Chapter 16: Future outlook studies

The use of scenarios to create healthy blue cities

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Introduction

So far in this book, a lot of material has been presented outlining the evidence base for blue health, presenting methods and tools for stakeholder involvement, assessing spaces and populations and also presenting inspiring examples and learning lessons from practice. In this final chapter, we turn to the future and consider what kinds of possibilities may emerge as a result of a range of drivers of change.

The challenges facing urban areas are complex. In urban settings, space is scarce and is subjected to multiple demands and complex interactions, while population density is high. Urbanisation and other future trends in demography, economy, technology, ecology and climate ostensibly unrelated to urbanisation can have large and unforeseen impacts on the environment and human populations (UN-Habitat, 2016), depending on the local context (Ebi et al., 2018). In order to create resilient, liveable and healthy blue cities, we need to understand the impact of these trends, their character and the forces which drive them. Furthermore, we need to identify which of these are most relevant and how they could interact at this local scale.

Future outlook studies are used to develop scenarios to enable politicians, local planners, public health practitioners and ordinary citizens to gain insights into the possible future impacts of (interacting) global and national trends in the specific local context, thereby supporting the development of effective policy strategies. Understanding the impact of global and national trends helps to prepare for the 'likely future' but, combined with the analysis of 'desired futures' in a local context (local pressures and priorities), gives insight into the broader scope of 'possible futures' and is input for these 'scenarios' that can be used for local policy decisions (see Figure 16.1). This chapter presents the approach in which scenarios were developed for five European cities, focusing on their particular opportunities and challenges around water and the marine environment and their impact on health and well-being.

After this introduction, we briefly explain the concept of future outlook studies, followed by a section summarising the major issues facing urban areas in Europe related to or driven by global and national trends. Then we outline a step-by-step method of building a normative or value-driven trend scenario from the local perspective. Next we summarise and present the outcomes of scenario building on the topic of creating healthy blue cities in five European examples which offer the opportunity to explore the role of blue spaces in very different geographical and sociopolitical contexts: Amsterdam (the Netherlands), Barcelona (Spain), Plymouth (United Kingdom), Tallinn (Estonia) and Thessaloniki (Greece). This reveals the way which the same trends may have different impact at the local level and lead to different potential options for appropriate policies and interventions. Finally, we compare the five cities we studied in order to reveal the dominant trends for blue health in Europe and the range of interventions possible. In order to obtain an idea of what a trend scenario for a city looks like, in the appendix to the chapter, we present a more detailed overview of the scenarios for the city of Plymouth (for more information

Figure 16.1
Different ways of looking at possible futures
 (Source: Hilderink et al., 2018)

on the other four cities and on future outlook studies on blue health, see the website <https://bluehealth2020.eu/projects/scenarios/>).

Urban blue health and the concept of future outlook studies

Future outlook studies aim at identifying emerging opportunities and challenges in light of long-term trends. With regard to our theme, a future outlook study can reveal the particular connections between global, national and local driving forces in a city and their impacts on the blue environment and blue health – see Figure 16.2. Understanding these connections paves the way for integrated thinking about effective policies around water and the marine environment that could improve the health and well-being of urban dwellers, taking into account local differences in both pressures and priorities.

Global trends, such as climate change, suggest not only an increase in the number of warm days but also sea level rise; a higher frequency of extreme weather events, such as storms and heavy rainfall; and increased perceived temperature (a combination of temperature and humidity) (Scoccimarro et al., 2017), all of which have implications for quality of life in urban settings. Ageing, migration and increasing prevalence of chronic disease among urban populations all imply different demands for the design of urban spaces. Economic developments, such as changes in income distribution, may result in increased social inequalities, for example, in inner-city areas where contrasts between rich and poor are most pronounced. The knock-on effects on society may be considerable, for example, when it leads to social unrest or when income inequalities negatively impact environmental quality and access to high-quality and affordable healthcare (e.g. Drabo, 2011), all of which constitute threats to maintaining public health. Ecological degradation results in less green and blue space and decreasing biodiversity in urban areas, which in turn increases the impact of temperature rise in the urban environment (exacerbating the urban health island effect) (Koop and Van Leeuwen, 2017).

Figure 16.2

A concept sketch of a future outlook study of urban blue health

(Source: Dutch National Institute of Public Health, 2020; illustration: BlueHealth Scenarios, 2020: <https://blue-health2020.eu/projects/scenarios/>)

The future challenges for urban areas are many and varied. Moreover, the trends driving these challenges interact. For instance, the urban heat island effect exacerbates risks from extreme heat among vulnerable groups and relatively more so for those living in deprived neighbourhoods (Filho et al., 2017; Macintyre et al., 2017). Many cities are situated in environments prominently featuring water, and since their infrastructure relies heavily on their water resources, such cities are especially vulnerable to certain impacts of climate change, such as flooding, drought, sea level rise and the consequent effects on society, such as risks to health from infectious diseases and death by drowning.

Future scenarios can be used to identify future challenges and possible strategies within the complexities of an urban area. They are based on possible future developments while acknowledging the inevitable uncertainties that come with them – not only uncertainties as a result of limited knowledge about future developments – but also as a result of deviating ideas, ambitions and visions about the desired future expressed by residents, stakeholders or authorities. They are, thus, not attempts to predict the future but explicitly to describe the kinds of futures desired by

particular groups and the possible impacts of autonomous trends that might be anticipated by policymakers (in the case of anticipation, these future scenarios themselves influence and change future outcomes).

It is crucial to view urban water themes in a future scenario not only in a negative manner – as a risk or a resource under threat – such as infectious diseases, lower well-being or drowning. The urban water environment can also play an important role in the process of realising a sustainable and healthy urban environment (UN-Habitat, 2016), as demonstrated by the evidence presented in Chapter 2. For example, water infrastructure can be designed not only to be climate resilient but also to maximise co-benefits through mitigation of urban heat island effects and promotion of physical activity (see many of the examples presented in Chapters 11–15).

The way in which these different opportunities and challenges in relation to water infrastructure are apparent in the five European cities studied in this scenario project will be presented after we provide some insight into the major issues facing Europe and a brief explanation of the various steps in the future outlook method to develop a future scenario with policy options to improve the blue health of cities in Europe.

Major issues facing urban areas in Europe: global and national trends

Although the extent to which a global or national trend may be relevant on a local scale may vary, some general trends can be identified as potentially very relevant on the scale of Europe for the establishment of healthy blue cities by 2040 (20 years after the work which contributes to this book was completed).

Both urbanisation and climate change are regarded as trends with a major impact on blue spaces in terms of both risks and benefits. Rising temperatures may lead to an increase of water use for recreation and sport. High-precipitation events may, however, result in flooding and sewage overflow and thus affect water quality. Water availability for human consumption and recreation, as well as for industrial use and agriculture, may be threatened through extended periods of drought; this may also negatively affect water quality due to the reduced dilution of point sources of pollution in the water system. Urbanisation and related demographic and economic trends impose greater demands on the availability of good-quality water but also offer a window of opportunity to improve the health and well-being of urban residents through the design of attractive blue spaces.

Economic inequalities, increased recreational use of blue spaces and climate change can be regarded as trends with important potential effects on health. Economic inequalities could lead to an increased disease burden and social unrest (impacting well-being) (Camilio Cardenas et al., 2002; Drabo, 2011). Increased recreational use of blue spaces could result in both increased health risks (drowning, waterborne diseases) and benefits (physical exercise, mental health and well-being) (WHO, 2005, 2014; White et al., 2020). The projected effects of climate change on water availability and quality may also have an effect on health due to increased exposure to pathogens and risks of drowning in the case of flooding; however, climate change adaptation measures in blue spaces, such as the development of wetland parks to deal with flood water, as demonstrated in Chapter 13, could also have beneficial effects on stress reduction and physical exercise. The loss of biodiversity could also make blue spaces less attractive to visit. Older people and those with chronic illness are more vulnerable to the consequences of heat waves. The combination of this with social deprivation could worsen the health consequences of these types of events, as these groups may have less access to adequate information or care.

The development of technology is a global trend that will have significant impact on the possibilities for domestic water management and urban water systems, making them more efficient and smarter using data and algorithms. Moreover, development of user-friendly interfaces for data and information related to urban biodiversity and healthy environment can boost available information, especially regarding water-related health risks and benefits. Such data will presumably have a big impact on the ability of people to make more individual choices in terms of healthcare and to create possibilities for personalised healthcare, for instance, with regard to blue health opportunities.

Figure 16.3

Future outlook dependent on local developments and perception

(Source: BlueHealth Scenarios, 2020: <https://bluehealth2020.eu/projects/scenarios/>)

Impact and challenges of global trends

The impact of these global trends can be assessed differently from one European city to another, since local stakeholders often have different preferences, perceptions and priorities for the societal challenges that arise from the business-as-usual-scenario (Francis and Lorimer, 2011; Van Broekhoven et al., 2014). For this reason, the scenario-building process starts with stakeholders identifying the values they perceive to be important for water and health in the local context – as visualised in Figure 16.3. While stakeholders in some European cities perceive climate resilience to be the most important aspect, stakeholders in other cities prioritise access to blue spaces for all or preserving biodiversity instead.

Moreover, the various trends pose different local challenges. Some European cities appear to be magnets for attracting highly educated employees from both inside and outside the country. The presence of companies and technology together with a favourable social and cultural living environment attracts such people, while other cities struggle with economically less favourable conditions, partly due to the disappearance of traditional industries and the fact that well-educated people prefer to go to other, more attractive cities. Tourism is also a subject that is considered a challenge in some urban areas, while others describe it as an opportunity. The inhabitants of Barcelona, for example, have reduced access to the beach during the summer months, as this is a hotspot for the huge number of tourists who visit the city. In both Amsterdam and Barcelona, affordable housing for all population groups has been under increasing pressure as the prices for accommodation are strongly affected by high tourist rental rates. Conversely, other cities, such as Plymouth or Thessaloniki, would like to attract more tourists in order to strengthen the local economy. They would like to use the opportunity of creating healthy blue spaces to set this development in motion. For many cities, the presence of water is an important opportunity, since it is attractive for people to both live and recreate at or on the water. However, a pressing question for these cities is how to guarantee access for all to these healthy blue spaces.

Towards scenarios for healthy blue cities in Europe – a step-by-step method

Before going into more detail on the specific trends in the five European pilot cities, we present an overview of the step-by-step method for constructing blue health future outlooks.

To set the scope for future healthy blue cities, the scenario development process starts by framing the issue around the main question: “What policy interventions on urban blue infrastructure can be beneficial to public health and well-being?” Urban blue infrastructure is defined in these scenarios as the physical structures and facilities built in, on and around blue spaces (such as those presented in the projects evaluated in previous Chapters 11 to 15. The scenarios use a time horizon of 2040, as this seems to accommodate the different time horizons of various trends the best.

Step 1: Local values and ambitions for water and health

The scaling down from the general trends to identify their impact at a local scale and to attach possible policy interventions is carried out in an interactive, multidisciplinary stakeholder workshop with experts and local professionals

Figure 16.4

The step-by-step method of future outlook studies for blue health in European cities

(Source: Anna Wilczyńska, based on Wuijts, S. et al., 2021)

Figure 16.5
DESTEP trends
 (Source: Wuijts et al., 2019)

from various backgrounds (such as water quality management, public health, spatial planning, landscape architecture, policy and governance, social science, technology, climate and environment). Besides cognitive uncertainties concerning the development of trends in these future outlooks, normative uncertainties of values and ambitions are addressed by commencing the local workshops with an analysis of the local values/perspectives related to water and health in the future. These values/perspectives are gathered at the start but only used in the final step in order to interpret the prioritisation of trends by the stakeholders and to assess the local impact of these trends, which is a prerequisite for identifying suitable policy options and strategies.

Step 2: Relevant global or European trends

The identification of global or European trends and their interactions is regarded as the second step of the scenario-building process. The broad identification of global trends, including their interaction, that drive changes in the field of water and health/well-being were established by researchers with different disciplinary expertise reviewing information on indicators and relevant literature (Wuijts et al., 2019). These trends are structured by using the DESTEP categories: demography, economy, social-cultural, technology, ecology and environment, political-institutional (see Figure 16.5).

Step 3: Current local situation and developments

The trends identified at Step 2 are prioritised by stakeholders, based on local data for the six DESTEP categories. The stakeholders then select the five most relevant and five most uncertain trends, as they perceive them, looking at the future of the urban area and population/city level. The results are subsequently reflected upon by the group of stakeholders as a whole in order to understand the outcomes against the relevant background of the local developments

according to six themes: urban planning, environment, population, public health, local economics and urban-rural interaction.

Step 4: Local impacts of global or European trends

After deciding the most relevant and most uncertain trends at the local level, an analysis of the possible impacts of these prioritised trends on the economy, health, society and (the natural and built) environment of the local situation is established by discussion in the stakeholder group. To compile the trends scenario, these results are complemented and supported in the report (that is produced as an output of the scenario workshop) by any available data on relevant issues (e.g. population development, climate change). Where possible, these data should be quantitative. However, not all relevant issues can be included in (quantitative) models, and therefore semi-quantitative and more qualitative descriptive methods can also be used. The draft narratives are then validated by the involved stakeholders and other interested parties in order to identify quick wins in urban policy and to facilitate mutual learning. The result is a so-called *trend scenario*, describing trends for an urban area without taking into account any interventions.

Step 5: Policy interventions

The final step is to identify possible policy options around the most relevant values/perspectives identified by the stakeholders that were gathered in step 1. The result of combining the local impacts of trends with this 'desired future' based on values/perspectives is a so-called *normative* or *value-driven scenario*, which reflects the ambitions of different local stakeholders. This provides insight into the challenges local stakeholders face regarding their ambitions as well as a window of opportunity for local action: best/good practices, identifying quick wins, mutual gains with other domains and nature-based solutions.

Blue health future outlook in Europe: trend scenarios for five pilot cities

BlueHealth scenarios were compiled for five cities located across Europe: Amsterdam (the Netherlands), Barcelona (Spain), Plymouth (United Kingdom), Tallinn (Estonia) and Thessaloniki (Greece) (Figure 16.6). The cities were selected for their diversity of climate zones, the availability and type of urban blue spaces (coast, lake, river, canal, basin), socioeconomic conditions and governance regimes. It was envisaged that this would provide a variety of results that would facilitate a discussion of the added value of this approach for policy planning. In these five European cities, interactive workshops with local (professional) stakeholders from a range of relevant disciplines were organised. With the results of these workshops, trend scenarios were developed stating the local impact of global trends, based on local values/perceptions, with possible interventions attached to improve local blue health conditions.

This section first presents summaries of the situation of each of the five cities in relation to the DESTEP categories (Wuijts et al, 2021). Then, the results of local stakeholders prioritising global and European trends for their impact at the local level (*trend scenarios*) are presented, combined with local values and ambitions, giving an insight into different opportunities and challenges (*normative scenarios*) for interventions around water and the water environment to improve health and well-being. To illustrate in more detail the way in which these scenarios were compiled, an overview of the complete trend and normative scenario for Plymouth is presented in the appendix to this chapter. An overview of the methodology applied can be found on the BlueHealth website (<https://bluehealth2020.eu/projects/scenarios/>).

- **Amsterdam**, the capital of the Netherlands, is a densely populated urban area (5,042 inhabitants/km²), including a port complex and adjacent industrial zones characterised by high economic value. It is situated in the delta

Figure 16.6

The pilot cities of BlueHealth: Amsterdam, Barcelona, Plymouth, Tallinn and Thessaloniki

(Source: BlueHealth Scenarios, 2020: <https://bluehealth2020.eu/projects/scenarios/>)

of several major international river basins (Rhine, Meuse, Scheldt and Ems) and is sited below sea level. The main risk of flooding in the future is posed by heavy rainfall in the city itself, as the dykes in the Netherlands provide a high level of protection. Amsterdam has a mild maritime climate, with rainfall throughout the year. The population of Amsterdam is projected to age progressively in the coming decades, and ethnic diversity will further increase; currently 70% of the population has a (mixed) ethnic background. The continuing development of social inequalities is a major challenge for the city.

- **Barcelona**, the second most populous city in Spain and capital of the autonomous region of Catalonia, is situated on the Mediterranean Sea. The city has a very high population density (16,000 inhabitants/km²), is characterised by its rich cultural heritage and is a major tourist destination. It has a large port that consists of a commercial, logistics and historical zone and also has a number of beaches along the southeastern edge of the city. Barcelona has a Mediterranean climate with mild winters, warm/hot summers and infrequent rainfall, including long periods without rain. Droughts are a recurring concern but also intense and high volumes of rainfall when it does rain. The hilly terrain, the largely impermeable surfaces due to urbanisation and extensive canalisation of rivers all contribute to the risk of flooding. Income inequality in Barcelona is large, and there is a strong spatial concentration of poverty in a number of neighbourhoods. By 2030, almost a third of Barcelona's residents will be aged 60 years or older. Access to affordable housing is likely to decrease, with rents in the city continuously rising and reduced availability of suitable housing for residents due to tourism.
- **Plymouth**, termed Britain's Ocean City, is a medium-sized city located on the coast of the southwest of England. It has moderate population density (3,300 inhabitants/km²) and a remarkably rich heritage and a maritime community with international recognition in trade, emigration, exploration and ocean science. The coastal infrastructure in Plymouth is partly classed as 'artificial', with sea walls and rock armour revetment. The city has many pockets of socioeconomic deprivation, a reality in contrast to the extensive recreational redevelopment of many of the city's waterfront areas to attract tourists and second-home owners. The Plymouth population is growing and ageing, and life expectancy in some neighbourhoods is among the lowest in the United Kingdom. Plymouth has a temperate oceanic climate which is generally wetter and milder than the rest of England.
- **Tallinn**, the capital of Estonia, is an historic Hanseatic city on the shore of the Gulf of Finland of the Baltic Sea, with close ties to Helsinki in Finland and Saint Petersburg in Russia. It was a major satellite city of the Soviet Union for decades, when many Soviet migrants were housed in new residential districts comprising extensive developments of multi-storey blocks of flats added to the city. Currently, slightly more than half of the population of Estonia lives in Tallinn, of which about one third is of Russian descent. The city has a below-average population density (2730 inhabitants/km²) and is the country's major financial, industrial, cultural, educational and research centre. Tallinn has the highest number of start-up companies per person among European countries, is the birthplace of many international high-technology companies and platforms and is listed among the top ten digital cities in the world. The city has a humid continental climate with warm or mild summers and cold, snowy winters.
- **Thessaloniki** is a Greek city on the Thermaic Gulf, at the northeastern corner of the Aegean Sea, alongside the delta of the Axios River. It is a medium-sized city with an average population density (7100 inhabitants/km²). The city has an extensive sea front and hosts the second-largest container port in Greece that functions as a major transportation hub for southeastern Europe. A major section of the waterfront has been renovated and many areas redeveloped, making efforts to attract more international tourists to visit its rich and unique cultural heritage (for example, as a destination for cruise ships) alongside domestic tourists. Unemployment rates are high as result of the Greek economic crisis, especially among young people. The city has a Mediterranean climate, with cold and wet winters and hot and dry summers, with urban heat island effect and sea level rise being the main climate change concerns.

These local (DESTEP) characteristics reveal the broad range of interacting factors that affect the impact of possible interventions in the marine environment for making the cities more resilient, liveable and healthy. Using the step-by-step method for constructing a blue health scenario, local stakeholders in each of the five cities prioritised these global and European trends for their city as well as their dominant values – see the results in Table 16.1. Local stakeholders were invited from a broad range of organisations with local knowledge, different fields of expertise related

Table 16.1 Relevant trends and dominant values identified during the interactive stakeholder workshops in the five pilot cities

Prioritised trends: D = demography E = economy S = society and culture T = technology E = ecology and environment P = politics and institutions		Amsterdam	Barcelona	Plymouth	Tallinn	Thessaloniki
D	Increasing life expectancy					
	Changing population composition					
	Migration					
E	Changes in income distribution					
	Changes in labour conditions					
S	More recreational use of blue spaces					
	More waterfront development for urban regeneration					
	Increasing individualisation					
T	Digitalisation of society					
	Towards healthy urban living					
E	Climate change					
	Higher risks of flooding					
	Higher risks of water scarcity					
	Further loss of biodiversity and other ecological impacts					
P	Changing institutional and governance structures					
	More healthy urban living in EU policies and strategies					
Dominant values	Climate resilience					
	Promoting social equity					
	Access to blue spaces					
	Improving identity/pride in the city					
	Preserving biodiversity					
	Sustainable urban design					

(Source: Wuijts et al., 2021)

to one or more of the DESTEP driving forces and different roles and responsibilities but all related to blue spaces and health. In addition to their thorough local knowledge of different aspects relevant to urban blue health, different stakeholders also expressed different values and ambitions for the future.

The results of the stakeholder workshops revealed that in a future outlook scenario of urban blue health in Amsterdam, *climate change and social inequality are interlinked challenges and opportunities for the city*. Some of the more deprived neighbourhoods in Amsterdam are prone to flooding, making them more vulnerable to pollution and infectious disease risk if heavy rainfall causes an overflow of the sewage system. Stakeholders pointed out that the vast diversity of citizens could make it challenging to reach out and communicate these risks to all the different groups,

Figure 16.7

Climate change and social equity themes in Amsterdam

(Source: BlueHealth Scenarios, 2020: <https://bluehealth2020.eu/projects/scenarios/>)

as well as the risks in using blue spaces – for example, for bathing, of which many of the citizens of Amsterdam are unaware (Municipality of Amsterdam, 2016). On the other hand, open water bathing sites may be cheaper and more accessible, and climate change is an opportunity to improve outdoor spaces.

Promising strategies to act upon this future outlook scenario for Amsterdam could be to increase *cross-sectoral spatial planning and citizen engagement*. Both health and climate resilience need to be accounted for in the spatial planning processes, such as when introducing waterfront protection zones to secure access for all and creating safe bathing sites. Engagement of local groups could add information on usage and satisfaction of blue spaces and increase awareness of risks of blue spaces (e.g. Assmuth et al., 2017). The ambitions towards healthy environments stated in the upcoming national Environmental and Planning Act (due 2022) could support this.

In Barcelona, the future outlook scenario of urban blue health based on stakeholder input also focused on *climate resilience and social equality*, with emphasis on *balancing sociocultural inequalities*. Vulnerable groups (e.g. lower income, elderly) often have fewer resources to adapt to the expected effects of climate change on the availability of drinking water, heat stress and bathing water quality. According to stakeholders, the access to blue spaces is unevenly distributed in Barcelona and generally better for high-income groups. Investments to improve blue spaces could result in more gentrification and worsen social inequalities if not taken into account in urban planning processes.

To act upon this future scenario a promising strategy could be to *raise the awareness for climate resilience in other policy domains* (e.g. related to work, income, housing, transport) *and among citizens and companies*, especially in neighbourhoods with a high density of activities, use of space and complex social interaction. Implementation of so-called Superblocks, where greening and traffic-calming measures in a cluster of several blocks are applied, could be a promising strategy to improve health and liveability if implemented on a city-wide scale (Mueller et al., 2020). Increasing blue and green spaces in the city could help to store water and form a source of cooling and shade during warm periods in summer, especially in deprived neighbourhoods. Stakeholders also stated that more awareness could be raised among the citizens of the need to use water more efficiently.

In the future outlook scenario of urban blue health for Plymouth – which is presented in more detail step by step in the appendix – stakeholders prioritised *the redevelopment of accessible waterfronts*, stated as *an impactful opportunity and challenge*. Economic investment to this end may lead to increasing employment opportunities in the service industry. It could also improve health, as increasing recreational opportunities stimulate physical activity, and a stronger identity of the city enhances social cohesion. Yet stakeholders emphasised that if redeveloping accessible

Figure 16.8

Accessibility and inclusiveness themes in Barcelona

(Source: BlueHealth Scenarios, 2020: <https://bluehealth2020.eu/projects/scenarios/>)

waterfronts leads to gentrification, which in turn can be enhanced by changing income distribution, it might 'price out' poorer residents.

Promising strategies for inclusive waterfront heritage in Plymouth for all groups include *public participation to ensure space meets the health needs of the population purported to benefit from it, in the face of greater vested interests* from other waterfront redevelopments (such as the highest probable economic return). Another significant factor to be included to foster recreation and identification is *the valuing (and preserving) of the city's identity in its natural and cultural heritage*, which could function as an asset to diversify the local economy with the importance of the marine and naval industry declining and pressure from sea-level rise.

In Tallinn, the central themes in the future outlook scenario of blue health prioritised by stakeholders are *loss of biodiversity, climate change and urban regeneration as intricate challenges*. The water bodies of Tallinn suffer from the negative effects of pollution, depletion and loss of biodiversity, while climate change relates to risks of moderate flooding and heat stress. Tallinn has several beaches open to the public, but there is a risk that they are built on and could become private areas without public access to the sea being retained. The relatively young population of Tallinn requires access for different age groups with different private/work/care balances.

In response to this future outlook, promising strategies in Tallinn are *to link spatial planning, demographics, economy and IT in the development of waterfront access*. The Environmental Strategy 2030 could be an important vehicle, as it recognises the essential role of water bodies, including the sea, in the internal structure of the city. It aims to increase links between green and blue spaces and residential areas, of which the development of new public waterfronts could be part. The advanced technological/digital infrastructure could be used to establish domestic water management and smarter urban water systems as well as user-friendly interfaces for data and information related to blue health – such as water-related health benefits and risks.

The future outlook scenario of blue health in Thessaloniki aims, according to stakeholders, at *balancing challenges set by climate change and social cohesion*. Climate change poses the challenge of increasing flooding of waterfronts, but increasing rainfall also creates the opportunity for more water flow in the Gallikos River and Aliakmon delta serving both the urban population, as well as biodiversity. Climate change also leads to increasing heat waves that

Figure 16.9

Accessibility and city's identity themes in Plymouth

(Source: BlueHealth Scenarios, 2020: <https://bluehealth2020.eu/projects/scenarios/>)

impact especially vulnerable groups (e.g. low income, the elderly) who do not have the resources to adapt to this effect. Stakeholders identified gentrification as a potential challenge for urban cohesion, as it pushes lower-income groups out of their traditional neighbourhoods.

Possible strategies to act upon this future outlook for blue health in Thessaloniki are that *climate change can be used as a catalyst for developing more healthy blue spaces with sustainable urban design*. For cooling, the wind off the sea could be used as a ventilation system in the streets, more trees could enlarge the amount of shaded surface and more free drinking water points for all citizens could be created. Water activities, such as swimming, could be stimulated, keeping in mind that this also requires more lifeguards and lessons at school to keep swimming safe. Increased accessibility of blue spaces – for which there is great potential on the long waterfront of Thessaloniki – could make the city more attractive to tourist and thus generate economic benefits. As beaches are far from the city centre, free transport could improve access for everyone. Stakeholder engagement as well as big data management could give insights into needs and ideas. The Internet of Things concerning urban transport, water and energy resources, waste and weather information – such as a heat map, including alerts for vulnerable groups – could enhance the development of blue health spaces for residents and tourists.

Insight into opportunities for blue health through future outlook studies – the city cases compared

The future scenarios for the five cities were established separately to identify the local opportunities and challenges. The examples of Amsterdam, Barcelona, Plymouth, Tallinn and Thessaloniki show how future scenarios can assemble contributing and interacting causes and priorities into a coherent picture. Thereby, the scope of the 'likely future' in a city is broadened to 'possible futures', giving ways to think about 'desirable futures' within this wider perspective – as shown in Figure 16.1. Combining these 'desirable futures' in a city based on local values and ambitions, within the context of the impact of global and European trends, provides a route to the development of concrete scenarios for each of these five cities. These scenarios resulted in (a first overview of) suitable interventions tailored

Figure 16.10

Waterfront access theme in Tallinn

(Source: BlueHealth Scenarios, 2020: <https://bluehealth2020.eu/projects/scenarios/>)

to local opportunities and challenges to enhance blue health not only for the present moment but in the light of global and European trends for the next 20 years.

Comparison of the separate scenarios for these five cities gives insight into predominant trends and the different ways in which similar trends work out differently in the local context. This chapter, therefore, concludes with a comparison of the five future outlook scenarios for Amsterdam, Barcelona, Plymouth, Tallinn and Thessaloniki.

The future outlook studies in the five cities in this research show that climate change and income inequality appear to be the most often mentioned trends with most impact on urban blue health. Moreover, it reveals that local interventions not only vary in subject but also in their focus on different groups, places, processes and/or institutions, depending on the opportunities and challenges of the local context (see Figure 16.7).

In almost all the cities, increasing income inequalities were regarded by the local stakeholders as having a negative effect on the accessibility and inclusiveness of blue spaces. In Amsterdam and Barcelona, these problems were perceived as being exacerbated by the negative consequences of (global) mass tourism. For example, local residents have to compete for housing with international and private investors (e.g. AirBnB) who want to rent out properties to tourists and for the use of urban blue spaces. In Plymouth and Tallinn, other, more local issues were raised by the participants, such as affordability of houses for local residents due to gentrification of the seafront. Global factors were considered of less relevance, such as the global housing market and the increase of mass tourism. In general, water-based mass tourism and restrictions to public waterfront access were among the top issues for all cities. In the case of Tallinn, the connection to the waterfront was also blocked by a fast road and railway, thus hampering accessibility. In Thessaloniki, local stakeholders were more concerned about trends of migration and changes in labour conditions, and they focused on more sustainable urban design to create healthier urban living conditions and to combat the impact of climate change.

Figure 16.11

Sustainable urban design theme in Thessaloniki

(Source: BlueHealth Scenarios, 2020: <https://bluehealth2020.eu/projects/scenarios/>)

Climate change appeared to be a significant trend in both Amsterdam and Barcelona, but while in the former, the issue of flooding was seen as more relevant, in the latter, the focus was more on water scarcity, especially for uses other than drinking water. In Tallinn, the loss of biodiversity was prioritised over climate change, but moderate flooding was also mentioned as a blue health challenge, as was the case in both Plymouth and Thessaloniki.

Interventions with regard to these predominant trends in these five European cities varied in their focus on groups, places, processes and institutions. Climate-proof interventions, for instance, could be implemented to benefit the growing group of vulnerable older people in the city the most (such as low-income neighbourhoods in Amsterdam) or be used to strengthen the local economy (such as innovation and tourist attractions in Thessaloniki). In other

Figure 16.12

Narrative of prioritised trends in the five pilot cities of the BlueHealth scenarios – follow-up from Table 16.1

(Source: BlueHealth Scenarios, 2020: <https://bluehealth2020.eu/projects/scenarios/>)

cases, the scenarios reveal that an important factor in improving the blue health of a city is not only about specific places and/or target groups but also on improved governance structures (for example, better urban planning in Tallinn, more citizen participation in Plymouth). Scenarios can also support the decision-making process by providing insights into the opposing effects of certain developments, such as the fact that tourism might be an important economic engine of the city but significantly reduces the equality of access to blue places for the citizens (as found in the gentrification in Barcelona).

The conclusion is that blue health scenarios are not a recipe for the future resulting in a list of ready-made solutions but rather stimulate interventions that prepare for the future in a specific local context and have the most win-win effect for the urban blue health in a city as it includes the effects of inevitable global and European trends.

Appendix: a more detailed scenario for Plymouth

BACKGROUND PLYMOUTH

Plymouth, coined “Britain’s Ocean City” in 2013, has a remarkable rich heritage beginning as a fishing village with a population of about 3,500 in the 16th century. The city is situated at the south-west coast of England, in the county of Devon. Plymouth is famous for its associations with Sir Francis Drake and the defeat of the Spanish Armada in 1588, the departure point for the Pilgrim Fathers on board the Mayflower to North America in 1620 and a major base for the Royal Navy, the largest in western Europe, which still generates around 10% of the city’s income and employs around 2,500 service personnel and civilians. However, it was also heavily bombed in the Second World War and has a number of areas categories as highly deprived.

As of 2016, it had 264,000 inhabitants and under the unitary authority of the Plymouth City Council it covers a total surface area of 30.82 sq mi (79.83 km²) with a population density of about 8,500/sq mi (3,300/km²). As a maritime community with an international recognition in trade, emigration, exploration, and ocean science, it is located right on the sea coast in the south-west of England with 33% of its coastal infrastructure classed as ‘artificial’ (i.e. sea walls and rock armor revetment).

TRENDSCENARIO PLYMOUTH

(more information: <https://bluehealth2020.eu/projects/scenarios/>)

Relevant trends in Plymouth

Increasing life-expectancy

- ▶ Proportion of the population aged 65 and over increases
- ▶ Variation between city districts in life-expectancy

More waterfront development and blue recreation, but concern about income inequalities

- ▶ Waterfront regeneration to become 'one of Europe's most vibrant waterfront cities'
- ▶ Popularity of water related activities is growing as result of technology (e.g. wetsuits) and ease of travel
- ▶ Increasing income inequalities enhancing differences in health and well-being

Increase of ecological impact due to human activities

- ▶ Deterioration of water ecosystems leading to a loss of biodiversity

Impacts of these relevant trends in Plymouth

- ▶ **Growing impact of water-related infectious diseases, risk of drowning and heat stress** due to environmental changes, use of water that is not designated for recreational purposes, but especially as result of the progressively aging and thus vulnerability of the population – though life expectancy differs substantially between neighborhoods
- ▶ **Different urban water use** as the shift in age groups, changing frequency of age-related diseases and increased use of nature conservation and water retention areas as playgrounds and parks
- ▶ **Increasing sense of pride to be Plymouthian** (or 'janner') as waterfront is arguably the city's most valuable asset and is central to its identity as Britain's Ocean City
- ▶ **Increasing inequity in access to and gains from blue space** due to increasing income inequalities and gentrification that pronounce differences between neighborhoods
- ▶ **Increasing public awareness** of ecological quality, marine issues and sustainable recreational water activities by developing a National Marine Park and of sustainability in surface drainage by implementing a reduction in household water bills
- ▶ **Significant economic cost and less attractive blue spaces** due to decreasing water body ecological status – which could be countered by well-executed waterfront regenerations that have a **positive effect on biodiversity and create healthier blue space and economic advantages**

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