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RESEARCH ARTICLE

Deliberate stakeholder engagement: a framework of considerations for integrated asset management of water utilities

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ABSTRACT

The importance of stakeholder engagement in asset management is widely accepted and emphasised. Nonetheless, in asset management practice, stakeholder engagement is still often applied in an unsystematised and ad hoc manner. By proposing a framework of considerations for the deliberate design of stakeholder engagement, this study aims to contribute to the realisation of integrated asset management by offering a means to explicate the often implicit considerations regarding stakeholder engagement. By providing a conceptual exploration, as well as an analysis of three asset management cases in the Netherlands, this article provides building blocks for deliberate stakeholder engagement, guided by consideration of the mission, local context, and available time. Taking the daily reality of asset managers as a reference, this study develops a synthesis between literature on stakeholder engagement and asset management, hereby showing that both material and relational considerations should be made deliberately in all phases of an asset management project.

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Stakeholder engagement; Integrated asset management; water utilities; public participation; infrastructure development

1. Introduction

Contemporary dynamics, such as urbanisation and climate change, as well as increasing system complexity, have been challenging asset management for water utilities over the last decades (Meuleman, Cirkel, and Zwolsman 2007; Van Loon et al. 2017). Within the field of drinking water, pipes, pumps, treatment facilities, and other aspects composing the infrastructure network, often dependent on each other in their efficacy, and demand continuous attention as they cannot be renewed or refurbished all at once, if only because of their different lifespans (Alegre et al. 2013). Indeed, the constant and coordinated refurbishment of an ageing water supply network is a key challenge for the investment decisions of every water utility (Vieira et al. 2020). These integrated asset management decision-making capabilities are necessary to systematically and continuously optimise the service performance level, collect and use asset information for life cycle costs evaluations, risk management and development of long-term strategies that can anticipate and adapt to changing conditions (Almeida et al. 2021). Moreover, broader social developments, such as higher health and safety standards play an increasingly important role in this consideration of performance, risks, and costs of asset management (Konstantakos, Chountalas, and Magoutas 2019).

To better cope with these complex dynamics and uncertainties, the importance of enhancing stakeholder engagement in asset management is increasingly recognised in both literature (Roovers and Van Buuren 2016) and practice (The Institute Of Asset Management 2015; Koop, Bouziotas, and Beuken 2020; OECD 2015). As described later, motivations for engaging stakeholders in asset management range from improving service delivery, enhancing customer satisfaction and legitimacy, facilitating implementation, as well as anticipating legal obstructions and delays. When related specifically to water infrastructure, the Organisation for Economic Co-operation and Development (OECD 2015) lists stakeholder engagement to be one of the main pillars of effective and efficient water policy. Moreover, the ISO-55001 requirement (clause 4.2) states that asset management organisations, such as drinking water utilities, should determine which stakeholders are important and map their demands and expectations, as part of their accreditation of effective and well-implemented asset management. Hence, working more closely with stakeholders seems indispensable for ensuring the delivery of high-quality drinking water at all times.

Although drinking water utilities in Western Europe increasingly recognise the more integrated nature of asset management – requiring deliberate stakeholder engagement to ensure the integration of different perspectives of the problem and solution of water utility issues (The Institute Of Asset Management 2019; Koop, Bouziotas, and Beuken 2020) – systematic and deliberate approaches are to this end not yet prevalent. Indeed, even if water utilities often have decades of experience with aligning asset performance, risks, costs and goals such as efficiency (Alegre et al. 2013), the tools and systems applied for stakeholder management tend to be less well defined and consistently applied (Bergsma, Büscher, and Schalkwijk 2016; Scholten et al. 2014). To be beneficial for society as a whole, asset management traditionally aims to deliver safe and high-quality water at an affordable price, a task that was, is and will remain of crucial importance, yet with little consideration for local stakeholders and functions

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(Lienert, Schnetzer, and Ingold 2013; Roovers and Van Buuren 2016). As a result, asset management decision-making still frequently seems to be dominated by technical and data-driven considerations (Van Riel et al. 2016), whereas their stakeholder management is often based on more ad hoc considerations, custom or immediate knowledge requests, leaving open the opportunity for, or impression of, arbitrariness and personal preference. Although one could argue that this approach may still seem sufficient for one-dimensional sectoral projects, basing asset management solely on technical asset considerations is sub-optimal at best, and does not always fit the reality of complex projects (e.g. Alegre et al. 2013, Akhmouch and Clavreul, 2016; Almeida et al. 2022; The Institute Of Asset Management 2019; Van Riel et al. 2016). Accordingly, we take the position that asset management projects do require social and institutional considerations through deliberate stakeholder engagement. And, although the ISO guidelines provide valuable direction in this regard (The Institute of Asset Management 2019), they do not offer a readily applicable approach for water utilities to systemically structure their stakeholder engagement in different cases and in different phases of a project. Hence, there is a rising demand for a more systematic approach beyond operational applications, focussing also on the tactical and strategic level of stakeholder engagement (e.g. Beuken et al. 2019; PWN 2018; Vitens 2019).

To allow for the realisation of integrated asset management and deliberate stakeholder engagement, this study primarily builds upon the knowledge and insights developed in the environmental governance literature. For the last decades, this field of study has focussed on the steering of developments in society to tackle environmental issues, including many participatory forms (e.g. Glucker et al. 2013; Uittenbroek et al. 2019). As such, aiming to develop and apply a more systemic and deliberate approach to integrated stakeholder engagement, this paper draws inspiration from this field and applies it to asset management, with the aim of enriching asset management literature.

By proposing a framework of considerations for the deliberate design of stakeholder engagement, this study aims to contribute to the realisation of *integrated asset management*, a systemic ambition formulated by the Dutch and Flemish drinking water utilities within their joint research program (Brouwer, Büscher, and Hessels 2018). They define integrated asset management as *asset management that aspires comprehensive decision-making, whereby the concept integrated embodies (i) the full drinking water supply chain from source to tap, (ii) the full lifespan of assets and (iii) decision-making process from developing strategies to implementation within the societal context* (Koop, Bouziotas, and Beuken 2020). Stakeholder wishes and needs are relevant for each of these three aspects of 'integration' (Koop, Bouziotas, and Beuken 2020).

To explore the practical applicability of the proposed framework of considerations for deliberate stakeholder engagement in asset management, three cases in the Netherlands are analysed representing the main asset management areas for drinking water utilities: a groundwater extraction; a distribution pipeline; and a water treatment project. Dutch drinking water utilities form an interesting case to analyse stakeholder engagement due to their ambition regarding the realisation of integrated approaches. Moreover, expected institutional developments also substantiate the selection of these Dutch cases, as a new environmental planning act will emphasise on and require pro-active interaction with stakeholders within the region. Consequently, the interest of a drinking water utility in The Netherlands is increasingly becoming merely 'one of the things' within a broader integral area assessment, rather than a sectoral planning topic (Van Loon et al. 2017). This development is a reality for many utilities within Europe, North America and beyond. Therefore, this study may provide insights with significant value in other high-density urbanised areas that (will) face challenges of refurbishing an aging infrastructure in a more complex and decentralised decision-making process that needs to account for a plurality of stakeholder interests and demands.

Using these cases, the application of the proposed framework is illustrated and explored, developing building blocks for deliberate stakeholder engagement in asset management projects and validating the proposed conceptual approach.

The remainder of this paper proceeds as follows. Section 2 briefly discusses the relevant literature regarding stakeholder engagement. This is followed by Section 3, describing the research design. In Section 4 the framework of considerations for stakeholder engagement in asset management projects is presented, followed by the analysis and discussion of three cases. Section 5 presents the conclusion and implications for both research and practice.

2. Rationales for stakeholder engagement

The environmental governance literature has long recognised that stakeholder participation can have various benefits and/or objectives. For instance, it is argued that it can enhance societal support and social learning, provide local and tacit knowledge, resolve conflicts and improve the overall quality of decision-making (Dreijerink, Kruize, and Kamp 2009; Koop et al. 2017; Roovers and Van Buuren 2016; Uittenbroek et al. 2019). Yet, in everyday practice, the design of this participation differs substantially and is neither always deliberate nor effective (Uittenbroek et al. 2019). Whilst the importance of stakeholder participation is discussed frequently (Dreijerink, Kruize, and Kamp 2009) and practice is often evaluated using concepts such as leadership (Van Aalderen and Horlings 2020), path-dependency (Dooms, Verbeke, and Haezendonck 2013), or place-based development (George and Reed 2017), most literature offers limited practical guidance on how to structure a stakeholder engagement process. A notable exception in this regard is the work of Uittenbroek et al. (2019), which builds on the work of Glucker et al. (2013). They noticed that scholarly and practical debates about stakeholder engagement are often fragmented and implicit about the rationales underlying participation. In response, they structured these into three rationales for participation: (i) the normative rationale striving for the involvement of stakeholders who have a stake in the matter, as they, according to this rationale, should also have a say in the matter. The normative rationale captures the objectives related to empowering stakeholders to share and develop their interests and involving stakeholders who have a stake in the matter; (ii) the substantive rationale, stiving for the

involvement of stakeholders as they can contribute to the solving of problems. This rationale is linking to the considerations on incorporating local and value-based knowledge; and (iii) the instrumental rationale, striving for the involvement of stakeholders to ensure support, hereby aiming to avoid and resolve conflict and generate legitimacy (Glucker et al. 2013; Uittenbroek et al. 2019). Accordingly, Uittenbroek et al. (2019) apply these rationales to inform three main questions to guide a deliberate and informed design of a stakeholder engagement process: 'who', 'when' and 'how'.

Although these rationales provide valuable insights into the motivations actors can have to initiate engagement processes, in this paper we take the position that for water utilities often another question seems to prevail the deliberation of these rationales for participation. Since asset management at utilities is typically grounded in material considerations regarding the functioning and replacement of assets, these actors commonly seem to have a different starting point when initiating stakeholder engagement processes, stemming from their needs regarding the realisation of physical assets. As such, stakeholder engagement is often regarded as an option, and not a starting point. Acknowledging the importance of aligning to the daily reality of practitioners' experience, and accordingly to the material considerations of utility asset managers, we therefore propose an additional 'what-for' question, exploring organisations motives for stakeholder engagement in an asset management context.

3. Methods

3.1. Research design

To allow for the specification of deliberations regarding stakeholder engagement for an asset management context, we have looked into the different motives for the development of assets. By doing so, we conceptualised a framework of considerations, which is meant as a tool to explore the main motives for stakeholder engagement in asset management projects (*what-for)*, allowing for the deliberate design of the following stakeholder process.

To elucidate the practicality of this study's proposed framework, we conducted an ex-post analysis through an single-embedded case design in the Netherlands. Three recent asset management projects were chosen as case studies. The analyses of these three cases allowed us to examine how and to what extent the framework gives voice to the complex reality found in these projects. Although we would have ideally tested the framework in different cases over time, we purposefully choose evaluation through current or completed projects (rather than just initiated) to avoid a Hawthorn effect which is an influence on the process by the researcher or through the study itself.

The context informing our analysis on deliberate stakeholder engagement is the drinking water system in the Netherlands. In the Netherlands, the development of a piped drinking water infrastructure network has started as early as 1853 and at present covers the entire country (Agudelo-Vera et al. 2014). Although this network could be considered mature, it requires constant maintenance and refurbishment, as well as adaptation to changing circumstances such as river and groundwater quality deterioration and availability challenges. Like many urban areas across the globe, Dutch cities face increasing scarcity of space, both above and beneath the earth surface, as well as a growing societal need to include other functions and interests in infrastructure planning (Heeres, Tillema, and Arts 2012). The latter is also increasingly incorporated in Dutch policy, as can be seen in the newly introduced environmental law which emphasises pro-active interaction with stakeholders within the region.

The multiple case-studies apply to recent asset management projects of Dutch water utilities. Each of these case studies is about long-term planning in a context of climate change and socio-demographic changes. The cases each represent the three main asset management areas: (i) exploitation and withdrawal, (ii) treatment and (iii) distribution. The different spatial-temporal features of these asset management areas may shape the type and nature of stakeholder interaction. For each case, we conducted semi-structured interviews with stakeholders, 29 in total (see Table 1). Each of these interviews lasted between 30 and 70 minutes and was executed via MS Teams or phone (a sole interview was conducted in person). Each interview was recorded and summarised directly afterwards. This report was shared with the interviewees for validation of the contents and attention to possible nuances.

In each case, first the drinking water professional involved was interviewed (i.e. the project manager). As part of this interview, we asked the project manager to map all case relevant stakeholders, which we, in consultation, consequently all contacted for an interview. To guarantee that all relevant stakeholders participated in the study, during the interview we also asked each stakeholder whether, in their view, there were parties that had an interest but had no role in the stakeholder

Table 1. Overview of the interviews per case.

Case	Number of interviews	Interviewees
1 – Groundwater extraction site	10	Project leader drinking water utility (two interviews); process manager drinking water utility; geohydrologist province; consultant forestry commission; hydrologist regional water authority; Member AHO[1]; licencing expert municipality; local farmer; representative community interest group
2 – Distribution pipeline	8	Project leader drinking water utility; strategic environment manager drinking water utility (two interviews); public transport project leader municipality; project leader municipality; infrastructure contractor; advisor regional water authority; operational supervisor regional water authority
3 – Water treatment	11	Project manager drinking water utility (two interviews); process support water utility; coordinator environmental impact assessment province; policy officer municipality; project leader municipality; regional environmental service officer; licencing expert DG PWWM[2]; steward forestry commission; Parkschap Biesbosch; local water recreation association

[a]AHO: Agriculture and Horticulture Organisation (In Dutch: Land –en Tuinbouw Organisatie (LTO)).
[b]Directorate-General for Public Works and Water Management (In Dutch: Rijkswaterstaat).

process. This was not the case, indicating that the initial stakeholder inventory included the main stakeholders. After the completion of all interviews, a draft report was drawn up for each case, after which it was submitted for checking any inaccuracies to the project manager concerned in a second and final interview, where there was also room for clarification of any final questions or uncertainties.

3.2. Analysis of the cases

While we first and foremost designed a framework of considerations for the deliberate design of stakeholder engagement for integrated asset management, in our case-study analysis we used key elements of this framework to get a better understanding of how stakeholder management takes shape in everyday practice. More specifically, in our analysis of the asset management cases we drew on both the developed framework and guiding questions presented in the following section to elucidate the most relevant engagement considerations. In doing so, we analytically differentiated between the strategic phase, the tactical phase, and the operational phase. With this, we deviate from the most commonly used phases in governmental planning, which can be summarised as policy-making, policy implementation, policy evaluation and maintenance (Uittenbroek et al. 2019), but instead followed the planning cycle of asset managers. In the *strategic* phase the project is initiated and the intended outcomes are defined (*agenda setting*). In the *tactical* phase a first plan is developed and reviewed by the involved actors (*planning)*. The *operation* phase is focused on implementation and realisation of the project itself (*implementation)*. As such, the developed framework is based on theory, yet refined and validated through interviews with experts linked to asset management projects. In this way the interviews explored the ways in which the methodological approach could fit to the multidisciplinary experts involved in asset management decision-making.

4. Results

4.1. Towards a framework of considerations for deliberate stakeholder engagement

When developing assets, a range of complex considerations is to be made. At least two studies have specifically looked into these considerations. Büscher, Brouwer, and Pieron (2015) studied the role of asset managers in spatial processes, whereas Roovers and Van Buuren (2016) studied the different roles asset managers can take in long-term asset management planning. Both studies discuss asset management roles using two dimensions illustrating the core considerations to be made.

A first dimension determined by Büscher, Brouwer, and Pieron (2015) is a core consideration often driving asset management projects, ranging from a sectorial to an integral approach. While projects can have a strong sectorial scope that is focused on the core business of asset management and drinking water utilities, projects can also have an integral scope, combining several functions and purposes, also beyond the own organisation. In this study, we consider the sectorial-integral dichotomy from a mere material point of view, whereby, sectorial asset management refers to the realisation of narrowly defined organisational goals, such as the security of water supply, water quality or infrastructure refurbishment targets, without considering potential co-benefits with other interests and domains such as water safety, energy provision, recreation, buildings or transportation and energy infrastructure. Integral asset management, on the other hand, refers to the exploitation of different opportunities to link various functions and to create multiple values from assets (Almeida et al. 2022; Van De Kamp et al. 2019). Integral asset management in this sense can both include horizontal and vertical integration. Horizontal integration refers to the integration of the goals of other stakeholders, such as inhabitants, local governments or nature conservation, and vertical integration to the integration of own versatile goals related to, e.g., nature development or energy recovery (Araya and Vasquez 2022; Halfawy 2008).

A second dimension identified by Büscher, Brouwer, and Pieron (2015) is based on the type of attitude an asset organisation takes. They differentiate between proactive and reactive asset management. When planning a new project, they suggest that asset managers can both proactively search for collaboration and link opportunities to integrate new assets into the surrounding areas and functions, or reactively focus on their own functions and tasks and only cooperate with others when deemed necessary (Büscher, Brouwer, and Pieron 2015). The proactive attitude is described as a risk-taking and opportunity-seeking style of asset management. A similar style is described by Roovers and Van Buuren (2016) as explorative asset management, which they define as asset management that is constantly learning and renewing within a network of actors. Reactive asset management, on the other hand, can be linked to what Roovers and Van Buuren (2016) name exploiting asset management. Both reactive and exploiting asset management are characterised by a strong focus on the functioning and optimisation of the utilities' own assets. Interaction with other stakeholders will only occur if it is considered to deliver benefits for the utility.

In this paper, we build on the work of Büscher, Brouwer, and Pieron (2015) and Roovers and Van Buuren (2016) by complementing the previously discussed *material* consideration (sectorial-integral) with a *relational* consideration. In doing so, we not so much focus on the attitude of the organisation, or reactive or explorative styles, but rather propose a focus on the aspired engagement of stakeholders. This relational dimension ranges from a unilateral approach, i.e. an approach taken when the organisation pursues efficient cooperation with a minimal number of partners, to a multilateral approach, when long-term, trusted and productive relationships with other actors are actively pursued. As depicted in Figure 1, when combining these considerations, four archetype motivations arise. These archetypes include 1) a situation in which stakeholders are included in the process to internalize their needs in the development of the utilities' material ambition, yet the ambition is not to realise also their goals (*sectorial-multilateral)*; 2) a situation where stakeholders are included in the process and there is also an active effort to realise their goals into the material realisation of the project, e.g. horizontal integration (*integral-multilateral)*; 3) a situation where the ambition is to realise a multifunctional material project, yet without active involvement of stakeholders in the process or goal

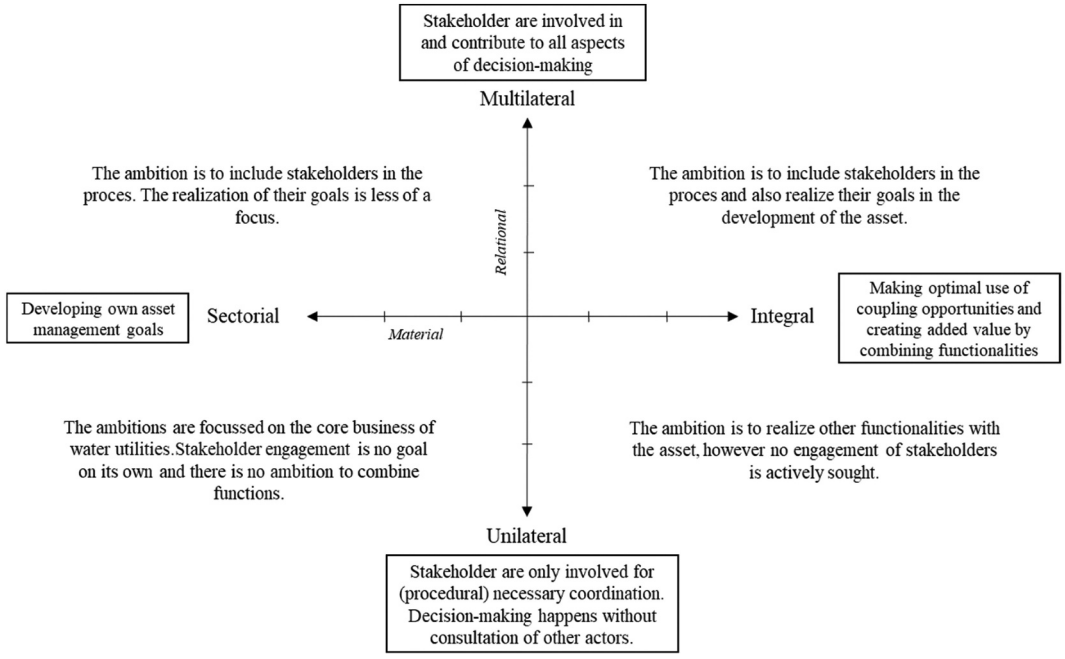

Figure 1. Proposed framework of considerations for the deliberate design of stakeholder engagement in asset management.

development, e.g. vertical integration (*integral-unilateral)*; and finally 4) a situation where a project is focussed on realising sectorial goals and no active involvement of stakeholders is solicited *(sectorial-unilateral)*.

We take the stance that none of the quadrants is preferred over the others per se, however that careful consideration of a utility''s own asset management ambition is needed to allow for deliberate stakeholder engagement. As stated before, the material consideration will traditionally be the starting point for the large majority of asset management projects. However, we aim to explore the hypothesis that the careful consideration of an additional relational consideration, on par with the material consideration, will allow asset organisations, such as water utilities, to further explore their main motives, hereby allowing for deliberate and considerate stakeholder engagement.

As explained, the framework depicted in Figure 1 is primarily meant as an ex-ante tool to deliberately design stakeholder engagement. By reflecting on the positioning on the framework, the dominant motives for stakeholder engagement, as well as the potential focus on both the material and relational dimension can be elucidated. By critically questioning one's own deliberations, the *what-for* question regarding stakeholder engagement can be answered, allowing for further exploration of the *who, when* and *how*. Yet, as the development of an asset management project never evolves in a vacuum, we propose three guiding questions to aid the deliberation of the material and relational considerations: i) what is the mission of the organisation and/or project; ii) what is the local context at hand; and iii) what is the time horizon in which the project is to be finished? Each of these aspects (mission, context and time) can impact the positioning on the two axes and will be discussed in the following sections.

4.1.1. What is the mission?

Management of drinking water assets can behold a wide variety of projects, some more related to the more narrowly defined goals of drinking water utilities than others. Traditionally, drinking water asset organisations focus predominantly on the delivery of uninterrupted high-quality drinking water by managing the asset group's withdrawal (in the case of surface water) or exploitation (in case of groundwater), treatment and distribution. Although these are still the main areas of focus for this sector, water utilities may also aspire a more inter-organisational approach, in which synergies are sought with functions of other actors (Bouziotas et al. 2019). This consideration could be described as applying a more inter-organisational or intra-organisational mission. Roovers and Van Buuren (2016) have maintained that this type of asset management means *getting the best value for money*. What, however, *value* encompasses depends on the ambitions of the asset manager and the type of project. As such, a distinction can be made between an asset organisation focusing on current functions ('closed' asset management) and an asset organisation who is open for suggestions to add other functionalities and values ('open' asset management) (Roovers and Van Buuren 2016). On a more practical level, the addition of other functionalities is often referred to as utilising coupling opportunities. A coupling opportunity refers to a development yielding effects related to different functions, creating a substantive synergy which transcends sectors to complete a task or asset. The realisation of these coupling opportunities resonates with the integral side of the *material* (horizontal) coordinate (see Figure 1). A second, less integral expression of adding additional functions are linking opportunities. In creating these, the focus remains on the development of the specific asset function. The main motives for linking are practical advantages of linking developments, efficiency or financial gains (Koop and Van Leeuwen 2017). This

also includes combining construction work to avoid nuisance or delay (Uyterlinde et al. 2019). Although the distinction between *coupling* and *linking* opportunities can be blurry in practice, the conceptualisation itself can be instrumental in defining and understanding an organisation's mission. As such, the specification of one's mission can aid the positioning of a project on the material and relational axes.

4.1.2. What is the local context?

A second question that may be helpful in determining the position on both the material and relational axe, and accordingly the stakeholder engagement what-for question, relates to the historical context and local circumstances. Historical collaborations and development of an area influence the way asset management works together with other organisations acting in the same context. If an asset manager knows the other stakeholders in an area well and has a long history and experience in cooperating, the likeliness of starting another project together and determining a common agenda, is bigger than if they are used to working alone on very sectorial projects. Moreover, recent or historical conflicts can influence the stakeholder engagement strategy chosen (Araya and Vasquez 2022). In general, having a strong network and being able to build a coalition of players is found to be a main strategy in realising change in interacting with stakeholders (Brouwer and Huitema 2018). Understanding the local historical context also allows for being sensitive for local experiences that might influence the acceptance of certain developments or methods. Consequently, the (historic) relations and networks built in a regional context can be seen as a key determinant for the asset management practiced.

4.1.3. How much time is available?

The third guiding question to aid the deliberation of the material and relational considerations relates to the issue of timing, and more specifically, the time available to finish the project at stake. The cooperation with stakeholders can be costly in terms of time as it requires alignment. Yet, timely inclusion of stakeholders could on the other hand also safe time as less coordination is needed in later stages. Moreover, a project under high time pressure does not always allow for the elaborate inclusion of stakeholders and combination of functions. Connecting this to drinking water specifically, dealing with an emergency, such as a pipe failure, or with a strategic project on the long-term planning of securing the long-term water provision of a province, necessitates a different time frame.

4.2. Stakeholder engagement in asset management projects

4.2.1. Case 1: groundwater extraction site in luxwoude

The first case analysed is the potential realisation of a new groundwater extraction site in Luxwoude, in the Northern Province of Friesland. This can be considered a unique and long-term project for the involved drinking water utility, as new groundwater exploitation sites are only rarely developed. In 2008, a broad exploration has started after which a location near the village of Luxwoude was selected as a potential location for groundwater extraction. After a successful pumping trial, a supervisory committee was established in 2018. At the time of the data collection, the drinking water utility is working on an Environmental Impact Assessment (EIA) and permit application. The implementation and operationalisation phase has not yet started.

4.2.1.1. Mission, context & time. The project has a **mission** with a strong sectorial focus, as developing the exploitation site is the core purpose. This mission was also communicated to the local community and used to gain societal support for the project. '*The water utility belongs to the residents*'. This focus seems successful, as the social importance of the project is recognised by the stakeholders. For example, the interviewed member of the Dutch agricultural and horticultural organisation states that there is awareness of the social importance of drinking water and that it must be extracted somewhere. As such, the sectorial mission seems to resonate with the stakeholders.

Moreover, the process manager indicates that they are consciously careful when it comes to realising coupling opportunities, as a development to which the project is coupled can have an influence on the image of a project. An example in this regard is provided by the process manager as in an earlier project in the region related to gas mining (leading to land subsidence risks) the coupling opportunity led to the image as if coupling opportunities are only realised to 'buy-off' resistance (**context**). In addition, coupling or linking with other goals can also delay the project. In view of the necessity of the project to secure sufficient water supply in the future, this project focuses on extraction solely. The opportunities for coupling have been largely disregarded (sectorial focus in the strategic and tactical phase) as the development of a groundwater exploitation site is a 'policy goal on its own' (process manager). Yet, the process manager emphasises, and other stakeholders share this view, that it is possible that coupling opportunities will come into play during the operationalisation phase, when the pipelines and other assets will be constructed.

In the Luxwoude area, historical problems with other groundwater extractions and related drought damage mainly plays a role when considering the **context**. Interviewees state that these experiences did not cause bad tensions within the current project. Yet, it did make the stakeholders appreciate the value of a well-executed baseline assessment to be able to monitor changes in groundwater levels in the future. In addition, previous developments of natural gas mining in the area also seemed to have influenced the substantiation of the process. Previous gas mining activities had not been communicated extensively with stakeholders in the area, whilst they could cause land subsidence. According to the project leader, these mining activities have demanded clear communication with stakeholders in this particular project.

No **time** pressure has been experienced by the interviewed stakeholders.

4.2.1.2. Material and relational deliberations. The Luxwoude case can be characterised by a focus on the material deliberations in the strategic phase, and a more combined focus on the material and relational deliberation in the tactical phase of the project. Whilst in the strategic phase the focus was

on the (material) mission of the drinking water utility, in the tactical phase also the local acceptance (relational) came into play.

In the strategic phase, a sectorial and more unilateral focus was followed by the water utility, as the project was exclusively coordinated with the province of Friesland and focussed on the selection of a new groundwater extraction location. With the selection of Luxwoude as a potential location, the tactical phase started, involving the inclusion of a broader stakeholder group in the planning process. A core aspect of this was the establishment of a supervisory committee, which can be considered multilateral. The drinking water utility strives for '*a surprise-free EIA and permit application for all parties*' (project leader) and this committee '*aims to identify tensions at an early stage so that no hurdles arise in the formal process*' (process manager). This is also important for the '*non-formal part*'. The supervisory committee is seen as '*an aid in informal planning, but not a replacement*', given that the drinking water utility remains responsible for the final choices (process manager). A process with a supervisory committee without formal control has been chosen as the drinking water utility wants to guarantee its central mission (providing sufficient drinking water). Hereby thus combining a sectorial material focus, with a multilateral relational one.

4.2.2. Case 2: distribution pipeline in katwijk

The second case in this project is the construction of a new major drinking water transport pipeline. This project mainly took place in a main road in the town of Katwijk, located in the south-western province of South Holland. The project is part of an overall ambition of the local drinking water utility to guarantee the transport capacity in this region for the coming years. When the data collection for this study took place, the construction of the pipeline was finished.

4.2.2.1. Mission, context & time. The core **mission** to provide drinking water to the supply area was found to be the main driver of the project. Initially, the utility's focus was mainly on the infrastructural challenge of the new transport pipeline. In the strategic phase, the potential impact on the surroundings and other stakeholders of different asset options was explored by the utility. In doing so, a potential linking opportunity was almost overlooked as the municipality, in close cooperation with the province, was planning a major reorganisation of the same trajectory in light of improving public transport, requiring substantial construction work. Linking both projects not only resulted in substantial financial advantages for both parties '*many of the costs could now be shared*', but also had a clear relational advantage: '*the successive execution of these major activities within the same area [. . .] would have been a major impediment [for actors in its surroundings]*' (project leader). Moreover, by linking the two projects, institutional hurdles, such as cutting down trees and applying for needed permits, could be taken jointly.

Thus, although the different stakeholders report a long history of coordination between the water utility and local partners such as the municipality and the regional water authority (**local context**), the results of our analysis – indicating that a major linking opportunity was only identified in a late state of planning, and therefore almost missed – suggest that, at least at the strategic level, there is ample room for improving this coordination. Once this strategic alignment had taken place, coordination at the more tactical and operational level concerning the coupling and linking of physical activities appears to happen much more easily. The utility's strategic environment manager indicates that, in future projects, it would be beneficial to contact key stakeholders in an earlier phase. For instance, by including stakeholders in the strategic exploration, which is now done mostly internally. This could help to elucidate opportunities and risks associated with a particular solution.

With the unfolding of a possible linking opportunity, **time** pressure arose for this project. As the planning of the reorganisations organised by the municipality and the province were well advanced and had set due dates, the decision to utilize the identified linking opportunity was accelerated as well as the preparations in the tactical phase.

Moving to the operational phase, close cooperation with the municipality and province was no longer deemed needed as they would only start working on their infrastructure project consecutively. However, the pressure to finish the project in time was still there. As a result, the communication with local residents and stakeholders was mostly left to the contractor that performed the construction work. Although, according to the interviewees, this has not let to any issues, this was not always clearly communicated to the residents, causing them to pose questions to the municipality.

In this project, the existing bonds between the drinking water utility and other stakeholders such as the water board clearly benefitted the effective handling of the time pressure and its completion. Indeed, the local context of good relationships and assisting each other when possible was reconfirmed time after time by different interviewees.

4.2.2.2. Material and relational deliberations. The material deliberations, relating to the sectorial mission of the utility, were dominant during the strategic phase of this project. Initially, a unilateral relational approach was followed through which the potential impact on the surroundings and other stakeholders of different asset options was explored by the water utility internally. Yet, identifying a possible linking opportunity pushed the project into the tactical phase and demanded a more multilateral approach. In this phase, both material and relational deliberations became prominent, allowing for the linking opportunity with the municipality to be realised. These considerations caused the project to shift to a more integral and multilateral focus in the tactical phase. As mentioned, this had to be done under a strong time pressure. As the planning of the infrastructural developments organised by the municipality and the province were well advanced and had set due dates, the decision to utilise the identified linking opportunity was accelerated as well as the preparations in the tactical phase. Nonetheless, working together rather than successively, was considered important for both parties in terms of time and costs savings as well as their societal values to serve the inhabitants. For instance, the utility stated that the nuisance for the neighbourhood has been minimised and the area is believed to be '*ready for the next 20 years*'.

Finally, the operational phase was again driven by material deliberations, with a strong focus on the timely completion of the project. Here, again, a more unilateral approach was followed, for which the pending time pressure was the main driver.

4.2.3. Case 3: water treatment – bergsche maas

The third and final case evaluated is the project for the construction of a new river-intake pumping station for the reservoirs of the Water Extraction Company (WEC; named the Brabantse Biesbosch) located in the province of South Holland. The WEC is owned by two drinking water utilities. Yet, as one utility is by far the largest user of the water (97%), this utility is undertaking this project on behalf of the WEC. Plans for increasing the capacity of the treatment plant have been around for some time, but studies on the development hereof were started more recently in 2011. When the data collection for this study took place, the new river-intake pumping station and the piping to the reservoir were constructed, but not yet commissioned and final work was progressing on realising the environmental objectives to minimise the damage caused by the construction work done.

4.2.3.1. Mission, context & time. Despite the fact that the project stems from the drinking water company's primary **mission**: the provision of sufficient drinking water, coordination and integration in the natural environment was considered important from the start. The latter primarily can be explained by the fact that this project is uniquely located within a major nature conservation area (the Biesbosch National Park), known for being the largest freshwater tidal zone in Europe (**local context**). Due to this location, the interests of the forestry commission who is in charge of managing the National Park (i.e. Staatsbosbeheer) and Directorate-General for Public Works and Water Management (i.e. Rijkswaterstaat) were taken into account when choosing the location (tactical phase).

With the start of the tactical phase, a coupling opportunity was soon identified in creating added value through nature conservation. Although the drinking water company has no specific interest in nature conservation (i.e. it is no part of their individual mission), it does align with their strategy related to Corporate Social Responsibility (CSR) objectives. When coupling the work with nature development is convenient, added value for nature can be created. In this particular case, this was done by redesigning a nature area after construction took place. Yet, the project manager explained that the drinking water utility must make a constant consideration between the primary business values of cost-efficiency and organisational image. Stakeholders often want to enter into a partnership with the water utility (as a financier), but this does not always fit within the utility's objectives, as '*the drinking water customer pays for drinking water, not for nature conservation*' [project manager].

Despite the careful planning and consulting regarding this coupling opportunity in the tactical phase, some tension occurred between the forestry commission and the drinking water utility over the realisation of developments within the national park. During the interviews, it became apparent that the realisation of certain nature objectives by the two parties was interpreted differently when coordinating the plans (in the tactical phase), making the actual implementation of the project less *integral* than the forestry commission had expected. Yet, it must be noted that this dispute was resolved and the drinking water utility performed some additional environmental mitigation constructions. According to the project manager, better management of the set expectations might have helped to avoid this.

Moreover, many interviewees state that, despite the fact that the project was initiated on the basis of the utility's own objective, there was a search for coupling and linking opportunities in the tactical phase, mainly with environmental objectives. What is more, several interviewees stated to support the sectorial infrastructure development goals of the drinking water utility as they are deemed necessary to secure the provision of sufficient drinking water. This societal objective is mentioned by several stakeholders as an important factor for their cooperation. Accordingly, a water recreation association who sold land for the development in the project stated '*If we had been approached by a commercial marina, the price we would ask would probably have been much higher. But we also see the social importance of this extraction, so we agreed on a lower price*'.

Time availability was not mentioned as an issue during the interviews. The project manager stated: '*We knew in advance that this was a long permit process. Planning carefully was more important than speed. And in terms of water technology, it is not yet an immediately urgent issue*'.

4.2.3.2. Material and relational deliberations. Also in this project, material deliberations were prominent in the strategic phase, stemming from the water utility's primary mission. Accordingly, the decision for the particular location of the station within in national park was based on a material consideration: the water utility already had a reservoir there and could improve its capacity by developing an additional intake. Yet, in the tactical phase, both the relational and material deliberations were key, as coupling opportunities were actively sought and decided upon. Here an integral and multilateral approach was followed, allowing for the close engagement of stakeholders in the process and the joint formulation of goals for the project.

Finally, the operational phase can be characterised as starting with a sectorial and slightly unilateral focus on the physical development of the inlet station. Yet, after consultation with the forestry commission, this shifted to a more integral and multilateral finalisation of the project. Thus, although the material deliberation dominated the start of the operational phase, all indications are that the dispute led the relational deliberation to become determining for the development.

4.2.4. Overview

Analysing these three cases some overall patterns can be identified. In the strategic phase the asset management projects are dominated by material deliberations whereby relational deliberations remain highly instrumental, and commonly underrepresented. This underscores how the material consideration is a common driver for the initiation of asset management projects, whereas relational considerations are, often without making this deliberation explicit, at best, only considered in the margin. As a result, for instance illustrated in the Katwijk case,

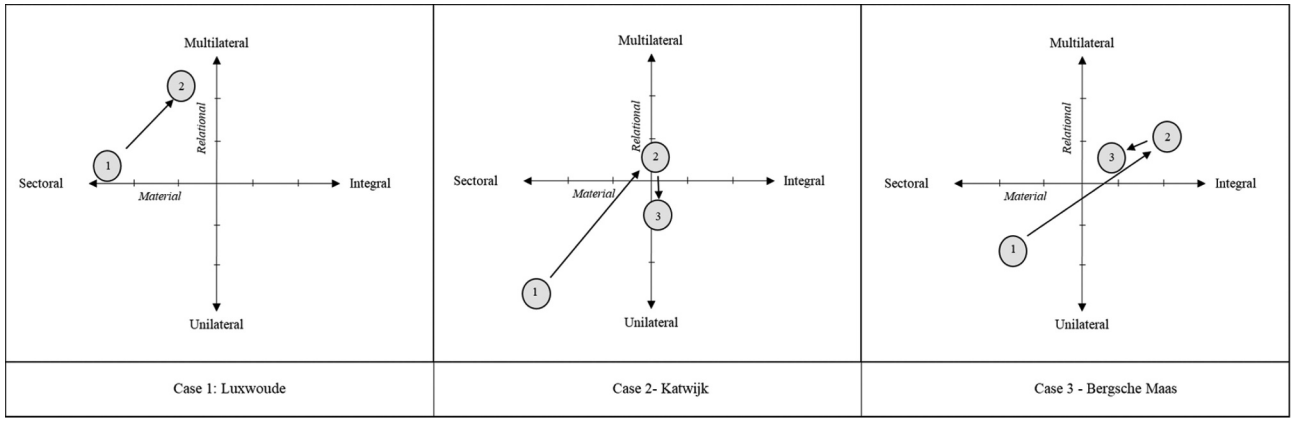

Figure 2. Positioning of the three cases on the framework of considerations. For each case the development over the main phases of the project are visualised. (1) Strategic agenda setting; (2) tactical planning; and (3) implementation and operationalisation.

potential linking or coupling opportunities relating to local contexts are sometimes only identified in a late stage, and could in other instances, obviously, also be completely overlooked.

It is, however, interesting to see that this material dominance in the strategic phase changes during the course of a project. Indeed, the cases in this study reveal a prominence of both the material and relational considerations in the tactical phase, as spatial overlap with other stakeholders and stakes require them to coordinate their development plans. The underlying motivations for these deliberations are different per case. In Luxwoude, the careful development of a baseline assessment (material), as well as the wish to create local support for the project by open communication (relational), show a clear focus on the local context. A similar focus is found in Bergsche Maas, where, due to its locally sensitive nature, the placement of the inlet station was carefully discussed with stakeholders (relational). In the latter case, also the development of environmental functions was discussed in the tactical phase (material), even though this includes a mission beyond that of the drinking water company. In the Katwijk case, on the other hand, time turned out to be the driving force determining the motives for stakeholder engagement, as the ambition to share costs (material) and minimize nuisance (relational) were the main driving factors for stakeholder engagement.

Finally, the developments in the Katwijk and Bergsche Maas cases demonstrate the difficulty to realise all set stakeholders' expectations in the operationalisation and/or implementation phase. In both cases, the operational phase started with a focus on the material dimension. Yet, a dispute with the other actors in the area made the relational deliberation dominant in the Bergsche Maas case.

5. Conclusion and implications

The importance of deliberate stakeholder engagement for effective asset management is emphasised by both the environmental governance literature, and more practical asset management guidelines and studies. Yet, in asset management practice, stakeholder engagement is still often applied in an unsystematised and ad hoc manner which may amplify the influence of cognitive or motivational biases such as omission of important variables or confirmation bias which can lead to selective acquisition and use of evidence in asset management decision-making (Almeida et al. 2022). From the results of the analysis of three asset management cases, in which we used key elements of our framework, in principle primarily intended to facilitate ex-ante deliberate stakeholder engagement, we conclude that (the rationales for) stakeholder engagement not only differ from case to case, which is of no surprise, also differ from one project phase to another.

In short, we have seen that – when looking at projects as a whole from a perspective that integrates both material and relational considerations – stakeholder engagement in asset management is still not necessarily a deliberate matter. At the same time, we see that the degree of deliberation, and thus also the outcome of, and significance for, stakeholder involvement, differs per project phase. This variation is visualised in Figure 2, where the development of these deliberations over the course of the three analysed projects is depicted on the proposed framework.

Based on the empirical exploration and theoretical considerations outlined in this paper, we would like to argue that the realisation of successful asset management projects, even though they often originate from material needs or missions, calls for a deliberate consideration of both the material and relational objectives. In doing so, not only practical impediments, such as missing linking opportunities or mismatching expectations, could be avoided, but more importantly, more deliberate stakeholder management can fuel more well-considered approaches regarding the 'who', 'when' and 'how' questions, as were posed by Uittenbroek et al. (2019).

We have seen that by positioning a project on the two axes and using the posed guiding questions regarding the mission, context and time, provides a valuable means for further exploring the motives for stakeholder engagement. Future research in the domain of stakeholder engagement may benefit from further integrating theoretical insights from stakeholder participation, e.g., regarding stakeholder identification and analysis (André et al. 2012; Reed et al. 2009), with asset management practices. Particularly when this is done while exploring integrated decision-making throughout all three project phases, with the asset manager's day-to-day practice as a starting point. Beyond water utilities, the long-term, multifaceted nature of asset management projects are of a rather similar nature

for projects related to flood risk management, water quality but arguably also for projects related to the energy sector and spatial planning. Applying the proposed framework of considerations allows for the explication of considerations of particular actors within the complex context of integrated asset management, hereby potentially contributing to the handling of complex problems in a spatial context. Nonetheless, the semi-public position of drinking water utilities in the Netherlands might form a specific context in which stakeholder engagement is considered. Wider application of the proposed framework within, for instance, the context of more privatised service providers, might require alterations, e.g. the consideration of alternative guiding questions or more specific questions. Another key point of improvement relates to embedding our methodology into asset management organisational decision-making cycles. This may differ substantially from one utility to another but identifying key lessons can strengthen the meaningful application of the proposed methodology. Moreover, future research about how to explicitly account for cognitive and motivational biases (as described by Almeida et al. 2022) could further strengthen the method and its meaningful application.

We can also derive some practical recommendations from our analysis. First, in order to allow for deliberate stakeholder engagement, we would encourage project designers in the strategic phase to form a varied project team consisting of participants with knowledge of and sensitivity towards developments and in the region. Based on the analysis, we believe the coupling of asset knowledge of different organisations in an early stage of development could allow for efficient and effective coordination of development with other parties. In this process, a deliberate reflection on the mission, local context, from both a material and relational standpoint, would be favorable. This could provide a sense of relevant historic developments in the particular region, as well as insight on more long-term plans of other asset owners. Second, in the tactical phase, we suggest the needs and wishes of stakeholders need to be made explicit and to be externally checked. This is needed as the cases show that the apparent focus on the relational dimension and local context in the tactical phase seems to be not always carefully transitioned to the operational phase. In the cases, this has allowed for a mismatch between the expectations set and the actual development included in the plan made. The assessment of the cases suggests that stakeholders sometimes develop specific expectations regarding the development, which cannot always be met within the scope of the project or the mission of the drinking water utility. Third, given our finding that the transition to the operational phase and the outsourcing of work to contractors demands clear agreements and management of expectations, we suggest a project designer active in the (strategic and) tactical phase actively tests the implementation against the agreements made. This could be done by for instance the strategic environmental manager. Although this is currently probably often meant in such a way, our findings suggest outsourcing requires explicit expectation management to avoid miscommunication or disappointment. Thus, although it might be desirable to focus on the timely realisation of material assets in the operational phase, the local context, as well as the relational dimension, should not be dismissed.

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