details, see Lange et al. (2005) and NLWKN (2007).

⁵ As a rule, measures of coastal protection are (mainly) financed via the program *Gemeinschaftsaufgabe Agrarstruktur und Küstenschutz*.

Currently, coastal protection policy continues to follow the motto “same safety everywhere”, and the demands arising from the climate debate, especially those calling for more probabilistic risk analyses and for the supplementation of lineal coastal protection (dyke lines) with elements of spatial planning (e.g. second dyke lines⁶) (Schuchardt and Schirmer 2007b), continue to be left unheard. Nevertheless, in the area of rising sea levels caused by climate change there is evidence that a change is taking place, replacing purely lineal thinking, and that decisions are no longer influenced solely on the basis of observation. This represents a clear turning point vis-à-vis dimensioning methods which for many decades were oriented solely to the lineal development of observed water levels.

Flood Protection in German River Basins

In August 2002, heavy rains led to unprecedented floods in Central Europe and caused severe damage and the loss of 100 human lives in Austria, the Czech Republic and in south-east Germany. Compared to floods in the past (along the River Rhine in the 1990s, for example), the damage was much greater. Around 100000 people had to be evacuated. The total economic losses due to natural disasters in that year were estimated at about 15–16 billion Euros, much of it uninsured. The highest losses occurred in Germany, at nine billion Euros (Becker and Grünwald 2003). Although Europe has not been exempt from floods in the past, the severity of that disaster seemed to have shocked not only the victims, but also governments, planners, and insurers as well: “It was as if wealth, infrastructure and order were being unfairly challenged by nature, in societies that considered themselves immune or robust, unlike the less developed countries” (Wisner et al. 2004: 201). Immediately after the flood, discussions relative to its causation began. Two primary arguments surfaced from these discussions. One was represented by the mass media. They referenced the impacts of global warming and climate change as both the frequency of floods and extreme rainfall events have increased (Nachtnebel 2003; Wisner et al. 2004). The second was loosely connected to environmentalists and the Green Movement (ibid., 202). They focused on the loss of retention capacity in the river basin and sparked a widespread debate considering direct human intervention as an additional and

worsening cause. Urbanization, accumulating economic values in flood-prone areas as well as river engineering like the canalization of rivers was regarded as particularly relevant (Mechler and Weichselgartner 2003).

After 2002, discussions on floods and on how to cope with an increased flood risk in the future intensified in several affected European countries (e.g. UK, Netherlands, and Spain),⁷ dealing with the question of how to cope with flood risk in future. Popular conceptions of floods gained influence emphasizing the “needs of nature” (e.g. “making space for water”) and the inappropriate behavior of man in relation to such needs (Wisner et al. 2004; de Vries and Wolsink 2009).

In Germany, this debate took place shortly before the general elections. This resulted in what was widely perceived as a very close race. Against this background, the intense and immediate assistance provided during the floods and immediately after “boosted the government’s poor standing in the polls during the run-up to the elections” (Mechler and Weichselgartner 2003). The government followed-up its firm handling of this crisis by proposing recommendations aimed at avoiding a repeat of the devastation. The government also proposed an end to building on flood plains and the removal of some flood defenses like dykes to allow rivers to swell naturally and thus reducing pressure downstream (the “Five-Point-Programme”).

In 2005, these measures were enacted as the “Flood Control Act” (BMU 2005; Garrelts et al. 2008). This enactment, however, was the result of a contentious policy debate in which the government appeared on one side, and the German Länder on the other (Jekel 2005). This Act envisages amendments in the Water Resources Act, the Town and County Planning Code, the Federal Regional Planning Act, the Federal Waterways Act, and the law governing the German Weather Service. Under the new law, the Länder are required to develop plans which coordinate flood protection along the rivers for the next 4 years. In developing these plans, the interests of upstream and downstream users of a water body must be coordinated. The underlying rationale is that every upstream building of flood defense could increase risks downstream. In addition, the Länder are required to designate flood-prone zones, assuming a flood that has the likelihood of occurring once in 100 years (BMU 2005). Flood plains and flood-prone zones must be marked in spatial and development plans in order to point to the danger of flooding at an early stage. The concerned public must also be involved in the decision making process. The

Footnote 5 continued

Under this construction, 50% of the costs are taken over by the federal state, and 50% by the *Länder*.

⁶ In case of first dyke line failure, second dyke lines reduce the flooded area and thus potential damages. This approach does not totally exclude a first dyke line failure anymore—with consequences for spatial planning in coastal regions, because second dyke lines need space which has to be provided.

⁷ For the Netherlands, see Wiering and Arts (2006) and de Vries and Wolsink (2009); for the UK, see Coleman (2009), for Spain see Moral et al. (2003); for more cases see Schanze (2006).

aim is to raise awareness among both the general public and planning authorities. It was the first time that a federal law prohibited planning new buildings in flood plain areas. Another “innovation” of this Act is its focus on ensuring that potential damage will be as low as possible. For example, in flood zones, computing centers and oil-fired heating systems are no longer allowed to be installed in the basement of a building (BMU 2003).

The key message consists of a paradigm shift from a “safety mentality”, with its promise of protection, to a “risk culture” and strategies to cope with floods complexity. The latter message fits into the precautionary principle. This means that the separation between those involved with flood risk reduction and those involved with coping with the floods has to be overcome. Flood risk reduction and flood response are

cross-sectional tasks and require a great deal of communication, cooperation and management. All participants from different specialist and spatial areas must be better integrated with each other (DKKV 2004, p. 6; see Friesecke 2004; Schanze 2006).

In addition, as more weight is added to participatory procedures, risk culture can be regarded as a process (Stirling 2003). This includes ex post evaluation and reformulation of strategies with learning from previous decisions (Schanze 2006).

These measures are not novel. They are very similar to guidelines recommended by the Working Group on Water of the German Länder (LAWA), which depict a forward-looking model of flood protection. In June 1994 the German Länder Ministers for the Environment instructed the LAWA to develop the guidelines, which were drawn up in November 1995 (ZENE 2002). Unlike the governmental programme of 2002, its stipulations never became mandatory regulations due to political resistance by different stakeholders (local and regional development actors). It needed exceptional political circumstances to disprove and delegitimize the so far dominant safety discourse.

DISCUSSION

Both of the case studies described here indicate processes of intentional change of path, although on different levels of intensity. In the first case, albeit less pronounced than before, the traditional methods of dimensioning the protective structures are still in use. This also applies to the retained discourse on precautionary measures: The motto continues to be “equal safety everywhere”. However, the topic of climate change has made inroads. Resulting from the rise of the surrounding debate on climate change, the inclusion of a “risk component” (+25 cm) over and above

previous dimensioning calculations constitutes a first conceptual break with past practice, which would have been quite unthinkable just a few years ago. Further reaching measures, as yet not implemented, are being discussed: the effects of regulation on the supranational level in the form of EU directives on flood prevention remain to be seen.

The path change illustrated in the second case is of a different and more far-reaching nature. Not only were the regulations on flood prevention standardized on the regional level of the Länder—there is also a stronger focus than before on directives and bans. The possibility of policy shortcomings is being explicitly raised both within the administration itself, as well as being communicated to the public at large. Especially with regard to this new institutional path, one can expect a momentum of its own.

Even though the changes of path described in our two case studies are of varying reach, the fact remains that in both cases the reaction on the part of the political-administrative system was not merely symbolic (see Edelman 1967), but also of substance. In both cases, the present situation is an improvement of the past, and certainly better than if nothing had been done. It, therefore, cannot be equated, as radical system theory would have made us believe, to the mere act of “signaling”. The question now arises as to which factors actually prompted the respective path change. We perceive the most crucial aspects to be the constellation of the actors involved (I), in the question of “reality tests” (II) and in further situational factors (III).

(I) Within the case of coastal protection (the first case) public administration over decades spanned the “boundary” between science and policy in the sense that it predominantly accepted those findings of climate research which matched with the “safety discourse” (the “old” organisational arrangement, the “old” path). This discourse is based on experience and routines regarding dyke safety and on a more or less linear understanding of climate change. Elements of the “risk discourse”, which in contrast underlines the potential non-linearity of further climate change and related effects such as sea level rise, were doubted or ignored unless they could be categorised as proven results. Thus, uncertainties were not publicly considered, compared to the IPCC-community where prognostic uncertainties are emphasized due to general deficiencies in knowledge and insufficient data availability as a starting point. This changed when the regional government addressed the precautionary principle and voted to raise the height of the flood protection dykes. Similarly, in the second case, the Federal Government went one step further and publicly made clear that risky constellations cannot be avoided once and for all and that flood protection measures guarantee only limited safety. Thus, in both cases political actors, not administrative officers, proved to act as “path breakers”. In terms of agenda setting, expertise

delivery, and in sum influence of the public discourse, scientific actors (IPCC, and scientists at the regional level), media, and NGOs also proved to be of high relevance.

(II) Apart from institutional factors, situational factors are of crucial importance to explain the observed shift from “safety” to “risk”. As for the second case, the severe riverine floods of 2002 can be interpreted as a reality test, disproving the idea that it is possible to calculate and to ensure “safety” under all realistic circumstances. Comparing both cases provides strong arguments that real disasters such as the extreme floods in Germany in August 2002 may help to undermine the so far dominant safety discourse and to establish elements of a risk discourse, demonstrating that risks are real and that ignoring them can lead to severe damages—not only in the future but even today—and that extreme events may occur anew even tomorrow. The “collapse of confidence in engineered flood protection” (Wisner et al. 2004) fostered a conceptual paradigm shift toward “living with floods”—an idea to be considered normal, which can be and must be accepted. This shift includes the opinion that rivers, their banks, and their flood plains provide valuable “ecological services” (which can include the absorption of some flood water). This encompasses a growing acceptance of the need to understand the function of rivers and their flow regimes in relation to the wider environment. Following the precautionary principle, adaptive measures have to be considered and decided upon today. Thus, the flood protection-issue is not framed any longer as a mere engineering challenge, but as a task for and responsibility of spatial planning. In fact, the risk discourse no longer seems to be effectively questioned publicly. In the first case, so far—fortunately—there has been no actual reality test. Our interviews, however, indicate that at least some of the actors have experienced a “transversal learning” process from the geographically distant but adjacent policy field of flood protection measures in low-lying areas (the second case)—a learning process most certainly preferable to learning from actual catastrophes taking place within one’s direct area of responsibility.

(III) A further decisive factor in the second case derived from the approaching elections. There can be no doubt that the coincidence of the damages produced by the floods in August 2002 and the upcoming elections as a specific challenge to the political class to demonstrate commitment worked very much in favor of accepting the risk perspective on the political level. In fact, the combination of spatial planning and precautionary principle fitted very well in the discourse of “ecological modernization”, pursued by the government in charge during that period, a coalition of Social Democrats and the Green Party. Thus, the Five-Point-Programme was accepted without any major problems.

CONCLUSIONS

Climate change is an extremely complex phenomenon—from both the temporal as well as the spatial perspective, and above all with regard to the dimension of the actors involved. It is, therefore, wrong to interpret political steering as a pure top-down intervention. Any such attempt must necessarily lead to negative results and findings. Rather, what is really called for are dynamic conceptualizations which grasp steering as a sequentially progressing and reciprocal process, grasped as a complex pattern of interaction between inter-dependent actors, often also incorporating a pronounced bottom-up approach. For processes of change are of manifold different types, often unplanned, and above all influenced by many contradictory developments. They can, therefore, not always be characterized by lineal sequences of action according to the pattern: problem—goal—strategy—instrument—effect. In certain situational constellations, the relations may even be “reversed”, for instance: instrument—action—problem situation—goal (Kingdon 1984; von Prittwitz 1994). Some European countries take these and other mechanisms into account and implement them in the practice under the heading of “transition management” (the Netherlands). Here, the main characteristic constitutes a break with the old plan-and-implement model aimed at achieving particular outcomes. It is based on a more process-oriented philosophy (see Kemp et al. 2005; Lange 2010).

From this perspective, realization of the research finding within the context of climate change stressed by Giddens (2009) and quoted in the introduction to this article, “Adaptation brings us back to the issue of planning”, is only in its beginnings. Only a few years ago still partially dismissed as non-existent, climate change is now assuming a higher priority on the political agenda. The dynamics which may be subsequently released can still only be guessed at. Our case studies illustrate that once such a path change has taken place and subsequent concepts begin to be enacted, the effect is not confined to the domain of the individual case that it refers to. As a matter of transversal shifts within the broader arena of public discourse, changes brought about in particular areas may also contribute to making changes easier in other sectors of the arena that are similarly dealing with controversies concerning how to cope with the scientific debate on climate change. This seems to apply not least to the fields of riverine flood protection on the one hand and to coastal protection on the other.

As shown by our case studies, especially with respect to climate change the state assumes a prominent position. For all the indispensability of participatory approaches—for reasons of integrating citizen’s expertise, for reasons of the additional need for legitimacy in face of existing future

uncertainty—it is the state that remains the institutional guarantor for ensuring that problems can be addressed from diverging perspectives. This dual role falls to the state because being interwoven in many different levels and organized segments it is simultaneously present in identical subsystems. Moreover, only the state is able to tap the financial resources necessary for funding the many tasks associated with adaptation to climate change. The state has already demonstrated its authority to intervene above all in the area of averting threats; the ability of state agencies to intervene with sanctions and directives addresses the question of ultimate responsibility, which is all too often overlooked by participation-oriented approaches. However, as we have seen, this does not diminish the role of other actor groups, in the contrary. In particular actors from science, the media, NGOs, and citizen groups are able to provide relevant expertise and to influence on the public discourse, thus mobilizing significant political pressure.

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