ESSENTIALS OF THIS THESIS - ENGLISH SUMMARY

River management projects raise questions

Society becomes more and more complex…

Society becomes more and more complex. To reach goals and implement projects, people and organizations become more and more dependant on each other. Policy fields get intertwined, and actors need each other to get things done. Outspoken en empowered civilians, in an individualized world, are more and more critical towards governments and their plans. There's always debate about these plans somewhere, and a trigger for dispute and resistance.

… and this applies to water management as well…

This applies to water management as well. There are growing demands from an environmental perspective and from the need to involve citizens. System effects of rivers make an integrated approach necessary. There's a growing connection between water management and other policy fields, such as spatial planning, urban development and economy. And, for example, actors like the European Union are participating in water management too, with river basing approaches and ecological guidelines. Finally, there's the influence of the climate change debate.

… which restrains itself from public debate

This makes Dutch water management remarkable: water management is not a topic widely discussed in the public domain. Water management issues hardly ever make headlines. As a topic, water management is often only mentioned in one or two sentences of the annual Queen's speech at the start of the Parliament's year. Within the context of the Dutch elections in 2010, professor Sybe Schaap stated that *'reading the election Party Programs, water management meets little interest'*. Only the Hedwigepolder, with it's recent political and public debate about depoldering or not, is an exception to the rule. As long as there is no thread of flooding, water management is de-politicized. It is becoming more and more complex, but in a relative quiet corner of the public domain.

Recent river projects show the same pattern …

Dutch water management seems a de-politicized matter, and river management is no exception. The dike reinforcements along the rivers Waal and Rhine, and the enlarging of River Maas, which took place in the nineties of the past century, illustrate this. Recent projects, such as the Spatial Key Decision (SKD) *Room for the River* and the deepening of the River Scheldt, have the same de-politicized characteristics. River projects in the Netherlands seem to lead to little public debate and media attention in the last decades.

… but, there is resistance: only local and late

This paints a picture that it's all plain sailing for Dutch river projects: there's quick agreement on the measures, without much debate or polarization. But this is not the full picture. Hundred's of tractors at the Waterboard's office in Apeldoorn because of the SKD *Room for the river* does imply resistance. And the ongoing discussion about depoldering the Hedwigepolder doesn't indicate a de-politicized issue either. Yet, this resistance has two important features: it's late, and it's local. The farmer's protest at Apeldoorn related to legal participation, as government parties already reached an agreement before. And the protest of farmers and people of the province of Zeeland against depoldering the Hedwigepolder arose only after the Netherlands and Flanders reached an agreement and concluded a treaty. In short: in river projects resistance does occur, and polarization does arise. But when it happens, it's local and late: by then agreement about the measures is already reached, and the resistance can't change it.

Explanations for this missing debate in river management …

The absence of debate in river management is striking. The more complex society becomes - with it's abundant dependencies and relations between people, organizations and issues - one would expect more debate and polarization. Especially because river plans are merely based on technical analysis of professionals, and on standards and principals of the National Government. Both of which are established without much public participation.

There are two explanations for this missing debate. First, an important cultural feature of Dutch river management is that 'safety prevails all other issues'. This dominant culture hampers discussions about benefits and necessity of projects, and thus complicates public debate. Furthermore, evaluations of recent projects in river management show that a clever use of a mix of hierarchic ('command and control') and network ('interaction') strategies was a key element of successful planning.

… but the question remains to be answered

Yet the question about the missing debate at river projects remains to be answered. In the recent case of the deepening of River Scheldt safety was not the issue. Nevertheless, there was quick agreement about the course of action. Furthermore, there was no real discussion about the benefits, the necessity or the type of measures. Therefore, the cultural power of safety and the smart mix of strategies do not entirely explain the lack of debate and discussion in river projects.

This leads to the following research questions

This research deals with the contradiction between a more and more complex society on one hand, and a lack of debate at river projects on the other. It researches the next three questions:

1. How does decision making in river management develop? And how can this process be explained?
2. What's the explanation of the fact that actors do not oppose the technical system approach of professionals, which forms the foundation of the decision making process?
3. What kind of interaction occurs between this technical system approach and other actors involved in decision making? What makes this interaction successful?
4. Why is there only resistance at the local level? Why does it happen so late, and why is it so often unsuccessful in changing the decision making?

Helped by these questions, this research aims to deepen theory about the interaction between system approaches, and the actors making decisions based on these approaches.

Research in three river management projects

In the last few decades, river management encounters the rise of the so-called river basin approach: new insights in the system operation of rivers lead to this system approach on a river basin scale. This research looks into three projects in Dutch river management:

1. *Dike relocation at Lent, River Waal*.
   A stand alone project which finally was incorporated into the SKD *Room for the River*;
2. *Bypass Veessen-Wapenveld at River IJssel*,
   Part of the SKD *Room for the River*;
3. *Development-outline of the Scheldt-estuary 2010'*,
   The measure 'Depoldering Hedwigepolder' was part of this outline.

These local projects are embedded in a broad decision-making process on a river-basin scale, or part of the basin (river branch). These projects are studied on the basis of theory about system approaches and actor-approaches, including interaction between both.

A SYSTEM APPROACH IS NECESSARY TO SUPPORT DECISION MAKING …

A river seen as a system

A river and it's catchment can be seen as a constellation of elements, which have a certain arrangement and which interact. Rivers are so-called open systems: influenced by incentives from outside, an open system can develop into a certain direction. People can assign conflicting goals to systems.

Rivers are natural systems, and can be assessed both physically and ecologically. But rivers also are strongly connected with social systems: societies use rivers as means of transport, drinking water, recreation- or waste area. Rivers can be a threat to societies when flooding or draughts occur. Furthermore, the social system intervenes with the ecological and physical

system: people make plans and implement measures. Thus, a river can be seen as a socio-technical system, in which interaction between river en people takes place.

A system is recursive. It can be unraveled into subsystems, but can be part of a larger system too: a 'system of systems'. Boundaries of systems therefore are choices, like a territorial boundary, political boundary, physical boundary, etc. Decision making therefore needs choices about the way a system is assessed. Choices which are debatable: other people can question them.

A system approach can be seen as part of the field of policy analysis. Both are originally technical-rational in their nature. And despite different perspectives which have developed within policy-analysis, policy-analysis essentially still has a rational-analytical nature. Modern approaches use a so-called multiple rationality, in which situations are analysed from different perspectives.

A system approach as procedure and a system approach as a product

A system approach focuses on the connection and interaction between the elements of a system. This approach can be used to facilitate decision making about interventions into the system. A system approach can even be necessary: without a system approach, decisions can be taken which lead to new problems. System approaches make use of system analysis and system models. A system analysis analyses the operation of a system. A system model is a simplified representation of a system.

A system approach can be seen as a procedure, an activity: conducting a system approach. But it can also be seen as the result of this procedure: a description of the system approach, in the form of a report, scheme, model, motivation, backing, etc. This research considers a system approach as *a procedure ánd a description of a system, meant to make the system manageable for decision making about interventions in the system.*

A system approach as an analytical view and a social construction

A system approach can be considered as an 'analytical view' to look at a system. A system approach fits the perspective of rational planning on decision making. Developed by experts, a system approach can lead to centralized decision making. However, a system approach is a social construction too: what is part of a system approach depends on what the developer considers to be relevant. A system approach works in two ways: it has a constructing influence and a communicative influence on a decision-making process. To develop a system approach, making choices is necessary. Doing this, the system approach intertwines with an actor perspective on decision making: a system approach as a way for actors to achieve their own goals.

… BUT ACTORS PLAY A ROLE TOO, AND INTERACT WITH A SYSTEM APPROACH

Actors and networks have their own, different, characteristics

Actors play a role in a decision-making process. Actors have different goals, interests and resources. Perceptions and reputations of actors can differ, as well as the amount of trust they have in each other.

Actors form networks. Networks distinguish themselves by the way perceptions of the actors involved differ, such as perceptions on the problem, solutions, situations and on each other. Networks distinguish themselves by their institutional characteristics too, such as the formal and informal rules of the game they play. For example, networks in river management in the Netherlands are characterized by a strong culture in which safety is much more important than all other aspects of river management. This culture makes a benefits and necessity discussion about safety measures obsolete. Upstream and downstream relations in river basins influence the distribution of resources and dependencies between actors.

Actors act strategically, decision making develops erratic and is hard to predict

There are many stakeholders in river management. They act strategically: with their actions, they aim to realize their goals. Their actions are based on their own interests and anticipate on other actors actions. Actors will use hierarchic strategies to impose their wishes on other actors: command and control. In a network of mutually interdependent actors with different interests, hierarchic strategies are problematic. They lead, for example, to resistance by other actors. Actors also use network-strategies: strategies aimed at realizing their goals and agreement by interaction and negotiation. In a network of mutually interdependent actors with different interests, these strategies are more effective. Because of these different interests, resources and strategies, decision making between actors develops erratic and is hard to predict.

An actor approach supports decision making…

To support decision making by actors, an actor-approach helps: this is an approach *'to visualize actors in network, their own interests, perceptions and means, and with a mutual interaction and interaction with their environment, to support decision making about an intervention.'* Effective strategies to influence decision making can be developed based on an actor-approach.

… and can lead to network management …

An actor approach helps to bring actors to an agreement by interaction and negotiation. With that an actor-approach can lead to network management: a way of management in which an actor tries to reach it's goals by interaction and negotiation.

A system approach and an actor-approach can't be divided, because…

An actor-approach in a complicated system asks for a system approach too. The actor-approach can cause endless lingering of decision making and a compromise which is erroneous in its content: 'negotiated nonsense'. Network management can lead to solutions which underestimate the complexity of the system, especially when it comes to interventions in complicated systems. This can lead to solutions which do not, or only partly, solve the problem or lead to unexpected new problems. In such cases, a system approach is necessary to guarantee the validity of a chosen solution.

Actors use a system approach to achieve their own goals…

Actors in a network act strategically to realize their own goals. Therefore a system approach will also be used by actors to realize these goals. As such we distinguish between the developers of the approach, and the users. The developers make choices to constitute the approach. Users support or question a system approach, depending on their goals.

… and a system approach influences the network of actors

Actors use system approaches to support decision making. This decision making will influence actors and their network. A system approach can function as a hierarchic strategy, can influence the division of resources and dependencies in the network, and reduces the substantial and strategic uncertainties of the network, including the perceptions of actors.

FOUR QUESTIONS, RESEARCHED IN THREE PROJECTS

Rivers are complicated systems. A system approach is used to support decision making in river management. Professionals (experts and public servants) develop this system approach, and subsequently use it in a network of actors. It could be expected that this would lead to strategic behavior of actors: use of a system approach for their own means. Discussion, debate and learning should occur and lead to adjustment of the approach. The system approach should also influence the characteristics of the network of actors.

On the basis of this, decision making in three projects in river management is researched:

1. Dike relocation at Lent, River Waal.
2. Bypass Veessen-Wapenveld at River IJssel,
3. Development-outline Scheldt-estuary 2010',

These projects are analyzed , based on four main questions:

1. Which choices are made to develop the system approach?
2. Who developed the system approach, and why?

3. What were the consequences of this system approach for actors, the network and the investigated solutions?
4. What role played the applied system approach in the decision-making process?

The analysis gave insight in:
1. a comparable sequence of decision making;
2. the strength of the applied system approach, which made speed of, and support for decision making possible;
3. the disadvantages of the applied system approach.

INSIGHT 1: A COMPARABLE SEQUENCE OF DECISION MAKING

The researched projects are different, for example concerning goals, actors, approaches, etc. Still, all projects have a similar sequence of decision making. This sequence has three stages:
1. Development of a system approach by professionals, without interaction with other stakeholders;
2. Rapid agreement (package deal) between actors on the system-level (river basin level), with local actors (such as municipalities, farmers and inhabitants) getting involved in a later stage of the process;
3. Formal ratification of this package deal in Parliament (final decision), with fierce discussion and resistance at local actors, including delaying final decision making.

Figure 42: *Schematic representation of the sequence of decision making*

The causes of this comparable sequence

This comparable sequence of decision making has the following causes:
1. The absence of a public discussion about the benefits and necessity of measures makes it feasible to develop the system approach within the small circle of professionals. Involving other stakeholders is not necessary.
2. Despite the fact that the applied system approach is debatable and stakeholders are not involved in developing it, rapid agreement about the measures to be taken develops:
   i. the applied system approach offers (just) enough room for actors with interests at a system-level to come to an agreement. At the same time, it doesn't offer too much room either. This would require the involvement of more stakeholders, as well as the linking of more interests. It would also require a discussion about benefits and necessity of measures.

   ii. there are so few local actors where measures are taken, that they can't constitute a substantial opposite-coalition.
3. The decision stands firm in Parliament, because adjusting the package deal…
   i. is not in favor of most actors;
   ii. requires adjustment of the underlying system approach;
   iii. and therefore would lead to the need to go through the decision making process again, in order to agree on a new package deal.
4. Decision making in Parliament therefore only leads to:
   i. exchange of (known) views of advocates and opponents of the decision, without adjustments (a dialogue of the deaf);
   ii. polarization between national government and local opponents;
   iii. forcing approval of the final decision by the cabinet and ministries, and 'catch as catch can' with fierce resistance by the "losers".

Actors don't argue the system approach, and that is striking…

In the researched projects professionals develop the system approach. Stakeholders are not involved. From a theoretical point of view, such an approach could be expected to be problematic. Actors have different interests and goals. They also have different perceptions of problems and of desirable solutions. Therefore, actors could be expected to behave strategically and question the applied system approach. This would lead to further debate, resistance and adjustment of the system approach, which then would lead to delaying decision making about the project. However, in the researched projects this debate does not take place. In all cases the system approach survives the decision-making process nearly unchanged. And actors quickly reach agreement about the measures to be taken. This is the opposite of what theoretically might be expected.

INSIGHT 2: THE STRENGTH OF THE SYSTEM APPROACH

Characteristics of a system approach which makes quick decision making possible

The remarkable sequence of decision making thus raises questions: what explains the strength of the applied system approach? How come actors don't question the system approach, or its outcomes? It looks like the applied system approach has *binding* power and *constructing* power.

The binding power of the applied system approach

The binding power of the system approach has four characteristics:

1. The system approach is robust in theory and policy discourse. The approach fits current scientific insights and ongoing policy discussions. Therefore, stakeholders have no reason to discuss the system approach.

2. The system approach is made understandable and simple, so that a level-playing field for actors is created: every actor seems to have equal opportunities in the decision making process. This level-playing field diminishes the unequal division of knowledge between actors.
3. Actors internalize the system approach, and barely criticize it. The internalization is made possible by four causes, which reinforce themselves. First, the application of the system approach is developed together with the stakeholders. Second, the system approach has (just) enough room to come to a package deal. Third, actors can play with the system approach, and therefore get acquainted with it. Finally, because actors are involved in the application and can play with the system approach, they learn about the system. Because of this combination of 'involvement' + 'room' + 'play' and 'learning' stakeholders internalize the system approach and therefore have less incentives to question the approach. They even will defend the system approach.
4. Invisible uncertainties, originating from the complicated system and extrapolation, don't hinder decision making. Actors accept the simplifications within the system approach, and have no reason to question these uncertainties.

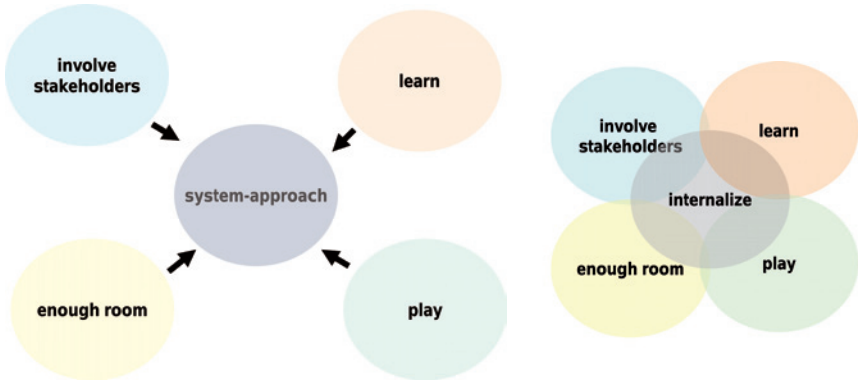

Figure 43: *Internalization of the applied system approach is made possible when stakeholders are involved, the approach has enough room, stakeholders can play and stakeholders can learn.*

The constructing power of the applied system approach

The applied system approach has constructing powers too. This power has four characteristics:

1. The system approach reduces strategic and institutional characteristics. By means of the system approach, all stakeholders act with the same content and possible solutions. The playing field is demarcated and transparent, and stimulates the development of trust between actors.

2. The system approach only leads to a limited amount of potential local losers. This diminishes the necessity to involve all actors from the beginning.
3. The system approach cascades the decision making with a growing support by stakeholders. The decision making process cascades in three steps, and at every step more support for the system approach from the stakeholders increases.
4. The loss of the, limited amount of, local actors only becomes visible at the end of the decision-making process. The package deal is then already agreed upon, and therefore inescapable.

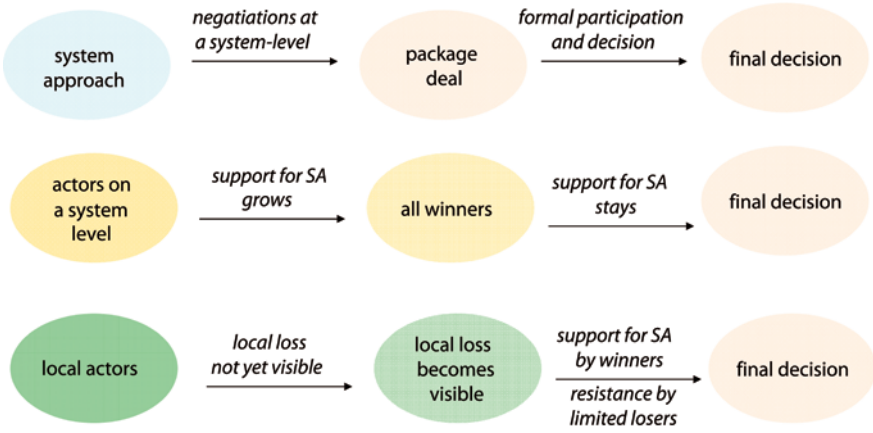

Figure 44: *The constructing impact of the applied system approach (SA)*

INSIGHT 3: THE APPLIED SYSTEM APPROACH HAS DISADVANTAGES

The strength of the system approach has a couple of disadvantages too. Local involvement is difficult, and leads to delay in de final stage. In addition, because of the success of the system approach, the need to put different, alternative, system approaches on the agenda, is missing. This can keep alternative and interesting solutions out of sight.

Local involvement is difficult: late involvement, loss is only visible at the end.
Involvement of local actors is limited, in numbers, as well as intensity, role and moment of involvement. Involvement of local actors at the level of a system approach is difficult because of the number of local actors involved. Representation by one actor is hard, and not necessary to come to an agreement. Most local actors only get involved at the end of the decision-making process, after actors reached an agreement about a package deal. It's only then that a limited number of local losers start questioning the outcome and develop resistance. In the end, these local losers only discuss the boundaries of the system approach, some of the starting points and the investigated solutions.

This difficult involvement of local actors (late involvement, loss only visible at the end) makes internalization of the applied system approach by local actors hard, introduces extra resistance, harms reputations and diminishes chances of cross-coalition learning and enrichment of the decision-making process. In all cases local losers are not capable to stop or change the package deal made at a system approach level.

No necessity to put alternative system approaches on the agenda.
Because of the success of the applied system approach stakeholders have no urge to open up alternative approaches. As a result, promising alternative solutions may stay out of sight.

A SYSTEM APPROACH OF PROFESSIONALS WHICH ENSURES SPEED AND SUPPORT

As said earlier: Dutch water management seems to be a de-politicized matter. There's hardly any debate, resistance and polarization, despite the growing complexity in society. While making plans, resistance develops, but only at the local level and late in the game: the decision has already been made by then. Despite involving stakeholders in making plans, river management still has a centralist and technocratic nature. Given this nature, the absence of debate and resistance at river projects in a more and more complex society, is strange.

There are explanations about this lack of debate, such as the cultural strength of safety in the Dutch policy debate, and smart use of hierarchic as well as network strategies by actors. However, they do not sufficiently explain the fact that there is no debate. An additional explanation is found in the strength of the applied system approach: the previously presented binding and constructing characteristics of the system approach. Because of these characteristics, stakeholders involved in the process can internalize the system approach, can reach their goals at this system level and have no urge to question the system approach. Because of the constructing characteristics there are only a few local losers, whose loss only becomes visible at the end of the decision-making process. Therefore they are not able to stop the system-level coalition and their package deal.

Resistance in decision making therefore only occurs late in the decision making process, with a limited number of local actors. At that moment, these actors aren't able to stop or change the package deal, because:

- they can't form a successful opposition-coalition, as there are only a few of them, and the package deal has too many winners;
- adjustment of the package deal needs adjustment of the initial system approach. In that case, the negotiations between actors at a system level would have to start all over again.

Remaining local losers can only accept their loss, or resist the decisions – but they will not succeed.

Enriched solutions were possible, and visible

One of the characteristics of the successful system approaches is that they have (just) enough room to facilitate a package deal. This characteristic is one of the causes of the rapid agreement between stakeholders about the package deal. The flipside is that potentially better solutions stayed out of sight. Maybe they would have been taken into consideration, if:

1. alternative system approaches, with different choices, would have been considered;
2. the applied system approach would have had more room for solutions;
3. linking goals within the system approach was applied more (issue-linking).

Problematic local involvement: but is this really a problem?

Involvement of local actors is problematic, but is this a bad thing? Actors make a valid decision in all three projects, supported by most of the stakeholders. From this perspective, the problematic nature of local involvement doesn't seem troublesome: the content of the chosen solutions are well justified and offer opportunities for municipalities, inhabitants and farmers. Government compensates those who are affected by the measures: they are legally protected. Everybody has had a formal chance to share their view. So, it's not only a decision with support from most stakeholders, but it's a legitimate decision.

Yet, a critical comment can be made. Local resistance can be that fierce that the question can be raised if this should be avoided. Local relationships are harmed, with only polarization and mistrust left. Maybe there are other solutions, which do more justice to local needs and opportunities? Finally, due to the polarization and mistrust, problems can arise while implementing the measures, or while developing new plans.

Does the system approach determine the final solution?

In the researched projects the applied system approach significantly influences the decision-making process. The choices to relocate the dike, plan a by-pass and to depolder are the result of the interaction between the system approach and the policy discourse. For example, the choice to pinpoint the maximum discharge on the River Rhine at 18.000 m^3/s had a big influence on the final choice of the measures at Lent and Veessen-Wapenveld. And the system approach of the River Scheldt inevitably leads to depoldering as the best option. This begs the question to which extent the system approach determines the final solution. Though this influence seems relevant and substantial, this doesn't seem to be problematic - given the fact that these final solutions are valid and supported. It's just that potentially better solutions have not been included in the decision-making process.

Further thinking about the interaction between actors and a system approach

The applied system approaches in river management construct the decision making process. Decision making occurs:

1. at two levels (at the system-level and at the local level), with a limited amount of local losers;
2. with room for solutions which is (just) big enough to come to an agreement at a system-level.

There are some classifications of system approaches. System approaches can be distinguished on the basis of style, function or type of decision-making process. This research raises the question how a system approach would have constructed the decision making process if it's characteristics had been different. For example if the number of local losers would have been bigger. Or had the room for solutions been too small to reach an agreement on a system-level. Based on these characteristics, a additional classification of a system approach can be developed, based on its constructing power. This classification can be based on:

1. the degree of multi-level decision making;
2. the number of local losers;
3. the moment at which this loss becomes visible;
4. the room for solutions.

This classification can give an indication about the degree in which a system approach facilitates rapid decision making and support for the decision. And by that: which strategies will more or less effective.

So: what determines the success of decision making in complicated systems?

The degree in which speed and support develop in decision making processes in complicated systems, results from:

- the ***sense of urgency*** of stakeholders at the system-level (absence or not of a discussion about benefits and necessity of measures);
- the ***binding and constructing strength*** of a system approach. A classification as described above can help to analyze this strength;
- ***smart use*** of hierarchic as well as network interventions.