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Governing the Urban Climate in Fukuoka City, Japan: What Can a Policy Narrative Approach Teach Us?

14

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Abstract

This contribution works with a policy narrative for green- and open space planning in Fukuoka, Japan, and assesses the role that the idea of *kaiteki kankyo*—a comfortable environment—plays in facilitating action towards maintaining a comfortable urban environment. Boundary objects and boundary concepts are terms and ideas which are vague and flexible enough to allow different interpretations, yet also robust enough to enable different groups to talk with one another and reach outcomes. By looking at policies for the urban green environment in Fukuoka since the 1980s, and also analysing practice-focused academic texts, the chapter argues that a comfortable environment does indeed function as a boundary object in Fukuoka. Whilst standards for attaining ‘comfort’ are never defined, the comfortable environment terminology persists over time in Fukuoka across different rationales for greenspace planning, from urban redevelopment to sustainability to climate adaptation. The chapter also cautions, however, that boundary concepts may draw actors towards more technocratic outcomes, and divert from attention to social processes which may help to sustain a narrative of a comfortable environment outside of the formal policy process.

Keywords

Fukuoka · Greenspace · Policy narrative · Thermal environment · Urban planning

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14.1 Introduction

This contribution assesses the role of *kaiteki kankyo*—a comfortable or liveable environment—as a boundary concept motivating governance of urban nature and greenspace in Fukuoka City, Japan. Fukuoka is distinct in Japan as a comparatively early adopter of municipal climate change policy, and also as a city with a tradition of locally led scientific research into the maintenance of comfort in the built environment through urban greening (Mabon et al. 2019a, b). To understand how this interest in a comfortable environment has been sustained over time, and also to evaluate what is meant by a comfortable environment in the Fukuoka context, this chapter constructs a policy narrative for comfort in the urban green environment through evaluation of current and recent policy texts, as well as underpinning academic research from the last several decades.

This chapter is the latest iteration of an evolving research project into the historical engagement of local government, academics, civil society and citizens in Fukuoka with questions of the urban thermal environment and adaptation to environmental change via urban greening more generally. The text builds on previous outputs into the role of an epistemic community of scholars in shaping greenspace and climate adaptation policy in the city (Mabon et al. 2019b); the evolution of greenspace policy and planning in Fukuoka to respond to climate challenges (Mabon et al. 2019a); engagement with publics on climate risks and adaptation actions (Mabon 2020a); and an environmental history overview of research and policy around extreme heat in Fukuoka (Mabon 2020b). This chapter builds on this existing work and adds new insight by taking the idea of a ‘comfortable environment’, which appears across numerous plans and practice-focused academic texts relating to green and open space in Fukuoka, and assessing the work that a ‘comfortable environment’ framing does as a boundary concept to build broad consensus for greening actions within Fukuoka.

It is also worthwhile clarifying key terms at this point. In this chapter, ‘greenspace’ is used as a generic term to encompass both formal, planned greenspaces and also informal greenery (such as street trees and green roofs and walls) referenced within plans, policies and academic texts. The thermal environment, which comes to have a major role in the policy narrative set out in the paper, is taken to refer to the temperature, humidity and variability of the outdoor environment as it is experienced by humans. Lastly, whilst the assessment and definition of comfort is itself a key point of contestation in the social science literature (see Sect. 2.1), ‘comfort’ in the lived environment can be understood as how the body relates to the everyday environment and weather (Shove et al. 2008).

14.2 Concept and Theory

14.2.1 Thermal Environments, Comfort and Environmental Change

The idea of a comfortable environment—and comfort in an environmental context—has been considered extensively not only from a natural science and engineering perspective, but also by scholars of science and technology studies and social

science more widely. Walker et al. (2016) summarise comfort as a system involving dynamic and complex interactions between the physiological, social, cultural and material, but call for more attention towards an understanding of comfort which emphasises meanings and social settings. Oppermann et al. (2019) propose thinking of thermal comfort in terms of the rhythms and flows exchanged, accumulated and dispersed through human bodies. In the context of people's interactions with the weather – and in particular the thermal environment—Shove (2003: 398) explains that “(s)ince the outdoor climate differs so much across seasons and between one country and the next, the worldwide provision and maintenance of comfort, technically defined, turns out to be an immensely resource intensive enterprise.” Shove goes to introduce the ‘science’ of comfort, which she describes as the scientific specification of conditions under which most people will report comfort.

A comfortable environment is hence context-specific, and can be both created by and assessed through techno-scientific measures. Nonetheless, the definition of what is considered ‘comfortable’ is a social process. Nicol and Roaf (2017: 711), for example, hold that thermal comfort, and indeed the idea of a comfortable environment more widely, is a “socially determined notion defined by norms and expectations.” In other words, societal and cultural influences will shape what is considered an acceptable level of comfort within a locality, and how this comfort may be attained. Social processes can also determine who has access to this comfort, and how it is distributed across space. At the city level, policies related to land use and urban development can create urban forms where the distribution of factors which may contribute to comfort, such as heat and the presence of greenspace, are unequally distributed. There is indeed evidence to suggest that comfort, in particular thermal comfort, may disproportionately accrue to wealthier areas, leading to ‘thermal inequity’ and ‘green inequity’ (Mitchell and Chakraborty 2015; Shokry et al. 2020). This means that both how comfort is defined and how it is implemented matter in terms of who has access to a comfortable environment.

14.2.2 Greenspace, Climate Change Adaptation and the Thermal Environment

The sustenance of comfort in the built environment under climate change, and the provision of comfort via environmental amenity, have become closely linked in recent years via increasing interest among researchers and international policy organs in urban nature as a provider of cooling and other benefits to human well-being. For instance, Keeler et al. (2019) list cooling as one of the core climate adaptation benefits which can be attained through the maintenance and expansion of urban nature, whilst also realising additional benefits to people such as mental and physical well-being and opportunities for social interaction. Academic interest in urban nature has been accompanied by increased attention to these so-called ‘nature-based solutions’, defined by Kabisch et al. (2016: 1) as “the maintenance, enhancement, and restoration of biodiversity and ecosystems as a means to address multiple concerns simultaneously.” The terminology of nature-based solutions and climate

adaptation through ecosystems is prominent in, for example, the rhetoric of the United Nations' Environment Programme (United Nations Environment Programme 2019), in ICLEI Local Governments for Sustainability's Cities Biodiversity Center (ICLEI-CBC 2017), in the Intergovernmental Panel on Climate Change's Cities series (Priour-Richard et al. 2018), and in the breadth of research-action projects into nature-based solutions funded by the European Union's Horizon 2020 programme (European Commission 2019).

At the same time, however, there is no standardised understanding of what constitutes a nature-based solution, or how nature-based solutions are distinct from other terminology related to urban nature such as green infrastructure and ecosystem-based adaptation (Kabisch et al. 2016). Garmendia et al. (2016) indeed believe that green infrastructure—one of the terms associated with urban nature with more technical origins rooted in the idea of a network of greenspaces—functions as a boundary object, which is plastic enough to be interpreted differently by different groups, yet also robust enough to enable cross-communication. Opdam et al. (2015) similarly develop the idea of boundary concepts, which are ideas that can help to create a discursive space to allow different groups of people to communicate with a common sense of urgency, but without needing full consensus or common knowledge base. Opdam et al. summarise that boundary concepts can help different groups to follow the same storyline together, but in a different way. Nonetheless, Garmendia et al. (2016) caution that boundary objects can act as ecological traps, where the pragmatic appeal of boundary objects in facilitating dialogue and consensus can draw time and attention away from targeted initiatives which could deliver more effective outcomes. Similarly, Westerink et al. (2017) believe there is a need to look not only at the presence of boundary concepts when making decisions about the landscape but also how these concepts are managed in practice to facilitate collective action.

14.2.3 A Comfortable Environment as a Boundary Object for Fukuoka's Greenspaces?

Taking the above points together, the objective of this contribution is to evaluate how—and to what extent—the idea of *kaiteki kankyo* has functioned as a boundary concept to guide the governance of Fukuoka's greenspaces in the public interest. Translated into English as 'comfortable environment' or 'liveable environment',¹ *kaiteki kankyo* encompasses both the subjectivities over defining and understanding 'comfort' outlined in Sect. 2.1., and the vagueness or contestation around what constitutes the urban natural environment as laid out in Sect. 2.3.

¹In previous outputs from this stream of research, some Japanese-language text extracts have translated *kaiteki kankyo* as 'liveable environment'. For consistency, when these texts are quoted directly in this chapter, the translation of 'liveable environment' is retained. However, in all cases, the original Japanese text read *kaiteki kankyo*.

This contribution also looks at how the provision of a comfortable environment over time could be considered an organising narrative to justify current and future actions towards the governance of urban nature in Fukuoka. Chabay et al. (2019) see narratives in sustainability as providing a rationale and a call for change, and giving a direction, goal and incentive towards a particular vision of a sustainable future. Shanahan et al. (2018) add that thinking in terms of narratives can provide analytical and explanatory insight into policy processes, either through using narrative elements and strategies to examine and make sense of the policy process for a specific issue; or exploring the role of narratives within a specific policy process. This chapter focuses mainly on the former of the strategies Shanahan et al. propose, working with available policy documentation to construct a narrative with the aim of understanding how *kaiteki kankyo* has functioned as a boundary concept over time in the governance of Fukuoka's urban natural environment. The analysis that follows pays respect to the elements that Shanahan et al. see as critical for a policy narrative to be more than a chronology: settings across space and time; characters (here in the form of institutions and individuals); plot/order of action; policy solutions; belief systems; and strategies.

14.3 *Kaiteki Kankyo* at Present

The first step in the analysis is to lay out how and where the *kaiteki kankyo* phrasing appears at present in policies and plans governing open- and greenspace in Fukuoka. First, the phrasing is included in the title of Fukuoka City Government's *New Generation Environmental City Vision*, which is sub-titled "Fukuoka: a shining comfortable environmental city, connecting people and nature to Asia" (Fukuoka City 2013). The language of comfort is also utilised repeatedly in the new *Central Park Basic Plan*, launched by Fukuoka City in 2019 (Fukuoka City 2019b); and across the most recent iteration of the city's greenspace plan, the *New Green Basic Plan* (Fukuoka City 2009). Lastly, the language of a comfortable environment appears within Fukuoka's *Climate Change Countermeasures Action Plan* in the context of both adaptation and mitigation (Fukuoka City 2016). Within these policy texts, there are two broad ways in which the idea of a comfortable environment appears. One concerns environmental amenity and pleasantness, and the other addresses moderation of the thermal environment more specifically.

14.3.1 Comfort as Amenity, Convenience and Aesthetic Quality

First, the idea of comfort is deployed in relation to the general quality of life. The *New Generation Environmental City Vision* proposes to "create green focal points and rest areas to improve the comfort of the urban environment" (Fukuoka City 2013: 37); and the *New Green Basic Plan* envisions Fukuoka as "a city where all citizens can live safely and comfortably by taking advantage of nature" (Fukuoka City 2009: 15).

The *Central Park Basic Plan*, created specifically to set out a vision for the large Ohori Park in central Fukuoka, emphasises in particular the aesthetic and mobility dimensions of comfort. In the vision it sets out, the plan proposes to “devise a design that allows anyone from children to the elderly to comfortably use the park” (Fukuoka City 2019a, b, c: 37) and explains that “for park users, the park is kept clean and offers comfortable and easy use” (*ibid*: 8). Moreover, the plan presents an illustration of a vision for the main gate of Ohori Park, which is captioned as showing a ‘comfortable’ environment and shows paved pathways being walked by people of all ages, with neatly lined trees and a small segregated area for vehicle traffic.

In this understanding of a comfortable environment, then, green- and open space is utilised as something to be managed and controlled, so that people may move easily through it and experience pleasant aesthetic qualities such as cleanliness and order.

14.3.2 Comfort as Regulation of the Thermal Environment

A second way in which comfort is deployed within Fukuoka’s green and open space policies is in sustaining comfort through addressing the effects of environmental change. The *Climate Change Countermeasures Action Plan* connects the sustenance of comfort to climate change adaptation actions, noting that “to live a safe, secure and comfortable life, necessary information on the necessity of and methods for climate change adaptation will permeate” (Fukuoka City 2016: 81). The *New Generation Environmental City Vision*, likewise, links comfort in the urban environment to climate change imperatives and also international science-policy rhetoric, by stating that:

to create a safe, secure and comfortable city which is adapted to climate change, the first step is to note that in 2007 the Intergovernmental Panel on Climate Change (IPCC) concluded that ‘there is no doubt about global warming’ and that ‘adaptation to climate change is essential’ (Fukuoka City 2013: 31).

Under this second understanding, comfort is positioned as something which is threatened by environmental change. Comfort here refers especially to mitigation of the urban heat island effect through Fukuoka’s greenspaces. Indeed, the *New Generation Environmental City Vision* continues (Fukuoka City 2013: 52): “To solve the problems related to the comfortable environment of the city [...] We will promote comprehensive measures such as the suppression of the heat island phenomenon in urban areas.” In a rather more technical explanation, the *New Green Basic Plan* outlines how “greenery also prevents high temperatures on the ground surface due to evapotranspiration and cools the surrounding air. Planting trees on places such as streets and parks make the space underneath cool and comfortable by creating shade” (Fukuoka City 2009: 17).

In addition to climate change justifications, the policy texts relating to comfort and the environment in Fukuoka City also make mention of air pollution, energy consumption and Asian Dust as environmental threats to comfort. Nonetheless, it is the thermal environment—especially the urban heat island effect—in which green and open space is most clearly and consistently linked to the maintenance of a comfortable environment.

14.4 *Kaiteki Kankyo* Context and History

Section 3 shows that the idea of a comfortable environment—*kaiteki kankyo*—remains a powerful organising force in Fukuoka City's governance of comfort through greenspace. Moderation of the thermal environment, and the language of thermal comfort via greening, are not unique to Fukuoka or even Japan. Yet what is striking in comparison to other Japanese city contexts is the level of technical detail that has developed in Fukuoka from a relatively early time—that is, since the 1990s—about the merits of urban greening for thermal comfort. This applies both to policy texts (e.g. the *New Green Basic Plan* showing thermal images of different temperatures at the building and street levels for different greenery configurations (Fukuoka City 2009)) and also academic research (for example, the textbook of Nitta et al. (1981)) on regulating the urban thermal environment and early remote sensing work into temperature around Fukuoka's greenspaces (Katayama et al. 1990)).

There is, therefore, a longer interest in the comfort of the urban green environment in Fukuoka which parallels Shove (2003) on the 'science' of comfort. The interest in Fukuoka in a comfortable environment as a boundary concept to motivate adaptation action may be seen to be linked to a longer history of resolving societal and environmental challenges through open space. Following Shanahan et al. (2018), this section hence aims to give some context to a narrative of policy for a liveable environment, by looking at shifts in rationales and framings for actions over time. To do so, this section draws not only on policy documentation, but also on scholarly outputs produced by academics working at the science-policy interface for a comfortable environment around this time (see Mabon et al. (2019b) for a fuller characterisation of this community of scholars).

The local lived environment took on greater significance within policy as a site for securing quality of life in Fukuoka in the 1980s, after pollution control had been priority in the 1960s and 1970s due to a number of high-profile incidents in the locality (i.e. Minamata Disease in the 1950s onwards and air pollution in Kitakyushu in the 1960s). Central to this turn toward interest in the lived environment was the idea of a comfortable environment. In a 1988 review of legal and policy provisions undertaken as part of a national government-funded project, Fukuoka University's Naohito Asano identifies this transition of local environmental research beyond pollution control:

Conventionally in Japan, the historical circumstances of how an issue emerged are reflected, for example for environmental issues, the argument is mainly around environmental pollution. [...] Arguing for a 'liveable environment' offers a new way to think about environmental issues that goes beyond this framing of 'pollution and nature.' (Asano 1988: 14 (cited also in Mabon et al. 2019a))

The *kaiteki kankyo* phrasing can be seen elsewhere in Fukuoka at this time, for instance, a 1985 paper by Kenji Mitsuyoshi of Kyushu University titled *The city and a liveable environment* (Mitsuyoshi 1985), and the use of the phrase in Fukuoka City's (1986) environmental plan (Fukuoka City 1986). There is unsurprisingly no discussion of climate change issues or the role of the built environment in their mitigation. Yet there is recognition that the role of urban greening in a liveable environment goes beyond aesthetic and recreational considerations. Kyushu Institute of Design's Nitta et al. (1981: 245) use an example from Fukuoka City to argue "construction that avoids existing large trees does not only contribute to urban beautification, landscape and symbolism, but is also useful for temperature moderation and air purification." The urban environment—especially greenspace and open space—is thus part and parcel of a framing of a 'comfortable environment' extending beyond pollution control.

A previous text stemming from this research (Mabon et al. 2019b) has assessed in-depth how the rationale for policy- and practice-focused academic research into the thermal and green environment in Fukuoka has shifted over time. Without wishing to repeat this work, it is worthwhile highlighting some of the insights from this work to feed into the policy narrative this chapter constructs. The social and environmental challenges to which local greenspace policy has to respond shifted into the 1990s towards a greater emphasis on climate change, and to the local environment as the site at which global environmental issues manifest themselves and must be managed, yet can also in part be resolved. For instance, Imura (1993) makes reference to the UN Framework Convention on Climate Change, the Rio Declaration, and Agenda 21 in an article on balancing environment and development at the local level. Fukuoka City's Green Basic Plan of 1999 reflects this emerging framing of urban environmental problems as complex issues where new knowledges and skills are required to balance different and sometimes competing pressures. It lists climate change, acid rain, the ozone layer, and species extinction as factors ultimately affecting daily life which must be considered in greenspace provision within the city, as well as the relationship of greenspace to water provision, recycling and energy consumption (Fukuoka City 1999; Mabon et al. 2019b).

As such, the threats to a comfortable environment and also the targets which ought to be achieved through a comfortable environment shift over time. Yet a core theme in this narrative is the role that the planning of green-and open space is argued to play in translating knowledge about the quality of urban living, into practical action. Thinking around urban 'green' planning and its role in a comfortable environment is raised prior to formal consideration of climate change in articles on urban planning for comfort; and legal provisions for a liveable urban environment, respectively:

This renewal is an opportunity to plan the revitalization of public and private services, and to reserve appropriate open space. [...] Preparing for urban living is necessary, but this does not just mean securing housing. The provision of a comfortable environment through maintenance of open spaces such as parks, greenspace etc is required. (Mitsuyoshi 1985: 5–8 [cited also in Mabon et al. 2019a])

From the perspective of creating a liveable environment, thinking individually, for many points we can expect urban planning to have a necessary role, but it has not really been discussed until now. The existence of the ‘green master plan’ [...] is an important part of considering a green environment. (Asano 1988: 17)

Another finding from existing work (Mabon et al. 2019b) is that an epistemic community of researchers situated within Fukuoka has arguably worked to shape local environmental policy for green space and adaptation to environmental change in the public interest, using planning processes and expert committees as a common policy enterprise to exert influence. Given that the Shanahan et al. (2018) understanding of policy narrative emphasises the need for actors, belief systems and strategies, it is hence worth reiterating some of the insights from this previous Fukuoka-related research to show the strategies and rhetoric adopted by those seeing to shape policy for a comfortable environment. Actions such as preservation of wind corridors (Nitta et al. 1981) and city-scale climatological planning (Miura 1995) have been constantly justified in terms of bringing quality of life to citizens. Ooi (2008: 35) likewise justifies biodiversity conservation in terms of the lived experience of an urban ‘green’ environment, alluding to the aesthetic qualities (butterflies dancing) and aural pleasures (singing birds) that come as a result of biodiversity conservation (Mabon et al. 2019b).

Viewed in this context, the sustenance of thermal comfort via urban nature in present-day Fukuoka may hence be viewed as just the latest in a number of iterations of citizen well-being through urban environmental governance and underpinning research. Whilst writing about Japan more generally, National Institute of Environmental Studies scholar Yasuaki Hijioka reflects in *Environmental Evaluation*, a journal produced and edited by the independent Kyushu Environmental Evaluation Association based in Fukuoka (see also Mabon et al. 2019b):

Our country’s adaptation actions are still just at the startline, but by bringing together a long history of experience, technology and knowledge in protecting citizens’ livelihoods in areas such as disaster prevention, farming, health etc, I hope that industry and academia can work together to progress towards a safe and secure future society. (Hijioka 2017: 24)

This idea of climate adaptation as the continuation and evolution of extant practices seems particularly appropriate for Fukuoka. Current considerations of a comfortable environment in response to climate change pressures—and also an ongoing interest in providing amenity and convenience through management of urban greenspaces—are the latest iteration of a policy narrative which considers comfort in the urban green environment through firstly urban development and

expansion, then sustainable development pressures, then, more recently, explicit consideration of climate change.

14.5 Discussion: What Is Missing?

14.5.1 How Do We Know If 'Kaiteki' Has Been Achieved?

If we return to Garmendia et al.'s (2016) idea of boundary objects in a greenspace context as being flexible enough to allow different interpretation by different groups, yet also solid enough to facilitate communication, then it seems a 'comfortable environment' functions very much as a boundary concept in Fukuoka's greenspace and environmental change policy narrative. Within the strand of policy texts which consider comfort in terms of convenience and amenity, it is never clear how exactly comfort can be assessed or quantified—and, therefore, whether a comfortable environment has ultimately been achieved or not. The policy texts reviewed in Sect. 3.1. do list up and visualise factors which can contribute to a comfortable environment—lack of litter, ease of mobility, presence of well-maintained trees. But these texts do not clarify what exactly a comfortable environment is, or how exactly the stated characteristics contribute to comfort. It is similarly noticeable in the academic outputs stemming from the 1980s (e.g. Asano 1988; Mitsuyoshi 1985) that while a comfortable environment is advocated as a goal point for greenspace policy, and while characteristics of a comfortable environment are again described, specific standards for what constitutes comfort in the environment and how this may be assessed are not laid out.

Comfort is somewhat more tightly defined in relation to the urban thermal environment. Particularly within Fukuoka's climate policies, Wet Bulb Globe Temperature is used to set temperature bands which are not only uncomfortable but also dangerous to human health. Specifically, a temperature over 31 °C is designated 'dangerous', whereas temperatures in the range of 28–31 °C are defined as requiring 'extreme caution' (<http://heatstroke.city.fukuoka.lg.jp/wbgt/>). The threat to comfort from a warming urban environment is also justified through reference across policies to IPCC scenarios and predictions. The name and outputs of the IPCC are used to legitimise the need for specific technical and planning actions to maintain thermal comfort. There are clear parallels here to Shove (2003) and the scientific specification of conditions under which most people will report comfort. Similar to Opdam et al. (2015), then, a comfortable environment—or more precisely the threat to thermal comfort posed by a warming environment—functions as a focal point for urgent action in the way one may expect a boundary concept to operate.

In sum, across the policy narrative of comfort through greenspace in Fukuoka City, there is plenty to suggest that a comfortable environment functions as a boundary concept to motivate specific greening actions. These actions include the planting of trees, creation of wind corridors, proliferation of green walls, preservation of green areas to sustain 'cool spots', and management of urban nature to sustain

accessibility and convenience for citizens. Moreover, the utilisation of the term 'comfortable environment' in outputs from government, academia and also independent organisations suggests that a certain degree of success has been achieved in bringing different actors and sectors together to work in a common direction. However, as Westerink et al. (2017) argue, the success of a boundary object rests not only on its presence, but also how it is managed. In this regard, limitations to a comfortable environment as a boundary concept emerge.

14.5.2 Limits of Boundary Concepts and Policy Narratives?

Norton (2008) cautions that analytical approaches to policy documents and texts may give a false impression of the quality or efficacy of a policy, if the analysis pays attention only to the presence of certain phrases or ideas and not to the wider context in which these ideas are implemented. It is for this reason that this contribution has sought to situate the evaluated documentation within a wider policy narrative (Shanahan et al. 2018), to contextualise the evolution of concepts such as a comfortable environment over time and assess their relation to non-policy texts such as scientific outputs.

However, what this policy narrative may miss is a much longer history of informal coping strategies to address comfort in the urban environment, which lie outside formalised policy processes, but may nonetheless support a longer narrative of actions creating a comfortable environment. A good example of this in Fukuoka is *uchimizu*, the practice of scattering water on streets and gardens in summer for keeping dust down, cooling the environment, and ritual performance. *Uchimizu* has recently been brought into formal narratives of thermal comfort. Fukuoka City Government held an *uchimizu* event in summer 2019 with the explicit purpose of raising awareness of the urban heat island effect (Fukuoka City 2019a); and Fukuoka Prefectural Government provide technical data on how a community *uchimizu* event reduced surface temperature from 51 to 46.1° on a hot summer day (Fukuoka Prefecture 2019). However, *uchimizu* as a practice to promote cooling in Japan dates back to the seventeenth Century (Solcerova et al. 2018), illustrating that the idea of creating and sustaining a comfortable environment extends far beyond the 'official' and techno-scientific justifications for *uchimizu* offered in more recent times.

As such, whilst a comfortable environment is a useful boundary object for stimulating policy action, it is crucial not to assume the goal of a comfortable environment is only understood by, or can only be achieved by, actors involved in the policy-making processes. The policy narrative of a comfortable environment in Fukuoka also illustrates a danger of boundary concepts. If used uncritically within technically driven policy processes, the Fukuoka narrative suggests boundary concepts may draw different actors towards technocratic 'solutions', which may be easier to understand or agree upon than social or structural changes. For instance, the policy texts analysed in this chapter, and also the related academic outputs, focus on

techno-scientific processes to enhance or sustain comfort. These include shaping or alteration of the green environment to facilitate accessibility and convenience, and strategic placing of greenery to cool the thermal environment. Within this narrative, citizens are portrayed as passive recipients of the benefits of policy decisions taken to secure a comfortable environment. Largely missing from this narrative are discussions on which members of society may be most vulnerable to environmental changes, or who ought to benefit most from a comfortable environment. Research elsewhere has argued that whilst they may be perceived as inherently ‘good’ and technically effective, strategies to mitigate the effects of environmental change via urban greening are not value-neutral and can reflect existing inequalities and exclusions (Haase et al., 2017; Shokry et al., 2020). Indeed, initial research conducted by Mabon et al. (2019a) indicates that formal greenspace, and also government-supported greening actions, are not distributed evenly across Fukuoka. The pragmatic appeal of boundary concepts in facilitating progress on urgent challenges thus runs the risk of closing down the discussion to the most obvious or readily quantifiable technical ‘solutions’, which may mask the underlying processes of green gentrification or green inequity—and subsequent unequal distribution of comfort – outlined at the start of the chapter.

14.6 Conclusion

This chapter took as its starting point the idea of *kaiteki kankyo* – a comfortable environment – as a boundary concept motivating policy for the management and development of greenspaces in Fukuoka. A comfortable environment remains today a core organising concept in Fukuoka’s greenspace-related policies, and encompasses two key understandings. One is comfort through the creation of a pleasant environment for accessibility and mobility, attained through the management and control of nature. A second is comfort through the utilisation of greenspace to regulate the urban thermal environment, specifically the urban heat island effect, through the cooling benefits of greenspace. By looking at recent history of the development of greenspace research and policy in Fukuoka, however, we can see that the idea of a comfortable environment has functioned as a boundary concept to guide management of greenspaces in response to urban development, sustainability and, more recently, climate change adaptation pressures. Yet, at the same time, qualities contributing to a ‘comfortable’ environment cannot be assessed for definite. In the absence of a clear definition of what constitutes a comfortable environment, proxies such as the presence of specific features or the control of the urban climate below a certain temperature are drawn on by policy, plans and academic texts to hint at how comfort may be enhanced or maintained.

It is also important to acknowledge that even when attempts are made to situate a chronology of policy over time in a wider narrative involving characters, actions, rationales and motivations, caution ought to be exercised over informal practices and knowledges which may help to sustain the narrative over time. Such actions may

pre-date formal policies and may not be acknowledged within texts or by policy actors (or may be appropriated into formal policies at a later date), but can be critical in establishing narratives of environmental comfort within a locality. Lastly, whilst boundary concepts may indeed be helpful pragmatic tools to facilitate consensus, it is imperative that this desire for consensus and ‘quick wins’ does not close down the outcomes of the narrative to a series of technical solutions. This is especially imperative when one is dealing with the urban green environment, where a desire to see all urban greening outcomes as intrinsically ‘good’ can mask underlying questions of unjust or unequal access to a comfortable environment.

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