WATER SECTOR RISK GOVERNANCE

A compendium of South African & international case studies

Andrew McDonald and Jessica Fell

WATER RESEARCH COMMISSION

TT 668/16

WATER SECTOR RISK GOVERNANCE

A compendium of South African & international case studies

Report to the
Water Research Commission

by

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Water sector risk governance: Implementation guide for South African water utilities (WRC Report No. TT 669/16)

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FOREWORD

Historically, risk in water utilities has been managed through traditional linear approaches and usually focusing on operational risks including water quality and asset failure. Many risks are systemic, interconnected and a function of various complex processes and systems that extend beyond the immediate operating environment. Such diverse risks call for a holistic process that embeds risk decision making in all levels of an organisation, across all functions and encourage collaborative stakeholder engagement. Recently, there has been a move, particularly in the international water sector, towards more iterative frameworks of risk governance rather than just risk management is evident. Risk governance includes a more strategic view of risk and the human and organisational factors; including accountability, collaboration, decision making, sharing of risk and reward, communication, leadership and organisational culture.

The management of risk in the water sector is a legal requirement in South Arica, and as such all organisations have to undertake risk management in some form. However, the majority of water institutions in South Africa have risk management practices that are often just focused on operational activities related to water quality and quantity (such as the Blue Drop, Green Drop and No Drop programmes and water safety and wastewater risk abatement planning). There is limited literature on risk governance practices in the South African water sector. In some cases organisations have developed a managed approach that exceeds regulatory requirements and extends across core business areas.

This compendium of case studies highlights good examples of risk governance in the water sector and is meant to provide some inspiration to water utilities to start their own journey to risk governance excellence.

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Sydney Water – page 16
City of Cape Town – pages 44, 46
IUCMA – page 34
TCTA – page 53
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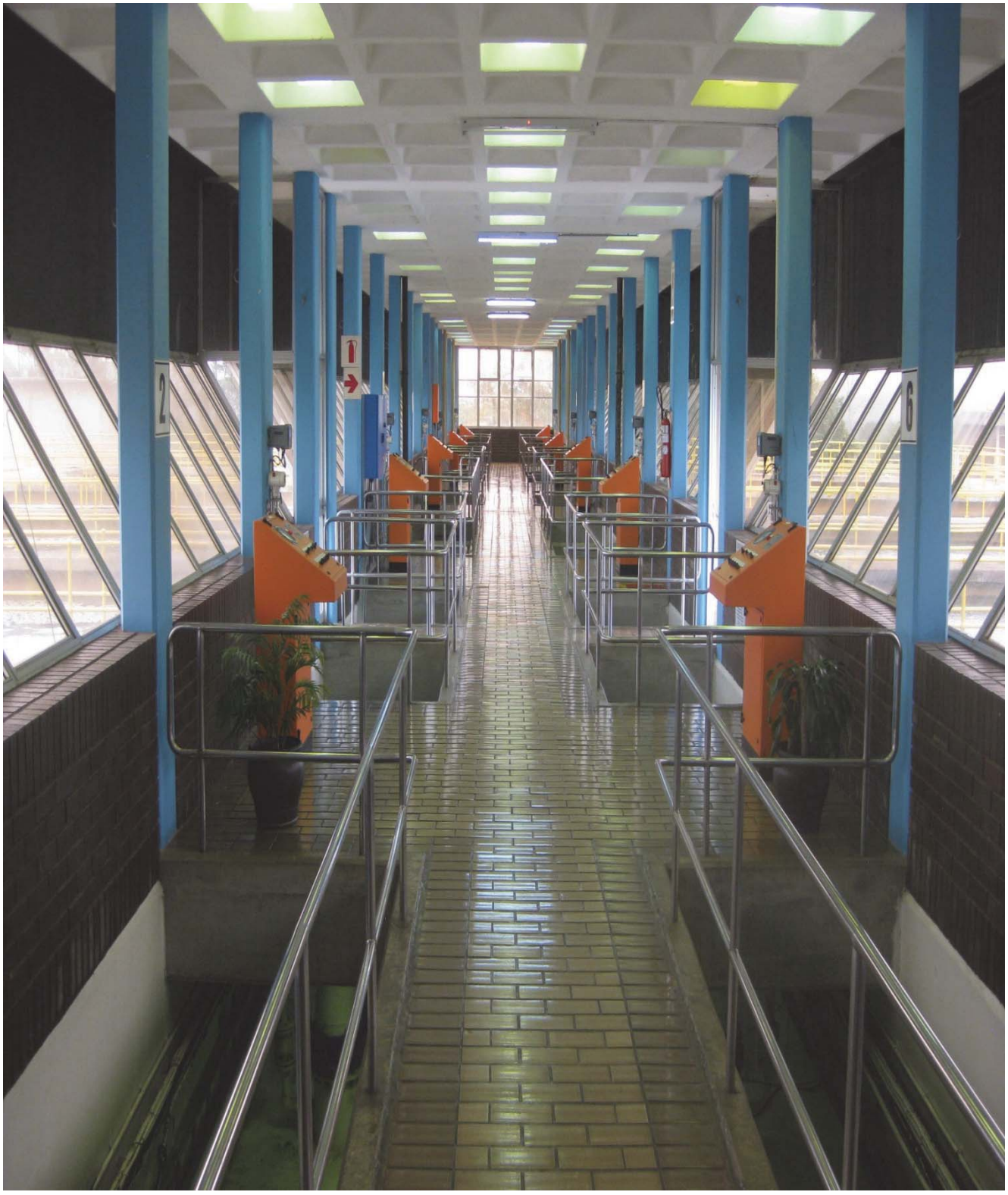
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Introduction

Introduction

The South African water sector is facing many challenges in providing safe and reliable water and sanitation services. The interconnected challenges of population growth, urbanisation, water scarcity, pollution, energy reliability, aging infrastructure, funding constraints and skills shortages are together putting unprecedented pressure on water utilities, water boards and municipalities. In addition, the provision of these services occurs within a constantly changing social, economic, political and environmental context resulting in a complex set of hazards, risks and uncertainties. A formalised capability in risk governance is therefore fast emerging in the water sector as a critical competency to deliver efficient water and sanitation services in an ever changing and uncertain world.

Historically, water utilities have managed risk using traditional linear approaches, with the focus on operational aspects such as water quality. In the last few years this has changed and a move towards frameworks of risk governance rather than just risk management is evident. Such frameworks adopt holistic processes that embed risk decision making in all levels of an organisation, across all functions and encourage collaborative stakeholder engagement. The term “risk governance” is used to stress a more strategic view of risk and the human and organisational factors that affect risk management; including leadership, organisational culture and structure, decision making processes and communication.

Risk governance is concerned with the structuring, organising and coordinating of risk management activities, and therefore the definition is less concerned with operational risk management, although the operational management of risks is still important. The true value of risk governance comes when it is integrated into wider business functions and occurs within the context of good corporate governance. Many water utilities are successfully integrating risk into functions such as strategic planning, operational planning, asset management, process optimisation, financial management, project delivery, climate change, business continuity and supply chain management.

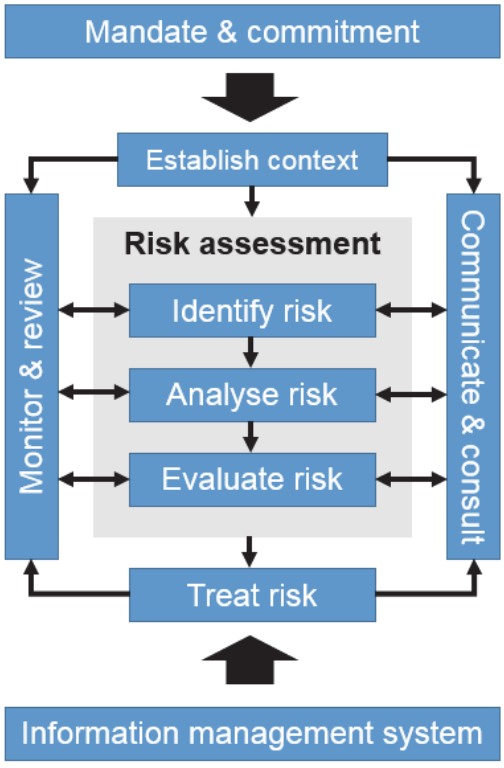
There are various risk governance frameworks that can be used to design and implement better risk management in an organisation. The most widely used are COSO (2004), the International Risk Governance Council (2006) and the International Risk Management Standard ISO31000:2009. The diagram below shows the risk governance framework adapted from ISO31000. The central part of the diagram shows the sequential actions to be taken for identifying, analysing, evaluating and treating risks, all within the context of the organisation. The outer boxes show the other governance processes required.

Introduction

The purpose of this compendium of case studies is to showcase examples of projects, practices and approaches undertaken by a selection of South African and international water utilities, to manage the risks they face in the provision of water and sanitation services. The focus of the case studies is on risk governance; with the case studies highlighting the cross cutting nature of risks within the water sector, and the broader risk governance approaches used.

When done well, risk governance approaches can provide many benefits; including customer, regulatory and investor trust, better operational performance, heightened emergency preparedness, improved financial management and greater employee engagement.

This compendium is a companion report to the Water Research Commission publication entitled "Water sector risk governance: an implementation guide for South African water utilities. Hopefully the guide and this compendium can raise the profile of risk governance and provide some inspiration to water utilities in South Africa about what can and is being done to better manage and govern risks.



Introduction

The case studies are categorised under eight risk governance themes.

Strategic planning

The consideration of risk and opportunity must be part of strategic business planning. Organisational objectives must be defined and the risks of not meeting them (or the opportunities to meet or exceed them) must be identified and managed. Risk appetite and tolerance must be defined by the Board or senior management. There must be overall alignment and line of sight between strategic objectives, risk appetite and tolerance and the tactical day to day risk management activities.

Risk policy & framework

A documented and communicated risk management framework must be in place that defines and sets out the processes, procedures, methodologies, responsibilities, communication and decision making structures for risk management. Risk criteria must be consistently defined. The framework must be underpinned by a risk policy which is endorsed by the Board or senior management. The policy and framework should be informed by an international or local standard or guideline. The policy and the framework must be well communicated, actively implemented and the benefits measured. Risk management must occur within the broader context of good and effective governance. Senior management and political office bearers must have the correct systems and structures in place to enable effective and transparent governance aligned to best practice corporate governance principles. Accountability to all stakeholders must be upheld.

Risk based decision making

Risk must be a central part of all business decision making, at all levels in the organisation. Asset management decision making in particular must find a balance between cost, performance and risk. Decision making structures, responsibilities and procedures need to be defined and implemented. Decision making must use best available and objective information, be inclusive of all stakeholders, transparent, collaborative and result in appropriate outcomes that align to the organisational objectives and risk appetite and tolerance.

Project risk management

The implementation of projects results in change and therefore comes with risks. In particular large value and complex capital schemes have many inherent risks associated with them. Organisations must have appropriate processes, procedures and systems in place to manage risks associated with projects throughout their lifecycle.

People & resources

The people in an organisation are the most important factor determining the success of risk governance. The right people with the right skills, attitude and behaviour need to be in place, they need to be trained to do their jobs and provided with the appropriate resources, tools and remuneration. They need to be well managed by inspirational leaders. Other resources are also required including information management systems and budgets.

Organisational culture & leadership

The culture of an organisation significantly influences risk management. Culture is the collective mind-set, behaviours, pattern of basic assumptions and beliefs that shape and influence actions, interactions and decisions. Leadership plays a critical role in shaping the culture by setting the right tone from the top, leading by example and driving and managing behaviours and performance of teams and individuals. A risk aware and mindful culture must be fostered. Organisations must be flexible to change and willing to improve and therefore need to have suitable change management and continuous improvement structures in place.

Business continuity & emergency preparedness

No matter how good an organisation is regarding risk management, there will always be the occasion when risks materialise. It is important that an organisation has plans in place to manage disrupting events to ensure the continuity of their services, and that the plans are communicated, resourced and all stakeholders know their responsibilities.

Performance management

Monitoring and review of the risk management policy, framework, implementation plan, governance structures and risk systems and activities is necessary to drive continuous improvement and to advance on the journey to excellence. A mix of hard and soft key performance indicators must be identified and monitored through a risk performance management system to ensure all risk activities are adding value and to identify areas for improvement.

YOUR NOTES

Strategic Planning

Risk appetite & tolerance – Umgeni Water, South Africa

Introduction

Umgeni Water is the second largest Water Board in South Africa, located in the KwaZulu-Natal province. They are responsible for the provision of bulk water and wastewater services to a customer base of six local and district municipalities, ultimately serving approximately six million people. The provision of these services occurs within an ever changing economic, social and environmental context, and as such results in various internal and external risks that may affect Umgeni Water's strategic objectives and ability to meet its core mandate. All organisations need to understand how much risk they will be willing to take in the pursuit of their objectives, and therefore how to balance risks with opportunities and rewards. Taking risks without a conscious decision on how much risk the organisation is prepared to take, or can tolerate, could lead to an unfavourable outcome. Umgeni Water has a Risk Appetite and Tolerance Framework, that it uses to inform and guide risk based decision making. They also have a Risk Policy and an Integrated Risk Management (IRM) Framework, of which the Risk Appetite and Tolerance framework is an extension. Risk appetite and tolerance levels have been explicitly defined in the framework.

Population served
6.1 million
Annual capital budget
R1.9 billion
Annual operational budget
R1.8 billion
Water treatment plants
14
Sewage treatment plants
9
No. of staff
996

Risk appetite & tolerance framework

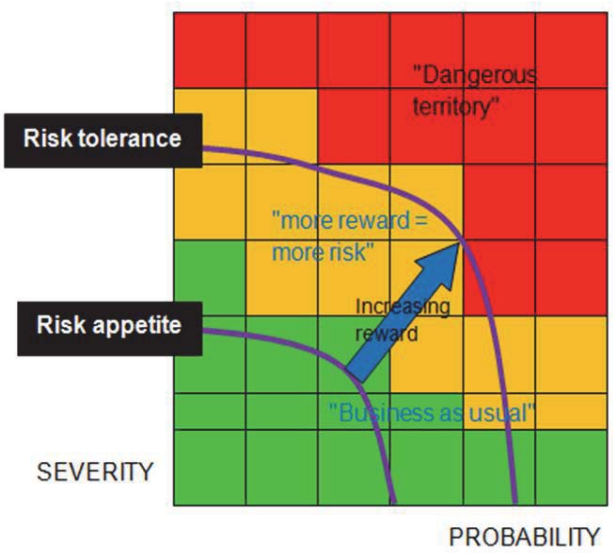
The framework was developed with involvement from a wide range of stakeholders, including senior management, risk management experts, the executive team and subject matter specialists. King III states that the Board should determine the levels of risk appetite and risk tolerance applicable to the organisation. Within a few months of King III being published, the Board initiated the process of formally defining and communicating their appetite and tolerance levels. The question to be answered is how much risk does an organisation need to take in order to attain appropriate or sought after returns? In practice, answering the question can be difficult. Efforts to quantify risk appetite can sometimes produce an illusion of precision, and the framework was therefore developed to accommodate hard and soft "how much" questions.

Umgeni Water used ISO31000 to guide the development of the framework. The ISO31000 standard defines risk appetite as the amount and type of risk that an organisation is prepared to pursue, retain or take. This definition shows that risk appetite is concerned with both the kinds of risk the organisation prefers as well as the level of risk to which it wants to expose itself to achieve one of more of its strategic objectives. Although the terms are used interchangeably by some, risk tolerance is not the same as risk appetite. Risk tolerance is defined in ISO31000 as the readiness to bear the risk after risk treatment in order to achieve its objectives. It can be seen from this definition that while the risk appetite is represented by the criteria that are applied during risk evaluation, risk tolerance is about making a decision on the willingness to tolerate or retain risk after risk treatment has taken place. This implies the application of a cost benefit analysis as part of risk evaluation and as the means of differentiating between options for risk treatment. It also implies that conscious decisions can be made at the right level in the organisation, to continue tolerating a risk (or not) should additional cost beneficial risk treatment measures not be available. The key message here is that not all risk treatment options will reduce the risk equally. Some may result in a higher residual risk than others, and it is only through a good understanding of risk tolerance that the right risk treatment can be selected.

Umgeni Water has a three part framework to define risk appetite and tolerance levels. Firstly the strategic objectives are identified as it is important that any risk appetite and tolerance statements are relevant to the strategic objectives. Next stakeholder expectations are considered. Finally a review of the possible impacts of the risk is undertaken in combination with the probability of the risk occurring and its potential velocity. Both quantitative and qualitative definitions are used depending on the impact in question. For example, for risks with a financial impact, an assessment of variation of operating profit was undertaken, to see what amount of money is typically available in the business to deal with this type of impact. A risk with a financial impact equal or greater than this predetermined value was deemed to be at the tolerance level.

Risk appetite & tolerance heat maps

Umgeni Water graphically represents their risk appetite and tolerance through risk heat maps. The heat map represents the probability and impact of a risk occurring, with the impacts ranked both on the basis of what is material in financial terms, or in relation to the achievement of strategic objectives. Each risk category has a heat map, with the risk appetite and tolerance levels depicted through curves. These reflect how much of a certain variance management is comfortable with. The appetite and tolerance curves take reward into account, with risk tolerance representing the limit beyond which no further increase in reward will justify increase in risk.



Key elements

1. Reflective of all key aspects of the business.
2. Considers what legislation, the organisation and its Board have defined within its materiality criteria.
3. Considers and uses real quantifiable metrics wherever possible.
4. Acknowledges a willingness and capacity to take on risk.
5. Is documented as a formal risk appetite & tolerance statement.
6. Considers the skills, resources and technology required to manage and monitor risk exposures in the context of risk appetite.
7. Is inclusive of a tolerance for loss or negative events that can reasonably be quantified.
8. Is periodically reviewed and reconsidered with reference to evolving sector and market conditions.
9. Is designed and recommended by management but approved by the Board.

Enablers

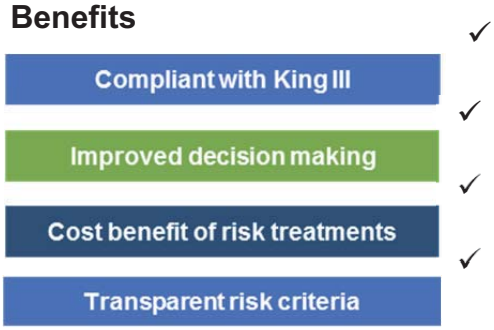
The primary enablers in the development of the risk appetite and tolerance framework were as follows:

1. Leadership commitment and support from the Board, Audit Committee and Risk Committees.
2. A well-defined and established risk assessment methodology that could be built upon.
3. Cross functional cooperation and understanding.
4. Capable and forward looking Risk Manager.
5. External facilitation to ensure an independent and best practise approach.

Conclusion

The framework and the definition of risk appetite and tolerance levels has significantly improved Umgeni Water's decision making capability. The risk heat maps have provided the organisation with a concise way of visualising risk appetite and tolerance levels. This has provided management with a clearer view of the reward versus risk equation. The holistic view has enabled Umgeni Water to improve outcomes by optimising risk taking and accepting calculated risks within an appropriate level of confidence.

Benefits



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Scenario planning for the future of urban water – Sydney Water,

Introduction

Sydney Water is the largest water utility in Australia and is a statutory State Owned Corporation, owned by the New South Wales Government. Sydney Water supplies water, wastewater, recycled water and provides storm water services to almost five million people in Sydney and the surrounding areas. The utility has three principal objectives in its enabling legislation; to protect public health, to protect the environment and to be a successful business. Sydney Water's Corporate Strategy 2015-2020 identifies its strategic objectives as: customer at the heart, high performance culture and world class performance.

Sydney Water realised that the world and Australia is a rapidly changing place. Political, economic and social systems are transforming in ways that are not always predictable, producing a variety of impacts. Technology is evolving quickly and living standards, consumption patterns and life expectancies are all changing. Human populations are growing, land use is altering, as is the climate. The long term impacts of this change often remain uncertain.

Challenges for Sydney Water included meeting future demand for water in a changing climate and with an increasing urban population, managing diverse sources of supply, ensuring the health of waterways and ecological systems, maintaining the affordability of water services and reducing the carbon footprint of urban water supply systems. The organisation realised that it would need to be innovative and make informed investment decisions now to maximise opportunities to provide services of value, while mitigating future risks and uncertainties. As a result, Sydney Water embarked on a strategic planning activity with the objective of identifying possible future scenarios and their risks and opportunities.

Population served
4,7 million
Annual capital budget
$548 million
Annual operational budget
$1.3 billion
Water treatment plants
9
Sewage treatment plants
16
Water recycling plants
14

Scenario planning

Strategic decision making involves significant risk as major strategy or investment decisions usually involve long time frames and uncertain outcomes. Often these decisions can fundamentally change an organisation. Moreover the key factors influencing success are often uncertain and are beyond the control of the organisation.

Scenario planning provides a unique opportunity to explore and compare alternative plausible futures and to identify the risks and opportunities that are associated with these futures. Instead of trying to reduce uncertainty to a single most likely forecast, scenarios try to identify the major forces driving change and the key uncertainties that lead to a wide range of possible future outcomes. They present a tool for strategic thinking through which organisations can make sense of uncertainty and better understand the potential impacts of this uncertainty on their business objectives in the future. With this knowledge, possible pathways towards the future, including the role of different stakeholders and alternative system designs, can be developed and mapped.

Methodology

The project was made up of four distinct phases — baseline and context, trends and benchmarks, future scenarios, strategy and implications. The methodology was a collaborative approach and involved many Sydney Water stakeholders from across the business. Resources and insights were drawn through desk research, expert consultation and a collaborative workshop. Scenario planning typically follows the following steps:

1. Identify a focal question and a baseline position.
2. Identify the drivers of change.
3. Identify critical uncertainties.
4. Develop scenario framework.
5. Identify characteristics for each scenario.

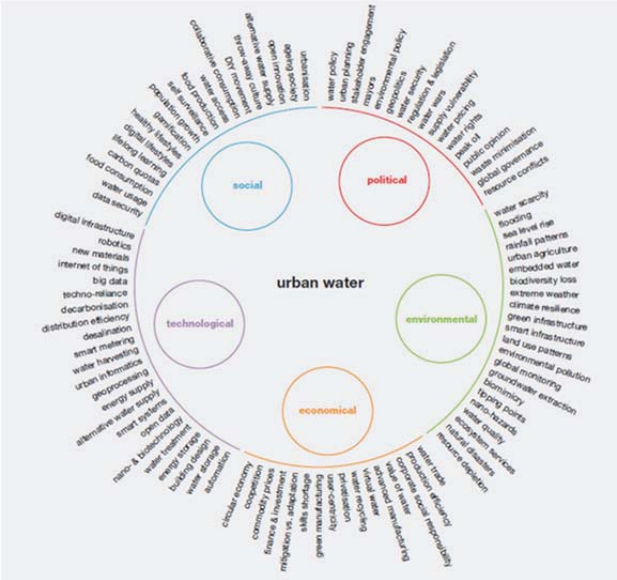
Focal question & baseline position

The first step in the process is to identify the strategic issue to be addressed through a focal question. For this activity, the focal question was open and fairly broad “what does the urban water utility landscape look like in 2040 and what is the implication for Sydney Water?” A number of assumptions were initially made to develop a baseline from which the future scenarios could be generated. The assumptions were that the baseline economy was a developed world economy; population would continue to grow due to urbanisation; the effects of climate change would continue to be felt; there would be increasing volatility and scarcity with water resources; utilities would strive to be efficient and there would be a shift towards smarter utilities with technological progression assumed.

Drivers of change

The second step in the scenario planning process is to identify the forces driving future change. Arup’s Foresight + Research + Innovation team undertook comprehensive horizon scanning and research to identify around 100 trends, from global megatrends to sector-specific drivers. These were developed into a set of workshop cards, which were then used at a series of workshops to identify the main drivers shaping Sydney Waters business now and in the future. The cards are based on the STEEP framework – social,

technological, environmental, economic and political. Drivers of change assist in identifying risks and opportunities and help to better understand the long-term issues. Sydney Water's responses to these drivers will be critical in determining the nature of urban water supply in the future.



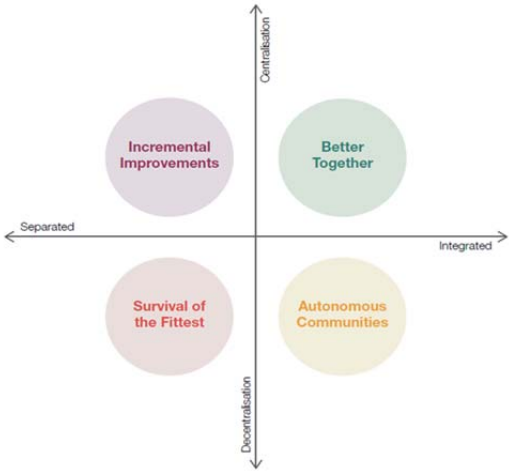
Critical uncertainties

The third step in the process is to identify critical uncertainties. Scenario planning aims to explore the boundaries of uncertainty and to look for a broad range of future outcomes, with the emphasis on divergence of outcomes. Two key independent variables representing major uncertainties were identified that fundamentally define the future of urban water utilities.

Centralised vs. decentralised	**The degree to which services and utilities are operated from a central point or from several separated locations.**
Integrated vs. separated	The level to which utilities are cooperating across different types of infrastructure.

Scenario framework

The critical uncertainties can be interpreted as continuums and represented as a matrix. Each quadrant then represents a unique combination of the critical uncertainties, a 2x2 matrix of possible future outcomes. The scenario planning activity identified four plausible scenarios that could occur by the year 2040.



Scenario characteristics

Once the framework has been defined, the characteristics of each scenario can be determined. Characteristics are usually generated in a creative brainstorming session to describe the future end state. The drivers of change provide a basis for defining the initial set of characteristics. A storyline is then constructed outlining the path from the present to the future. The real future will likely contain elements of all four scenarios. The goal is to learn from the scenarios, to gain insights on what could change, why it could change and what this knowledge might mean for strategic decisions.

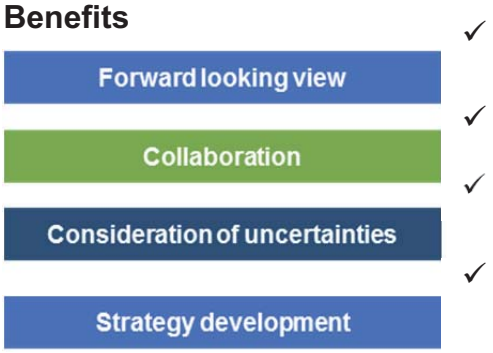
The scenario characteristics are as follows:

- **Incremental improvements** describe a world with little change to existing assets and operations. A centralised water supply system with a separated provision of utilities.
- **Better together** pictures a scenario where industry and utilities better collaborate across a centralised system. A centralised water supply system with an integrated provision of utilities.
- **Autonomous communities** are a world in which households, communities and industry develop independence in water management. A decentralised water supply system with an integrated provision of utilities.
- **Survival of the fittest** paints a scenario with greater competition for limited resources and restrictions to supply with high disparities in usage behaviour and access. A decentralised water supply system with a separated provision of utilities.

Key elements

1. Developing scenarios is an art rather than a science.
2. A set of scenarios should always contain at least four alternatives, covering a range of outcomes.
3. The best scenarios are built on new insight and creative thinking.
4. Scenarios will not provide all of the answers, but they will help managers to ask better questions and prepare for the unexpected.
5. Scenario planning works best when it's a collaborative effort.

Benefits



Conclusion

Scenario planning was used by Sydney Water to identify four plausible scenarios for the future of urban water utilities in 2040. The approach explored how a wide range of social, technological, economic, environmental and political trends could shape their urban water future. In times of increasing uncertainty, scenarios help to better understand possible pathways into the future and enable conversations about how organisation can influence and shape the direction they are travelling in. By understanding trends and planning for the future, water utilities can create more engaging customer experiences, enhance the liveability of urban areas and get more out of their current and future assets. While the scenarios were based on Sydney Water, their implications are relevant to a wide range of other water utilities around the world.

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YOUR NOTES

Risk Policy & Framework

Introduction

The City of Cape Town (CoCT) is a metropolitan municipality located in the Western Cape Province of South Africa. The CoCT is a water service authority and a water service provider as stipulated by the Water Services Act of 1997. The Water and Sanitation Department falls under the Utilities Directorate within the municipal management structure. The department is responsible for the operation, maintenance, optimisation, planning, refurbishment and renewal of all water and sanitation assets and in doing so provides an essential service to the residents and businesses of the City.

The CoCT is facing a number of challenges including population growth (mainly from urbanization), water resource shortages, aging infrastructure, energy constraints and a challenging external stakeholder environment. As such there are many inter dependent hazards and risks that need to be identified and managed both within the Water and Sanitation Department and within the wider municipality. Consequently the CoCT has implemented an Integrated Risk Management (IRM) policy and framework to provide assurance that risks are being suitably addressed at an enterprise level.

All directorates and the departments within each directorate are required to implement the policy and framework through routine procedures defined by the risk management implementation plan. For the Water and Sanitation Department this includes infrastructure performance and condition assessments and risk identification through the Blue Drop and Green Drop regulatory programmes.

Population served
3 million
No. of departmental staff
4,000
Annual capital budget
R1 billion
Annual operational budget
R5.5 billion
Water treatment plants
13
Sewage treatment plants
26

Objectives & key elements

The primary objectives and outcomes of the IRM policy and framework are to:

1. Achieve a sustainable and reliable delivery of services.
2. Enhance decision making by promoting a less risk adverse and innovative culture.
3. Prevent redundancies, inconsistencies and gaps in policies, procedures and guidelines.

4. Provide for good corporate governance based on sound risk management principles.
5. Minimise fraud and corruption.
6. Improve performance and outputs through better project and programme management.
7. Achieve better value for money through the more efficient use of scarce resources
8. Decrease surprises by understanding emerging risks and uncertainty.
9. Prevent reputational damage.
10. Ensuring compliance with legislation, regulations and corporate governance requirements.

The framework has been developed by the IRM team and has been influenced by the following:

- The Local Government Municipal Finance Management Act of 2003.
- The Local Government Municipal Systems Act of 2000.
- National Treasury Public Sector Risk Management Framework.
- The King III Code of Governance in South Africa.
- ISO31000 & ISO9001
- Occupational Health and Safety Act no. 85 of 1993.

Responsibilities

A wide range of stakeholders, from elected council members and senior management right down to operational staff, have risk management responsibilities. There are clear reporting lines and accountabilities. Furthermore, internal business processes are in place that allow for effective risk decision making, escalation and delegation between all the people and committees with risk responsibility.

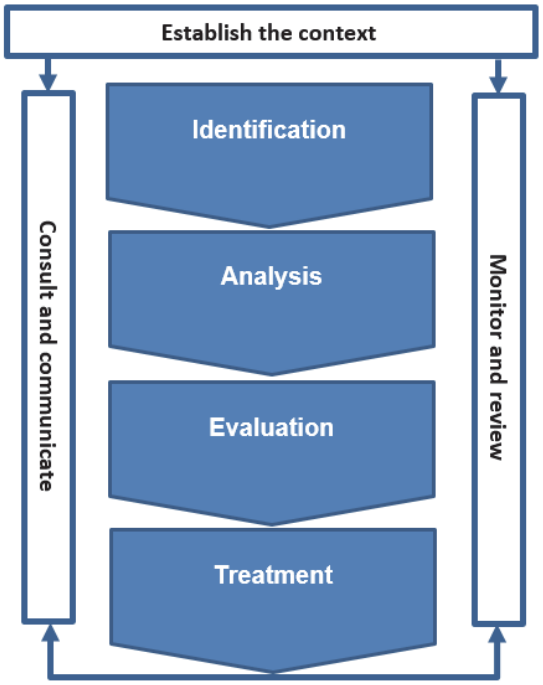
Name	Responsibility
Council	Interface with the public. Provides challenges, checks and balances.
Audit Committee	Independent oversight on governance, controls and the IRM policy and framework.
Risk Committee	Reviews risk management progress, effectiveness and maturity. Reviews key risks.
City Manager	Ultimately accountable for all risk management. Ensures the IRM policy, framework, procedures and guidelines are implemented in all departments. Develops a risk awareness culture.

Name	Responsibility
Senior Managers	Ensures the IRM policy, framework, procedures and guidelines are implemented in their departments and that controls are put in place. Accountable for risks in their departments.
Risk Champions	Responsible for embedding the IRM policy, framework, processes and guidelines in each department through communication, training and reporting.
Officials	Undertakes the IRM activities and tasks according to the policy, framework, procedures and guidelines.
Internal Audit	Independent review on governance, controls and the IRM policy and framework. Checks, tests and evaluates the effectiveness of risk management.
External Audit	Identifies weaknesses and non-compliances with required legislation, regulations and national standards.

Risk process

The risk process consists of the following core components:

1. External Context – Defines the external environment affecting risk management including social, technological, economic, environmental, legislative, political, stakeholder, financial and global drivers and influences.
2. Internal Context – Sets the roles, responsibilities and timescales for each stakeholder group. Defines the internal parameters, criteria and methodology used to undertake risk management.
3. Communication and Consultation – External and internal consultation at all stages of the process to ensure the needs of all stakeholders are accounted for and to ensure a cross functional approach to risk management.
4. Risk Identification – Activities, tasks, tools and systems that identify future uncertain events from both internal and external sources.
5. Risk Analysis – Controls in place to manage the identified events and risks including preventative, detective and corrective controls.
6. Risk Evaluation – Likelihood and impact matrix for determining risk rating.
7. Risk Treatment – Identification of responses for each root cause to the risks that are above the City risk tolerance threshold.
8. Monitoring and review – On-going monitoring of the risk register risks, controls and responses. Periodic review of procedures, risk matrix and tolerance thresholds. Production of dashboards and heat maps identifying new risks, critical risks and their movement.



Enablers

The primary enablers contributing to the success of the IRM framework are as follows:

1. Leadership and support from the highest level within the CoCT management structure.
2. Policy that reflects the need for integrated risk management and provides the framework for it to be implemented.
3. Embedded systems that are simple to follow, auditable and integrated at an enterprise level.
4. Various departments including the Water and Sanitation Department have ISO9001 accreditation which contributes to better governance and quality control.
5. Cross functional working between teams and departments; where this does happen it has considerable benefit.
6. Risk champions and coordinators in each department that communicate and manage risk processes on a daily basis.

Challenges

The primary challenges are as follows:

1. Silo thinking between teams and departments.
2. Some departments are more mature in their adoption and implementation of the IRM processes which results in some inconsistencies.
3. The success of the IRM system is dependent on the initial identification of the risks, which in turn requires the correct internal departmental tools and systems to be in place and used correctly. Some departments have better tools and systems than others.
4. Risk management can become a “tick the box” exercise particularly if the local team cannot see the benefit to their day job.

5.

Benefits

Conclusion

The City of Cape Town has a robust system in place to manage risk across the entire municipal organisation. Furthermore risk governance processes and structures are established and functional. The Water and Sanitation Department are using the risk management framework to understand asset and process risk and therefore make asset related decisions that allow continued service delivery performance. Furthermore as the risk framework is at an enterprise level, there is some consistency and integration between directorates.

Credits

Ludwig Geldenhuys – City of Cape Town

References

City of Cape Town. 2013. Integrated Risk Management Framework and Implementation Plan.
City of Cape Town. 2013. Integrated Risk Management Policy No. 13195.

YOUR NOTES

Risk Based Decision Making

Gateway process for risk based decision making – Thames Water, United Kingdom

Introduction

Thames Water Utilities is a privately owned water utility responsible for water and sanitation services for Greater London and large parts of south east of England. It is the largest water utility in England providing wastewater services to over 15 million customers and potable water to nine million customers. Thames Water has a considerable capital budget which is in the order of £1 billion per annum, across multiple investment areas including capital maintenance, capital enhancement, environmental quality and new services. The water sector in England and Wales is regulated by the government economic regulator Ofwat.

Every five years water utilities, including Thames Water, develop and submit comprehensive business plans that outline the amount of money they intend to spend in the next five year regulatory period. More importantly the plans also outline what value this expenditure will give to bill paying customers, in the form of regulatory outcomes. During the regulatory period, Ofwat scrutinises the company's expenditure to ensure the outcomes they committed to are being delivered in a cost effective way, and therefore providing value for money to the customer.

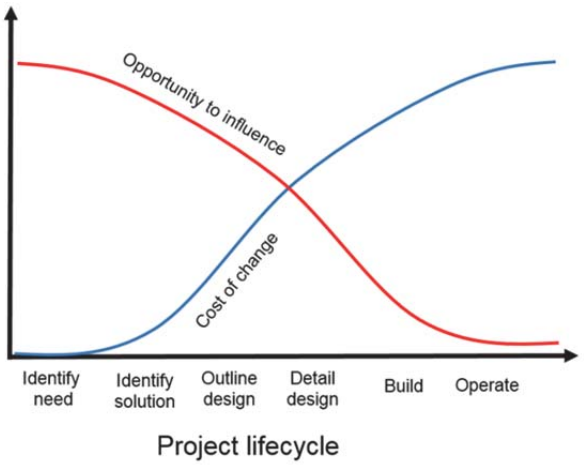
Therefore, it is critical that the business has robust internal governance processes in place for the approval of investment, to ensure the investment is made on the right asset at the right time and is providing suitable value for money and return on investment for customers.

Population served
15 million waste & 9 million potable
No. of departmental staff
4,700
Annual capital budget
£1 billion
Annual operational budget
£1.3 billion
Water treatment plants
100
Sewage treatment plants
350

Risk based decision making

The impact of an investment decision can be significant. At the very beginning of the project lifecycle there is the biggest opportunity to influence scope and cost. As the project lifecycle progresses, the cost of making a change increases significantly and the flexibility to change is decreased. Decision making structures must be established that allow for investment decisions to be made early on in a project lifecycle.

Thames Water recognised that they could improve the way they made investment decisions and decided to adopt a process whereby decision making happens at key points in a project lifecycle, incorporating a robust risk and value assessment at each stage. If the outcome of the risk and value assessment at each stage is acceptable, the project proceeds to the next stage.



Gateway process

In 2010 Thames Water implemented a six stage Gateway process to be used during the regulatory period that ran between 2010 and 2015. The process was designed to align with the capital delivery model at the time, and the various business structures in place. Importantly, the process also aligned with the approach to risk identification and quantification used across the business. The aim of the Gateway process was to influence all capital investment decision making, from initial need identification right through to project completion, and to ensure robust risk based principles were embedded into the decision making criteria.

The Gateway 0 was the most important stage of the investment and project lifecycle. It was very important to ensure that the correct investment needs were identified at the beginning and prioritised against one another. This was especially important with limited budgets available. Without a robust gateway system established, there could be no assurance that the investment needs were correctly prioritised, which could result in budgets being allocated to lower priority issues, or even work that did not need to be done at all. The focus of this Gateway was therefore to provide assurance that an investment need had been clearly articulated and quantified with respect to risk. Each investment need would be quantified in terms of future frequency of occurrence and consequence of occurring. This risk was then compared to other investment needs to build a priority list. All the risks were quantified in financial terms based on internal cost models for service failures, as defined in the corporate risk framework.

In order to pass this gate, there would have to be a very clear demonstration of the level of risk and the service failure expected (or already occurring) if the investment need was not addressed. It also ensured that there was a sufficient level of risk to justify any subsequent investigations, feasibility studies or solution optioneering. In some cases an initial maximum value of a solution was identified (prior to a technical solution being developed) to ensure that subsequent work would yield a range of options that would be feasible and based on cost benefit. In some cases, there was not sufficient data to accurately quantity the risk and this was then specified as part of the study work. Once the need had been approved at Gateway 0, it progressed to the next stage, which would be additional investigation or feasibility studies to develop solutions. **Gateway 1** was used to confirm that the identified solutions presented the best value for money, and in particular reduce the original risk to a suitable level, recognising that not all solutions reduce the risk

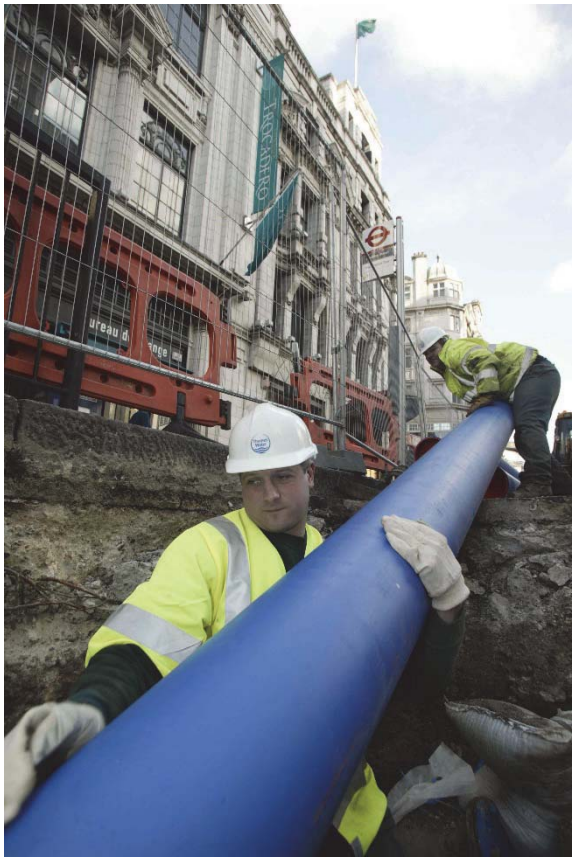
equally. The outputs of any feasibility studies or solution optioneering would be presented at Gateway 1 where a decision would be made as to which option was preferred based on risk reduction and whole life cost analysis. An assessment of the residual risk would be made to understand how much risk would be remaining after the solution was implemented and if the residual risk was an acceptable position. The data was entered into the computerised Asset Planning System to determine which solution would be the most cost beneficial and provided the lowest whole life costs option. For some types of investment, a cost beneficial solution may not have been identified but the investment was still required and in this case the most favourable solution would need to be selected based on other criteria. Discounted solutions were also assessed to ensure the right solution had been selected. This ensured transparency and demonstrated a holistic approach to solution appraisal. Once a solution had been approved, it moved into Gateway 2.

Gateway 2 was to get financial approval to release funds for the preferred solution to be implementation under a particular programme of work. The Gateway 2 was a high level committee of senior management and directors from across the business. Once a solution had Gateway 2 approval, it was briefed to a programme of work. Gateway 0, 1 and 2 were monthly meetings scheduled in a coordinated manner, with clear terms of reference, decision making structures and limits, compulsory attendees, an agenda and minutes. The key stakeholders at Gateway 0 and 1 were the Asset Planning team, Capital Programme team, the Risk team and the Operations team.

Other stakeholders could be invited as required depending on the investment need being discussed, for example the Asset Modelling team, the Capital Delivery team or the Innovation team.

Gateway 3 & 4 were part of the engineering design and build process. After a solution had been approved at Gateway 2, the Capital Delivery team and Programme Management team took ownership of the solution. The Capital Delivery team would manage the detailed design, construction and commissioning of the solution; working closely with the Programme team, who managed the investment programme. Gateway 3 was the next stage whereby the engineering designs were reviewed and approved. Once a design was approved, the solution was constructed and commissioned. Gateway 4 was then held at the end of commissioning to check whether the project benefits had been realised and the project completed within time, costs and budget. The key stakeholders at Gateway 3 and 4 were the Capital Programme team, the Capital Delivery team, the Engineering consultants and contractors and importantly the Operations team, who were the ones responsible for operating the solution once it is in place.

Gateway 5 was the final stage, whereby key stakeholders would undertake a post project appraisal to identify where things had been done well, where things had gone wrong and what could have been done differently. Not all projects passed through this gate. In particular, the original investment need and risk was reviewed to ensure the as built solution resolved the need and reduced the risk to acceptable levels. The Asset Planning System would be updated to reflect the change in the risk profile.



Enablers

The primary enablers contributing to the success of the gateway process were:

1. Leadership and support from key stakeholders.
2. Clear terms of reference for each gateway meeting.
3. Early engagement with stakeholders to design the gateway documentation.
4. Ongoing training of stakeholders on the use of the gateway documentation.
5. Easy to follow and simple process.
6. Consistent approach to need and solution prioritisation.
7. Cross functional working opportunities between teams and departments.

Challenges

The primary challenges were as follows:

1. Some duplication between the gateway documentation and the Asset Planning System.
2. As the regulatory period progressed, the gateway process evolved and in some ways became more complex and cumbersome.
3. Wholesale compliance with the process across all areas of the business.
4. Lack of support and buy in from some staff and teams.

Benefits

Conclusion

The Gateway process provided Thames Water with assurance that investment decisions were made based on sound risk and value principles. By following the process, a robust programme of investment needs and solutions was developed that ensured the lowest whole life cost options were progressed into the capital programme. The process allowed for decisions to be made throughout the project lifecycle, including the opportunity to undertake a post project appraisal, and therefore learn from mistakes.

Credits

Graeme Kasselman – Thames Water

Managing water quality risks – IUCMA, South Africa

Introduction

The Inkomati water management area (WMA) is an international river basin located in the north-eastern part of South Africa in the Mpumalanga province. It borders on Mozambique in the east and Swaziland in the south-east. The basin is defined by the Komati River, Crocodile (East) River and Sabie River catchments. The river catchments all drain in an easterly direction and join to form the Incomati River which flows through Mozambique and discharges into the Indian Ocean.

The Inkomati-Usuthu Catchment Management Agency (IUCMA) is a statutory body with jurisdiction in the Inkomati WMA. It is mandated by the National Water Act of 1998 to manage the water resources of the WMA and to co-ordinate the functions of other institutions involved in water related matters.

The IUCMA manages the water resources according to a strategy based on sustainability, equity and efficiency. The aim is to empower stakeholders to engage in consensual and adaptive decision making, to achieve reform, and to promote social, economic and environmental justice.

Water quality risks

Land uses across the area are dominated by mining, agriculture and forestry activities, which all account for significant water use. Moreover, these activities pose significant risks to water quality. In many areas, the state of municipal wastewater treatment infrastructure is poor, further contributing to water quality issues.

The multiple stakeholders involved across the WMA requires the IUCMA to facilitate cross functional working in order to ensure a holistic approach to the management of water quality risks. The complex interconnected nature of the Inkomati-Usuthu river basin means that water quality risks in one area have the potential to impact stakeholders across the basin. Thus the management of water quality risks requires a collaborative approach inclusive of all stakeholders across the catchments, based on the sharing of risk and reward. The successful management of water quality risks at the IUCMA is reliant on involvement from all the various stakeholders across the WMA. Stakeholders are involved throughout, from the classification of the water

resources to the day to day management of water resources through catchment management forums (CMFs). There are six CMFs facilitated by the IUCMA which allow stakeholders to raise opinions on how they want water resources to be managed so that the set objectives can be met. The CMFs are therefore very important as they facilitate the sharing of risks and risk interdependencies to allow for a holistic management of water quality risks.

Risk management

The IUCMA does not have a specific risk management policy. The general approach to the management of water quality risks is based on knowing the location of the hazards in the catchment and monitoring water quality parameters upstream and downstream of the hazard. The IUCMA follows the approaches outlined in various guidelines and legislation:

1. The National Water Act of 1998.
2. The South African water quality guidelines.
3. The risk assessment process built into the classification process of setting Resource Quality Objectives (RQOs). This risk assessment approach is designed to ensure that certain variables should not exceed defined concentrations as higher levels of these variables have detrimental effects on ecology and water users.
4. The process for assessing water use license applications. This process assesses the risks associated with allowing such an activity and determines mitigation measures for the activity.

Enablers

The primary enablers contributing to the successful management of water quality risks are as follows:

1. Buy-in from the supervisor and governing board.
2.
3. Quick responses from management and the governing board whenever calls are made to augment capacity or reorganize a division to be able to discharge its responsibilities.
4. Support from the Department of Water and Sanitation (DWS) for certain functions such as Resource Directed Measures.
5. Skilled persons who can manage the broad range of fields involved in water resource management such as chemistry, ecology, hydrology and microbiology.
6. Monthly water quality monitoring which helps detect trends of deteriorating water quality. This allows an investigation to then be initiated and for responsible parties to be held accountable.

   Regular compliance inspections to determine if users conduct their water use activities in accordance with the policies, authorisations and standards set out by the DWS.

Challenges

The primary challenges are as follows:

1. Silo working between the Water Quality and Water Quantity Directorates. This can result in further risks, for example when a water abstraction authorisation is issued for a location upstream of a discharge point, which then affects the flow and assimilative capacity to dilute the pollution source downstream.

2. Poor data availability due to the high cost associated with water quality monitoring. Water quality is currently monitored on a monthly basis by taking grab samples, thus failing to detect pollution or changes in water quality over shorter timescales.
3. Lack of clear roles and responsibilities, as the IUCMA is responsible for the development of the Catchment Management Strategy but the DWS is responsible for the classification of water resources. This creates confusion around what role the IUCMA has on the class or level of protection set through the classification of the water resources.
4. Lack of clear guidelines and procedures which makes it difficult for stakeholders to implement guidelines and risk management activities effectively. Similarly, officials struggle to explain how to implement the guidelines to stakeholders which creates more difficulties and leads to the mismanagement of water quality risks.
5. Inconsistencies in cooperative governance which creates problems for the IUCMA in the sense those municipalities cannot be held responsible to the same extent as other water users. Thus water quality risks from municipalities cannot be adequately treated and mitigated.
6. Conflicting user requirements between different organisations. This is especially relevant between mining and power generation.

Benefits

Conclusion

By including the diversity of stakeholders in the basin through the CMFs, the organisation is able to adopt an inclusive approach to the management of water quality risks down the water value chain. There are however some institutional challenges relating to the roles and responsibilities of stakeholders and the application of legislation and regulations.

Credits

Marcus Selepe – IUCMA

References

Inkomati Catchment Management Agency. 2013. The Inkomati Catchment Management Strategy: A First Generations Catchment Management Strategy for the Inkomati Water Management Area.

Using a sludge optimisation model to balance risk, cost & performance – Yorkshire Water, UK

Introduction

Yorkshire Water is a privately owned water utility located in the north east of England. Yorkshire Water collects, treats and disposes of over one billion litres of wastewater on a daily basis. Wastewater treatment involves the purification of industrial and domestic sewage through various physical, biological and chemical processes. The wastewater process produces both a liquid effluent and sludge. The treated effluent is discharged back to the environment, with the quantity and quality tightly monitored and controlled by the environmental regulator, the Environment Agency. The second by-product is sludge, produced in the primary settlement tanks, activated sludge plants and the final settlement tanks. Yorkshire Water processes about 160,000 tonnes of dry sludge each year. Sludge is no longer considered an economic and environmental burden that needs to be disposed of quickly. Yorkshire Water has recognised that sludge is of significant value as it contains energy and nutrients that can be extracted and used.

Population served
5 million
No. of staff
2,500
Annual capital budget
£760 million
Annual operational budget
£600 million
Water treatment plants
100
Sewage treatment plants
600

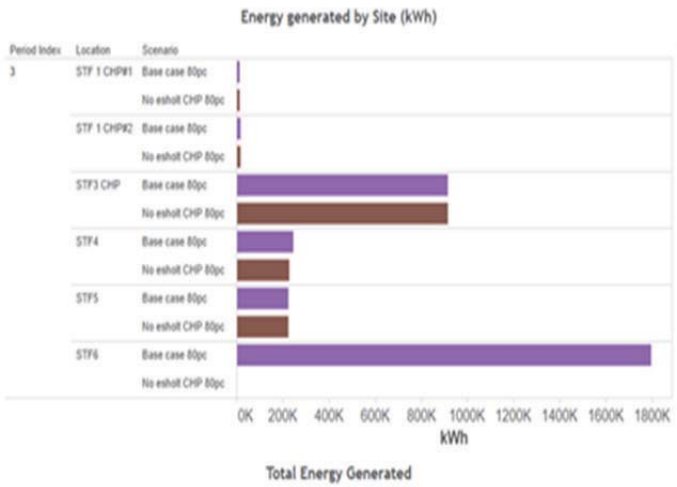
The sludge is a continuous and renewable resource from which they now generate revenue and reduce operational costs. Biogas in the form of methane is recovered from the sludge as a by-product of the anaerobic digestion process. The biogas is used in combined heat and power (CHP) engines to generate heat and electricity. The heat is recirculated to heat the anaerobic digesters and the electricity is used to power onsite processes, and in doing so reduces fuel and electricity costs. When the plant is producing more electricity than it needs, the excess can be sold back to the national grid. Furthermore, the production of renewable energy is incentivised by the government, with renewable energy producers being paid for each kilowatt produced through the Renewables Obligation Certificates and Contracts for Difference schemes. Water utilities, like Yorkshire Water, are effectively

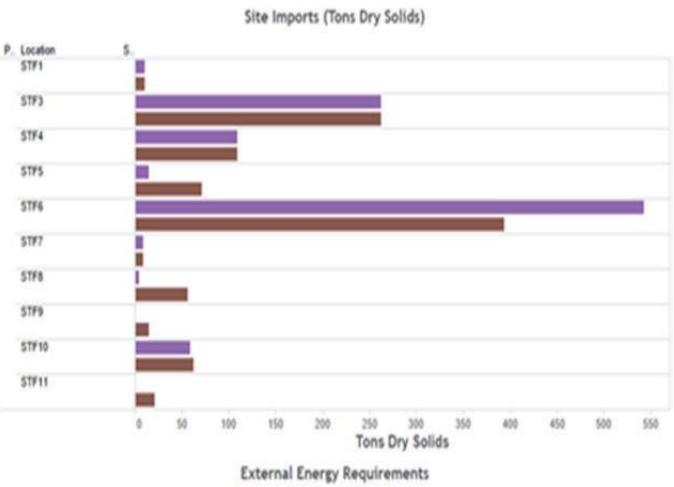
being paid to generate renewable energy from biogas. Digested sludge also has a value as it contains valuable nutrients like phosphorus and nitrogen that can be used as fertilizer. Yorkshire Water recycles 80% of the sludge it produces, using the revenue generated from biogas to offset operational costs. The production of renewable energy reduces Yorkshire Waters carbon footprint and contributes to the business meeting its carbon targets. In 2013/14 Yorkshire Water generated 8.5% of their electricity needs using a mix of wind and hydro turbines, and sludge digestion. They have a target of 12% by 2015/16. One of their biggest sewage treatment sites is Esholt in the town of Bradford. At this site, the digestion process is enhanced by a Thermal Hydrolysis Plant that produces over 22 million kilowatts of electricity per annum. The energy and heat that the site generates reduces Yorkshire Water's carbon footprint by 9,000 tonnes and saves £1.3 million a year in energy costs. A total of 62,000 tonnes of fertiliser can be produced at the site each year.

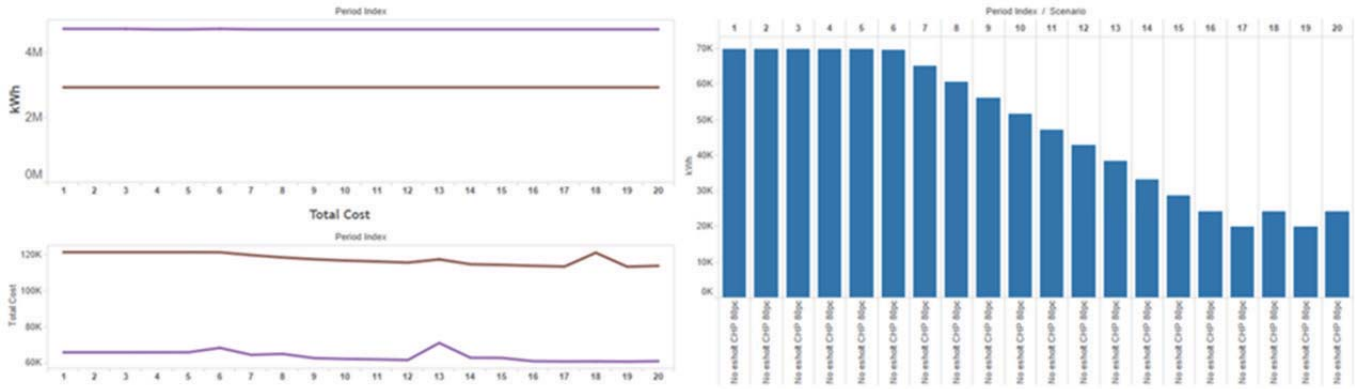
The business wide sludge assets comprise an extensive network of interdependent systems involving complex feedback and feed forward mechanisms. There are also multiple internal and external stakeholders involved including operational staff, the environmental regulator, the economic regulator, the energy regulator, customers and shareholders. The complex and nonlinear systems coupled with the unpredictable characteristics of the sludge treatment process results in systemic and interconnected risks. Also the costs of treatment or the loss or revenue can be significant. The strategic importance of the sludge and the sludge assets requires coordinated management and decision making to ensure suitable asset performance, risk management and cost reduction over the long term. If decisions are not optimised, the cost and reputation implications could be significant.

The sludge optimisation model

Yorkshire Water wanted to enhance their decision making capabilities, and to this end they worked with Business Modelling Associates to create a sludge optimisation model. The model provides a full representation of the sludge process at a plant level from sewage treatment through to sludge recycling and disposal. The model integrates cost, risk and performance metrics in a single platform, providing a tool for multiple stakeholders to optimise sludge processes and make informed decisions.







Key elements

1. The model takes into account all of the key factors associated with the sludge process across all sludge treatment facilities, sludge production, sludge quality, planned maintenance, and asset availability, processing capacity, energy generation, revenue and operational costs.
2. All factors can be visualised in the model by generating output dashboards. The dashboards are user configurable and interactive and allow users to make use of filters and drill down menus to customize their view. They are able to show the data for each site, a collection of sites or an aggregated view of all sites. Furthermore, they automatically refresh source data as it is updated, allowing for an almost real time view of the system.
3. The model provides a single view of the sludge process, providing all stakeholders with an opportunity to see the overall impacts of their decisions.
4. The model can be used for shorter term operations management. Daily and weekly production plans can be generated that show daily performance, cost and risk metrics. These can be used to set targets and develop operational plans to ensure operational expenditure and short term operational risks are managed. For example, the model could be used to assess the consequence of a loss of an asset at a specific site, which could then be used to inform an operational response plan.
5. The model can be used for longer term planning. Full year production plans can be used to undertake long term investment planning. A long term view can allow the organisation to identify potential future risks that may emerge and to assess the impact of an investment decision, such as the installation of a new sludge thickener or the refurbishment of a digester.

Asset criticality assessment

A risk based assessment of asset criticality is important. In this example the model allows for asset criticality to be assessed by providing the financial consequence of an asset failure. For example a scenario involving the loss of a CHP at an energy generating site, will show the impacts it has on site energy generation, sludge imports, total energy generation, loss of revenue and total cost. The model will optimise for this new constraint by moving as much sludge to other energy production sites that

have capacity. The net impact of this new constraint is an overall reduction in energy and revenue generation and corresponding increase in cost. This approach can allow the business to identify critical assets and then make maintenance and investment decisions accordingly.

Planned maintenance

The model can be used to determine the impact of a planned maintenance activity, such as the refurbishment of a digester. Understanding the likely impact of an activity allows Yorkshire Water to plan such activities in a coordinated manner to reduce risk and unintended cost. One of the scenarios assessed is where there is planned maintenance over a two week period on a digester at a medium sized treatment plant. The model generates a dashboard that shows the impact of the complete loss of digestion at the plant on operational production, energy generation, total energy generation and total cost. The model has optimised for this new constraint by diverting that sludge to the next best site, a large sludge treatment facility. There is no appreciable impact on energy generated for the 20 week period modelled although there is an impact on cost due to the additional tankering required to move the sludge to the other facility.

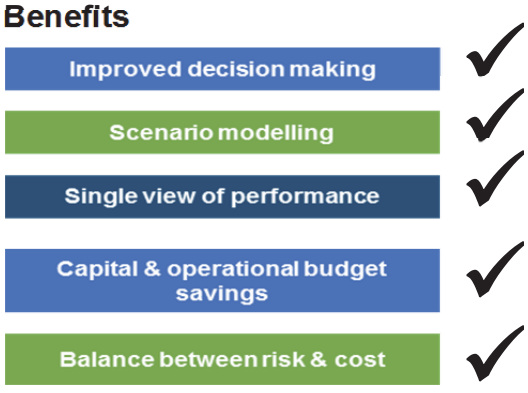
Optimised asset decisions

Asset management decision making involves finding a balance between cost, risk and performance. The sludge model provides Yorkshire Water with a tool to make trade-offs between conflicting decisions. A key driver for the business is to keep operational costs as low as possible, but without compromising service or regulatory compliance. The model trades off the cost to treat the sludge against compliance risk. The RAG status for each site can be displayed on a map that shows the compliance risk. The model will attempt to minimise risk and cost, but must accept higher risk at some sites due to fixed operational constraints. Through analysing these trade-offs and the various risk and cost factors associated with them, better business decisions can be made across the sludge treatment process.

Conclusion

All sludge stakeholders in the business have the ability to visualise the impacts of their decisions informed by real financial and performance metrics. The implementation of the model required a shift in the way the business made decisions about sludge and now there is better cross functional working between all the sludge stakeholders, with the model philosophy as the central tool. The dynamic and interactive nature of the model coupled with its ability to produce productions plans, visualise a range of potential scenarios and optimise for cost allowed for a holistic approach to the management of risks. Yorkshire Water is now able to make decisions that find a balance between risk, cost and performance and in doing so are able to get improved value out of their sludge assets.

Benefits



Credits

1. Craig Mauelshagen – Business Modelling Associates

Risk based decision support tool for pumping stations – Thames Water, United Kingdom

Introduction

Thames Water Utilities is the largest water utility in England, providing drinking water to nine million customers and wastewater services to 15 million customers. The utility owns and operates a significant number of assets, including water treatment plants, storage reservoirs, sewage treatment plants and a network of pipes and sewers. The utility also owns and operates over 2,600 pumping stations, which pump storm water and sewage. With changes in the pumping station ownership legislation in England being implemented in 2016, an estimated 3,000 additional sewage pumping stations will transfer into Thames Waters ownership. The pumping stations range from small installations serving a few properties to very large installations of strategic importance that service large areas of combined sewers in Greater London. Pumping stations are a critical part of the storm and sewerage network as they lift flow from a low level to a high level through a rising main, with some pumping stations pumping to a wastewater treatment plant.

Population served
15 million waste & 9 million potable
No. of departmental staff
4,700
Annual capital budget
£1 billion
Annual operational budget
£1.3 billion
Water treatment plants
100
Sewage treatment plants
350

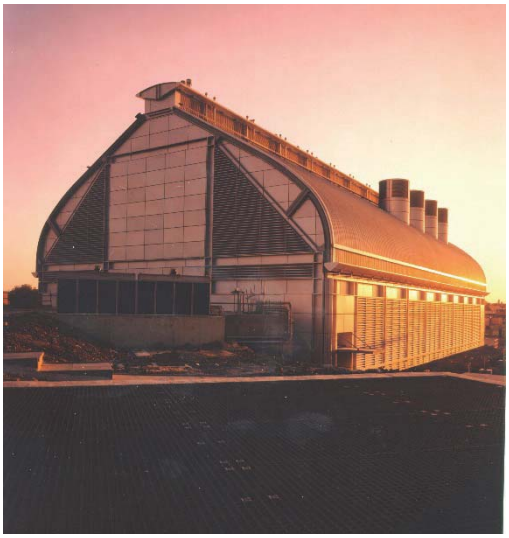
The assets in a pumping station include pumps, valves and pipework, control panels, electrical, monitoring and telemetry systems as well as the wet and dry well structures. Larger sites may also have buildings, roads and pathways, fences, storm tanks, workshops and standby power facilities.

The cross functional team meeting

During the Asset Management Period between 2010 and 2015, there were various teams involved in the management of pumping stations, such as Operations, Maintenance, Asset Planning and Network Optimisation. Furthermore, the operations and maintenance function was split between five geographical areas, each with a different management structure. The specific work that each team undertook was often related and in some cases duplicated, and communication between these teams could be improved. Furthermore, there were a number of decision support tools and data reports available, that could provide valuable data and information on asset performance, yet use of the tools and reports in a consistent and formal manner did not occur.

As a result, there was inconsistency in investment decision making between the areas, which was not benefitting the assets and providing customers with varying levels of service. A simple example was a variation in the level of planned investment (as opposed to reactive investment), with some solutions not resolving the root cause of the problem at first attempt. Interventions were also usually capex focussed with little understanding of whole life costing, appropriateness or consideration of alternative interventions. To overcome these and other issues, the cross functional team meeting was established, involving all pumping station stakeholders. The main objectives of the cross functional team meeting were as follows:

1. Actively use the available decision support tools and reports to inform operational and investment decision making.
2. Engage all relevant stakeholders at the appropriate management level.
3. Build consistency across areas.
4. Ensure the smooth running of the risk review meetings.
5. Identify the root cause of an issue.
6. Ensure an appropriate intervention is considered that represents the best whole life cost option.
7. Develops a proactive approach to risk identification.
8. Develops a forward looking programme of potential solutions.

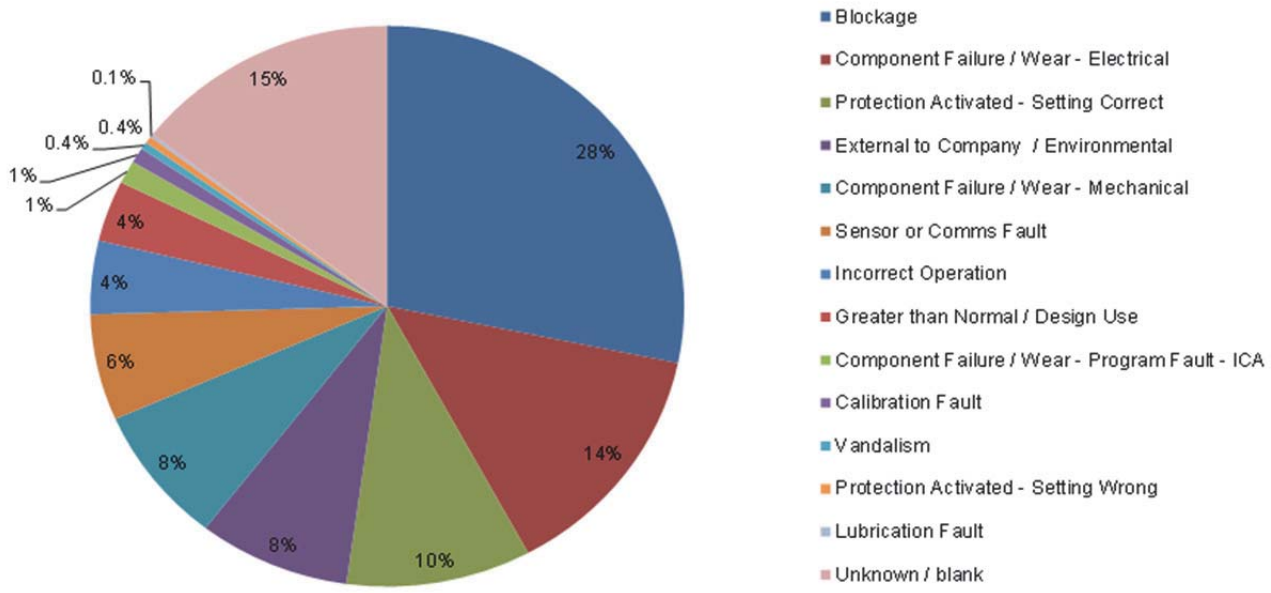


Pumping station risk model

A key component of the meeting was the use of a decision support tool to support risk based decision making. A pumping station risk model was developed and then incorporated into a Microsoft Access database. The model used the standard risk equation:

Risk = Asset Failure Likelihood x Consequence of Failure.

The consequence of failure data was predetermined and fixed in the model. Overland flow modelling techniques were used to identify likely receptors that may be affected should the pumping station fail. Each of the pumping stations was assessed and the receptors identified and the consequences categorised and quantified financially. The financial quantification was aligned to the corporate risk framework and cost of failure methodology. Asset failure likelihood data was derived from the monthly emergency (unplanned) maintenance work order data. Once a month the most recent maintenance data was extracted and inputted into the risk model. The figure below is an example of maintenance data categorised out of the work management system.



Receptor	Service Failure
River, wetland or water body	Pollution
Residential, commercial or industrial property	Flooding
School or hospital	Flooding
Roads or railways	Disruption

As the consequence of failure was represented in financial terms, the total risk was also in financial terms. This allowed for a comparison between sites. As with any model, the outputs needed to be routinely validated to ensure that the input data was correct and the outputs did broadly represent the real levels of risk at each site. In some cases it was noted that the consequence of failure data was overestimated, and hence the overall risk at the site was not realistic. The cross functional team meeting was the opportunity to review the model outputs, validate and make improvements to the model as required. The outputs of the model were used at the cross functional meeting to highlighted sites of concern, deteriorating sites or high risk sites, which then informed operational and investment decision making. It also allowed for a consistent approach to be followed in all the geographical areas, using the same risk information. Some pumping station sites had high levels of inherent risk based on their size or location. Therefore it was not the absolute risk position of a site that was important, rather the relative change in risk position over time. As the unplanned maintenance data was updated monthly, the model highlighted a change in priority over time, which was a good indicator of increased risk due to factors that need to be investigated further.

Key elements

1. The model took into account the likelihood and consequence of a pumping station asset failure, and displayed this total risk in financial terms for each site.
2. The model allowed for drilling down into each of the emergency work orders to enable the root cause of each work order to be determined. This then ensured that any

solutions would focus on addressing the root cause of the issue.

3. The model tracked the change in risk at each site over time, which allowed for deteriorating sites to be identified. This was also a mechanism to check that a solution actually did reduce the risk once it was in place. The model allowed for informed decisions to be made that were directly related to asset performance, deterioration and consequence of failure.
4. The model provided a single view of the pumping station portfolio risk, providing all stakeholders with an opportunity to view and compare the current risk profiles.
5. The model was used for shorter term operations management. For example, in many cases a site had a high number of emergency work orders as a result of blockages. The Operational teams could then develop an optimised maintenance programme that included periodic cleaning of the wet well. If the blockages were regular, the Network Optimisation team could initiate a catchment investigation to identify the source of the blockages.
6. The model was used for longer term investment planning. The model allowed the organisation to identify potential future risks that may emerge and to develop a forward looking capital plan to address the issues before a risk is realised.
7. The model was used to develop emergency plans based on asset criticality. Sites that had a high consequence of failure would have emergency plans developed to ensure that if the site did fail, suitable responses were in place to limit the impact.

Conclusion

The cross functional team meeting and the risk model significantly improved decision making related to pumping stations. All pumping station stakeholders in the business worked together using a common methodology and risk information to inform decision making. The implementation of the model required a shift in the way the business made decisions about pumping stations and resulted in better cross functional working between all the stakeholders, with the model as the central tool.

Benefits

Credits

Graeme Kasselman – Thames Water

Risk interdependencies & cross functional working – City of Cape Town, South Africa

Introduction

The City of Cape Town (CoCT) is one of the largest municipalities in South Africa, providing a range of municipal services to a population of approximately three million people over an area of almost 2,500 square kilometres. The vast array of functions fulfilled by the municipality fall under a number of directorates and departments and involves a broad range of internal and external stakeholders. As such, the municipality is faced with a large number of hazards and risks, which are often a function of complex processes that extend beyond the direct influence of the municipality, a directorate or department. The size and scale of the city's operations, coupled with the complex and interconnected risks it faces, requires coordinated cross functional working, robust communication and open collaboration between internal and external stakeholders to ensure effective risk management.

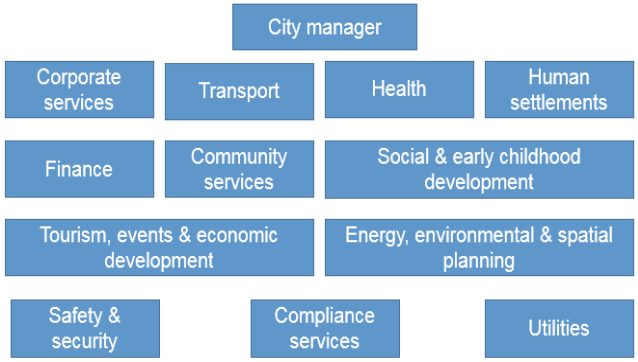
Population served
3 million
No. of departmental staff
4,000
Annual capital budget
R1 billion
Annual operational budget
R5.5 billion
Water treatment plants
13
Sewage treatment plants
26

Risk interdependencies

One of the major risks faced by the municipalities Water and Sanitation Department (WSD) is that of deteriorating water quality. Poor quality effluent from wastewater treatment plants and other industrial discharges can result in point source pollution. Diffuse pollution from catchment runoff, particularly from unserviced informal settlements is also a risk. This type of pollution is more challenging to identify and resolve. If the source of pollution is from storm water runoff, then the Stormwater & Sustainability team in the Transport for Cape Town Directorate would be responsible for managing the risk. A low priority water quality risk for the WSD or the Stormwater & Sustainability team can become a contributing factor for a high priority risk for the Health Directorate. Therefore in order for the health risk to be mitigated, an intervention will be required by the WSD or Stormwater & Sustainability team. Other directorates could also have a role to play, for example Housing or Spatial & Environmental Planning. It is then critical that cross functional and collaborative working between the various directorates and departments is well established to enable this type of risk interdependency to be identified and managed before it results in the outbreak of disease. In this example an integrated solution would be required that cuts across the multiple teams, departments and directorates. This is just one example of many risk interdependencies between directorates and departments that may have very different mandates.

The Integrated Risk Management team

The Integrated Risk Management (IRM) team sits within the Compliance Directorate within the CoCT management structure. One of the key objectives of the team is to facilitate cross functional working between the various directorates and departments to ensure that risk management does not become a stand-alone activity undertaken in organisational silos.



The team facilitates the identification and sharing of risk interdependencies across the municipality. To this end, they undertake a range of activities to coordinate risk management, which include:

1. The facilitation of risk workshops, where risk interdependencies are identified and categorised as "City Dependency" risks.
2. The identification of risk interdependencies through strategic risk assessments at a departmental level. This provides for mitigation measures to be identified at a strategic level.
3. The communication of cross cutting risk interdependencies to the relevant teams and risk owners. Risks above a certain threshold are communicated to the Risk Committee for consideration.
4. Ensuring that the risk owners and action plan owners follow the methodology outlined in the IRM framework.
5. The facilitation of cross functional working through regular team meetings and email communication between teams. This ensures communication channels are always open and a consistent message is given to all teams.
6. The use of quarterly prompt lists to stimulate lateral thinking and encourage a broad identification of risks.
7. The use of a consistent and integrated risk registers to allow for a diverse array of risks to be captured in a single unified platform for all stakeholders to make use of.

Furthermore, the CoCT is implementing a combined assurance system to improve overall risk governance over “City Dependency” risks and to provide a coordinated approach to all assurance activities across the entire municipality.

Enablers

The primary enablers contributing to the facilitation of cross functional working include:

1. Clearly defined roles and responsibilities included in the IRM policy, framework & implementation plan.
2. The regular reporting between the Risk Committee to the Audit Committee.
3. The bi-annual meeting between the Executive Director and the Mayoral

Committee, where strategic risk are an item on the agenda.

4. Continuous improvement through benchmarking the CoCT's risk management activities and cross functional working strategies against local and international best practice.

Challenges

The main challenges include:

1. Risk management is not an exact science but based on perception.
2. Silo thinking between departments and directorates.
3. Inconsistencies in risk maturity between departments.
4. Institutional red tape which complicates attempts to facilitate cross functional working.
5. Political decision making turnaround time.
6. The manipulation of risks and ratings to push individual and team agendas.

Benefits

Conclusion

The cross functional working facilitated between departments enables better decision making capabilities and allows for better utilisation of resources across the municipality. The efforts of the risk team allows for better risk reporting through the use of risk software, generating concise and actionable risk reports. Furthermore, the sharing of risk interdependencies reduces wastage within the municipality and works to minimize fraud and corruption. Through working in a collaborative fashion and embedding a culture of openness and sharing, the municipality is able to optimise their risk management.

Credits

1. Ludwig Geldenhuys – City of Cape Town
2. Maureen Noonan – City of Cape Town

YOUR NOTES

Project Risk Management

Managing risks in strategic projects

TCTA, South Africa

Introduction

The Trans-Caledon Tunnel Authority (TCTA) is a state owned-entity established in 1986 to give effect to the Treaty on the Lesotho Highlands Water Project. The TCTA operates within the regulatory framework of the National Water Act of 1998 and the Public Management Act of 1999. The organisation is accountable to the national Department of Water and Sanitation (DWS). The organisation's core business is the implementation of large scale bulk water schemes on behalf of the DWS. This includes the raising of capital and funding, management of risks and liabilities, as well as project implementation and management. One of the multiple projects that the TCTA currently manages is the Mooi Mgeni transfer scheme. The transfer scheme aims to augment the growing water requirements of the Mgeni system which supplies the water needs of Durban, Pietermaritzburg and the surrounding areas. The project is a huge undertaking involving an inter-basin water transfer between the Mooi and Mgeni Rivers, including a large dam on the Mooi River at Spring Grove. Such a large and strategically important project requires a robust approach to project management and the management of risk.

Enterprise risk management

The majority of TCTA's business is the delivery of projects. While the organisation will also have various strategic, operational and financial risks, a significant proportion of TCTA's risks are related to project implementation and management. The organisation is exposed to different types of project risks due to the uniqueness and complexities of each project. These project risks are managed in a formal and structured approach through the Enterprise Risk Management (ERM) system used across the organisation. The risk management process is guided by the ERM framework. The framework is reviewed on an annual basis in order to align with international best practice, ensure continuous improvement and to incorporate recent changes in the operating and regulatory environment in which TCTA functions.

Project risk management process

Since a significant proportion of TCTA's business is related to project implementation and management, it is important that project risks are identified and effectively managed. In order to provide reasonable assurance to all stakeholders that project risks are well managed and that there is independent analysis and monitoring, the Risk Management Department is involved in the management of project risks. The following process is in place to ensure that project risks are well managed:

1. The Risk Management Department schedules quarterly risk assessment workshops with all project teams.

2. The workshops are intended to provide all participants with an in depth understanding of project risks, in order to ensure that appropriate mitigation measures are developed.
3. The team members usually include the Risk Manager, Risk Officer assigned to the project, Project Manager, Cost Engineer, Project Engineer, Environmentalist, Project Financier, Social Analyst, external engineering consultants and contractors and a representative from the DWS.
4. The workshops provide a basis for integrating risk management and project management activities as there is overlap between these processes and procedures.
5. The workshops allow for cross functional decision making and the sharing of information about the status of project risks. Owners of the identified risks are able to validate the risk rating allocated to each risk by the group, and to update the risk rating if found to be inaccurate.
6. Thereafter, a Risk Officer assigned to the project will conduct regular meetings with the Project Manager and other team members, to update the project risks and identify any emerging risks.
7. The Risk Management Department carries out periodic site visits to monitor and audit the project to ensure the risk processes are being followed.
8. A project representative attends the Project Committee meeting to present the status of the project risks.
9. The Project Manager remains responsible for managing the risks associated with the project.

Phase	Responsibility
Project charter	The Risk Manager and responsible Risk Officer identify risks.
Project preparation	Risk Management team undertake risk workshop with project team and relevant stakeholders. The deliverable of this phase is a detailed risk register. The above process is reviewed quarterly or annually depending on the project life cycle and complexity.
Project implementation	The Risk Manager and the Risk Officer assigned to the project are involved in the identification and updating of risk registers on a monthly basis.
Handover for operation	The Risk Manager and the Risk Officer assigned to the project are involved in the identification of any risks that may emerge out of this process.

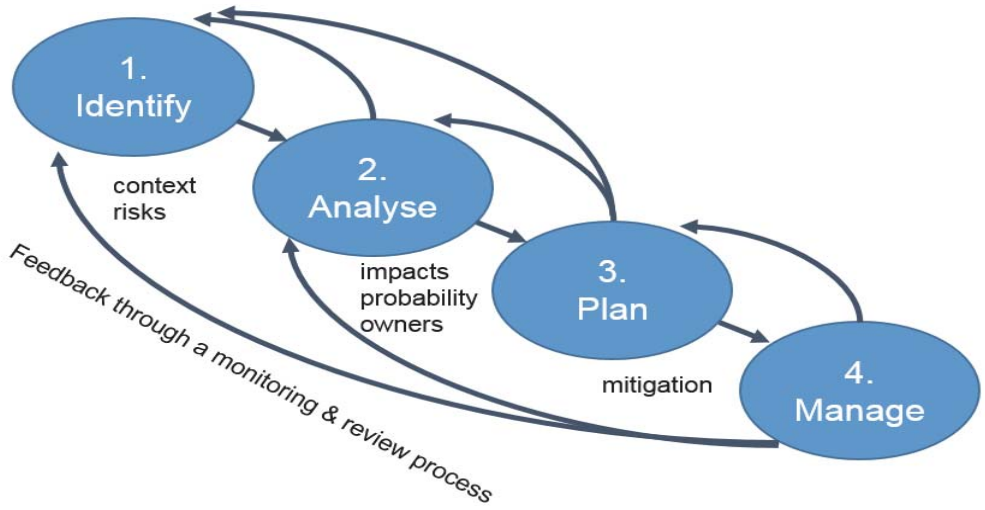
Project risk workshops

The following process is carried out at the risk workshops:

1. The project risk register is reviewed by working through each risk. If it is a new project then a new risk register is developed.
2. Project risks are identified and assessed, including the identification of their root causes, consequence and likelihood, inherent and residual risk and their overall impact on the achievement of project objectives.

3. Controls for managing risks are identified and documented.
4. New controls are proposed for those risks found not to be sufficiently managed.
5. Action plans are updated and allocated to a dedicated project team member.
6. A reasonable expected date for completion of the action plan is identified and documented.
7. The risk register is validated and signed off and then used for monitoring and reporting on progress and actions required to manage and mitigate the identified risks.

The primary deliverable of the workshop is an updated risk register for each project, covering all identified risks. This will include a description of each risk, root cause, likelihood and consequence, inherent risk rating, control measures and action plans and residual risk ratings. The risk register forms the basis of risk reporting to the relevant committees and for risk monitoring within a project and between projects across the organisation.



Enablers

The primary enablers that have contributed to the success of the project risk management approach are as follows:

1. Continued leadership support from the Board and Executive Management.
2. Having a risk management policy, framework and philosophy aligned to King III, ISO31000 and the COSO framework.
3. Dedicated project risk roles.
4. Combined assurance approach by the Risk team, Internal Audit team, Compliance team and Legal team.
5. Collaboration with other parts of the organisation.
6. Having an experienced and suitably qualified Risk team.

Challenges

The primary challenges encountered are as follows:

1. Organisational culture can lead to a resistance to change.
2. Sometimes project risk management is seen as a compliance exercise.
3. Difficulties in quantifying the value add of the project risk management process.
4. Lack of understanding of the role of project risk management stakeholders.
5. Lack of sharing of information that has serious impact on the organisation, whether positive or negative.
6. Lack of accountability for project risk management in some areas.

Benefits

Conclusion

The project risk management approach provides TCTA with the assurance that project risks are managed according to a robust, inclusive and comprehensive process. By following the process, the organisation ensures that it can successfully implement and manage a range of projects and, therefore, deliver on its strategic goals.

Credits

1. Nancy Mphuthi – TCTA
2. Xolani Ngonini – TCTA

YOUR NOTES

People & Resources

The role of a risk champion – City of Cape Town, South Africa

Introduction

The Water and Sanitation Department (WSD) at the City of Cape Town (CoCT) provides water and sanitation services to over three million people. The municipality has an Integrated Risk Management (IRM) framework and policy that is applied at an enterprise level across all directorates and departments. However the successful management of risks requires more than just having a policy and framework. It's important to have competent people in place within each department to facilitate the application of the policy and framework. Furthermore risk activities need to be coordinated within each department to ensure that there is consistency. To enable this to happen, the WSD has three risk coordinators and one risk champion.

Population served
3 million
No. of departmental staff
4,000
Annual capital budget
R1 billion
Annual operational budget
R5.5 billion
Water treatment plants
13
Sewage treatment plants
26

Role of the risk champion

The role of the risk champion is to:

1. Ensure that staff in the WSD is aware of their own roles and responsibilities regarding risk management.
2. Ensure the IRM methodology is being followed.
3. Provide easily accessible and understandable guidance and information to stakeholders.
4. Ensure that the risk register is available and accessible to stakeholders.
5. Provide feedback to the IRM team on the status of risk management and related actions within the department.
6. Provide feedback to the Utility Directorate risk champion in order for risk information to be escalated if necessary.
7. Ensure risk management is a standing agenda point on the department's management meetings and that risks are actively discussed.
8. Ensure all updates and changes are timeously made to the departmental risk register.
9. Develop integrated and collaborative action plans to breakdown silo working between teams within the department and facilitate communication between the various stakeholders within the department.
10. Manage risk interdependencies with the risk owner, IRM team and the risk coordinators.

Enablers

The primary enablers that contribute to the success of a risk champion role are as follows:

1. Support from senior leadership.
2. Support from the IRM team, which provides the policy, framework and software required for the risk champion to fulfil their role.
3. Effective change management programmes.
4. Communication and the sharing of information between staff within the department.
5. Training programmes to provide the necessary skills to manage risk.
6. The biannual meeting between the Executive Director and the Mayoral Committee which enables the sharing of risks.

Challenges

The primary challenges encountered by the risk champion are as follows:

1. The inherent error in human decision making which can lead to bad judgement in the identification and treatment of risks.
2. Overlooking relative cost and benefit when responding to risks and identifying controls.
3. Institutional red tape which complicates attempts to facilitate cross functional working.
4. The ability of management to override decisions.
5. Silo working within and between departments.
6. Political decision making can be slow.

Conclusion

The risk champion in the WSD is an important role as they ensure a consistent approach to risk management is carried that is aligned to the municipal wide IRM policy and framework. The role also fosters a collaborative and cross functional working environment. As a result risks and risk interdependencies can be better identified and managed, resulting in improved service delivery.

Credits

Nqobile Damane – City of Cape Town

Using performance contracts to ensure line of sight – Umgeni Water, South Africa

Introduction

Umgeni Water is the second largest Water Board in South Africa, located in the KwaZulu-Natal province. The organisation employs 996 people who all contribute to achieving the strategic objectives of the organisation. Due to the critical role played by the staff, it is important that each employee is aware of how their responsibilities contribute to the organisation's strategic objectives. To this end there must be overall alignment and line of sight between strategic objectives and the tactical day to day business activities. This helps employees to understand the connection between their role in the organisation and how this can contribute to being a successful water utility.

Population served
6,1 million
Annual capital budget
R1.9 billion
Annual operational budget
R1.8 billion
Water treatment plants
14
Sewage treatment plants
9
No. of staff
996

Performance management system

Umgeni Water implements a three-component performance management system which ensures that all employees have an understanding of the role and purpose of their jobs in relation to the organisation's strategy. Each year, following the review of the organisational strategy and key performance indicators (KPIs) and targets, all divisions and departments of Umgeni Water develop plans, indicators and targets. These are then further cascaded to individuals, who develop individual performance agreements all aligned to the team, department, division and ultimately the organisational objectives. The Board of Umgeni Water and the executive management team assess organisational and divisional performances against targets on a quarterly basis, whilst employee performance assessments are undertaken twice a year. The performance management process at Umgeni Water is development orientated, which is intended to cultivate effective human resources management and career development. As a result, appraisals are used to provide feedback and coaching to individual employees concerning their job performance.

Performance contracts

Umgeni Water ensures line of sight between strategic objectives and every day business activities through performance contracts for each staff member. Performance contracts are prepared jointly by the manager and subordinate and agreed to for an annual cycle. If the KPIs change during the year, the contract will be revised to

include the changes. The contract is then signed off by the employee and manager. An extract from a typical performance contract is shown. Column 1 shows the key performance area with the link to one of the organisational strategic objectives. Column 2 provides the link to the employee's objectives and column 3 shows the key deliverables and outputs.

Key performance area	Employee objective	Deliverable/Output
KPA 7: Infrastructure expenditure within target cash flows and completion dates.	Manage baseline risk assessments.	• Measure compliance against appropriate legislation and standards. • Verifying that staff conducts HAZOP studies of all new or modified processes. • Oversee staff completion of risk assessment studies. • Confirm that all recommendations are presented to customers.

All key performance indicators in staff contracts are linked directly to the organisational strategic key performance areas. Umgeni Water documents its performance indicators in a formal document that is guided by best practice and the National Treasury Framework.

1. These indicators are defined and the importance of the indicator to Umgeni Water is explained.
2. The indicator responsibility is indicated (i.e. the allocation of the indicators to divisions and its departments and employees).
3. The manner in which the performance calculation will be done and performance indicator assessed is explained.
4. Suggestions of the nature and type of support documents that validate performance information is communicated.

This significantly adds to the understanding of how strategy (vision, mission, intent, strategic objectives and outcomes) is translated into a scorecard (action plan with performance indicators, targets and responsibilities), and how the loop is closed through performance monitoring, evaluation and feedback.

Linking performance to reward

The business plan and scorecard are developed by holding workshops with senior managers, where the strategic objectives are communicated. Umgeni Water uses a balanced scorecard for strategic planning and performance measurement. Once this business plan is approved by the board, senior managers will present it to the staff in their respective areas. The Strategic Plan is also presented by the Chief Executive to all staff in an open forum. The company's performance, as measured by the balance scorecard results, is also presented to staff on a quarterly basis. Performance bonuses are paid subject to all of the following requirements being met:

1. The organisation's balanced scorecard targets have been substantially met as set out in the shareholder's compact.

2. The divisional balance scorecard targets have been met as per divisional business plans.
3. The individual performance targets have been met as per individual performance contracts, and
4. The organisation can afford to pay the performance bonuses.

Through this structured performance management process, Umgeni Water ensures implementation of its strategic goals through skilled, competent, motivated and committed employees, whilst recognising and rewarding good performance.

Enablers

The primary enablers are as follows:

1. Support from leadership for a sound business model that is based on international best practice yet aligned to national government frameworks.
2. Resourced strategy office, reporting to the Chief Executive that takes ownership of key processes in the business cycle that further ensures integration across divisions and enterprise-wide credibility.
3. Strategy clearly mapped to operations – embedded and documented as a policy document.
4. Performance indicators owned by the entire organisation from boardroom to shop floor.
5. Diligent and consistent implementation over the years, that has built maturity for the process in an already mature organisation with a credible legacy.
6. Performance results that demonstrate and affirm the model.

Challenges

Some of the challenges include:

1. There needs to be at least a 12-month lead time to build maturity with new employees.
2. Pros and cons of internal and external auditors – both add value and take away efficiency due to the amount of time spent with gathering, storing and providing documentation.
3. Policy and procedure documents too cumbersome – need to be summarised and reduced into quick reads as many people tend to ignore large documents.

Benefits

Conclusion

Umgeni Water's performance management system ensures overall alignment and line of sight between strategic objectives and the tactical day to day business activities. It has ensured sound internal controls that are maintained every year and has ensured reliable performance which can be validated and credibly communicated to stakeholders. Additionally the staff performance contracts have aligned all employees with the organizations strategic objectives and allowed them to see the value that their role adds to organization. This alignment with strategic objectives ultimately promotes retention, ensures consistency and enhances employee attitudes and performance at Umgeni Water.

Credits

Peter Thompson – Umgeni Water

YOUR NOTES

Organisational Culture & Leadership

Fostering a risk culture through a positive tone from the top – Stellenbosch, South Africa

Introduction

Stellenbosch is a local municipality situated in the Winelands District of the Western Cape. The area is an internationally renowned tourist destination attracting thousands of visitors a year to the regions wine farms. The municipality strives to deliver cost effective services that will provide the most enabling environment for all its citizens. Stellenbosch municipality has a robust risk management system in place that has grown from strength to strength over the last five years. The success of the risk maturity journey has been primarily driven by leadership's commitment to risk management. A strong tone from senior management and leadership has embedded risk management into the cultural mind-set of the organisation over the past few years. The culture is based on openness, transparency, collaboration, risk awareness and mindfulness. Leadership have created an enabling environment for risk management through various elements such as conveying consistent and positive messages and providing the relevant resources and budget for risk activities.

Population served
155,000
No. of departmental staff
1,092
Annual capital budget
R471 million
Annual operational budget
R1.2 billion

Key elements

The risk maturity journey has been facilitated by leadership in the following ways:

1. Risk management is driven from the highest possible level in the organisation; from Council and the Mayor. They have set the tone high up in the municipality and lead by example. These messages and attitudes have then been cascaded down through the different levels of the municipality, fostering an enabling environment for risk management activities to occur.
2. The Chief Risk Officer role is central to risk management across the organisation, facilitating risk management activities at an enterprise level and across all directorates and departments.
3. The Audit Committee has had an integral role in driving risk management and picking up on issues which hinder risk activities.
4. There is regular reporting to the Audit Committee and Council on risk activities.
5. Risk management is a standing item at the Director and Heads of Department meeting held every week.

6. Risk management is a standing item at the Municipal Managers meeting held every week.
7. The emphasis placed on risk management by the Western Cape Government, National Treasury and the Auditor General has driven the focus on risk management within the municipality.
8. The Municipal Finance Management Act of 2003, the National and Provincial Treasury processes including the Municipal Governance Review and Outlook (MGRO) process and the Local Government Medium Term Expenditure Committee (LGMTECH) advocates for a risk management approach, which has driven the focus on risk in the municipality.
9. The commitment to the requirements of the Blue Drop and Green Drop Regulatory programmes has ensured risk based approaches are undertaken in the Water and Sanitation Department.

Enablers

The primary enablers that contributed to the success of the risk management journey include:

1. Support from leadership and their interest in actively managing risks.
2. The perception from strategic leadership that risk management is a tool that adds value.
3. Interest and commitment from Council on how risks are managed.
4. Systems, circulars and legislation specific to risk management.

Challenges

The primary challenges are as follows:

1. Silo thinking and a lack of initiative and interaction.
2. Budget constraints.
3. Placing focus on the wrong risk issues, for example focus is placed on mitigating risks, which is not always the main issue.

Benefits

Credits

Helena Priem – Stellenbosch municipality

Conclusion

Leadership at Stellenbosch municipality fostered an enabling environment for risk management, creating a culture where everyone has ownership and responsibility for risk activities. This enabled the municipality to make more informed decisions and ultimately has improved the state of readiness of the municipality to deal with uncertainty.

The first steps to risk governance excellence - Mhlathuze Water, South Africa

Introduction

Mhlathuze Water is a Water Board operating in the KwaZulu-Natal province of South Africa. The area of operations covers approximately 37,000 square kilometres. The organisation is responsible for the provision of bulk water services to twelve key customers including local municipalities and major industry in the Richards Bay area. They also operate and maintain an inter-basin transfer scheme on behalf of the Department of Water and Sanitation, and operate and maintain a number of water and wastewater treatment plants for local municipalities.

As important stakeholders in the water value chain, Mhlathuze Water needs to manage a range of risks and opportunities across various functions and at various scales. Mhlathuze Water has robust and established governance structures in place, in the form of various committees, such as the human resource and remuneration, service delivery and the audit and risk committee. These serve to ensure the proper functioning of the organisation and to help realise the organisation's strategic objectives.

The audit and risk committee identified the lack of a formalised and structured approach to risk management as a key issue that needed urgent attention, especially to be compliant with the National Treasury Risk Management Framework.

As a result, Mhlathuze Water established a risk management unit in 2014 to start the journey to risk governance excellence. The first steps were critical as these built a solid foundation for future risk management activities. Mhlathuze Water has since dedicated a significant amount of time and resources to design and implement a risk management approach most suited to the organisation.

No. of customers
12 industrial and municipal
No. of staff
314
Annual capital budget
R134 million
Annual operational budget
R282 million
Water treatment plants
1
Offshore disposal pipelines
2

Key elements

The initial steps taken on the journey included:

1. Appointing a consultant to develop a formal risk management policy and framework to inform the risk management approach across the organisation.
2. Defining and communicating various risk related roles and responsibilities to stakeholders, such as the risk manager and risk champions.

3. The undertaking of risk assessments across all departments to gain a full understanding of the risks the organisation faced across key areas.
4. Cultivation of an awareness of the value of risk management through communication and regular engagement with staff.
5. The establishment of training programs to provide staff with the necessary skills to undertake risk activities.
6. The benchmarking of the risk function against other water utilities in the province to learn from what others are doing.
7. Undertaking continuous research to keep up to date with the latest information regarding risk management.

No.	Top 10 Strategic Risks
1	Availability of water in terms of quality and quantity
2	Power failure
3	Inadequate purified water storage capacity
4	Infrastructure failure
5	Increasing input cost (electricity, fuel)
6	Increased competition
7	Non-payment and/or bankruptcy of key customers
8	Environmental pollution effluent disposal
9	Inadequate document control management
10	Failure to effectively implement projects

Enablers & challenges

1. The primary enablers contributing to the success of the initial steps on the risk journey include:
2. Support from the Board, senior management and all the various Board committees.
3. The appointment of a dedicated risk manager and risk administrator to oversee and coordinate risk activities.
4. A well designed and fit for purpose risk policy and framework.
5. The identification and training of risk champions within each of the departments who facilitate communication and the management of risk activities.
6. Regular inter departmental meetings which facilitate cross functional working and the sharing of risks.
7. The addition of risk management as a key performance indicator for all managers.

Challenges

The major challenges that still need to be overcome include:

1. The linking of risk management activities with organisational planning, budgets and performance.
2. Difficulties encountered with aligning risk reporting with regulatory requirements.
3. The varying levels of commitment of some departments which results in inconsistency.
4. Poor integration with other business processes due to the low levels of maturity and unfamiliarity of the risk management system.

5. The high costs associated with risk reporting software.
6. Deciding on whether to report on inherent risk or residual risk.
7. The separation of risks from general safety and operational issues.

Benefits

Conclusion

The development of the risk management unit has created value for the organisation through enabling them to effectively identify and manage their risks, and make business decisions accordingly. Moreover Mhlathuze Water is now compliant with various regulations relating to risk management. The risk management function has resulted in a more collaborative working arrangement between departments due to the regular occurrence of meetings between departments. There is now more positive teamwork which has enhanced the organisation's cross functional working capability. The quarterly reporting of the risk function to the Board has provided regular insights into the key risks and allowed the organisation to plan their operations more effectively. A well designed risk policy and framework is required to define the overall approach to risk management, and these documents have outlined the crucial initial steps to develop a foundation for risk management at Mhlathuze Water. As Mhlathuze Water continues on their journey, their next steps include reviewing their risk management framework and policy in order to improve on its content. Furthermore, Mhlathuze Water aims to quantify risks in financial values, thereby linking risks to cost which could allow for further improvements in decision making.

Credits

Mimmy Zuma – Mhlathuze Water

References

Mhlathuze Water. 2014. Annual Report

Green Drop score improvement – Saldanha Bay, South Africa

Introduction

Saldanha Bay Municipality (SBM) is a local municipality situated on the West Coast of South Africa. The municipality provides water and sanitation services to a population of about 110,000 people in seven main towns. They purchase bulk potable water from the West Coast District Municipality and hence do not own any water treatment assets. They do collect wastewater, which they treat in seven wastewater treatment works, before discharging the treated effluent back into the environment.

Population served
109,966
No. of wastewater staff
30
No. of wastewater treatment sites
7

The Green Drop system

The Green Drop Regulation programme was established by the Department of Water Affairs in 2008 to certify the wastewater systems of water service authorities in South Africa. It is an incentive and risk based regulatory mechanism with the primary objective of improving wastewater effluent discharge quality.

Whilst the Green Drop assessment focuses on the entire business of the municipal wastewater services, the risk analysis focuses on the wastewater treatment function specifically. Risk based regulation allows the municipality to identify and prioritise the critical risk areas within its wastewater treatment process and to take corrective measures to manage these. A central part of risk management is having a wastewater risk abatement plan. Every two years, wastewater systems are assessed against defined criteria including wastewater effluent quality, process control and maintenance, wastewater quality failure response management, wastewater sample analysis and monitoring programme, bylaws and asset management.

Green Drop performance

The first Green Drop audit was carried out in 2009. The municipality scored an average of 59%. The table below shows the scores for each criterion in 2009.

Criteria	Saldanha	Vredenburg	Hopefield	St Helena	Paternoster	Langebaan	Shelley Point
Process control	A	B	B	B	C	B	B
Monitoring	A	A	A	A	E	A	A
Sample credibility	A	B	B	B	B	B	A
Sample submission	A	A	A	A	A	A	A
Quality compliance	E	E	E	E	G	E	E
Response management	A	E	E	E	E	A	E
Treatment capacity	A	C	C	C	A	A	C
Green drop score	75%	57%	56%	57%	39%	73%	57%

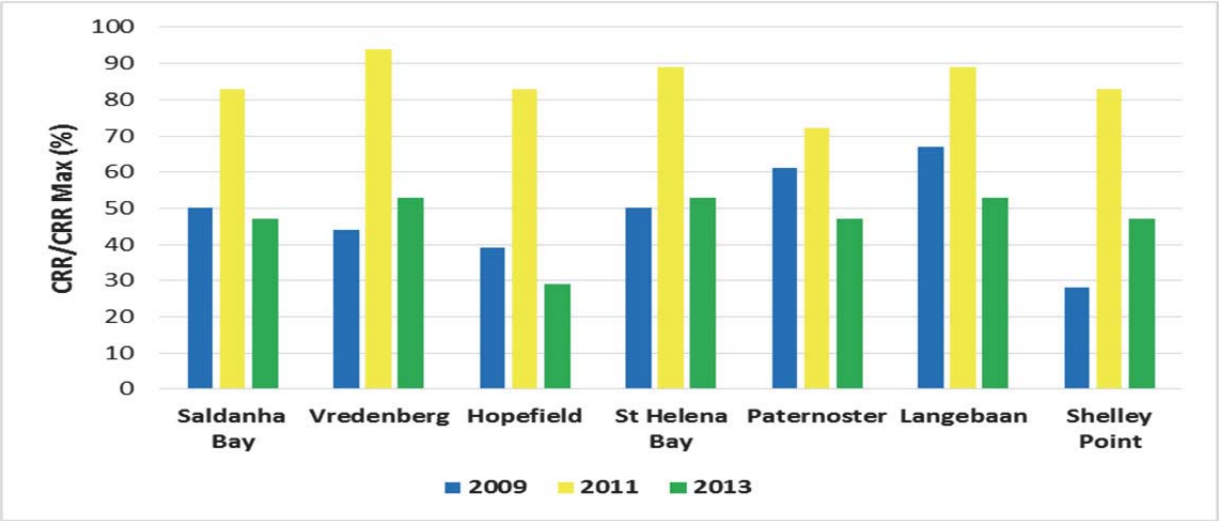
The results of the audit highlighted a number of areas of concern, in particular the low score for the compliance of the wastewater effluent quality to regulatory standards. There were also large variances between some sites for criteria such as response management and water quality monitoring programmes. The results suggested that the municipality was underperforming and there was a lack of coordination and ownership of activities and tasks. Significant improvements were required across most criteria. The 2011 audit highlighted that the municipality had digressed significantly in comparison with its 2009 performance, scoring just 39.1%. The municipality was unable to provide evidence of performance which is mostly due to the lack of record-keeping. Furthermore, process controller skills improvement was required together with registration as per regulation 2834 requirements. Finally the municipality needed to show improvements in the upgrade and expansion to its wastewater treatment systems; and to ensure affordable and appropriate technology options were implemented.

Steps taken to improve on their Green Drop score

The municipality recognised that their Green Drop scores were not improving and decided to actively implement various improvement initiatives. They used the 2009 and 2011 audit findings to develop an action plan. The problems associated with the poor scores in 2009 and 2011 were predominantly due to administrative issues and to a lesser extent due to the quality of effluent. Major problems were experienced with the loading of results onto the Green Drop system, the registration of process controllers, and the development of a wastewater risk abatement plan and the implementation of maintenance and refurbishment programmes.

The 2013 audit showed a marked improvement in all criteria at all wastewater systems, with the municipality scoring 80.5%. The following activities were undertaken that contributed to an improvement:

1. Firstly the municipality developed a wastewater risk abatement plan to ensure an integrated approach to the identification of hazards and risks, and the development of solutions and mitigation measures.
2. The plan was converted into maintenance and refurbishment projects to upgrade key assets that represented a high risk.
3. Each project had a timeframe, responsible person and dedicated budget. This resulted in a significant improvement in performance and a reduction in the risk rating at each of the wastewater treatment plants.
4. The municipality ensured the Green Drop system was regularly updated by the appointed laboratories.
5. Process controllers were put through training to develop the critical competencies required to manage risk. This initiative was done in conjunction with the Local Government Sector Education & Training Authority and the national Department of Water and Sanitation.
6. Finally the municipality dedicated time, resources and people to improve on their risk management and asset management capabilities.
7. The figure below shows the annual risk score for each of the wastewater systems. A score below 50% is deemed to be good. It clearly shows the deterioration in risk score between 2009 and 2011, and then the significant improvement in 2013. As a result of the improvements at the wastewater treatment sites, the final effluent quality result also improved since the last audit.



Enablers & challenges

The primary enablers which facilitated the Green Drop score improvement included:

1. Strong support from senior management and Council.
2. Sufficient budget and resources in order to make improvements.
3. Dedication from staff at the wastewater treatment plants.
4. A well drafted wastewater risk abatement plan which facilitated a proactive approach to the management of risks.

Challenges

The primary challenges were as follows:

1. Getting all the administrative requirements in place.
2. Registration of the process controllers which was a time consuming process.

Credits

Gavin Williams – Saldanha Bay

Benefits

Conclusion

By taking a proactive approach to risk management, and realising that risk management requires time, resources, budgets and skilled people, the municipality has significantly improved its Green Drop score since the first audit in 2009. As such the municipality is now in a robust position to further improve the way they manage risks to drive continuous improvements in the delivery of wastewater services.

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Department of Water Affairs. 2013. Green Drop Report 2013, Volume 1: Municipal and Private Wastewater Systems.

YOUR NOTES

Business Continuity & Emergency Preparedness

A climate change resilience strategy to manage water scarcity – Water Corporation, Australia

Introduction

Water Corporation is an Australian water utility providing water, wastewater and drainage services to over two million customers across the state of Western Australia. They are a business enterprise owned by the Western Australian Government and accountable to their sole shareholder, the Minister for Water. The utility has three pillars of their vision; water forever, zero footprint and great place. Rising temperatures and reduced rainfall, have a significant impact on the availability of water in most parts of the state, particularly in the capital city, Perth. Compounding this is the increasing demand for water from a growing population. Water Corporation realises that reliable water supply is critical to the economic and social stability of the state. Consequently, the utility undertakes a range of activities to build a climate independent water supply for the future.

Population served
2.5 million
No. of staff
2,852
Annual capital budget
$766 million
Annual operational budget
$880 million
Water treatment plants
81
Wastewater treatment plants
113

Risk management

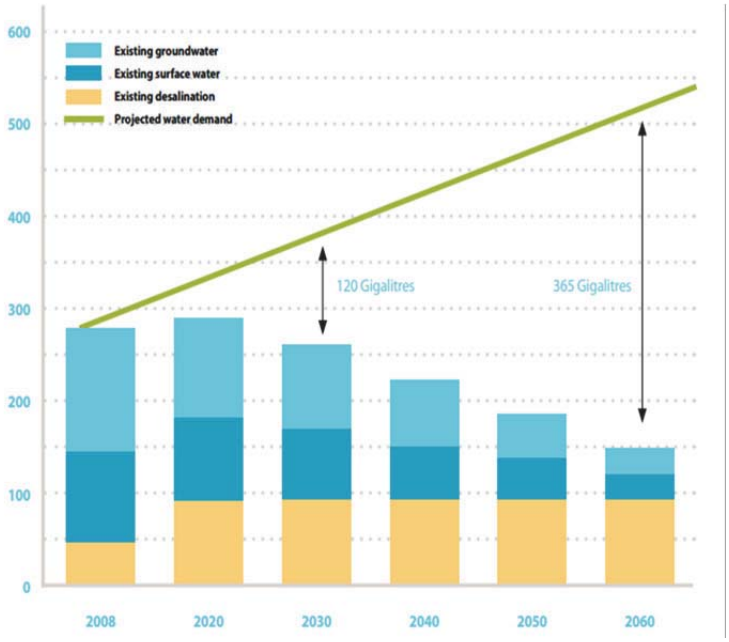
Risk management at Water Corporation is integral to corporate governance, strategic and business planning and the optimisation of operations. The organisation's policy on risk management sets the context for the business. The aim of the policy is to manage the risks involved in all business activities to a tolerable level and achieve a balance between levels of risk and reward. The policy allows for a consistent risk approach that cascades through the business to inform operational and investment strategy. Risk is used as a common language to make transparent investment decisions and trade-offs which support cost-effective solutions and the use of resources over the long term. The Water Corporation also has a risk management framework that is aligned to ISO31000. The framework defines the risk process to be followed, providing a structured and systematic methodology to identify and manage risks, and therefore implement the policy.

Impact of a drying climate

The state of Western Australia is faced with a drying climate that has depleted dam storage and shallow groundwater reserves in southern parts of the state. In 2010, Perth's major supply dams, which have a total capacity of 605 billion litres, received just six percent of their average annual inflow. Climate models indicate that a further seven percent reduction in surface water yields could occur by 2030. If water demand continues to increase, this would result in a supply deficit of 120 gigalitres.

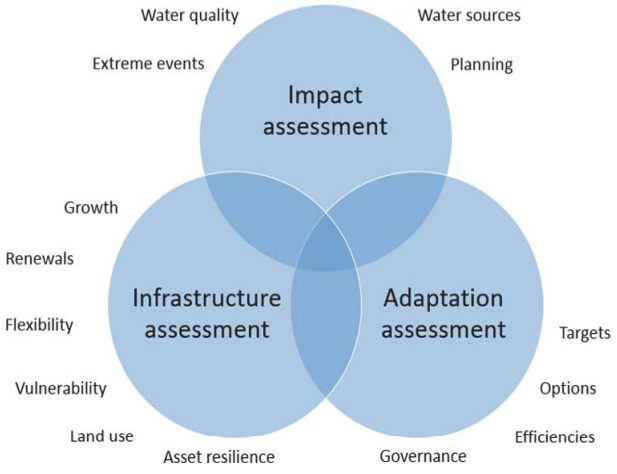
So the utility has needed to re-think the way new water sources are developed to manage risk and make them more resilient to the vagaries of the weather. When considering water supply risks, Water Corporation considered a range of factors including:

1. Temperature projections and rainfall patterns from the Commonwealth Scientific and Industrial Research Organisation's climate models.
2. Population growth forecasts.
3. Projected water demand.
4. Government policies and legislation on climate change.



In an effort to identify and manage the diversity of risks from the drying climate, the organisation undertook an integrated approach across multiple levels of the business. Firstly they undertook an impact assessment to assess climate pressures. This was followed by an infrastructure assessment to look at their assets and land uses. Finally they undertook an adaptation assessment to identify adaptation measures. The figure below reflects the different factors considered when the impact assessment, infrastructure assessment and adaptation assessment were undertaken.

The outcome of the assessments was the development of the Water Forever Strategy. The strategy provided a clear long term view of climate resilience, with a 50 year timeframe. The strategy brought risks around the drying climate to the forefront and identified approaches to mitigate these risks. For example, the strategy recommended increasing the proportion of water to be delivered from sources which are independent of rainfall, such as recycling and desalination.



Enablers

The primary enablers that contributed to the success of the Water Forever strategy were as follows:

1. The focus was on all hazards and risks associated with the drying climate through the value chain including water sources, water treatment, water distribution, water use and wastewater.
2. A completeness check was undertaken to check that all elements associated with their operations had been considered.
3. A thorough risk process was carried out that considered the root causes, contributing factors, consequences, likelihoods and controls.
4. Having an established and embedded risk approach defined in the corporate risk policy, framework and associated risk assessment methodology.
5. Support from leadership reflected through the following quote from the Chairman in the 2015 Annual Report “I am pleased that our past work and programs have made us highly resilient to whatever the climate chooses to throw at us. Our willingness to address this difficult issue in a timely way means we are in excellent shape to face the future with confidence”.

Challenges

The primary challenges associated with development of the Water Forever strategy were as follows:

1. A lack of a common understanding of performance measures associated with tolerances and targets, which acted as a barrier to achieving targets.
2. The complexities of water supply systems and the multiple factors which influence these systems made it challenging to identify some risks and mitigation measures.
3. Challenges working with some external stakeholders and customers to collectively prepare for future impacts.
4. Challenges around identifying and developing ways to improve preparedness for future impacts.
5. Some inconsistencies in the line of sight at different levels in the organisation.
6. Lack of a set of common guidelines for managing the impacts of climate change, both from a water sector perspective and at a corporate level. There is a need to provide the water industry with consistent, clear and authoritative guidance on how to build climate resilience into operations.

Benefits

Conclusion

By considering the impact of the drying climate risks on the organisation, the Water Corporation was able to develop a strategy to allow the organisation to prepare for the uncertainties of the future and to build resilience to these climate impacts. Furthermore, it provided clearly articulated information of the causal factors that can and cannot be mitigated. The strategy provided assurance to the shareholder and customers that climate change had been considered.

Credits

Mandy Damant – Water Corporation

YOUR NOTES

Performance Management

The MGRO process – Western Cape Government, South Africa

Introduction

The Western Cape Province is one of nine provinces in South Africa. The province provides services to the people of the Western Cape; working with the national government and municipalities in the Western Cape to ensure that the citizens of the province have access to the services, facilities and information they need. The Western Cape Government (WCG) is responsible for creating laws for the province within its realm of responsibilities, including amongst others, health services, housing, police services, regional planning and development, tourism, transport, welfare services and infrastructure development. The province consists of five district municipalities, 24 local municipalities and one metropolitan municipality. Each of these municipalities are defined as local government and are autonomous in terms of the way they manage their affairs. The provincial government plays a support role to the municipalities; ensuring services are delivered effectively, efficiently and with consistency.

Objective of local government

The role and purpose of local government is captured in section 152 of the Constitution of South Africa. The objectives are to:

1. Provide democratic and accountable government for local communities.
2. Ensure the provision of services to communities in a sustainable manner.
3. Promote social and economic development.
4. Promote a safe and healthy environment.
5. Encourage the involvement of communities in the matters of local government.

A municipality must strive, within its financial and administrative capacity, to achieve these objectives. In addition, they need to do so whilst demonstrating sound financial and risk management. The Municipal Finance Management Act of 2003 states that the Accounting Officer is responsible for establishing and maintaining effective, efficient and transparent systems and internal controls for financial and risk management. These requirements usually are interpreted to relate to financial and fraud risks. Although negative perception of local government prevails, there have been substantial achievements made over the last few years to improve audit outcomes and service delivery. Embedding a transformed system of developmental local government is a major undertaking, one that requires time and resources.

Municipal governance review & outlook

The Western Cape Government recognised that the local municipalities within the province would require assistance to ensure they achieved their objectives, improve service delivery, improve risk management and importantly improve their audit outcomes. To this end the municipal governance review and outlook (MGRO) process was developed. The process was intended to drive a single-minded focus on good governance across all the municipalities, ensuring their activities aligned to and supported national and provincial strategies and objectives. The process would require collaboration between the municipalities, Provincial Treasury (PT) and Department of Local Government (DLG). The municipal Accounting Officers and their executive management team would own the process, which would drive an improved level of commitment to addressing governance deficiencies within their municipalities. The MGRO process was formally adopted by provincial political representatives, the Premier and the municipal Mayors in 2012.

Key elements

1. Based on an annual self-assessment performed by municipalities against the criteria in the MGRO maturity model.
2. The model defined six maturity levels from level 1 (start-up) to level 6 (optimising).
3. It focuses on the processes and controls that need to be in place within a particular level and gives guidance as how to progressively improve from one maturity level to another.
4. A large focus of the criteria is on risk governance activities and compliance with corporate governance requirements.
5. Provincial Treasury would perform a validation assessment.
6. Provides a tool to assist municipalities in the proactive identification gaps in compliance with national and provincial legislation, regulations, guidelines and standards.

Continuous improvement

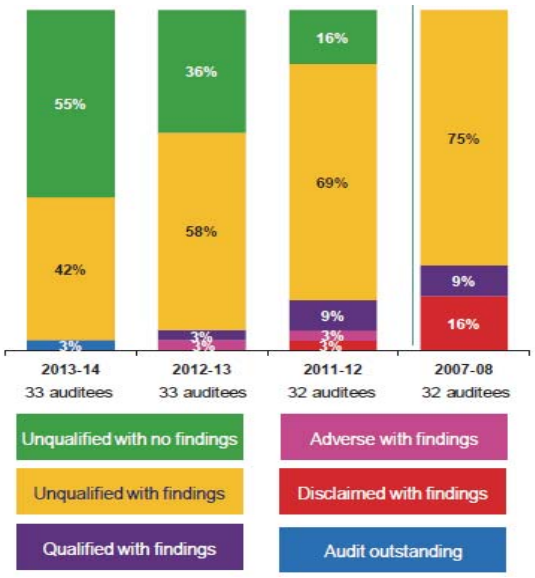
Municipalities in the Western Cape use the annual MGRO audit as an independent check of their risk governance activities. Since its inception in 2012 the MGRO process has resulted in improvement in municipal audit outcomes. 55% of audits are now unqualified with no findings, compared to just 36% in 2012, 16% in 2011 and 0% in 2007. The process has also improved and strengthened relationships between municipalities and WCG with more collaboration between all stakeholders to address challenges in a more effective and efficient manner. Access to and the sharing of information has assisted in the development of standardized response strategies to address municipal performance failures, including better ways to manage risk. Some examples of improvement initiatives include:

1. Supply chain management regulation 44.
2. Piloting of the electronic annual reporting template.
3. Standard set of key performance indicators.
4. Development of an expenditure charter.
5. Development of one supplier’s database.
6. Development of long term financial plans.
7. Development of training programmes.

Benefits

Conclusion

In order for local government to successfully achieve their goals, it is essential that good financial and risk governance practices are undertaken. Leadership for both the municipalities and provincial government has helped to build a more professional local government that embraces the concepts of transparency and accountability. All municipalities in the Western Cape region are assessed and many have benefited considerably from the strategic and independent advice provided by the provincial government. The MGRO process has played an important part in improving municipality performance and risk governance activities and will continue to be used in the future to drive further improvements.



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1. Aziz Hardien – Western Cape Government
2. Melissa van Niekerk – Western Cape Government
3. Western Cape Government. 2015. MGRO presentation.
4. Auditor General. 2014. General report on the local government audit outcomes for the Western Cape.

YOUR NOTES

Lessons Learnt & Conclusion

Lessons Learnt

The table below summarises some of the main lessons learnt on good risk governance practices in the water sector.

Criteria	Case study	Lessons learnt
Strategic planning	Scenario planning for the future of urban water at Sydney Water	Planning for a range of potential future scenarios and taking into account a range of trends is critical for the successful provision of water services into an uncertain future. Scenario planning is a useful tool to strategically plan. It is best done through workshops with a range of stakeholders.
	Risk appetite and tolerance at Umgeni Water	Defining and communicating risk appetite and tolerance is important to understand how much risk the organisation is willing to take and how to balance risks with opportunities and rewards. A risk appetite and tolerance framework that provides a standard approach is highly beneficial. Risk heat maps are an effective way to graphically represent appetite and tolerance levels and provide a clearer view of the reward versus risk equation.
Risk Management Policy & Framework	Risk Policy and Framework at the City of Cape Town	A risk management policy, framework and implementation plan at an enterprise level can provide assurance that risks are being suitably addressed. It is important that clear reporting lines and responsibilities for risk activities are in place. The policy and framework need to be developed for the organisational context and cannot be copied from another organisation.

Risk Based Decision Making	Gateway process for risk based decision making at Thames Water	Investment decision have the most impact early on in a project lifecycle as there is the biggest opportunity to impact scope and cost at the beginning. The six stage Gateway process allowed sound investment decisions to be made based on an assessment of risk and value at key points.
Risk Based Decision Making	Managing water quality risks at the Inkomati-Usuthu Catchment Management Agency	Engagement with a wide range of stakeholders across a catchment can allow for an inclusive approach to the management of water quality risks down the water value chain. Staff with expertise and competencies in a broad range of fields is necessary to manage risks associated with water quality.
	Using a sludge optimisation model to manage risk at Yorkshire Water	A model that simulates a key process in water and wastewater treatment can be used to identify and manage risks and optimise performance and cost. A model can provide a single view from which all stakeholders could see the impact of their decisions. A model can provide a risk based assessment of asset criticality through providing the financial consequence of an asset failure.
	Risk based decision support tool at Thames Water	Models and tools can assist in integrated decision making, often being the catalyst to bring different teams together. Asset management decision making must find a balance between cost, risk and asset performance, and therefore tools and data analysis are required.
	Risk interdependencies & cross functional working in the City of Cape Town	A large organisation can benefit greatly from an enterprise wide risk management team to enable cross functional working and breaking down silos. Tools such as risk workshops and strategic risk assessments can identify key risk interdependencies and create a platform for cross functional working. Consistent and open communication channels are important to embed a risk culture based on sharing and collaboration.

Project Risk Management	Project risk management at the Trans Caledonian Tunnel Authority	It is highly beneficial to have a project risk management process in order to provide a formal and structured approach to project risk management. Dedicated project risk roles can ensure that people are held accountable.
People & Resources	The role of the risk champion in the Water & Sanitation department at the City of Cape Town	A risk champion or co-ordinator within a department will assist with the co-ordinating and facilitating risk of activities and ensuring risk information is available to all staff. A risk champion or co-coordinator can play a role in enabling cross functional working and the sharing of risk interdependencies.
Organisational Culture & Leadership	Fostering a risk culture through a positive tone from the top at Stellenbosch Municipality	A strong involvement and example set by leadership is fundamental to provide direction and guidance for an organisation's risk management system. Risk roles such as the Chief Risk Officer and Audit Committee play a central role in driving risk management and picking up on issues which hinder risk management.
	The first steps to risk governance excellence at Mhlathuze Water	Developing a formal risk management policy and framework is fundamental to implementing a risk management system. Providing training for employees to gain skills to undertake risk management is important when starting on the risk journey as people are the most important assets. Cultivating a risk aware culture through regular communication and engagement with staff is crucial.
Organisational Culture & Leadership	Green Drop score improvement at Saldanha Bay Municipality	A well drafted wastewater risk abatement plan can help in providing direction and guidance to improve on wastewater effluent quality. Assigning timeframes, responsible persons and dedicated budget to projects contributes to their success. Providing training for technical roles, such as process controllers, to develop the critical

		competencies required to manage risk can enhance the overall risk management at an organisation.
Business Continuity & Emergency Preparedness	A climate change resilience strategy to manage water scarcity risks at Water Corporation	When considering climate related water supply risks, it is important to consider a range of factors through the water value chain. A long term resilience strategy informed by a range of assessments can be beneficial when managing the impacts of a changing climate on the provision of water services.
Performance Management	The MGRO process at the Western Cape Government	Guidance and leadership from provincial and national government is critical to assist small municipalities to achieve better audit outcomes and to provide an independent check of risk governance activities.

Conclusion

South Africa provides a unique, dynamic and challenging physical, political and socio-economic environment in which to manage the complex risks associated with the provision of water and sanitation services. The challenges highlight the need for a paradigm shift in the manner in which water is managed. More specifically the better management of risks within a wider system of good governance may provide the opportunity to facilitate solutions and ultimately to secure the efficient provision of water and sanitation services in South Africa.

There is considerable value when risk management and governance approaches are integrated with other business functions, such as strategic planning, water quality management, finance, climate change, asset management and supply chain management. In the complex, interconnected and globalised world of today, the water sector in South Africa can greatly benefit from an approach that offers value across every function of the organisation. The journey to risk governance excellence in South Africa is thus a vital one on which to embark.

The challenges of implementing successful risk management and governance approaches in the water sector are well documented. Literature indicates that the journey is demanding and can take many years, and requires strong leadership, a clear vision, a well-designed implementation plan, commitment and resources to implement the plan, good governance structures, open and transparent reporting mechanisms and engagement with all stakeholders. Moreover it indicates that a culture of risk needs to be deeply embedded in the organisation, which involves changing the mind sets of employees and other stakeholders. This compendium provides an insight into what can be achieved when risk management and governance is a central part of the organisation, and will hopefully provide some inspiration to water utilities to start their own journey to risk governance excellence.


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