



Learning Alliance Briefing Note 11: Scenario Building (draft)

Prepared by Charles Batchelor and John Butterworth

Introduction

“Nothing is more obvious than the unpredictability of the future”¹. In planning processes, we just cannot escape from the dilemma that all our reliable knowledge is about the past, whilst all our decisions are about the future. Arguably, uncertainty in the water sector has now become so pronounced as to render futile, if not counterproductive, planning processes that are based on probabilities and extrapolation of current trends. Or put another way, unique forecasts of factors influencing water supply and demand can and should not be relied upon.

So, what can we do? One option is to use scenarios and scenario building as an integral part of planning processes². In the context of integrated urban water management, the main purpose of scenario building is to enable a learning alliance³ or a stakeholder platform⁴ to identify, evaluate and take explicit account of a whole range of uncertain factors that might either support or derail strategies and plans that are aimed at achieving a shared vision⁵.

Scenario building is essentially a team exercise that can help a group of stakeholders to come to terms with uncertainty and risk in a planning process. In particular, scenarios can be used to identify the *most uncertain* and *most important* factors that are outside the direct control of the stakeholders. Experience has shown that it is these uncontrollable factors that are more likely to disrupt plans rather than factors that, although very important, are predictable and under the control of stakeholders tasked with implementing strategies and plans.

¹ From: http://buildnet.csir.co.za/cdcproc/docs/1st/ratcliffe_js.pdf

² A scenario is a plausible and internally-consistent description of a possible future situation, a story about the way an area or domain of interest might turn out at some specified time in the future. *Scenario building or development* is the process of developing scenarios.

³ A *learning alliance* is a group of individuals or organisations with a shared interest in innovation and the scaling-up of innovation, in a topic of mutual interest.

⁴ A *stakeholder platform* provides a forum for stakeholder dialogue, conflict resolution and integrated planning. In a practical sense, a stakeholder platform usually takes the form of a committee that meets routinely.

⁵ A *vision* is a concise description of a desired future state.

Scenario building forces stakeholders to confront key beliefs, to challenge conventional wisdom and to really think outside the box (rather than just say that they are doing this!). It also forces stakeholders to think imaginatively and systematically about the multitude of inter-sectoral issues and factors that, in the future, have an increasingly important impact on the water sector (e.g. peak oil⁶ or climate change).

Whilst scenario building is used routinely throughout the fields of industry, commerce and government, its use in the water sector and urban planning is still relatively limited. In these other sectors, scenario building no longer regarded as gimmick but as a methodology is taken very seriously. The result being that, scenario building is an integral part of planning processes and time and other resources are routinely allocated to develop the skills required to construct and use scenarios effectively.

Scenario building can be a very creative and enjoyable process that inspires stakeholders into identifying and discussing uncertainty and risk. Whilst a scenario process should not ignore lessons learnt from early projects and programmes, it is important that stakeholders recognise that the future rarely resembles the past. Adaptation to change is feasible if the changes processes are slow and predictable (i.e. based on current trends or frequencies of occurrence). Problems really start to kick in when change is rapid and unpredictable. This is when scenario building shows its real worth as part of a planning process.

Getting started

Facilitation. In most cases, scenario building requires facilitation that includes organising and facilitating stakeholder meetings and workshops, documenting the outcomes of these events and circulating resulting materials to the participants. Ideally, facilitators will have a good knowledge of the water sector and training and experience in the use of facilitation techniques.

Specialist support is often needed to prepare materials for meetings and workshops. These materials can include reviews and copies of existing scenarios for the area or domain of interest. Specialist support may also be necessary to ensure that scenarios are internally consistent and based on accurate evidence and knowledge (rather than hear say and intuition).

⁶ *Peak oil* is the point in time when the maximum rate of global petroleum production is reached, after which the rate of production enters its terminal decline

Accra Scenarios for 2030

Scenario I: Accra in 2030 is a depressing, chaotic and crisis prone town. Severe water shortage is the norm, with an outdated and under-designed water supply system failing to meet the needs of a population that has exploded to 5 times its 2007 level. Adequate sanitation seems an increasingly distant dream – with the majority of residents lacking access to the most basic facilities. Ever increasing quantities of urban waste lie uncollected in the streets, and outbreaks of cholera and other diseases are an annual occurrence in the city's high density slums. Lack of effective political leadership, coupled with poor economic performance and severe poverty mean there is little ability to tackle deep seated problems of under-investment and poor management of water supply and sanitation infrastructure. Problems are made worse by lack of raw water resources due to increased competition and a 20% reduction in river flows.

Scenario II: Accra in 2030 is a city facing serious water and sanitation related challenges, but quite confident in its ability to meet them. Very rapid population growth, fueled in part by strong economic performance based on oil wealth, has led to sharply increased demand for water (10 times what it was in 2007). This demand has been increased by the growth in the tourism and manufacturing sectors. However, while rapid, growth has not been chaotic due to a marked improvement in political culture and related enforcement of planning laws and other regulations. Climate change, and competition for water from outside the city, has led to a modest reduction in overall water resource availability which together with the strong growth in demand presents a major challenge. These challenges are compounded by low access to finances and shortages of land for new infrastructure. However, improved management and capacities within GWCL and AMA, new technological options, and engaged and empowered citizens inspire confidence that solutions will be found.

Scenario III: Accra in 2030 poses a range of serious challenges to water managers and service providers. Steady population growth means three times more people live in the city than in 2007, while overall demand has grown four-fold, driven also by tourism and industry. Economic growth has been reasonable, fuelled in part by new oil wealth. However, oil wealth has also led to a marked deterioration in the quality of public life, with a lack of trust developing between citizens and leaders. This lack of trust spills over to all those institutions associated with 'the government', resulting in low levels of willingness to pay for services, and high levels of illegal use of water infrastructure. High demand for water coupled with serious reductions in flows in the Volta and Densu mean a constant shortage of raw water, much of which is then lost in an antiquated pipe network. Financing is difficult to come by, and coupled with lack of willingness to pay, leaves utilities constantly cash strapped. Lack of land for new facilities and a lack of enforcement of existing regulations mean that pollution from the growing mountain of waste is widespread and disease outbreaks are on the rise.

Scenario IV: Accra in 2030 is in many ways a blessed city. Contrary to the fears of many in the early 2000s, the city's population growth has been high but manageable (2.5 times 2007 levels). The frequent power-shortages of the early 2000s are only a distant memory. A sharply improved political culture has led to improvements in enforcement of planning laws, whilst policy is seen as progressive. This, coupled with strong economic growth (partly driven by increasing oil wealth) has led to marked improvements in citizens' willingness and ability to pay for water and sanitation services. Challenges do exist. Overall water resource availability is reduced, and high losses from the pipe network remain a problem. It continues to be difficult to source the necessary financing to upgrade the city's infrastructure, and access to land for waste processing facilities and new networks is a constant problem. Nevertheless, there is guarded optimism about the ability of the city to deal with these problems

Developed by the Accra Learning Alliance in August 2007

High-level support. Ideally, to have credibility and legitimacy, the group of stakeholders, learning alliance or stakeholder platform involved in scenario building should include or have the support of democratically-elected representatives.

Marginalised groups. Similar to above, the group of stakeholders, learning alliance or stakeholder platform should be gender aware and proactive in involving or representing marginalised social groups.

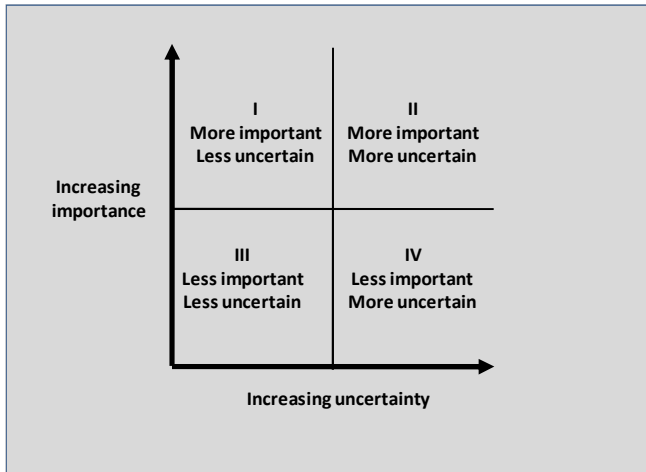
Methodology

Although scenario building can be carried out as a stand-alone activity, it is normally used as part of a planning process. Ideally, scenario building follows the development of a shared vision and an initial assessment of the status of water resources and trends in water supply in demand in an area or domain of interest. There are many different methodologies that can be used to build scenarios. These all have their advantages and disadvantages. However, a generic stepwise approach to scenario building is as follows:

Step 1: Brainstorm factors. As part of a card exercise in a stakeholder workshop, brainstorm all the factors that will affect achievement of a vision. This brainstorming should be wide ranging (i.e. thinking outside the box). During this step, it is often useful to ask stakeholders to consider factors that had a bearing on the success or failure of ongoing or completed projects or programmes. At the end of this brainstorming, ask stakeholders to discuss whether some factors should be discarded on the basis that they have no relevance to the implementation of an integrated urban water management strategy and/or to the area or domain of interest.

Step 2: Separate the factors into local and external factors. As a continuation of the card exercise in Step 1 (i.e. using the same set of cards), separate the factors into local and external factors. *Local factors* are those that can be controlled or mitigated in some way by the stakeholders themselves (e.g. lack of skill or capacity can be overcome by organising a capacity building programme). *External factors* are those that are outside the control of the stakeholder (e.g. climate

change, global economic trends). The difference between these two types of factors can be fuzzy, so do not be overly dogmatic. If it goes well, this discussion can be highly illuminating for a group of stakeholders because it helps them to differentiate between the perceived and actual boundaries on the control that they may have over implementation of an integrated urban water management strategy.



Step 3: Rank factors according to importance and uncertainty. As part of the card exercise, classify the external factors according to the figure (above). This figure can be drawn up as a wall chart to which cards are attached. The factors in the upper-right quadrant (the more important and more uncertain) are used to differentiate between possible futures described by the scenarios. On the basis of discussion, it is preferable to limit these more important, more uncertain factors to two or three, as this reduces the number of possible combinations and hence scenarios. It is advisable to take time over this exercise because strong differences of opinions can occur. If it is facilitated well, this exercise provides an opportunity for lively discussion around these differences of opinion and, over time, for consensus to be reached.

Step 4: Agree on the states of external factors. Discuss and fix different future states for each of the “more important, more uncertain” external factors that were selected in Step 3. These states should be the realistic upper and lower limits of these factors at a specified time in the future. These values can be set on the basis of the views of the stakeholders, expert opinion, rigorous statistical analysis⁷ or some combination of all of these methods. In other cases, it makes sense to adopt values that have wider government, scientific and/or public recognition⁸.

⁷ For example, analysing probability distributions relating to the factor of interest.

⁸ For example, OECD forecasts for economic growth or IPCC forecasts for climate change

Step 5: Create outline scenarios. The outline scenarios are created by taking the all possible combinations of the states of the selected external factors. So, if two external factors have been selected each with two states, the number of outline scenarios will be four. If three external factors have been selected each with two states, the number of outline scenarios will be nine.

Step 6: Create narrative scenarios. After the workshop, a nominated individual or small group with good writing skills should convert the outline scenarios into narrative scenarios. This is achieved by adding a background story to each of the outline scenarios. This background story should be based partly on the less important and less uncertain factors that were identified in Step 3. The background story should also use information on the area or domain of interest.

Step 7: Naming the scenarios. Select evocative and memorable names that represent the essential logic for each scenario. Meaningful and vivid names stand a better chance of being accepted, remembered and used by stakeholders during planning processes. It is best, however, to avoid using titles such as “good”, “bad” or “most likely” because one strength of a good set of scenarios is that each should be plausible. Or put another way, all scenarios should be equally valid (although not necessarily equally likely to occur) and, therefore, a truly robust integrated urban water management strategy must enable the vision to be achieved under all of the scenarios.

Step 8: Test and evaluate the scenarios. Review available information to check the validity of the descriptions of external factors and the values that have been given to the states of the most important and most uncertain states. Check the internal consistency of individual scenarios again by reviewing published information or by using modelling techniques. Finally disseminate the scenarios to the groups of stakeholders and specialists and ask for feedback on their plausibility and validity.

Lodz scenario external factors for 2038

More important, more uncertain external factors	Lower and upper states
Macro-economic status	Current GDP (Euro 4,800)
	GDP that is the same or above the EU average (Euro 22,860)
Macro water governance framework	Current fragmented approach. Low-level political support for IUW governance
	IUW governance that has political support at all levels and leads to effective implementation of the WFD

Characteristics of a good scenario

Although there are many different processes that can be used for scenario building, scenarios that can improve planning process have certain common characteristics. These include:

- The scenarios have a logical structure and are internally consistent;
- The scenarios are equally plausible and take full account of existing information and knowledge;
- The scenarios are a mix of narrative and numerical information. As such, they can be used for specialist activities (e.g. as a basis for modelling the ability of strategies to achieve the vision under different scenarios) and non-specialist activities (e.g. as a component of awareness campaigns);
- Whilst the scenarios may take account of a wide range of factors, they give particular weight to the most important and most uncertain factors that are outside the control of the stakeholders who are ultimately responsible for implementing the resulting plan;
- In the context of a planning process, good scenarios will always challenge and surprise. Bad ones merely confirm current conceptions and perpetuate personal prejudices.
- The scenarios have the ownership of the stakeholders and the narratives have a local flavour.

Challenges and tensions

A well-crafted set of scenarios is said to lure decision-makers outside the comfort and familiarity of their traditional mind sets. In so-doing a number of challenges and tensions can come up. These include⁹:

- *Present versus future.* Decision makers have to respect and reconcile simultaneously present realities with the logic of plausible futures. This requires a good understanding and analysis of drivers of change.
- *Closed versus open-ended.* Scenarios can be constructed with very specific strategy decisions in mind, or they may be developed to help decide which strategy decisions should be analysed.
- *Grounded versus imaginative.* Good scenarios are both thoroughly researched and thoroughly imagined, whilst bad scenarios rely too heavily on uninformed speculation and are poorly researched. However, a balance between detailed study and unfettered creativity needs to be struck.
- *Intellectual versus emotional.* In a similar vein, scenarios are necessarily an intellectual and analytical activity, but they must attempt also

capture the emotions of those who develop and implement them.

- *Advocacy versus dialogue.* Good scenarios are likely to be built when individuals advocate their point of view and argue the importance of different factors. However, once scenarios have been selected, a more reasoned dialogue is needed among all those concerned.
- *Scepticism versus expertise.* Expertise is essential in the analytical process of scenario building, but because the future can be so different to the past, a healthy scepticism should be maintained about the pronouncements, judgements and assessments of experts. This scepticism should compel decision-makers to reflect critically upon each scenario's logic and plausibility.
- *Probability versus Plausibility.* One of the most contentious debates concerning the use and development of scenarios centres on the assignment of probability to the final scenarios. One school of thought argues that not assigning probabilities is a 'cop-out' because probabilities give decision makers important information on which to base their strategies. Another school believes that assigning probabilities is a 'hangover' from the days when forecasters really thought they could predict the future. In most cases a balance needs to be struck between basing scenarios entirely on statistical analysis and ignoring statistics altogether.

Tips and tricks

Separating local from external factors is not easy. Stakeholders typically focus on the former. Prolonged facilitation is needed to encourage stakeholders to have the confidence to consider and voice opinions on external factors

Developing scenarios is as much art as science. Ideally those tasked with writing scenarios should have journalistic or creative writing skills.

Similarly, the presentation of scenarios in meetings can be made more interesting and thought-provoking if some creativity is used. For example, by asking stakeholders (or even professional actors) to enact scenarios.

It is best not to rush scenario building. In the context of a multi-stakeholder planning process, as much value can be gained during discussions from discussions during the scenario building as from the final outputs (i.e. "Remember that happiness is a way of travel - not a destination").

There is always a tendency to give specialists the leading role in a scenario building workshop. In most cases, specialists should be supporting the scenario building process.

It takes quite some time before stakeholders (and even facilitators) start to appreciate the value of scenario building as part of a planning process. Often quite

⁹ Modified from http://buildnet.csir.co.za/cdcproc/docs/1st/ratcliffe_js.pdf

senior-level champions are needed to ensure initial resistance to change is overcome.

Finally, scenario building is not about 'knowing the

future', or always being right; it is about trying to minimize the chances of being seriously wrong.

Lodz Scenarios for 2038

Scenario I: The economy remains stagnant owing to a series of worldwide economic recessions and poor performance of the Polish economy owing to political instability, a shortage of labour, and poor infrastructure. Incomes/output remain similar to 2008 (GDP of Euro 4,800 at current prices) and the country is one of the poorest within a highly unequal Europe. There are low tax revenues and little external funding (richer countries with the EC have stopped supporting major investments in the Centre and East) for investment in improving infrastructure. Institutions dealing with water management at a city level remain highly fragmented with different agencies dealing with various issues and poor coordination between agencies and departments, partly as a result of politicisation of local government. Nobody is looking and planning to improve overall performance of the water management systems, but only at their individual areas of responsibility. As a consequence, the city's water governance system have been slow to adapt and respond to the challenges posed by climate change (increasing frequency of droughts and floods) and the rising costs and absolute shortages of fossil fuels. Despite the efforts of individuals and localized success stories, the state of the city's urban environment has deteriorated. WASH service levels have are unacceptable in many areas of the city.

Scenario II: The economy remains stagnant owing to a series of worldwide economic recessions and poor performance of the Polish economy owing to political instability, a shortage of labour, and poor infrastructure. Incomes/output remain similar to 2008 (GDP of Euro 4,800 at current prices) and the country is one of the poorest within a highly unequal Europe. There are low tax revenues and little external funds (richer countries with the EC have stopped support major investments in the Centre and East) to invest in improving infrastructure. Despite the above, strong leadership and professionalism within the various organizations dealing with aspects of water management in the city (and its catchment areas) leads to improved sharing of information and coordination. An integrated plan is developed (largely based on the water framework directive) and implemented to use water wisely and improve the environment. However, shortage of tax revenues has limited the scope for the major investments needed for the city's authorities to adapt and respond effectively to the challenges posed by climate change and the increasing costs and absolute shortages of fossil fuels. Lack of investment funding has meant that the city's emphasis has been on promoting and encouraging action by community-based groups. Whilst this local action has been successful, it has not been able to impact on all the challenges facing the city. Inequities exist in WASH service levels and the urban environment is much better in richer areas of the city.

Scenario III: The Polish economy develops steadily to become the largest in eastern and central Europe and average in terms of performance across the whole of the EC, closing the gap with western European countries (with a GDP equivalent to the EU average: Euro 22,860 at current prices). Many young people who migrated to the UK, Ireland and other EC countries in the first decade of the century return to the city owing to the better wages and prospects. This results in a sharp recovery in the population, a rise in investment and a reverse "brain drain". Much higher tax revenues can be invested in infrastructure improvements, and people are also able to pay much higher fees for services. The institutions dealing with water management at a city level remain highly fragmented with different agencies dealing with various issues and poor coordination between agencies and departments, partly as a result of politicisation of local government. Nobody is looking and planning to improve overall performance of the water management systems, but only at their individual areas of responsibility. Investment needed to address the increasing challenges of climate change and the rising cost and absolute shortages of fossil fuel is poorly targeted. In fact, much of it has been wasted! Individuals and urban "landcare" groups have achieved a lot as a result of the strong support and involvement of environmentally-minded returnees. As a result of disillusionment in government, these groups have turned a coalition of landcare groups into a strong political voice. However, the ability of local action to address major problems is quite limited. There is a growing gap between the rich and the poor in the city. Landcare groups tend to be more active and successful in the richer areas of the city. Similarly, WASH service levels tend to be much better in the richer areas.

Scenario IV: The Polish economy develops steadily to become the largest in eastern and central Europe and average in terms of performance across the whole of the EC, closing the gap with western European countries (with a GDP equivalent to the EU average: Euro 22,860 at current prices). Many young people who migrated to the UK, Ireland and other EC countries in the first decade of the century return owing to the better wages and prospects available at home, leading to a sharp recovery in the population. Much higher tax revenues can be invested in infrastructure improvements, and people are also able to pay much higher fees for services. Strong leadership and professionalism within the various organizations dealing with aspects of water management in the city and its catchment leads to improved sharing of information and coordination. An integrated plan is developed (largely based on the water framework directive) and implemented to use water wisely and improve the environment. The city has responded and adapted famously to the challenges posed by climate change and the rising costs and absolute shortages of fossil fuels. Environmental plans are well aligned across all the sectors and the city's environment has never been better for all the city's inhabitants (and for its flora and fauna). WASH service levels are also outstanding across the whole city. A combination of local action and innovative city governance has resulted in Lodz being a leading proponent in integrated urban water management (IUWM) and a source of IUWM expertise that is in high demand across Europe and worldwide. The city has achieved all aspects of a vision that was formulated by a "turning point" project (we think it was called SWITCH?) in the first decade of the century.

Examples developed with members of the Lodz Learning Alliance in April 2008

References and websites

http://buildnet.csir.co.za/cdcproc/docs/1st/ratcliffe_js.pdf

Excellent review of the history of scenario building and relevance of scenario building to the construction industry. This introduction to this briefing paper draws extensively on this paper (accessed May 2008).

www.project.empowers.info/page/120

The Empowers project adapted visioning and scenario-based planning methods to participatory planning of water projects in the Middle East. These guidelines describe how scenario building can fit into a wider planning process. They also contain details on how to use time series analysis.

http://en.wikipedia.org/wiki/Futures_techniques

Information in Wikipedia relating to forecasting, backcasting, trend analysis and other techniques that can be useful when building scenarios.

www.jiscinfonet.ac.uk/tools/scenario-planning/evolution

This UK site includes a comprehensive set of resources on scenario planning.

www.shell.com/home/content/aboutshell-en/our_strategy/shell_global_scenarios/what_are_scenarios/what_are_scenarios_30102006.html

According to some, the oil company Shell benefited from scenario-planning to become the second biggest oil company in the world after the 1970s oil price shocks. This site explains their approach, and includes a report on energy scenarios to 2050.

www.project.empowers.info/page/120

The Empowers project adapted visioning and scenario-based planning methods to participatory planning of water projects in the Middle East. See the main guidelines (The EMPOWERS Approach to Water Governance: chapter 5) and working paper 4.

www.irc.nl/content/download/24277/273359/file/OP41_WASHScenarios.pdf

In this paper, the IRC International Water and Sanitation Centre using scenario planning methods internally and with partners to look at their core business - supporting access of poor people to water, sanitation and hygiene – might change over future decades.

en.wikipedia.org/wiki/Scenario_planning

For more information please contact: John Butterworth, IRC International Water and Sanitation Centre (butterworth@irc.nl) who coordinates the learning alliance work package for SWITCH or Charles Batchelor (batchelor@irc.nl) and Patrick Moriarty (moriarty@irc.nl) who adapted a visioning methodology for the project.

SWITCH (Sustainable Water Management Improves Tomorrow's Cities' Health) is a research partnership supported by the European Community (Framework 6 Programme) and its partners
www.switchurbanwater.eu/learningalliance