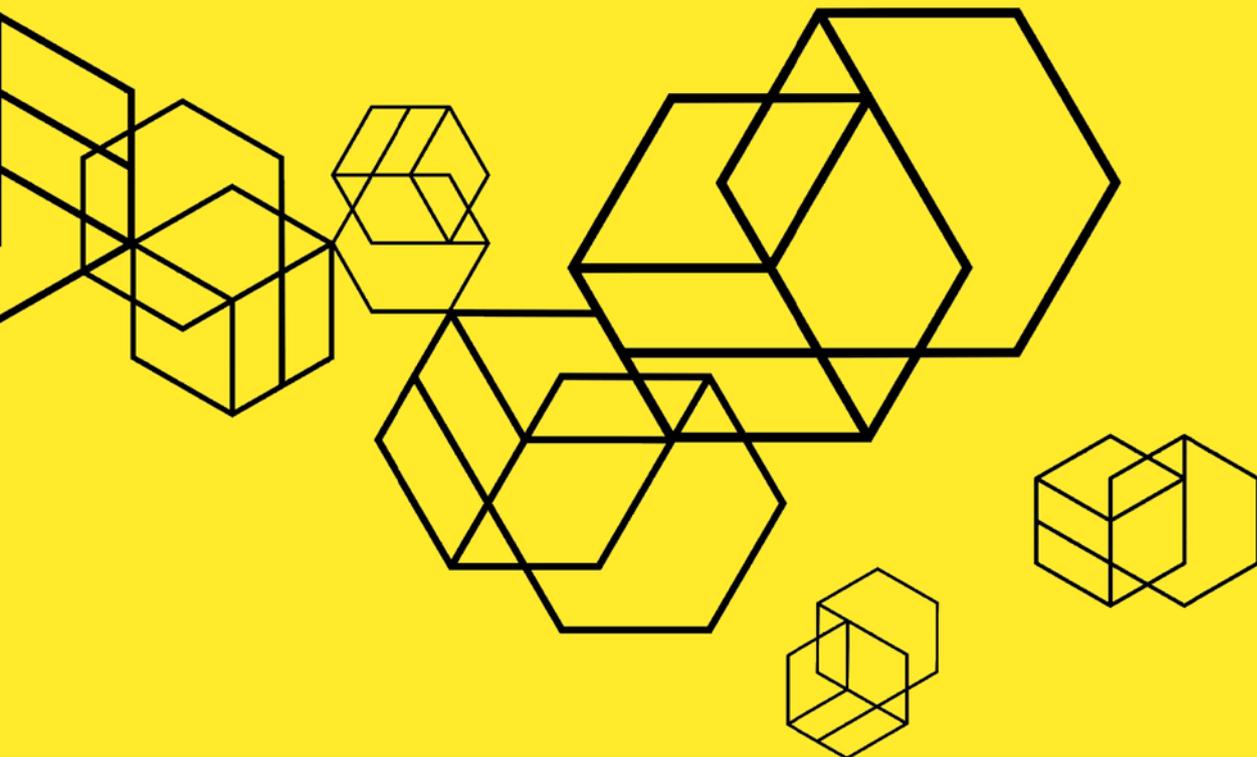




**SOCIAL  
INNOVATION  
COMMUNITY**

# **Dynaklim**

*TU Dortmund University (TUDO)*





# **Dynaklim - Dynamic adaptation of regional planning and development processes to the consequences of climate change in the Emscher-Lippe region<sup>1</sup>**

## **1. DESCRIPTION OF THE CASE**

Dynaklim (Dynamic adaptation of regional planning and development processes to the consequences of climate change in the Emscher-Lippe region) was a project funded by the German Federal Ministry of Education and Research (BMBF) running from 2009-2014. It aimed at enhancing the knowledge about the effects on climate change for the geographic region of Emscher-Lippe (located in the German Federal State of North Rhine-Westphalia) and setting up an inclusive strategy for dealing with them. The project was rather complex, as it tackled many (also technical) aspects related to water management, including the development of future climate scenarios, used different activities to increase outreach and tangibility of such an abstract topic, including the creation and implementation of pilot projects, whereby the single activities and tasks were interdependent.

The core idea of Dynaklim was initially to develop a climate change adaptation strategy for the project region. During the course of the project, the Roadmap process gained more importance, as it was used to develop a common strategy for the region using a participatory format involving actors from different institutional and disciplinary backgrounds. Therefore, the core idea was still the same, but realized in a broader sense.

This increasing importance manifested itself at two stages of the project. First, when writing the project proposal and secondly, when it became the steering mechanism coordinating the consortium during the second half of the project.

<sup>1</sup>This case study includes research results from a case study within the project SI-DRIVE: Social Innovation Driving Force of Social Change (Work Package 6 Environment and Climate Change) by Antonius Schröder and Marthe Zirngiebl (TU Dortmund University).



Later on, the elaboration of a Roadmap 2020 became the central objective of the Dynaklim network. This required a coordinated and cross-sectoral adaptation strategy to be provided by the year 2014. This roadmap fleshed out important fields of action such as water resource management, economic development, or urban and regional planning, as well as detailing what adaptation measures were to be provided by what actors from politics, the economy, education or society, and when as well as what resources were required to achieve this. Dynaklim initiated and moderated this regional strategic process, mobilized the relevant local players and made established know-how available. At the same time, the results and experiences gained from the project work and pilot areas were continually absorbed into the roadmap effort.

### **The context**

The German conurbation of Dortmund, Bochum, Essen and Duisburg forms the core of the Ruhr region and one of Europe's most densely populated areas of economic activity. 3.8 million people live here within the area drained by the rivers Emscher and Lippe. This region contains strong contrasts: the Emscher area is industrial in character, adjoined by the more rural Lippe region to the north. The future climate here will be characterized by wet, less cold winters and hotter, dry summers with frequent heavy rains. The average annual temperature will rise by between 2 and 3.5 degrees Celsius in the area drained by the Emscher and Lippe rivers by the year 2100. The annual rainfall will only increase by 5 percent, but will increasingly shift from summer to winter. This change will entail tangible consequences for the regional water balance in western Germany within only a few decades, and hence also for the population's living and economic conditions. The dynaklim network therefore primarily concentrated on the future availability and usage of water in the region.

The problems described in the Roadmap 2020 addressed on the one hand, the arising difficulties in developing a climate change adaptation strategy and, on the other hand, the future impacts of climate change. The former problem package held that the impacts of climate change realized themselves over a long period of time; the related interdependencies were complex, as climate change and other future developments, such as changes in demography and urban sprawl, were surrounded by uncertainties. Moreover, the problems' causes and effects spanned over generations. One of the consequences of this complex interdependency was that conventional administrative processes were not adequate in solving the problem, as different administrative organizations and departments rarely neither cooperated with one another nor involve other relevant stakeholders. The problem at hand from a policy and administration point of view could be summarized in five key challenges:

- 01 Effects of climate change were often under-estimated.
- 02 Cities and its habitants did not know about their vulnerable spots.
- 03 There was a lack of connecting points between the stakeholders (consequently, knowledge about problems and solutions is fragmented).



- 04 People tended to see the responsibility with others, since everyone was only partially responsible.
- 05 There was a lack of financial and human resources to address the issue at hand adequately.

Since the specific effects of climate change depended on other future developments and were highly context-dependent (influential factors are e.g. the design of the built environment, demographic specifics or consumption patterns), Dynaklim first developed socio-economic and climatic scenarios independently.

### **The case**

The Emscher-Lippe region is naturally rich in water – which one would think an advantage in a time of climate change. But just like everywhere else in the Ruhr region, in the next 50 to 100 years people living in this region will also need to prepare for climate changes that are already noticeable. This particularly applies to water supply and sewage disposal systems, as well as to ground and surface waters.

Essential questions for dynaklim in this regard were: how was the urban infrastructure prepared for the future higher frequency of floods entailed by heavy rains? How could people living in the region deal with dry periods? How would the availability of water be affected? How would severe rains and heat waves affect the water quality of rivers and lakes, or of ground water? How could competing interests be coordinated when water is scarce? And how could the sensitive ecosystems of the regional green belts and forested areas be adapted to climatic extremes?

To answer these questions, dynaklim developed those socio-economic and climatic scenarios. These were later combined resulting in five different dynaklim scenarios. The first one depicted a development according to the prevailing trends; the second one drew an optimistic picture in which the project area was a competitive and attractive region. The third one showed that even though heavy rains occur, the region would be prepared to cope with them. The fourth scenario was more pessimistic in stating that the project region was experiencing hot and unbearable summers. The fifth one was not more optimistic in projecting severe floods. Despite of being more or less pessimistic, all of the developed scenarios predicted more dry days during summer, more and longer dry periods (i.e. at least 10 days with an average temperature > 30°C), more wet days and floods during winter, and a more frequent occurrence of heavy rainfalls. While these scenarios focused on the near future (i.e. 2021-2025), projections for the distant future (i.e. 2071-2100) were included, as well. Even though the problems depicted in the scenarios manifested themselves, a strategy including counter-measures had to be designed and realized. Again from this perspective, the contemporary problem dynaklim mainly addressed was the above-mentioned lack of cooperation between relevant stakeholders. With the roadmapping process, dynaklim was able to get them closer.



In the Emscher-Lippe region, the dynaklim projects elaborated new concepts for a sustainable and adaptive management of the water balance. Technical solutions enabling more precise predictions of, and more flexible responses to, the consequences of climate change for the water balance, water infrastructure and urban climate were being developed. Comprehensive hydro-meteorological data were being gathered and more exact precipitation data extracted from them to provide a basis for this work. Initial draft concepts for sustainable ground water management and ground water use in the cities have already been delivered. Considerations on adaptive rain water management have already been drawn up. In addition to this, new approaches were being elaborated for the future coordination of competing users of ground and surface water in the central Lippe region. This pilot project for the Lippe area was providing an important part of the basis for the entire regional climate adaptation strategy in the Emscher-Lippe region. Solutions to the problem of securing a reliable supply of drinking water for an adaptive approach to urban water management were also being designed. And the results of an urban quantitative climatological network were set to be included in a guideline to improving the urban climate.

To find out, in which way and when all this could have been implemented, dynaklim cooperated with experts in water management, public administration and the economy of the region in studies to identify the regional costs to be expected in the future for climate adaptation, and what a future climate-proof, cost-efficient organization and finance model was likely to look like in relation to water management.

## **2. DESCRIPTION OF THE LEARNING PROCESS**

The Roadmap 2020 process, which was used to develop a common strategy for the region using a participatory format involving actors from different institutional and disciplinary backgrounds, was of primary interest.

Due to this, dynaklim, developing different projects with different partners, was such a broad project, that the Roadmap 2020 was necessary to use the projects as a governance-innovation.

Initially, the method of roadmapping was developed in the 1980s to enable planning for the far future and developing technology forecasts. In the Roadmap 2020 which described the strategy and measures developed in dynaklim it is summarized as follows:

“The Roadmap 2020 is comparable to a timetable including a set itinerary which takes up processes of change within population, economy, and society and describes a possible way leading to a climate-robust, attractive, learning future agglomeration following integrated and adaptive development processes. The Roadmap is supposed to ensure that we, the region, decide upon a common goal, take off in time, pack the right equipment for the journey, have all those who are responsible, affected, and interested on board and are able to identify together the right paths and short cuts, avoid dead ends and react to unforeseen changes quickly” (Schultze et al. 2014, p. 5).



Consequently, due to Roadmap 2020, strategic development trends could be analysed and compared to the proposed development and future trends; new action plans could have been made and translated to measures and responsibilities. These processes only were possible through the roadmapping, with dynaklim as showpiece and forerunning project.

Moreover, dynaklim built on prior projects and initiatives that dealt with the interface between research and policy in regard to issues related to climate change and water management. Yet, dynaklim was one of the forerunner projects in designing a common strategy for water management and climate change adaptation which managed to involve a large variety of actors.

As said before, the core idea was to initiate a climate change adoption strategy; focusing on Roadmap 2020 included the possibility to get an overview and use all information to reach the project's aim.

The problem was the main theme of climate change – climate governance was characterized by insecurity and conflicts between preventive government actions on the one hand and adjustment processes on the other hand. At the same time, dynaklim's actors had to handle different conflicts of interest, constellations of heterogenic actors with different aims and motivation and at least unclear areas of responsibility. During recognizing this, dynaklim developed an interdisciplinary investment program about regional climatic problems and changing potential in the Emscher-Lippe region.

Because dynaklim worked regional, regional governance in the Emscher-Lippe region was constitutive for its research and network programs.

Networks: The dynaklim group included more than 50 network partners; companies involved in the regional economy, water boards, municipalities, universities and research facilities, as well as regional and civil society initiatives.

Although the Roadmap process could build upon these local conditions, bringing the desired participants together was not an easy task. The project coordinators were of key importance in bringing about the measures formulated within the Roadmap process, as they continued to enhance and focus on the Roadmap process, despite all difficulties. Taking conflicts into account, they pushed partners to get involved into the Roadmap process instead of simply delivering report after report.

Dynaklim proved to be a key project for more technical-oriented project partners who turned back to the social innovation and made use of it in other projects and processes. In the course of dynaklim, the project leader, as a natural-science oriented institution, learned to work more with social science-oriented partners and to organize networks from scratch. The method of roadmapping helped to organize the inter- and trans-disciplinary network. The role of Roadmap changed during the project course.

Due to the project logic dynaklim had to follow it was not possible to implement significant changes



during the project's lifetime (Cormont/Frank 2015). One of the things the project coordinators acknowledge to be changed in future roadmapping processes for climate change adaptation was the participation of citizens. The possibilities that exist in terms of involving citizens were by no means fully utilized.

Since the rollout process in the more rural area and the dynaklim process in the Ruhr region overlapped, certain things learned in the course of the main process could have been implemented differently in the rural area. For example, political actors were more directly involved in the follow-up process in order to ensure that the strategy would become a political decision adopted by the city council and as such more binding.

Therefore, during the process, improved cooperation methods and more effective approaches to adaptation management were jointly developed and put into practice. Close networking and an approach to knowledge management focused on disseminators within the region, fostered trust between the protagonists and created efficient working, coordination and decision-making structures. This in turn paved the way for continued development and the successful implementation of the regional adaptation strategy. Related to the partners, through participative changes and informative exchanges, dynaklim learned a lot during the practical implementation. This was quite an important learning process; the project partners with their different specializations were able to benefit from.

Drivers/ barriers: The project coordinators regarded dynaklim as a very complex project. In 2010, when the coordinator of the Roadmap process joined, there were still 142 tasks to be accomplished. Those were all interlinked and interdependent. The good cooperation of the project coordination team was a precondition for working effectively in the dynaklim network, as well.

The Roadmap process started with envisioning a common future. Three scenarios were developed, that were helpful in building this network. Having this common goal especially proved useful in progressing with the Roadmap, i.e. all actors regarded it as a necessary process and were eager to achieve results.

The main challenge was to motivate actors to participate and form a network. The project ran over a course of five years, which was a rather long timeframe. In order to take up this challenge identifying and involving suitable multipliers was crucial. Yet, to maintain a dynamic interaction and perpetuate the process - in a sense of pursuing the same spirit of cooperation within the actors' own organization - proved to be demanding for the project coordinators.

One of the things the coordinators would have changed in future roadmapping processes for climate change adaptation was the participation of citizens. The possibilities that existed in terms of involving citizens were not fully utilized; reflecting the communication with citizens, they would have made more use of methods such as storytelling, they would have produced more short films and complemented the whole process with dialogue sessions with citizens. The actors experienced and learned that the involvement of citizens had more importance than it was originally assumed.



All in all, the conclusion can be separated in three parts:

- 01 The project treated possible governance actions related to climate protection and adaption.
- 02 The most important issues were reached by the roadmapping process.
- 03 Afterwards these issues were discussed and reflected in relation to regional governance demands.

Governance actions related to climate protection and adaption had primarily a technical and organizational nature. They needed a regional coordination and cooperation, where aims could be developed in bottom-up and top-down processes. During the dynaklim project, the region was made aware of climate adaption; knowledge was implemented to begin climate change projects, which could be seen as extensive preventive climate policies. All this just could be developed during the realization and carrying out of dynaklim, resulting in one of the important parts of the learning process.

### **3. DISCUSSION**

To understand the novelty of dynaklim it has to be taken into consideration that knowledge about the particular impact of climate change on the region was still missing before starting the project. In addition, the knowledge about concrete measures that can be taken did not exist, yet. Due to this, it was quite an important project.

As dynaklim was such a big project, the networking factor has to be discussed quite well and has to be examined in different parts.

Climate change adaptation is a cross-cutting issue affecting a variety of public institutions and actors. Hence, addressing it adequately, it required cooperation between actors who normally did not work together. Moreover, especially practitioners did not understand the potential climate change impacts and did not see the relation to their (institution's) work. Actors who had to work together to implement measures, did not know each other in person. In addition, practitioners did neither have the time nor the financial resources to organize such a forward-looking planning process as established in dynaklim.

Hence, having a look at this part of the networking factor, dynaklim could have been a more cooperative project in sense of a broader overview.

The project's internal personal relationships between people steering dynaklim was a critical factor in determining a temporary promotor or "caretaker" who proceeded the process and successfully involved people over and over again. According to the project coordinators, a project organized in a more segregated manner would not have been that successful, because it would not have increased the level of engagement of a few motivated individuals working closely together. The cooperation was centrally coordinated by the project leader, but the different actual actors also networked among themselves.



This group consisted mainly of experienced practitioners and researchers who were not involved in their organizations' board or coordination of working groups which gave them the freedom to act relatively independent.

The project coordinator's ability to jump back and forth between different types of partners (partners from technical sciences and from social sciences as well as practitioners) and keep them on the same track was also quite important. This ability made it possible to serve the needs of science and research as well as those of the practical application and political framework. So, this part of networking did work quite well, thanks to the project coordinator.

The methods were employed to enhance cooperation and design participative processes in a way that it would become a task-assigning procedure which worked in a solution-oriented manner. Especially the roadmapping brought many aspects together which otherwise would have been addressed separately in research and science, on the one hand, and in practice, on the other hand. Dynaklim helped to inform the different actors and offered a lot of theoretical information, which were afterwards framed by dynaklim on practical issues to guarantee an adaption to climate-related changes. Examples for this were the nine networking workshops, concentrating on different specialisations, connecting scientist and practitioners.

Working according to the motto "networking for the sake of networking is nonsense", the dynaklim network, as well as the platforms and workshops had a task and a goal. This common willingness and collective capacity were seen as major success factors which again is interlinked with the core group's high level of commitment which dripped down to other network partners.

While the level of participation and discussions in dynaklim was remarkable, the region's experience in inter-communal cooperation and exchange dates way back had been pursued in an array of thematic areas: They had this huge conglomeration with thousands of actors in 50 cities including a number of researchers at universities which used the area constantly for cooperation and as a laboratory. Thus, the overall experience with this kind of cooperative approach was positive, i.e. overall actors had been benefitting from the participation. In addition, there was collective knowledge how to behave cooperatively in group processes.

Another success factor was the distribution and assignment of tasks and work packages to different individuals who could create and lead them in a more independent manner.

Related to the involvement of citizens, the actors planned to include them. Activities such as citizen panels should have been organized to involve citizens. These participatory formats should have been organized in a way that they related to the citizens' way of life and were interesting to them. But this did not work; ultimately, the proposal did not address the inclusion of citizens, they were just involved occasionally. While actors thought about measures which demanded civil engagement, such as the protection of basements during floods, they did not initiate any kind of participation process focusing on



citizens. If the general public demanded that action has been taken, there would have been a greater pressure to do so. This general awareness for climate change adaptation ideally had to be an awareness that everyone from administration over business to citizens had to become active. So far action was only required from administration which was far from being the integrated process which was envisioned in dynaklim.

Generally, there was a high exchange of knowledge and important interaction. This also was influenced by the actors' background and high level of competences. As every actor brought a specific knowledge, the project benefited from these extensive facilities.

Related to governance, the importance of regional policy should be mentioned. As dynaklim worked hand in hand with regional policies, there existed a one-way-dependence. On the other hand, being embedded in governance processes was also a benefit for dynaklim.

Unfortunately, a general connection between all regional activities in the German Federal State of North Rhine-Westphalia was not possible. Dynaklim was able to influence regional aims and offered successful structures, but the initiatives, hit by dynaklim, continued being separated projects, different in terms of planning, financing and representation. Therefore, the most important difficulties, which could have been solved through regional climate governance, have not been reached.



## REFERENCES

Birke, M., Schultze, J., Hasse, J. & Rauscher, N. (2014). *Roadmapping: eine Governance-Innovation für den Weg zur klimarobusten und klimakompetenten Region*.

Cormont, P. & Frank, S. (2015). Netzwerk-Governance und Projektförderung – Widerstreitende Logiken und unterminierte Anpassungsziele. In: J. Knieling und A. Roßnagel (Eds.): *Governance der Klimaanpassung. Akteure, Organisation und Instrumente für Stadt und Region*. München: oekom, pp. 403-417.

Dynaklim (2015). *Project homepage*. Online: <http://www.dynaklim.de/dynaklim2pub/index.html> (last accessed on 03.11.2016)

Dynaklim (2014). *Roadmap 2020 brochure*. Retrieved from:  
[http://www.dynaklim.de/dynaklim2pub/index/3000\\_projektergebnisse/3100\\_roadmap\\_2020.html](http://www.dynaklim.de/dynaklim2pub/index/3000_projektergebnisse/3100_roadmap_2020.html)  
(last accessed on 03.11.2016).

KLIMZUG (2012): *Climate Change in Regions. Adaptation strategies for seven regions*. Retrieved from:  
[http://www.klimzug.de/\\_media/KLIMZUG-broschure\\_english.pdf](http://www.klimzug.de/_media/KLIMZUG-broschure_english.pdf) (last accessed on 03.11.2016)

Schultze, J., Kohlgrüber, M. & Hesse, J. (2014): *Roadmap 2020 – Regionale Klimaanpassung in ausgewählten Themenfeldern*. Dortmund: TU Dortmund Eigenpublikation.