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Topical Review

Mapping the evidence of climate change adaptation policy instruments in Europe

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Abstract

With climate change impacts being felt across Europe, governments have started to invest in designing and implementing adaptation actions. The means through which governments adapt is generally referred to as policy instruments. Although there is a large body of adaptation policy literature emerging, our comprehensive understanding of policy instruments is limited nor do we know much about how scholarship on adaptation is addressing critical questions about policy instrument choice and effectiveness to support policy practice. In this article we map academic scholarship on climate change adaptation policy instruments in Europe. Using systematic approaches, we identify 184 relevant articles published 2014–2019. Our findings show that research is heavily concentrated on a limited number of western-European countries, with hardly any insights from eastern Europe and smaller countries. Most studies do not connect climate change impacts and risks with policy instruments, making assessment of policy effectiveness difficult, if not impossible. We argue that expanding the geographical scope of future research and enhancing the diversity of study types across Europe is critical for advancing theories on climate change adaptation policy, as well as providing useful recommendations for policy makers to strengthen the solution space and accelerate climate change adaptation.

1. Background

Climate impacts are already being felt across Europe, with large differences in the scope and extent of impacts being observed and projected across geographical regions and vulnerable sectors (EEA 2017, IPCC 2018, Harrison *et al* 2019). Across Europe, state and non-state actors have begun formulating ambitious goals to take actions and allocate resources, and early evidence of adaptation taking place is reported in the emergent adaptation scholarship (Biesbroek *et al* 2010, Lesnikowski *et al* 2016, Aguiar *et al* 2018, Reckien *et al* 2019). However, the growing gap between the rate of climate change and observed adaptation actions has resulted in stronger calls for expanding the adaptation solution space, increase the portfolio of adaptation actions, and accelerate implementation of climate actions on the ground (IPCC 2018, GCA 2019, Haasnoot *et al* 2020).

Adapting to climate change impacts generally refers to the process of increasing resilience, reducing vulnerability, enhancing adaptive capacity, and in some cases, to take advantage of possible opportunities climate change offers (IPCC 2018). Policy instruments play an important role in the adaptation process, as these are the means through which governments 'get things done'. Examples of policy instruments include policies, regulations, laws, subsidies, educational programs, and coordinative bodies (Mees *et al* 2014, Henstra 2016, Stead 2018). Policy instruments have a longstanding tradition in research on public policy (Howlett 2009) and this perspective is increasingly used in adaptation scholarship to understand what governments are doing to adapt to climate change impacts. There are different ways in which the instruments can be classified for policy analysis (Capano and Howlett 2020). One frequently used classification is NATO: Nodality, Authority, Treasure, and Organization (Hood 1983) which is increasingly used in the context of climate change adaptation; Henstra (2017) uses this typology to analyse adaptation policy in Canada, and Lesnikowski *et al* (2019)

analyses the adaptation policy instrument mixes at 125 local governments. Moreover, there is a large body of adaptation scholarship that does not take an explicit policy instruments perspective, but analyze climate change adaptation by investigating the tools and resources governments have at their disposal and use to implement adaptation actions. Biagini *et al* (2014), for example, develop a specific classification of actions to investigate adaptation in the context of the Global Environment Facility.

Despite progress in the recent adaptation literature, our knowledge of adaptation policy instruments is scattered across different strands of literature. For example, there is very little we know about what kind of instruments are being studied, whether such studies are focusing on specific types of climate impacts and risks or cover the broad spectrum of risks, and whether there are gaps in our understanding of where adaptation is taking place in Europe. Moreover, key questions about the link between policy goals and policy instrument choice are hardly understood; Policy design theory for example suggests that alignment between the policy problem, goal formulation, and instrument choice is important to increase chances of successful implementation as such alignment should result in a more coherent, effective and efficient policy process (Howlett 2019).

In this article we map academic scholarship on climate change adaptation policy instruments in Europe to answer these questions. Several recent systematic maps and evidence syntheses have considered climate change adaptation topics (Berrang-Ford *et al* 2015, Roggero *et al* 2018, van Valkengoed and Steg 2019), focusing mostly on barriers and limits to adaptation (Biesbroek *et al* 2013), but no studies exist that focus on understanding adaptation and policy instruments specifically, nor have an explicit European focus. Clarifying and strengthening what research is taking place is vital for informing future research directions and investments in climate change adaptation research and practice across Europe.

2. Systematic mapping methodology

For the purpose of this study, we define adaptation policy instruments as those tools at the disposal of government that are intentionally designed to deal with the projected, long term impacts of climate change (Dupuis and Biesbroek 2013). There are several concepts related to climate change adaptation—i.e. sustainability, resilience, disaster risk reduction—which are excluded here to ensure conceptual coherence in the collection and interpretation of the findings (as per other systematic reviews on adaptation, see Berrang-Ford *et al* (2015)). This means, for example, that existing policy instruments that reduce vulnerability and increase adaptive capacity but which are not explicitly referring to adaptation are not considered in this review (as per other

adaptation studies and reviews, see Lesnikowski *et al* (2016)). However, when existing policy instruments are recalibrated to achieve a particular climate change goal (e.g. amendments in building codes)—i.e. there is *explicit intentionality* in the recalibration—these instruments will be included in the study.

Supplementary material I (SM-I) (available online at stacks.iop.org/ERL/15/083005/mmedia) provides the detailed protocol used for this study including the key concepts used. The protocol was scoped, discussed, and drafted through multiple iterations between the authors of this article. Figure 1 captures the key steps taken in implementing the study.

2.1. Identification of articles
The search is focussed on literature published between January 2014 and June 2019. Our study aims to inform the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (Working group II), and therefore focusses on the post IPCC AR5 literature. Given the cut-off point of the IPCC, and our time constraints, we could not cover all articles published in 2019. The review focusses on Europe, following the geographical boundaries used in the IPCC AR6 WGII, which includes for example Iceland but excludes overseas territories, see Kovats *et al* (2014). Moreover, the IPCC uses bio-physical boundaries rather than merely geopolitical, therefore including for example parts of Russia (e.g. the Ural mountain region being the biophysical cut-off). Here we include such countries as a whole. The study covered 47 countries which are listed in table 1 (Results section) and the SM.

The keywords and synonyms used for this study was checked against an initial list of five key publications identified by the research team. The search query was iteratively refined by included more and alternative synonyms until the key publications showed up in the search results. The search query included four concepts and their synonyms which were connected using Boolean operators: (1) climate change; (2) adaptation; (3) Europe (including country names); (4) policy instruments.

The two largest online resources of scientific literature—Web of Knowledge and Scopus—were selected for this study as per previous systematic reviews studies on climate change adaptation. The search is restricted to the English language for feasibility reasons. The final search strings were implemented in June-August 2019. After removing duplicates the final dataset included 1570 articles for screening.

2.2. Screening process and study eligibility criteria
Screening took place in two stages. The first stage focused on the title, abstract and keywords. Articles were excluded that did not consider climate change adaptation as the main focus nor included explicit

Figure 1. Seven key steps taken in systematic mapping of the adaptation scholarship.
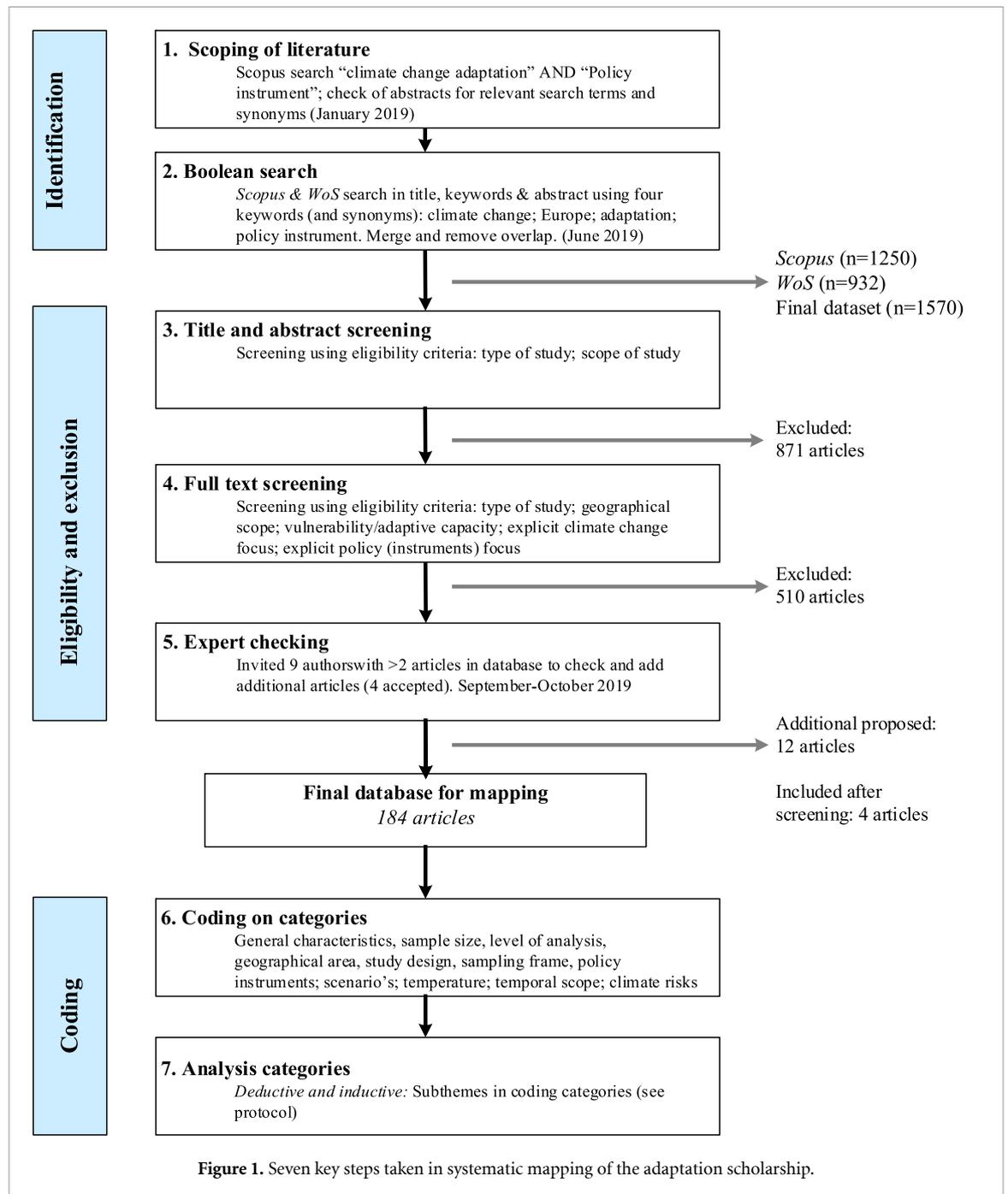
reference to policy instruments or their synonyms. In the second stage, the full text of the articles was downloaded and screened using an additional layer of screening criteria, see SM-I. Issues during screening were discussed among the research team and changes in the mapping protocol were made where necessary.

The second screening stage resulted in a list of 180 articles. To check for completeness of the search, we sent the final list of articles to 9 scholars working on climate change adaptation in Europe. The authors were selected from our list of articles. In total 4 scholars proposed 12 new articles of which 4 met our

inclusion criteria, thereby also confirming the robustness of our search protocol. This resulted in a final set of 184 articles included in the final database for analysis.

Given the goals of this study (mapping rather than systematic review of evidence), the broad scope of this systematic map, and the emerging scope of the adaptation research field in general, we did not critically appraise individual articles (i.e. assess reliability and reproducibility based on the study design), but rather captured the research design and other aspects during the coding and analysis stage.

Table 1. Geographical split of studies included in the database and the instruments reported.

Country	Studies that include the country		Number of cases			Policy instrument types reported					Total PI	Percentage of total dataset
	n =	% of total studies	1	2–20	>20	N	A	T	O	U*		
Netherlands	58	34%	15	30	13	47	29	19	24	21	140	16%
United Kingdom	42	24%	8	19	15	35	16	6	3	15	75	9%
Germany	37	22%	3	22	12	37	8	13	12	15	85	10%
Denmark	21	12%	3	7	11	7	5	3	5	12	32	4%
Sweden	21	12%	3	12	6	55	8	1	3	8	75	9%
Finland	20	12%	2	9	9	11	23	3	4	15	56	7%
France	19	11%	3	5	11	9	5	1	10	10	35	4%
Italy	19	11%	2	5	12	10	3	2	5	13	33	4%
Spain	19	11%	2	5	12	7	4	4	8	14	37	4%
Austria	15	9%	1	4	10	8	4	3	2	10	27	3%
Norway	14	8%	1	7	6	31	8	2	3	4	48	6%
Ireland	12	7%	2	1	9	6	2	1	1	6	16	2%
Poland	11	6%	1	3	7	1	2	1		7	11	1%
Belgium	10	6%		1	9	2	1	1		6	10	1%
Portugal	10	6%		4	6	1	9	2		5	17	2%
Greece	9	5%	1	1	7	2	3	1		6	12	1%
Switzerland	9	5%	1	4	4	4	8		3	6	21	2%
Turkey	9	5%	1	3	5	7			6	7	20	2%
Estonia	8	5%		1	7	1		1		6	8	1%
Hungary	8	5%		1	7	1		1		6	8	1%
Latvia	8	5%		2	6	4		1		5	10	1%
Bulgaria	7	4%		2	5	1		1		5	7	1%
Czech Republic	7	4%	1		6	1		2		4	7	1%
Slovakia	7	4%			7	1	1	1		4	7	1%
Slovenia	7	4%	1	1	5	1		1		5	7	1%
Romania	6	3%		2	4	1		1		4	6	1%
Cyprus	5	3%			5	1		1		3	5	1%
Lithuania	5	3%		1	4					5	5	1%
Bosnia	4	2%		2	2					4	4	0%
Croatia	4	2%		1	3					4	4	0%
Serbia	4	2%	2	1	1	2	2			1	5	1%
Iceland	3	2%		1	2	1	1			1	3	0%
Albania	2	1%			2					2	2	0%
Luxembourg	2	1%			2					2	2	0%
Malta	2	1%			2					2	2	0%
Macedonia	2	1%		1	1	1				1	2	0%
Russia	2	1%		2						2	2	0%
Azerbaijan	1	1%			1	1					1	0%
Lichtenstein	1	1%		1						1	1	0%
Moldova	1	1%			1	1					1	0%
Ukraine	1	1%			1					1	1	0%
Andorra	0	0%									0	0%
Georgia	0	0%									0	0%
Monaco	0	0%									0	0%
Montenegro	0	0%									0	0%
San Marino	0	0%									0	0%
Totals						298	142	73	89	248	850	100%

Note: (Systematic) reviews were removed from the database to create this table. In case multiple countries were included in an article, they are counted multiple times, therefore the total number of countries reported in articles here differs from the total number of articles in our database.

2.3. Data coding and analysis

The final set of articles were coded based on a number of dimensions. First, we recorded the following attributes for each article: author(s), year of publication, journal, study area (country/countries), sample size (single, small-N, large-N), governance

level (national, subnational, local), type of study (cross-sectional, longitudinal).

Next we coded for the key impacts and risks, goals and instruments reported. We identified the key impacts and risks the articles focused on by using open coding and progressively clustered these in the analysis to create a comparable set of key impacts and risks. Some articles included multiple and these were assigned multiple codes. Next, we identified the policy goals formulated in the articles to tackle these impacts and risks. Policy goals were only extracted when they were explicitly linked to the climate risks and policy instruments. We extracted the literal text from the original articles to allow for qualitative interpretations. Third, of the various typologies of classifying instruments available (Capano and Howlett 2020) we selected the NATO typology to catalogue the instruments identified in the articles (Hood 1983); '*Nodality*' refers to the generation or provision of information or knowledge. '*Authority*' refers to the ability of state or supra-state bodies to command certain types of behaviour, through for example legislation or regulation, or through hierarchical relations with lower-level state bodies. '*Treasure*' refers to the use of financial resources to bring about policy outcomes. These can consist of the production of public goods or services that further a particular outcome, or financial incentives such as subsidies or taxation that aim to stimulate behaviour in a target group. Finally, '*Organisation*' signifies the adaptation of (aspects of) governmental functioning itself.

Some articles already used the NATO typology, and in other articles other typologies were used. In some cases the policy instruments were not made explicit but synonyms were used, such as policy tools. Instruments were only coded if they were clearly identifiable and described in the empirical sections of the articles and not, for example, in the theoretical or conceptual sections. In cases where multiple countries were included in the study, each goal and instrument was assigned to a new row in our data extraction table.

We further unpacked the perspectives used in the articles by assessing the timeframe (short, medium, long term), temperature (1.5, 2, 3, 4 degrees Celsius) and models and scenario's used to assess the climate impact and risk and inform policy instrument choice (e.g. SRES, RCP/SSP, downscaled scenario's). We used closed options for timeframe and temperature, but open coding for the models and scenario's used as these proved to be more difficult to define *a priori*. Unclear assignment of codes were discussed among the research team.

All results were coded and, where needed, clustered and recoded into tables to map the literature on climate change adaptation policy instruments used in Europe. Of the 184 articles included in our study, 12 were classified as reviews or meta-analysis. We excluded these for double counting, but used them as check to ensure we covered all relevant articles in our study.

2.4. Limitations

We included scientific papers in written in English only. Particularly eastern European studies could have been missed, which might explain why eastern Europe is underrepresented in the results. Moreover, we included peer-reviewed journal articles identified through two databases only. There are increasing numbers of policy strategies, plans and evaluations, research reports and other sources where climate actions are being recorded. Whilst relevant for a systematic review or content analysis, we argue here that for the purposes of a systematic map on the current state of knowledge, our sources are sufficient to identify the knowledge gap(s) within the academic literature. Finally, due to the IPCC AR6 WGII cut-off point for accepted papers (June 2020), we were unable to identify, assess, and report all articles for 2019.

3. Results

Most articles in our database were published in interdisciplinary journals with a strong environmental focus with the most frequent journals being *Regional Environmental Change* (13), *Ecology and Society* (9), *Environmental Science and Policy* (7), *Global Environmental Change* (6), and *Sustainability* (6).

Most studies focused on the local level (n = 77) followed by the national level (n = 69), which is perhaps not surprising given our search query included country names only. Studies with a subnational focus (n = 22) were less frequently identified. Our findings are similar to other studies which find that regional level studies in general, and climate change adaptation studies in particular, are severely underrepresented in the academic literature (Biesbroek *et al* 2018). The remaining articles covered multiple levels or did not make explicit reference to any level of governance (n = 24).

The results also show that the vast majority of studies are cross-sectional (n = 165) with only a few longitudinal studies (n = 7). This skewed representation in the literature might be the result of the relative newness of climate change adaptation and the global attention to climate change mitigation, but arguably hampers our ability to assess progress over time, and the efficiency and effectiveness of climate change responses.

3.1. Climate risks, timeframes, scenario's and timeframes

Table 2 shows that river flooding and sea level rise are among the most studied topics for adaptations in Europe. Some articles combined multiple

climate impacts and vulnerability when empirically investigating adaptation policies and actions, for example sea level rise, river flooding and coastal flooding. Some climate impacts and vulnerability are poorly covered, including topics related to health impacts (although these are included as secondary impacts in some studies). More than half of the articles do not explicitly state which climate change impacts and vulnerability their study focusses on, but simply refer to the general need to adapt to a wide range of climate impacts. In some instances it was unclear whether some climate-related impacts and vulnerability belonged to a certain category.

We find very few studies that explicitly consider climate risk projections (n = 16) and explicitly consider temporal scales (i.e. short, medium, long term). Moreover, we found 4 studies that explicitly discussed measures to adapt to a predefined temperature goal. Our initial ambition to split these articles across regions and instrument types for more fine-grained analysis was therefore considered not useful.

3.2. Policy goals and instruments

Our database includes 172 articles (excluding articles classified as reviews) and 684 policy instruments, resulting in an average of 3.9 policy instruments per article. We find that nodality (n = 285) is the most frequently included instrument followed by authority (n = 145), organisation (n = 94) and treasure (n = 75). A number of instruments could not be classified as they covered multiple instrument types, or the original article was too ambiguous in what the instrument constituted (n = 85), see table 1.

When splitting the dataset across geographical regions, we find that there is a heavy concentration on a few countries: Netherlands, United Kingdom and Germany. This is particularly true for single-N studies. Studies of the Netherlands include frequent reference to authority type of instruments, specifically in relation to climate risks in the water sector. Moreover, frequent reference is made to a range of specific instruments such as the Delta Act and installing new program such as the Delta Program (van der Steen *et al* 2016). Reference to the UK is characterised by the high frequency of nodality and authority, with reference to the Climate Change Act 2008 as being the most frequently mentioned authority instrument. Studies that include Germany identify more nodality, organisation and treasure type of instruments, but much less authority instruments. Other observations are that Sweden scores high when it comes to the total number of instruments reported, but could be explained by few studies that identify a large number of instruments, and that Finland identifies many authority related instruments.

In general, we find very few papers in the English academic scholarship literature that focus on Eastern Europe. Studies that do cover eastern Europe

are large-N in scope and provide limited details on instruments constituencies, see for example Reckien *et al* (2014) and Pietrapertosa *et al* (2018). By their nature, large-n studies prefer breath over depth and thus offer limited insights in the particularities of which instruments are selected and what role they play in the process of climate change adaptation in these countries. Moreover, smaller countries (with the exception of the Netherlands) are severely underrepresented in the academic literature. This pattern is found in policy practice too; large countries tend to make more progress compared to smaller countries, and larger countries tend to report more adaptation progress (EEA 2014, Lesnikowski *et al* 2016).

4. Discussion and possible ways forward

This study mapped the scientific articles that analyse climate change adaptation policy instruments across Europe. Our study identifies a number of critical knowledge gaps important to discuss in greater detail here.

First, we find that most studies in our database are concentrated around a few countries, predominantly the Netherlands, Germany, and the United Kingdom. Eastern European and relatively small countries are far less studied compared to often larger, western-European countries. Several reasons could be considered including that some countries have invested significantly in climate change adaptation research funding over the past years explaining higher research output. Moreover, these countries are often seen as early adopters and global leaders when it comes to climate change adaptation, making them interesting case studies (Lesnikowski *et al* 2016). However, the implications of the regional differences within Europe could be far reaching for both adaptation science and practice.

The strong concentration on a few countries means that theory building on climate change adaptation is biased towards certain socio-political and institutional settings, and therefore preferred types of adaptation responses. Large-N studies demonstrate the differences across Europe (and other regions of the world, see Berrang-Ford *et al* (2014)) and the influence this has when it comes to formulating theories on instrument choice opportunities and preferences for instrument selection, for example. Advancing emergent theories on climate change adaptation requires expanding the empirical knowledge base beyond these few western-democratic countries and requires testing whether the results found hold in other contexts. Recent calls to advance theory through large-N studies Biesbroek *et al* (2018) should therefore be cautioned, as single case and small-N cases can provide critical insights in context where little information is known about adaptation processes.

Table 2. Key climate change impacts and vulnerability the articles focused on Multiple can be the focus of an article.

	Number of articles	% of dataset	Policy goals Yes	No	Policy Instruments N	A	T	O	U*
River flooding	43	25%	68	64	55	37	10	20	10
Sea level rise	28	16%	54	46	40	23	12	18	7
Heatwaves (incl. urban heat island)	13	8%	13	10	9	3		5	6
Coastal flooding (incl. erosion)	12	7%	22	19	22	5		10	4
Droughts	10	6%	16	6	2	5	4	6	5
Urban flooding (incl. pluvial flooding)	8	5%	9	7	2	7	3	2	2
Landslides	6	3%	4	28	24		2	5	1
Disease (vector, food, infectious)	1	1%	0	44	20	2		20	2
Unspecified	102	59%	144	205	141	76	46	24	62
totals	*223*		*330*	*429*	*315*	*158*	*77*	*110*	*99*

Such geographical bias is not only problematic for advancing research on adaptation; most adaptation studies aim to inform future policy making through lesson drawing and formulating recommendations. However, if this is done on a small sample of larg(er) western-European countries, such lessons and recommendations will be heavily based on experiences from a few countries, which are not easily transferable to other contexts.

At the same time, the countries which are studied less frequently tend to be more vulnerable to a range of climate impacts when compared to countries that have made most progress and for which adaptive capacities tend to be high (EEA 2017). We find that policy instruments for some climate impacts are less frequently studied, with adaptation to wildfire and human health as two concrete examples. Existing studies on these topics might have not been caught by our search strings, which focus on intentional climate change adaptation rather than related concepts, but these are important areas of climate research for large parts of Europe (Kovats *et al* 2014). Studies show that some of these impacts are likely to occur more frequently and in greater magnitude in regions where we generally found less research articles on climate change adaptation.

Hence investing in place-based and contextualized studies in these underrepresented regions, and publishing these in English scientific literature, is critical to increase our understanding of how adaptation is taking place in these regions, to build more robust theories that hold across different contexts, and provide possibilities for context specific lesson drawing. Challenges related to geographical scope have been recognized in past global assessment reports (Kovats *et al* 2014), but we find here that limited progress has been made in the post-AR5 literature assessed here to fill these gaps. This is likely to influence the IPCC's sixth Assessment cycle and other European wide assessments.

Second, our findings echo observations made by others, namely that nodality is the main type of policy instrument type used, probably as it is an integral component of creating groundwork for adaptation actions (Lesnikowski *et al* 2019). However, in contrast to most literature, we find that organisational instruments—arguably also a key element of groundwork—is mentioned relatively few times compared to other studies (Henstra 2016). Authority instruments are more frequently reported when compared to other studies. These observations could indicate that recent literature is signalling a shift from policy instruments related to predominantly groundwork, to increasing policy efforts to mainstream and mandate climate change adaptation actions through authoritative instruments. Further research would be needed to test this empirically.

Third, our analysis suggests there are different ways in how governments respond to climate impacts and future risks. For example, the high number of authority type of instruments reported in studies on the Netherlands are specifically related to the water sector for which there is a strong institutional architecture in place. Finland identifies many authority related instruments, which could be an indication of their early adopted National Adaptation Strategy and subsequent coordinated approach across sectors and regions. Studies on Germany report few authority instruments, which fits the federalist characteristics of Germany and the devolution of authority to *Lander* to tackle climate change impacts. Empirically investigating the differences between countries is important to theorise about the hypothesizes differences in adaptation policy styles and policy instrument choice (Biesbroek *et al* 2018). It also helps to understand if, why and how insights gained from one country on policy instrument choice can be transferred meaningfully to other contexts.

Our original intention was to map adaptation policy instruments that target different levels of governance (e.g. national, regional, local), but the data collected from the articles was considered not robust enough to conduct such analysis. Similarly, we aimed to extract information on whether there was evidence

of a causal link between policy goals and policy instruments, but this too was nearly impossible to identify from the analyzed articles. We also experienced difficulties in whether the articles focused on a climate hazard, impact, vulnerability, or climate risk—terms that were often used interchangeably. Future research should therefore be more explicit not only which policy instruments are analyzed, but also for what purpose and in which context they operate. This would allow for more in-depth evidence syntheses of what works where and why.

Our analysis here focused on individual policy instruments, but there are still large gaps in our understanding of the linkages between mixes of policy instruments, the coherency and consistency of these mixes, and how their performance in achieving certain policy goals can be evaluated, and under which conditions certain mixes are most effective. These and other questions are key questions in general policy instruments literature (Capano and Howlett 2020). Such questions will be highly relevant in the next stages of adaptation policy instrument research.

Our final observation is that effective policy design requires alignment between the climate change impact and the policy goals and instruments (Berrang-Ford *et al* 2019), but we found few studies that actually do this. Most adaptation studies included in our mapping take a historical perspective to catalogue what governments have done to reduce vulnerability, which tools were used to do it, and what barrier/enablers were encountered in the process. Yet these linkages are of critical importance to ask emerging policy relevant questions. Moreover, assessing the effectiveness and efficacy of policy instruments (or adaptation actions in general) requires understanding of the links between climate change impacts and risks, the goals governments set to reduce vulnerability, and the ways through which they plan to do that. Making adaptation policy scholarship more relevant to policy practice requires more forward looking dimensions in these studies, where temporal dimensions, multiple scenario's and different temperature objectives are connected. Although some of such studies were found in our database, see Haasnoot *et al* (2018) for example, they are severely underrepresented in the literature. Yet our ability to understand the solution space of adaptation, and the role policy instruments play in shaping the solution space and implementing adaptation actions, requires understanding the range of future climate risks to inform instrument choices (Haasnoot *et al* 2020).

Acknowledgments

Data statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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