Strengths and Weaknesses of Spatial Language:
Mapping activities as debating instrument in a spatial planning process

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Key words: Interactive policymaking, Mapping, Visualisation, Spatial planning.

ABSTRACT

It seems like a battle for 'space' has broken out in the Netherlands. Since the fifth National Policy Document on Spatial Planning has just been delivered, the topic spatial planning is high on the agenda of many governmental departments, special interest groups and research institutions. In the many discussions on the national policy document, a common call is the need for more *interactive spatial policymaking*. A map can be a helpful instrument in such processes. But how mapping activities can be incorporated in the new ways of interactive policymaking is not yet clear. This paper is part of a research project, which tries to answer how maps, or mapping activities, can be used effectively and efficiently as supportive tool in interactive policymaking. This paper does not aim at a standard recipe how to implement a (participative) mapping process as debating instrument. From the perspective of the policy sciences this is not possible because of the complexity, capriciousness, and situational dependency of a policymaking process. Instead, a broad overview of the role of mapping activities in a policymaking process is given, of which a part is illustrated in a case study.

Roles of mapping activities in interactive policymaking

Seen from the perspective of policy analysis, mapping is a form of modelling, and maps are a type of visual language. A mapping activity is seen as the making and use of spatial visualisations, including the use of tools like GIS. Mapping activities have a role in several phases in policymaking processes. The following phases can be identified: problem formulation, design phase, comparing and ranking of alternatives, final selection, implementation and evaluation. Maps are helpful in the stage of *problem formulation*, in defining the scope of the problem and specifying the 'system'. Later in the process, maps can be used to visualise spatial criteria. Spatial visualisations are important for identifying and designing alternatives in the *design phase* of the policymaking process, by emphasising certain spatial themes and by showing search spaces. Mapping activities can also be undertaken to visualise the (spatial) impacts of plans. In the following phases, maps play a role in the deliberation by showing preferences and communicating planning concepts.

There are also supportive functions of mapping activities across the successive phases. For example, maps can serve as guiding support in the management of the abstraction level during the policymaking process, by using different maps of lower and higher scales. Also, by using maps, the aspect of goal searching in the beginning of the process can be *framed*

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towards a certain direction. Finally, because maps are concrete and graphic, they facilitate the process of fitting different jargons into one language, contributing to collective learning. Above roles of maps are illustrated in a case concerning a sectoral, regional planning process. In the case, a water board made a 'water opportunity map' in an interactive process with municipalities and province. In figure 1, a matrix is spanned by the phases in policymaking and the types of maps made in the case of the water opportunity map. The matrix illustrates the shifting role of mapping activities during the policymaking process.

Figure 1. The changing role of maps in the case of making a water opportunity map

Conclusions

A rudimentary framework is given, that relates several functions of maps to elements of an interactive policymaking process. The case illustrates how the 'funnel-shaped' process of developing a policy vision is framed by mapping activities. The case confirms once more the power of the language of (spatial) images. But by 'flattening' the policy complexity literally and figuratively into a plane of a map, other perspectives with their own points of attention fall outside the line of sight. Examples in the case are the ignoring of financial and landscape aspects. Probably a combination with other types of activities can overcome this weakness. Remarkable in the case is that legend items appear to be a red line in the process. It deserves united attention to formulate them specifically and clearly, and to explain them. The case shows the difficulty of managing the 'interaction' between the policy process and the mapping activities. Further research how this interaction can be approved is recommended.

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1. INTRODUCTION

It seems like a battle for 'space' has broken out in the Netherlands. Since the fifth National Policy Document on Spatial Planning has just been delivered, the topic spatial planning is high on the agenda of many governmental departments, special interest groups and research institutions. The pressure on hectares in the densely populated country is high and still increasing. In the many discussions on the national policy document, a common call is the need for more *interactive* spatial policymaking; more interaction between departments of different sectors (infrastructure, agriculture, recreation, housing etc) and scales (national, regional and local governments), but also with actors from society. This should lead to more efficient policymaking and more integral policy outcomes, is the general line of thought. The involvement of *stakeholders* has implications for the planning process, and also for the use and visualisation of spatial information in this process. From several disciplines issues have been raised that relate to the use of 'spatial visualisations' in interactive spatial policymaking.

Stillwell et al. (1999, p. 18) say: "One recent development that has made a huge impact on the process of planning and its associated information requirements and technology support is the rise of 'interactive' or 'participatory' plan-making." This shows that the Dutch situation is no exception. The authors state these changes have far-reaching consequences for geographical information provision and analysis. Planners have been required to respond to more and more consultations, time horizons have shortened and time pressures have increased. Problems of information overload have been encountered.

In his article "Mapping revisited", editor Boelens (2000) made up the balance of visualisation techniques of planners in the last decade of the twentieth century, through an investigation of six map images in prominent numbers of the (Dutch) magazine "Stedebouw en Ruimtelijke Ordening" (City and area planning). He concluded (translated): "More and more diversity is demonstrated, though we often have to guess to the 'why'. None of the contributions legitimate circumstantially why he or she choose for this representation technique, and not another. The used mapping technique therefore remains untransparent and highly esoteric…. the interrelation between form and content remains without arguments and unspoken, and therefore hardly serves as food for a further disciplinary development of map discourse."

This paper is part of a research project, which tries to answer how maps, or mapping activities, can be used effectively and efficiently as supportive tool in interactive policymaking. Maps have always been used in spatial policymaking; the spatial planning tradition is dominated by the use of maps. But next to the indisputable conclusion that maps have been a helpful tool, a lot has changed over recent years: the technical possibilities of visualisation, the working methods and context of policymakers, and the real world situation

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on which policy should apply. It is the change in policymaking and the way we perceive this, and the craft on supporting policymaking called policy analysis, that formed the basis of this research. By taking this view, also the dynamic aspects of a policy process are included in the analysis of the use of maps in a policymaking process. For example the arrival of new information during a policy process, the framing and reframing of policy issues, and the shift of priorities during the process, all have their influence on the making and use of maps.

This paper does not aim at a standard recipe how to implement a (participative) mapping process as debating instrument. From the perspective of the policy sciences this is not possible because of the complexity, capriciousness, and situational dependency of a policymaking process. Instead, a broad overview of the role of mapping activities in a policymaking process is given, of which a part is illustrated in a case study.

2. MAPPING IN INTERACTIVE POLICYMAKING: A FRAMEWORK

In theories on policymaking, a shift has taken place from more 'rational' policymaking towards a participatory and network approach. In addition to a focus on the substance of a policy field, the insights in the interdependencies and complexities of network relationships and the architecture of a (interactive) process are seen as important object of study (Bruijn and ten Heuvelhof, 1995; Mayer, 1997; Salet and Faludi, 1999; Wildavsky, 1992). At the faculty of Technology, Policy and Management the research program in this field is called 'multi-actor systems: analysis, design and management'.

2.1 Interactive policymaking

The conceptual approach for interactive processes, based on process management and policy analysis notions, contains among others the following notions:
- The problem definition should be formulated and reformulated thoughtfully in interaction with stakeholders, with a possible widening of the goal focus, aiming for a more integral solution and more policy support (Enserink, 2000)
- Decisions should be made 'in the heart' of the variation and selection process, where new policy options are designed, analysed and assessed (Edelenbos, 2000)

The interaction between stakeholders is considered important for several reasons. Through exchange of information, local knowledge can be capitalised. Through participation, (social) values are given a place in the process. And through debate, recognition is gained of constraints and of opportunities for solving the problem (Enserink, 2000).

These notions have led to a wide variety of experiments with interactive policymaking processes. For example, the pilot study "Quickscan Ede" for the passage of the new High Speed Train in the Netherlands through the village Ede was executed with participants. Policy analists ran into the importance and the difficulty of using and making maps. Enserink and Monnikhof (2000): "Visualising new preferred solutions proved harder than voicing concerns and issues. All participants clung to the pre-supposed delineation of the problem; even though we had purposefully taken maps of a much wider area, the suggestions by some

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of the participants for alternative trajectories circumventing the town were jeered at…. One group had difficulty in starting to sketch alternatives and got stuck in endless deliberations."

2.2 Roles of mapping activities

Seen from the perspective of policy analysis, mapping is a form of *modelling,* and maps are a type of *visual language* (Horn, 1998; Kraak and Ormeling, 1987; MacEachren and Kraak, 1997; Monmonnier, 1996; Wood, 1992). In this light, a *mapping activity* is seen as the making and use of spatial visualisations, including the use of tools like GIS. This view is consistent with the definition of a map by Kraak and Ormeling (1987): 'A map is a graphical model of the spatial aspects of reality'. The authors also makes a reference to the means-end character of GIS being a tool to support policy: 'GIS is a computer-supported information system for the gathering, storage, processing and presentation of spatial data within an organisation, which aims to function as a policy supporting instrument'.

Mapping activities, possibly supported by GIS, have a role in several phases in policymaking processes. The following phases can be identified: problem formulation, design phase, comparing and ranking of alternatives, final selection, implementation and evaluation (Miser and Quade, 1985). Maps are helpful in the stage of *problem formulation*, in defining the scope of the problem and specifying the 'system'. They show the boundaries of the problem area, items of interest and administrative boundaries (indicating the spatial range of influence of the governmental parties and interdependencies between them). Later in the process, maps can be used to visualise spatial criteria, for example locations that are suited for a specific activity. Spatial visualisations are important for identifying and designing alternatives in the *design phase* of the policymaking process, by emphasising certain spatial themes (function, hights, soiltype) and by showing search spaces. Mapping activities can also be undertaken to visualise the (spatial) impacts of plans, and visualise indicators and concepts. In the deliberation about *comparing and ranking alternatives*, maps play a role in showing preferences and communicating planning concepts. In the later stages of *final selection* (by politicians and directors) and *implementation* of the policy, maps can be used to communicate (potential) outcomes to the wider public and to monitor progress and effects for *evaluation*.

There are also supportive functions of mapping activities across the successive phases. For example, maps can serve as guiding support in the management of the abstraction level during the policymaking process, by using different maps of lower and higher scales. Also, by using maps, the aspect of goal searching in the beginning of the process can be *framed* towards a certain direction. Finally, because maps are concrete and graphic, they facilitate the process of fitting different jargons into one language, contributing to collective learning.

Above framework is a rudimentary classification of mapping activities according to phases of interactive policymaking. The use of mapping activities in the *problem formulation and design phase* will be illustrated in a case where the policy issue is framed into terms of making a map, see section 3. The case focuses on one specific aspect of above framework: the *framing* part.

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2.3 Maps as framing instruments

One cannot analyse policy problems with many dimensions like social, economic and environmental, without 'catching' the complexities into a certain structure. One way of getting a grip on policy choices is to set up a cost-benefit analysis. This way, the issue is framed into a choice among a set of alternatives according to a simple performance measure, usually formulated in terms of money. A second example is the evaluation of alternatives by using a multi-criteria scorecard. Another way of 'framing' spatially related policy issues is to project the issues on a map. Rein and Law (1999, p. 93) describe frames in a policy analytic context as 'structures that give form to processes of social interaction and communication, as a particular way of representing knowledge, or as an interpretative scheme that bounds and orders a chaotic situation to facilitate interpretation.' This can be also applied to graphic language. For example, a 'picture frame' is a way of framing the more general phenomenon of defining and delimiting what is important to pay attention to and what is not.

Mapping activities clearly frame the policymaking process. This 'flattening' of the policy issues and complexities into a map can be done in different ways. A map can show a *metaphor* of an idea in order to persuade people to act according to a certain principle (Van Eeten, 1999; Zonneveld, 1991). In Dutch spatial planning, examples are the Green Heart, Randstad and Deltametropolis planning concepts. *GIS-technology* supports on logically answering spatial queries, thereby directing the attention for 'what is really out there' in the area. Both metaphors and graphical representations of empirical data can be seen as framing instruments. This will be illustrated in a case concerning a sectoral, regional planning process, in the sector of water management.

3. CASE: WATER OPPORTUNITY MAP

3.1. Background

In the Netherlands, the issue of water management is high on the policy agenda. The threat of climate change and the subsidence of the ground make heavy measures necessary. The urgency of the problem is twofold: heavier rainfall is expected due to climate change, which may cause flooding in parts of the country. This has already happened for a few winters. Another consequence of climate change is dryer summers. The traditional Dutch water system is built and optimized to drain the water away. Nowadays, drinking water companies almost have a lack of water in dry summers. As a principle for solution, has been chosen to retain water within its own area, and to store it locally, before it will be drained away. But these solutions ask for space where the water can be retained and stored. Therefor water management concerns should have a larger impact in spatial planning.

This has resulted in a request from the national government to provinces to draw attention for water in the making of spatial plans. On their turn, the province asked the water boards for their vision on water management in their territory, with this new approach in mind. The water boards were asked for a vision on a more sustainable water system in terms of a 'water opportunity map' (the term 'opportunity map' is not clearly defined). The water board in this

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case started this assignment with the objective to affect spatial planning and also saw it as an opportunity to improve its image as a progressive institute. Therefore, they invited stakeholders in spatial planning (municipalities and province) to join them in the process. The project was framed into a project of making a (number of) map(s). The process as it was actually implemented is visualised in Figure 1.
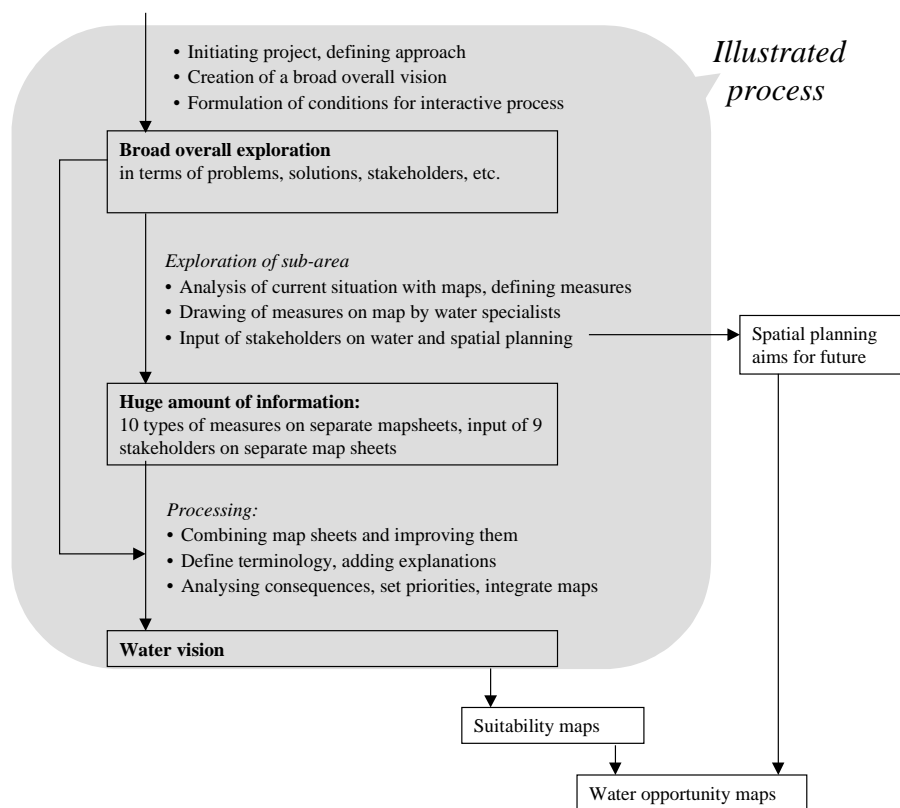

Figure 1. Scheme of the policymaking process of the water vision map

3.2 Internal preparation: table of problems and solutions

The water board had hired a consultant for the project who had made a water opportunity map before. In four internal expert meetings, a preliminary 'internal vision' was developed. As working method, they filled a huge table with text about problems and possible solutions in the water system. They split up the issues in different categories:
- three types of areas, described in terms of characteristics of the water system
- three themes; shortage situation (of water), surplus situation and water quality
- and the categories short and long term.

This resulted in a table like Table 1. The tables made up a structure of issues to be addressed.

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	Bottlenecks in water quality		Solutions in water quality	
	[present]	[future]	[present]	[future]
Reservoir-land	Pollution by point sources	Decrease of point sources?	Clean up sources of drainage	Further cleaning of sources of drainage
Reservoir	Incoming water is immediately polluted or transported to the sea	More need for water in dry periods	Direct incoming water 'from clean to dirty'	Separated flows carrying on and off
Polder	Seeping water /chlorid	…	Retention of clean water	…

Table 1. Example of a table with tactics (measures) for bottlenecks on behalf of water quality

3.3 Exploration maps

Also, the consultant made rough, abstract sketches of the area according to information and discussion of the experts. These sketches showed the first 'policy choice' to be made (see Figure 2): the water now runs trough the area from higher to lower areas. But this way the water runs through the polluting areas first, spreading the dirty water afterwards to clean areas. From perspective of water ecology, this is the wrong order. The project group of the water board liked the idea of the new water circulation. They agreed to follow the new policy principle 'from clean to dirty' where possible, and to explore the consequences. Some indicative calculations were made on amounts of water. This lead to a very rough vision map for the territory of the water board, later called the 'clover-leaf' (not shown), serving as metaphor for the aim for a new circulation.
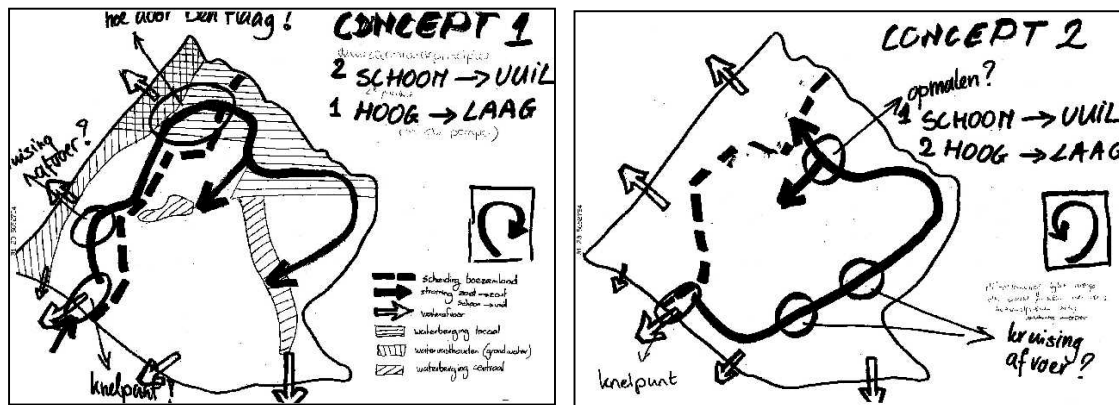

Figure 2. The two sketches of water circulation through the territory. Left: from high to low. Right: from clean to dirty

3.4 Many maps for legend items

Now many items ware mentioned for legend items on the vision map. Most of them were agreed upon, resulting in no less than ten legend items. They varied from 'bottlenecks in circulation' till 'reservoirs for water conservation'. They were not formulated sharply, problems as well as solutions were part of the collection of legend items. Several specialists prepared a map sheet with *search spaces*, for each topic.

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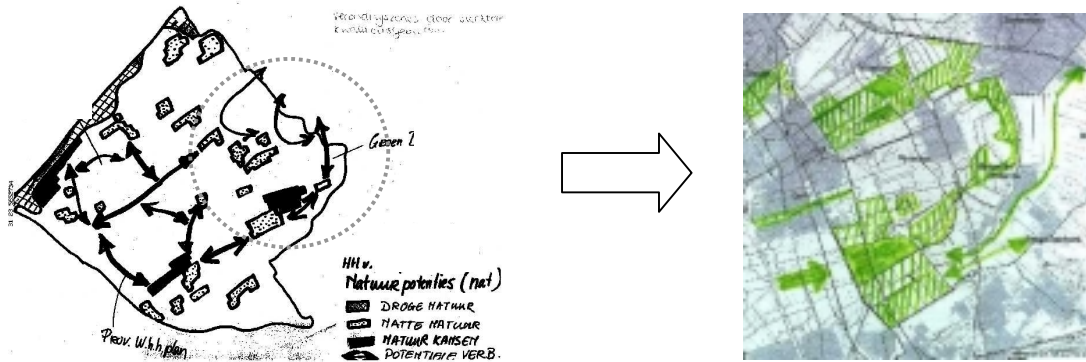
Figure 3. Zooming in for the issue of water related nature.

These maps were merely based on tacit knowledge and expert judgement. The example showed here is on the topic of 'water related nature' (see figure 3). The specialist, an ecologist, had drawn the areas he thought of as *potential areas* for water related nature.

3.5 No attention for nature?

The ecologist argued that the topic of water related nature could be integrated in the topic water quality, because these subjects almost mean the same thing. The map of water quality was worked out and detailed, but more and more suggestions and questions came from the participants. Finally, the ecologist came to the conclusion his assumption was not true.

Figure 4. Left: Separate areas of water quality and water related nature. Middle: GIS overlay of many topics. Right: Vision map on the water quality related issues.

When he then split up the topics, the difference in areas for the two legend items were eminent (figure 4, left). Nature was back on the agenda again. GIS overlays with several other map sheets were made to see where ambitions were conflicting, among them with a map of planned urbanisation programs (figure 4, middle). This resulted in a vision map with

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the title water quality. This map contained separate legend items for ambitions on water quality and nature, now reformulated as 'ecologic pearls' and 'water related nature as secondary occupation' (figure 4, right).

4. ANALYSIS: MAPPING AS GUIDE FOR THE POLICY PROCESS

4.1 From a broad preliminary vision to a concrete final vision

In the beginning the discussion was kept on main lines. The first sketches were made without topographic background. On purpose on a small paper, the territory was divided into four parts, which worked out very well. Once in the sub region, the discussions were focussed on achieving more details and clarifying legend items. Now and then the link with the overall territory was mentioned in the discussion. It was remarkably how strong the analysis and design activities were interwoven. Commonly speaking, the 'abstraction and detailing processes', switching between scales, went smoothly. It must be noted however, that the process was not very efficient, but there were many causes for that, especially organisational developments.

4.2 Legend items

Because the end product of the project was to be a map, the formulation of legend items appeared early in the process. As these items were visualised by expert judgement of specialists, the forming of ideas took place along the way. When the maps were overlaid, the formulation of new legend items enrolled automatically. Although the advisor tried to delay discussions on terminology and graphic design for the latest phase of the project, this remained a returning agenda point. The vagueness of terms and classifications kept room for difference in interpretation, and these came back as questions and points for discussion. This was particularly the case for all legend items and their classifications.

4.3 Shifting role of maps

The mapping activities offer handhold to the process, and at the same time their role changes during the process. In the beginning, only the mayor problems of the tables made in the problem formulation phase (see Table 2) were mapped, on a very broad scale. When 'zooming in' to a sub region, first *descriptive maps* were made to explain the current situation to the consultant and participants. Then followed ten maps with *interpretations of specialists* (expert judgements) of current problem situations and potential areas for measures. These maps led to a discussion on *normative interpretations* (how should the topic look like in the desired future?) which were worked out in several versions, of each topic individually.
In the next step, the maps were *overlaid* to explore conflicts and win-win situations. Finally, these were integrated into an integral vision. These are all changing uses of maps. At the same time, also the character of the maps changed. Along the process, discussions on deviating opinions at the water board got more intense. It appeared that the maps had implicitly gained a higher state of authority. In figure 5, a matrix is spanned by the phases in policymaking of paragraph 2.2 and the types of maps made in the case of the water

opportunity map. The matrix illustrates the shifting role of mapping activities during the policymaking process.

4.4 Losses on behalf of the framing

In the meetings, the focus was mainly on map sheets. The map images dominated, and the story behind the construction of these maps got out of sight. After the broad exploration phase, this focus even pulled away the attention for formulations and interpretations of terms. As a result, the gap between jargons and interpretations of words was very big. Along the process, attention raised for the precise definition of terms and legend items.

The different measures were worked out in parallel on separate map sheets, but the priorities and preferences between them were not clarified at the beginning. This resulted in strong disagreements when the measures had to be integrated, and trade-offs had to be made on the base of the individually optimised solutions.

Other examples of issues that were not part of the discussion are financial aspects and landscape aspects. It could be these subjects were ignored on purpose, but it is not clear why for example impacts on landscape should not be addressed.
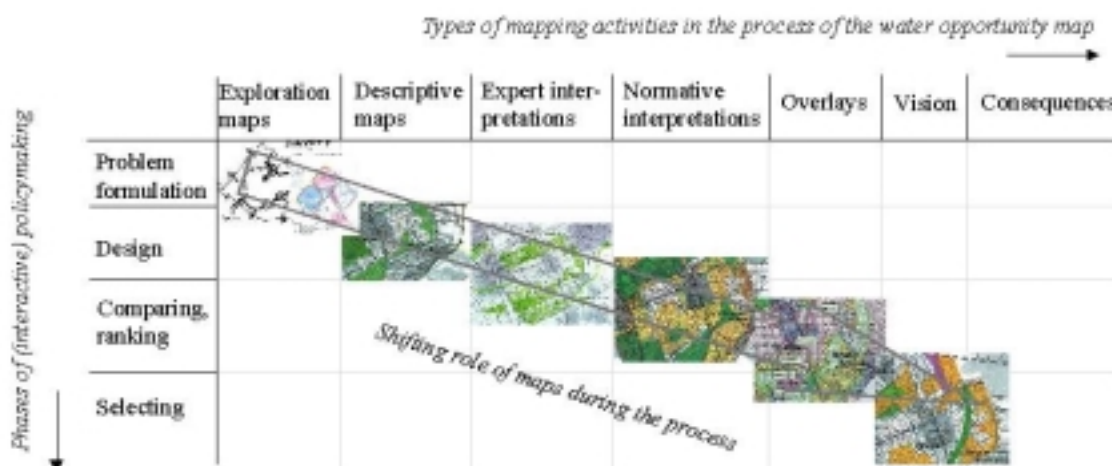

Figure 5. The changing role of maps in the case study

5. CONCLUDING REMARKS

A rudimentary framework is given, that relates several functions of maps to elements of an interactive policymaking process. The case illustrates how the 'funnel-shaped' process of developing a policy vision is framed by mapping activities. The case confirms once more the power of the language of (spatial) images.

But framing an issue can never be free of losses of information, and this is also true for maps. By 'flattening' the policy complexity literally and figuratively into a plane of a map, other perspectives with their own points of attention fall outside the line of sight. Examples in the case are the integration of two policy issues into one legend item, the neglect of early

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attention for priorities between different policy issues and the ignoring of financial and landscape aspects. Probably a combination with other types of activities can overcome this weakness. These could be methods like cost benefit analysis, but a more interactive solution can simply be to walk through the area with the stakeholders, and thinking through thoroughly how the surrounding area should function and look like.

Remarkable in the case is that legend items appear to be a red line in the process. It deserves united attention to formulate them specifically and clearly, and to explain them. They form the kernel of the mapping language.

This case shows an example of using mapping activities as an instrument in an interactive policymaking process. The neglect of priorities between different issues visualised in different maps, mentioned in paragraph 4.4, is an example of the difficulty in managing the 'interaction' between the policy process and the mapping activities. It seems an interesting question how this interaction can be approved. Further research is recommended on the following questions: What tools and methods can be applied to serve this interaction, how should these methods and tools be applied, and what are their limitations.

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BIOGRAPHICAL NOTES

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