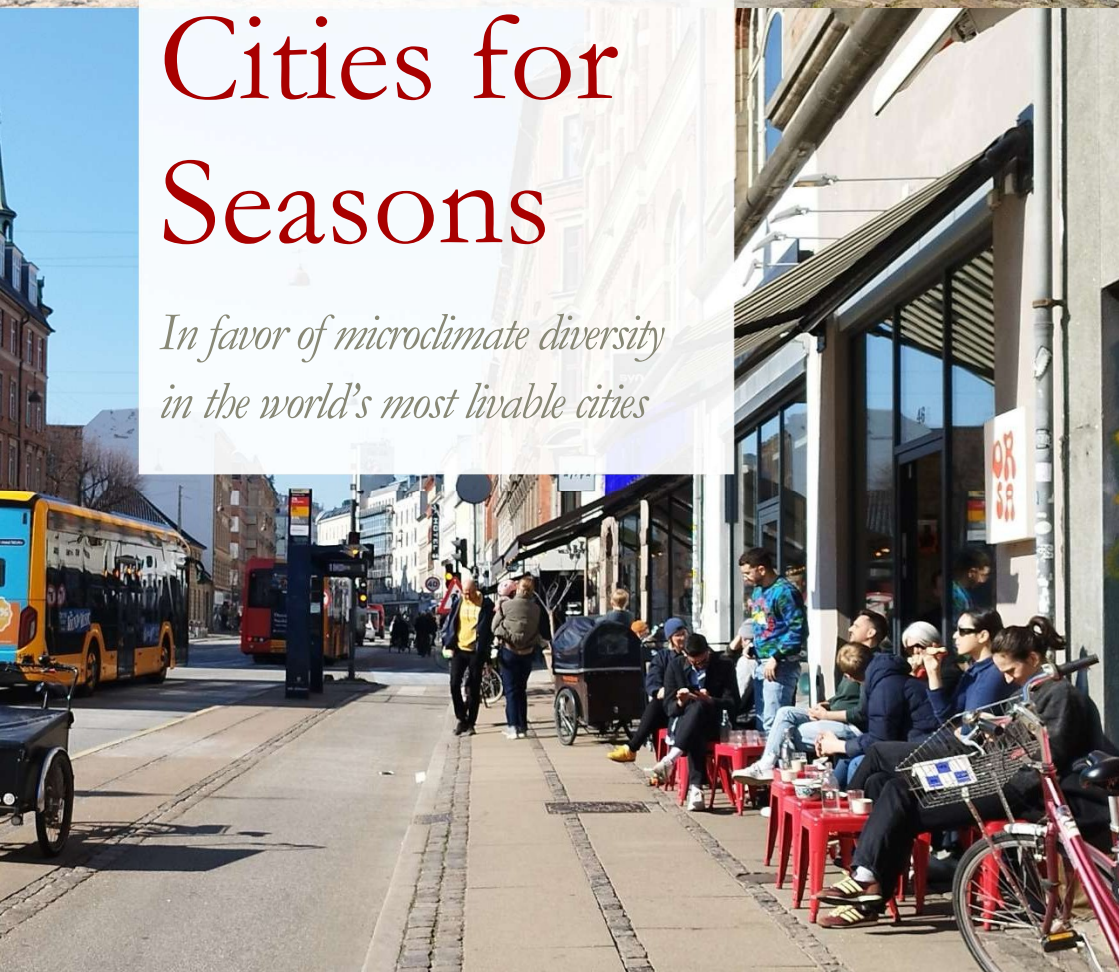
Cities for Seasons

In favor of microclimate diversity in the world's most livable cities



Loosely based on master's thesis *"Cities for seasons – In favor of microclimate diversity as alternative to the metric of total yearly comfort hours in competitively livable cities in temperate climates"*

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My deepest gratitude to
Thomas Skou Grindsted
and Michele Coscia

All models are wrong,
but some models are useful

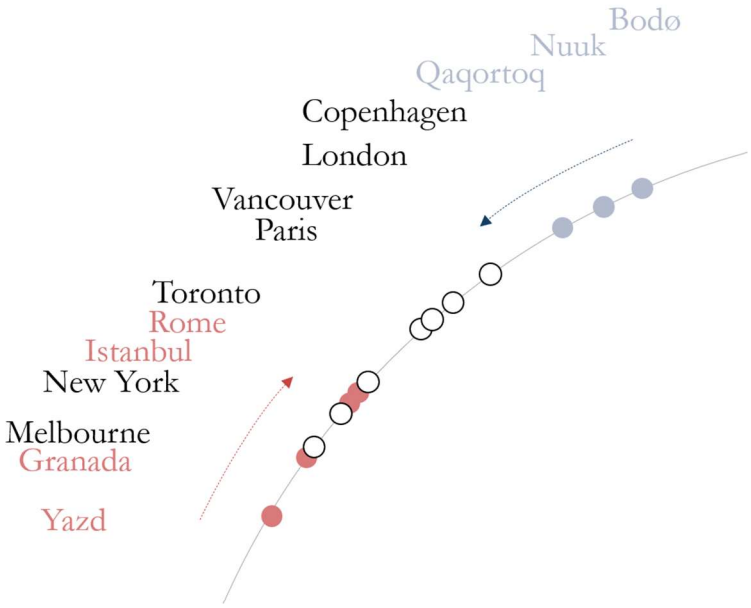
- George E. P. Box

To be able to cut up each kind
along its natural joints,
and to try not to splinter any part,
as a bad butcher might do...

Plato, Phaedrus

A most intriguing paradigm emerged,
that the harsher the climate,
the more ingenious the devices and methods
for creating physically comfortable places.

- Chip Sullivan, Garden and Climate



Cities in warm climates generally seek to bring microclimates north. Cities in cold climates may seek to bring them south. But what of cities in temperate climates?

Preface

I intend for this book to increase awareness that we have reached rapidly diminishing returns, and may already be doing more harm than good, by striving for optimized microclimates in the world's most livable cities.

These cities, all in temperate climates, are experiencing increasingly intense heat waves, wherefore they are fighting heat island effects and recreating adequately cooled microclimates, which are referenced as 'improved' or 'optimized'.

What is apparently unfashionable to acknowledge is that outside of those hours of scorching midday heat, inhabitants benefit greatly from the warmth of the sun. Even on the nights of those scorching hot days, inhabitants tend to enjoy the residual warmth when they feel it outside.

These are conditions not unlike those of ancient cities around the mediterranean, from

which we may consider taking inspiration – of their rhythms and their building practices – to build cities of varied microclimates.

We may also look further north, where there is inspiration for how to make the most of the sun when it is sparse.

But first we must relinquish our resolve to make every unit of surface comfortable at every moment, and aim instead to produce a built environment that enables us to lead everyday lives flowing between microclimates, always able to find warmth or chill, whichever we desire.

It also necessitates a change of how we speak of heat islands. In this framework, no thermal phenomenon is bad: heat island effects are attractive in early spring, and wind tunnel effects and wind chill can be attractive in heatwaves.

At first glance this may appear as a weaker signal of climate responsivity – "what do you

mean we should embrace heat island effects?" – but I have confidence that the signaling effect will be reversed once it is understood that it is the stronger *action* towards climate responsivity; "yes, I am advocating for microclimate diversity. Why aren't you?"

In doing so we may save energy and materials, and improve climate resilience and biodiversity, all while staying in closer touch with the flow of the seasons and the hours of the day.

We may call these cities **cities for seasons**.

Residual warmth enjoyed in Premana, Italy.

A warm microclimate enjoyed in Torshavn, Faroe Islands.

Contents

1. The world's most livable cities

The world's most livable cities are competing to stay as such. They compete to attract investment and residents, and while many conflicting interests are at play, insofar as these cities build their economies on knowledge and skilled labor, the day that they will stop remains out of sight.

And so these cities compete to attract the most resourceful residents, vying for them to vote with their feet and select these cities as their home.

Thereby here, maybe more than anywhere else, is the prolonged incentive to compete to imagine and build urban utopia.

2. Microclimatic design in temperate cities

While these cities have raised the bar for the world's most livable cities, they have also been points of origin for new steps in the field of urban planning, giving rise to several sub-fields within the larger field of urban planning.

One of these sub-fields is microclimatic design[1].

While the last few years have seen quantum leaps in our ability to model and thereby design attractive microclimates, little attention has been devoted to the question of what constitutes 'attractive microclimates'.

And why should this question be explored, one may ask. Is it not obvious? Aim for the temperature to fall within the thermal comfort range, for as much time as possible, across as large an area as possible.

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[1] *Some readers will know that this field is, in fact, much older than the modern practice of urban planning.*

This approach is largely identical to the contemporary approach:

We quantify the comfort range as UTCI, model it for every unit of surface, and aim to maximize it over time (as yearly comfort hours).

We place most emphasis on staying below the higher end of the comfort range – on mitigating heat island effects – following the insight that while we can dress up for the cold, there is only so much we can do to avoid overheating.

And the risks of overheating are potentially lethal, and the heat is only expected to become more extreme…

This approach is reasonable.

And have the scholars indicated that our approach should be any different?

In this anti-heat island context, the highly influential and otherwise continuously relevant

Jan Gehl appears somewhat outdated, defending warm microclimates and criticizing tall developments for their cooling effects at street level.

Looking back at the full body of his work, much of it has been about defending the import of the mediterranean café culture to Northern Europe (to which this café culture was still new when Gehl began his work), which was achieved, in no small part, by creating warm microclimates.

Furthermore, he also tended to do his observations on pleasant summer days, following the insight that when it is colder, people largely rush through. But this decision constitutes a systemic blind spot to the phenomena in the slightly colder and warmer periods, and worse yet, it becomes a self-fulfilling prophecy when it leads to recommendations of building cities only for that period…

Meanwhile, Christopher Alexander's approach to microclimates, at first glance, seems comparatively nuanced, as in *A Pattern Language* he advocates for cool, mild and warm microclimates alike.

But certain details, such as ambivalence about whether dark surfaces with thermal mass are "good" (as reflected in *Pattern 92, Bus Stop*) or "bad" (as reflected in *Pattern 51, Green Streets*) for the microclimate, indicate that this advocacy for varied microclimates may be an unintended effect emerging from other concerns.

This is also suggested by Alexander altogether renouncing the spaces on the north side of buildings in temperate climates as spaces to be in - even though they may be designed to offer relief during heat waves:

Pattern 105, South Facing Outdoors:
"People use open space if it is sunny, and do not use it if it isn't, in all but desert climates."

This attitude, at closer inspection, is not entirely unlike Gehl's: prone to generalizing that sun is good and shade is bad. This appears to be a prevalent mindset in temperate climates, particularly prior to global warming: "there is one good microclimate, and it is the warm microclimate".

It also appears that the contemporary trend is a simple tweak of this sentiment: "To be responsive to global warming, we must aim for cooler microclimates. The warm ones get too warm now…"

A scholar who stands out by refusing to generalize that any microclimate is good or bad, and who is perhaps the strongest proponent of microclimate diversity in cities in temperate climates, is *Berkeley Professor of Landscape Architecture & Environmental Planning*, Chip Sullivan.

In his 2002 book *Garden and Climate*, he describes how traditional garden designs can be used to create a magnificent a variety of

microclimates, accommodating varying uses throughout the year. Here, the crudeness of the generalization that 'sun good, shade bad' is thrown into sharp relief with the simple observation that:

"*The courtyard was always a comfortable place*
to sit and think;
one could find a shady seat in the summer
or a protected corner in the winter."

And more poignantly still, he finds the revealing trend that:

A most intriguing paradigm emerged,
that the harsher the climate,
the more ingenious the devices and methods
for creating physically comfortable places.

This appears to remain as true as it was on the date of publication, more than 20 years ago. While these temperate cities, in the world's mildest climates, are dedicating increasing attention to microclimatic design, our devices remain crude: the 'microclimatically optimized'

spaces are often achieved with the simple trick of green surfaces and tree canopies.

Why does it seem we've been standing still?

Should it not be trivial to implement, or at least begin to explore, microclimatic diversity?

3. A case of Goodhart's law

As it turns out, pursuing microclimate diversity in the context of this contemporary approach, is all but trivial. Not because the microclimatically diverse designs are practically unfeasible – they are anything but – but because the contemporary approach is fundamentally at odds with the pursuit of microclimate diversity:

As our approach is to strive for comfort everywhere, at all times, we replicate – and dictate the continued replication of - one optimized microclimate.

In the temperate city, this optimized microclimate is moderate; mild. Insofar as the cooler and warmer microclimates have a lower number of yearly comfort hours, they are found to be strictly inferior to the mild, 'optimized' microclimates.

But while the mild microclimates are optimal, they nonetheless remain imperfect: in the shoulder seasons they become too cold, and at

the height of heat waves they become too warm. Thus, striving for this 'optimum' effectively narrows the operating envelope of the city, rendering it *only* comfortable on mild summer days.

This is clearly paradoxical;
a case of Goodhart's law:

Our objective parameter was chosen so unfortunately that we had hardly started working toward it, before our efforts only got us farther from our intention…

Thus, there may be little doubt that we have reached rapidly diminishing returns by striving for one optimal microclimate, and that the global optimum is more likely to be found in the direction of a higher diversity of microclimates.

Let us begin exploring.

4. Microclimate diversity

In the following I will contrast the contemporary optimization-oriented approach to an alternative approach which promotes microclimate diversity.

The pro-diversity approach will be represented not just as striving for diverse microclimates, but also as striving for supplementary appeals that synergize with those microclimates.

The eager reader may find an elaboration of the theory behind those supplementary appeals in this the following.

Other readers may jump ahead to the comparison of the two approaches starting at page 47.

Warm microclimates and their supplementary appeals

The warm microclimates may extend the comfortable season earlier into the year, where the sun is strong only for a few hours around midday.

For that reason it is crucial that the warm microclimates are highly accessible, prompting only short (or no) detours from the buildings that users are occupying regardless, such that even a five minute window can be utilized.

The detour to the warm microclimate is as short as it can possibly be when it sits right at the doorstep of buildings that the users occupy anyway, wherefore the edges – soft edges – near the entrance at the south side of these buildings are understood as prime locations for warm microclimates.

Since sun and convenience are two major appeals at this time and place – at accessible warm microclimates around noon on sunny days in early spring - other parameters are understood to be at relatively diminished significance, such as comfort or greenery, or even distance to traffic noise. This is not to say these parameters do not matter – just that, in this time and place, they matter *less* than they

would absent the pull of the sun and the convenience.

This pattern of sun and convenience outweighing most other concerns has been observed to repeat with surprising consistency, appearing as a distinct early spring phenomenon:

When the sun first becomes strong enough to render the warm niches comfortable – we may call this 'the cool edge case' – people will occupy any sunny crevasse of buildings – stairs, steps or plinths - or even pull out their own stool – to bask in the sun.

Most of the year, only youths will tend to sit on such miscellaneous surfaces, but in early spring people of all ages have been seen engaging in this behavior.

This suggests that, in early spring, the appetite for sun is strong to any demographic.


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Caf
Exi

Cool microclimates and their supplementary appeals

By contrast, the cool microclimates are understood to have most potential to offer appeal at the height of heatwaves, specifically at and a few hours after noon, where the temperatures tend to be peak.

This is a period in which many (but not all) people have more time available to move to wherever they would like to be, wherefore the cool microclimates may be more dispersed, prompting more lengthy detours.

For this reason, they must also accommodate the whole palette of appeals – lest they are simply abandoned in favor of other places that require no compromise.

Though preferences vary between individuals, between groups they tend to converge on low traffic noise, comfort, availability of cooling refreshments and of bathrooms (for prolonged stays), green surroundings (well hydrated vegetation, not scorched), and preferably water

– if not interactive water, then simply circulating water, the sound of which can have a particularly reassuring appeal when the memory of rain is faint, and the sun is bordering on oppressive.

This, too, has been confirmed with observations, manifesting as the heatwave phenomenon that places that require any compromise are largely left behind in favor of places that satisfy all appeals, which can become unusually crowded.

It has also been observed that, at these destinations, around this time, occupants do not move around much; they settle down, and stay, only starting to move about again once the temperatures drop.

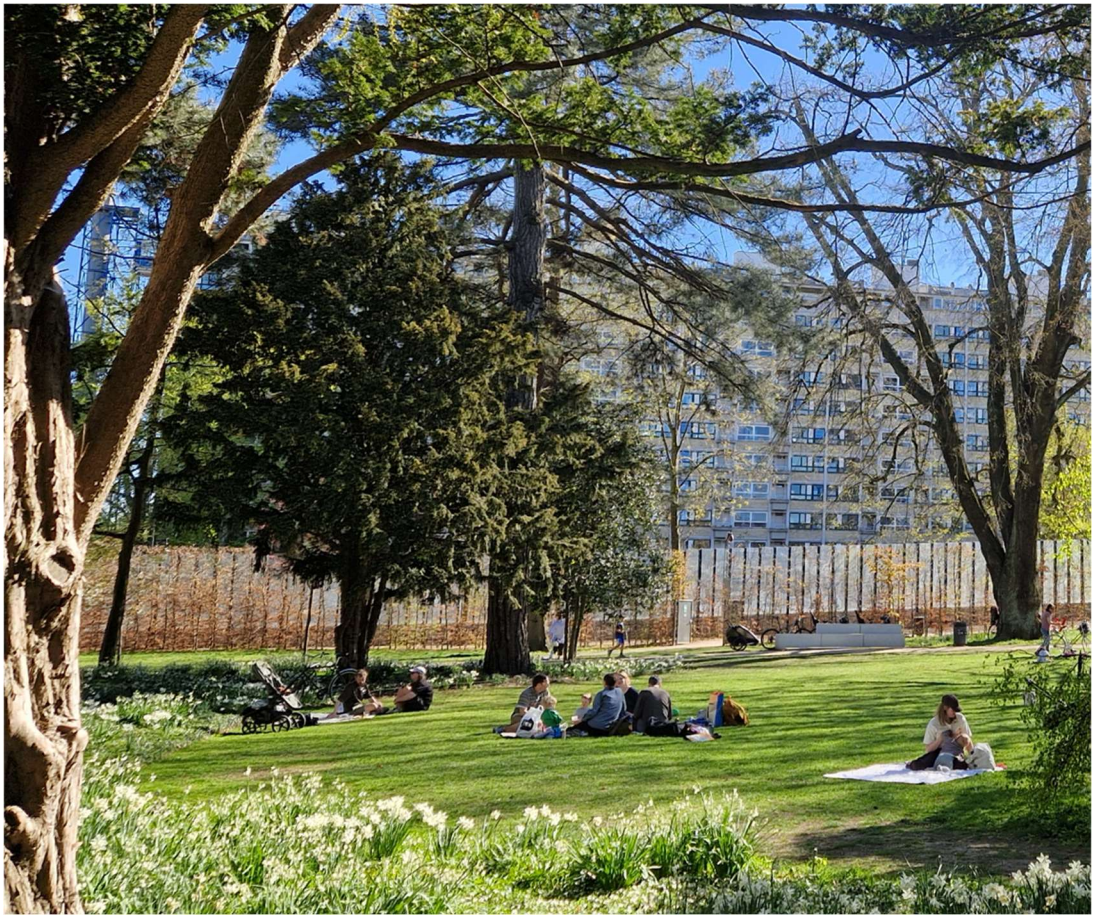
This echoes the insight that also underpins *chahar baghs*: When the heat is so intense that we need to combine cooling effects to remain comfortable, no one in their right mind would voluntarily remain physically active…

Mild microclimates and their supplementary appeals

Finally there is the period in between these extremes: The mild summer days, during which virtually *every* place seems to be comfortable, and where any discomfort can be alleviated by slight adjustments, whether to position relative to sun, to activity levels or to clothing.

During these days we seek mild microclimates – and since mild microclimates constitute most of the city, it feels like we move *regardless* of microclimates. We may seek grassy fields or gravel paths or ball courts or patches of forest… Places where we can engage either in physical activity, or rest, or a pleasant combination of the two.

These are the days that are praised by inhabitants; when, at long last, the city feels like the perfect environment; neither frigid, like winter, nor oppressive, like summer. Just right; friendly and inviting.

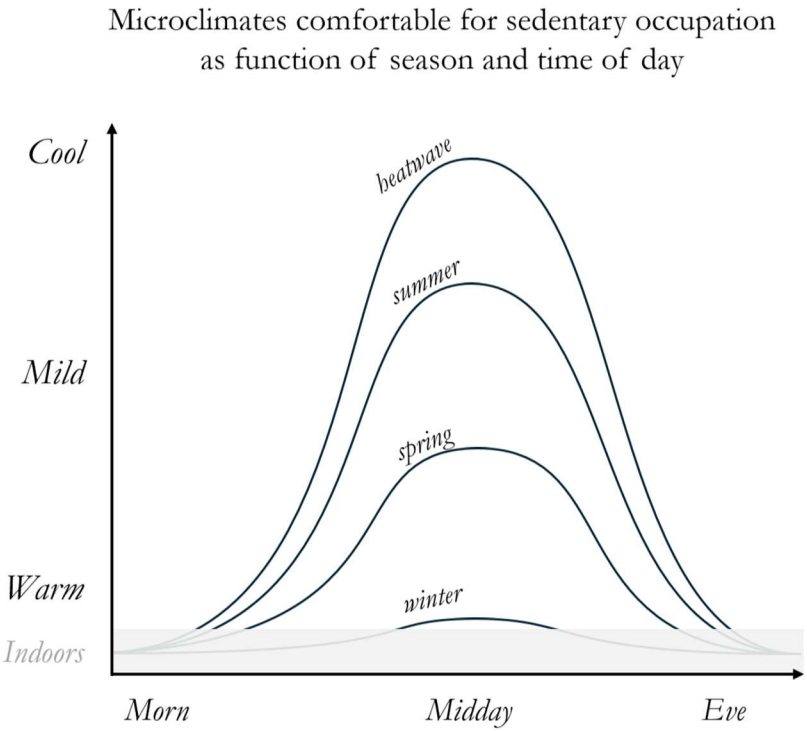


Microclimates as function of time of day

We have examined the appeal of the microclimates around mid-day, through summer and to the fringes of the active season. But what about the fringes of the day?

The pattern that repeats throughout the year – from the warm microclimates, to the mild, to the cold, and back again – appears to repeat throughout the days:

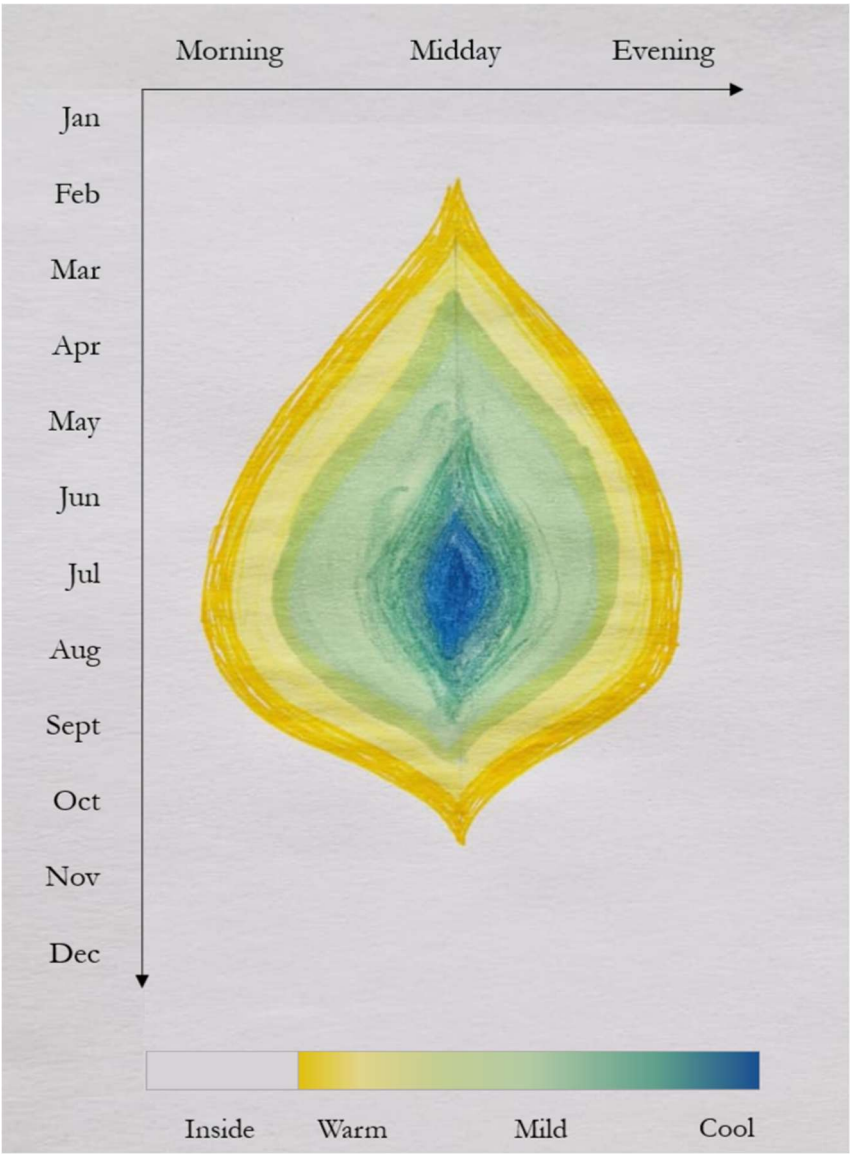
During heatwaves, the day may start at the warm microclimate at the edge of the building, the hours before noon may be spent in the mild microclimates, before refuge from the scorching heat is sought in the cool microclimate. But once the sun loosens its grip, the motion starts to flow back again: back to the mild niches, before the evenings, where the residual heat at the warm microclimates may be enjoyed as long, warm summer nights, before we retreat into the buildings until next day.



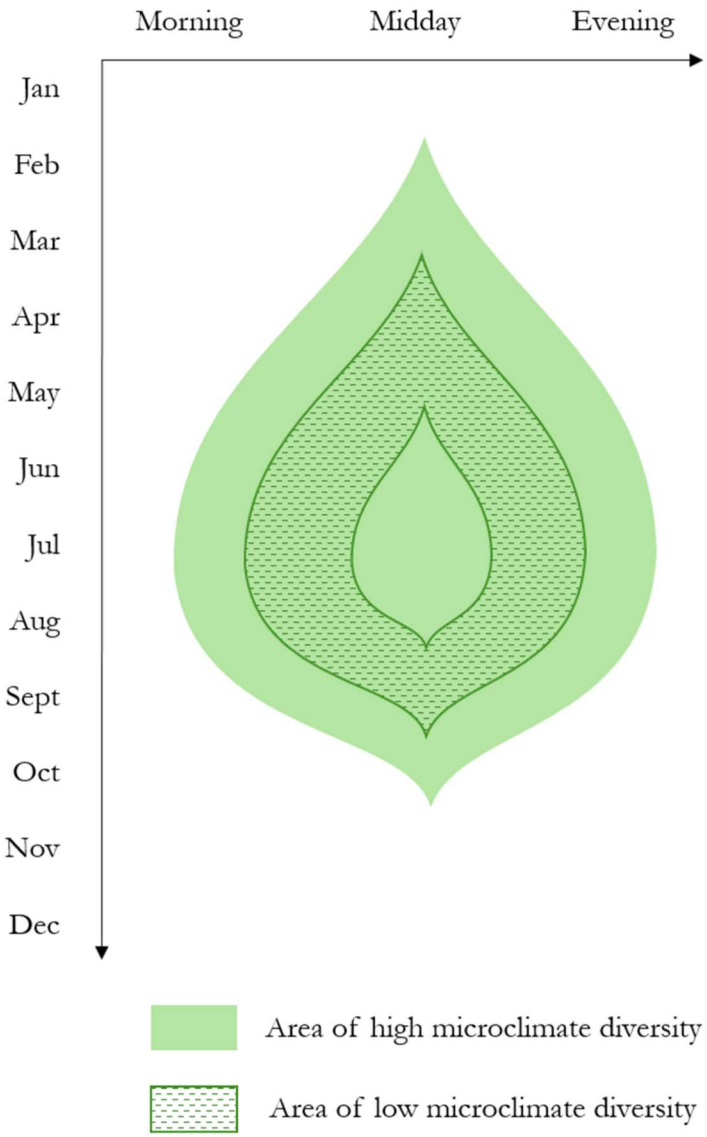
One of several variations of visualizations. More on following pages.

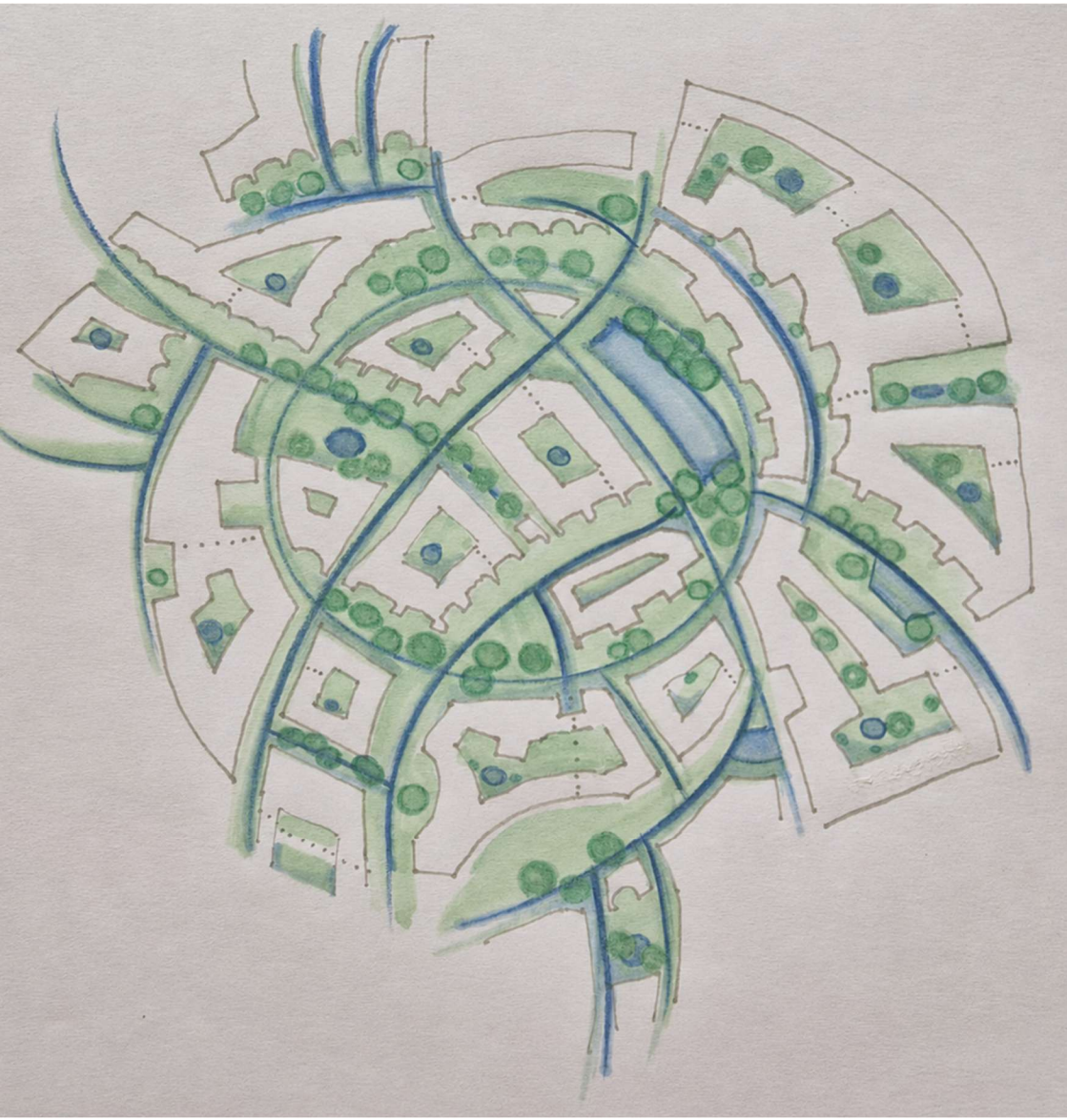
On milder summer days, the motion strays slightly less from the soft, warm edges – until finally, at the edge of the active season, the only places that are occupied at length at all, are those soft, warm edges around that brief mid-day window.

Comfortable microclimates
as function of month and time of day

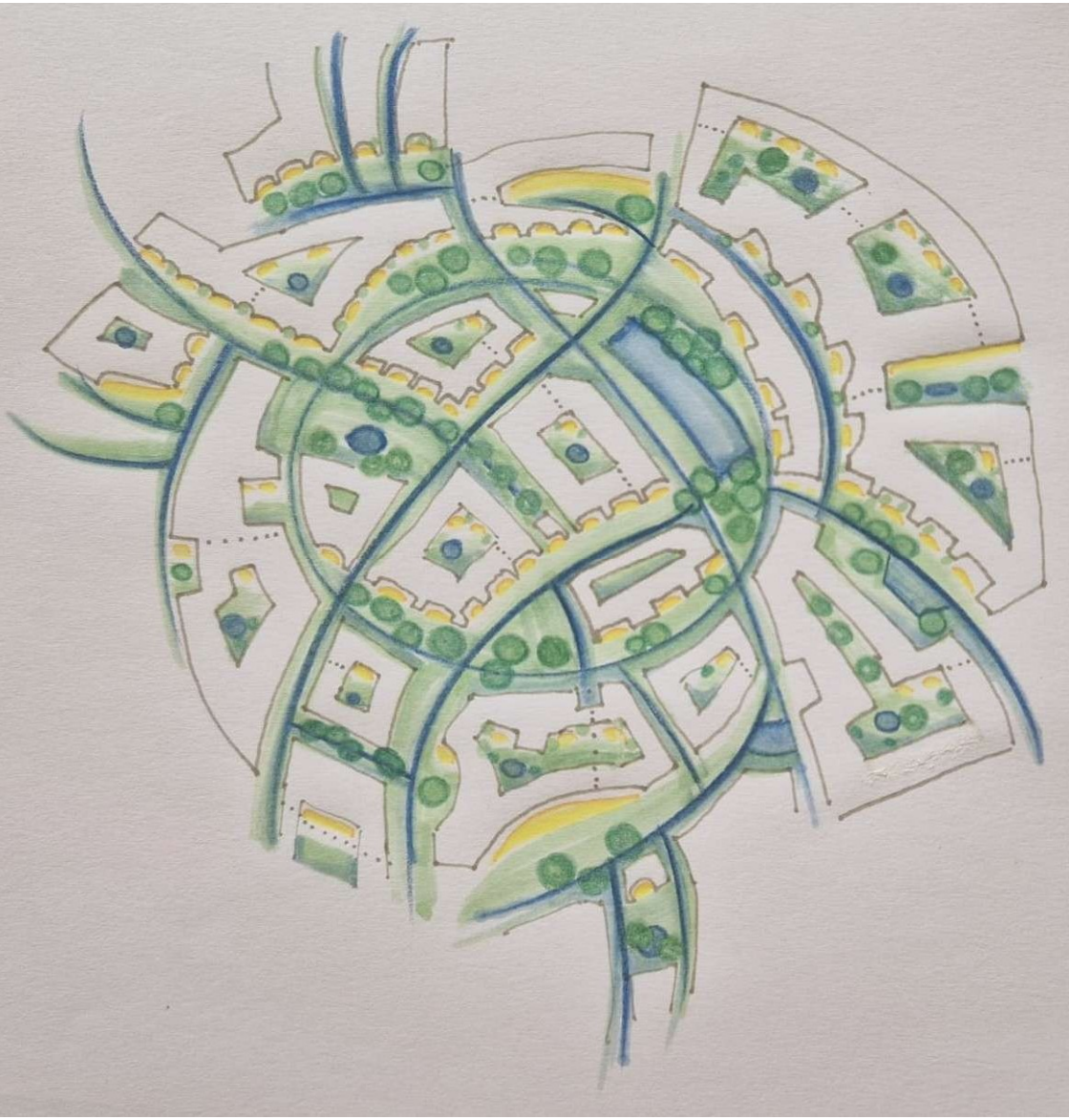


Theorized solution window of area of high and low microclimate diversity





Area of blue-green infrastructure with heat island mitigation (relatively low microclimate diversity)



Area of blue-green infrastructure with heat islands.
(relatively high microclimate diversity)

Summary of guiding principles for microclimate diversity

Thus the microclimates, their use cases and their supplementary appeals, following the pro-diversity approach, can be summarized as shown in the following table.

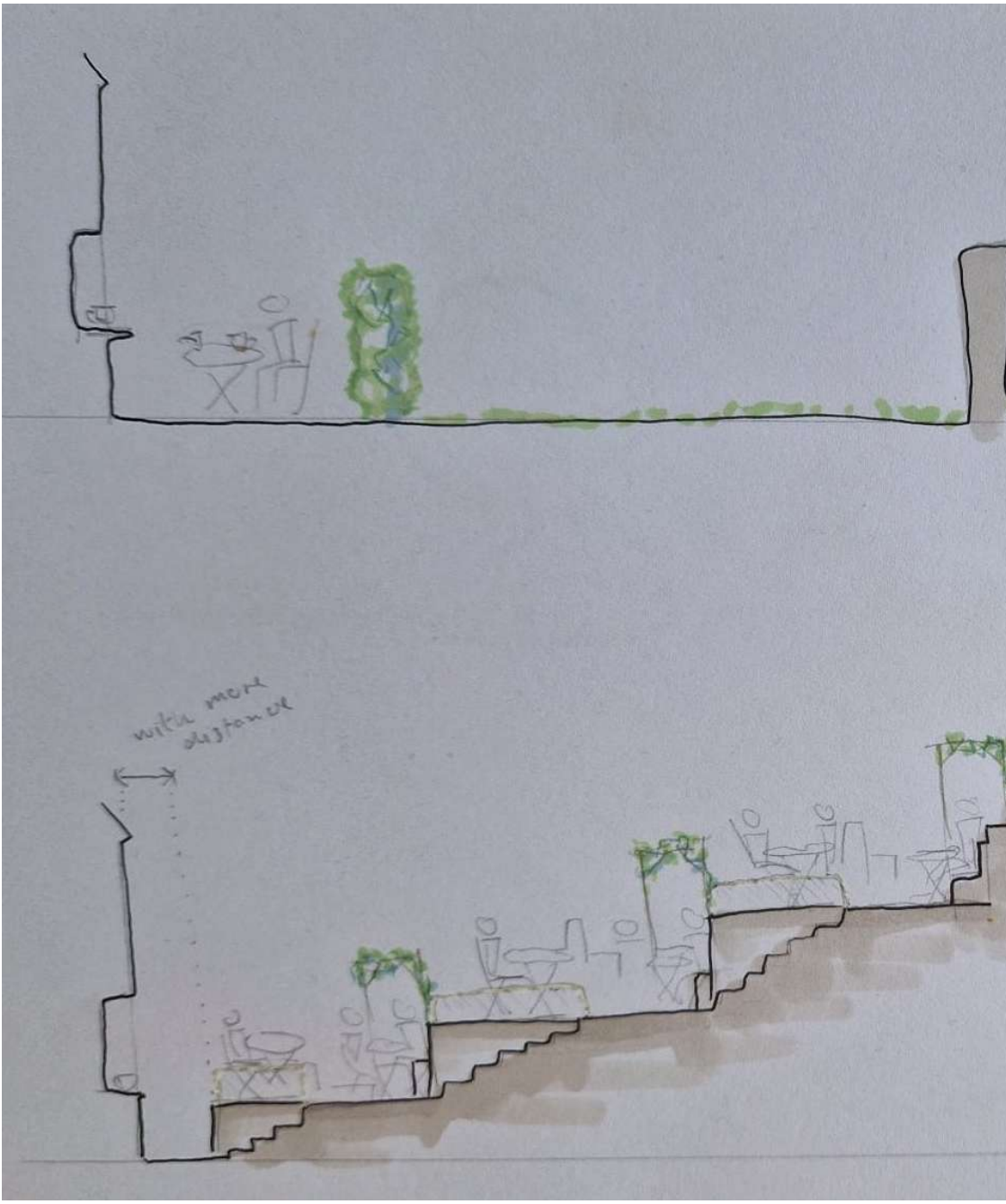
Readers are asked to take note that this is a preliminary framework. Though observations have confirmed some of its' claims, it remains largely based on expected findings, as opposed to confirmed findings.

Thereby the framework can be understood, for the time being, as a somewhat bold explanatory framework, which invites testing and critical assessment.

Readers are invited to crucially assess what they perceive to be the strengths and weaknesses of this explanatory model, and how it may be tested.

Micro-climate	Use cases	Supplementary appeals
Warm	Sunny days in early spring and autumn (midday); Mild summer days (pre-noon to afternoon) Heatwaves (morning and night)	Accessibility (to accommodate time constraint in spring and autumn), high levels of soft traffic (to satiate appetite for people in early spring), direct sun, warm beverages
Mild	Late spring and early summer (midday) Heatwaves (pre-noon and afternoon)	Grass; trees; low traffic noise *Etc.* (very wide solution window)
Cool	Heatwaves (midday)	Vegetation; water (flowing or inter-active), low traffic noise; cooling refreshments

Guiding principles of microclimate diversity



Above: Area of low microclimate diversity.

Below: Alternative of high microclimatic contrast
(not high diversity, as it misses a mild microclimate)

Comparison between frameworks

Thus we have firmly established both the contemporary optimization-oriented approach, and the alternative pro-microclimate diversity approach.

In the following we will explore the two approaches in relation to the following adjacent dimensions:

1) Life on the street
2) Climate resilience
3) Biodiversity
4) Proxy concepts (shorthands)

I. …as solution to the coordination problem of where to gather for life on the street

The first dimension we will explore is the dimension of **life on the street**. Though life on the street certainly relies on many factors beyond microclimate, we will attempt in the following to explain life on the street first and foremost as a function of microclimates.

Life on the street has been chosen as the first subject of exploration following the insight that life on the street – people - is one of the main appeals of life in the city, if not *the* main appeal of the city[2].

For simplicity, let us begin by comparing how the two approaches may influence the form and the use patterns in an east-west reaching street canyon among medium rise buildings.

[2] The title of this framework, *Cities for Seasons*, is itself a play on and homage to the infamous title *Cities for People*.

Form, following contemporary approach

The contemporary approach may reach a proposition for the form as follows:

- The south-facing edge is at risk of becoming subject to heat island effects, wherefore significant cooling measures should be implemented here, such as dense tree canopies and green surfaces.

- The middle of the canyon can be made comfortable with fewer cooling measures, wherefore green surfaces may be sufficient. Green surfaces can synergize with the contemporary aim of improved rainwater management, wherefore the middle of the canyon should be developed as permeable rainwater gardens.

- The north facing edge receives too few sunlight hours to be attractive for placemaking, wherefore these areas may be used for utility, such as parking.

Form of street canyon
shaped according to contemporary heuristics,
yielding a moderate microclimate throughout;
an area with low microclimatic diversity.

Use, following contemporary approach

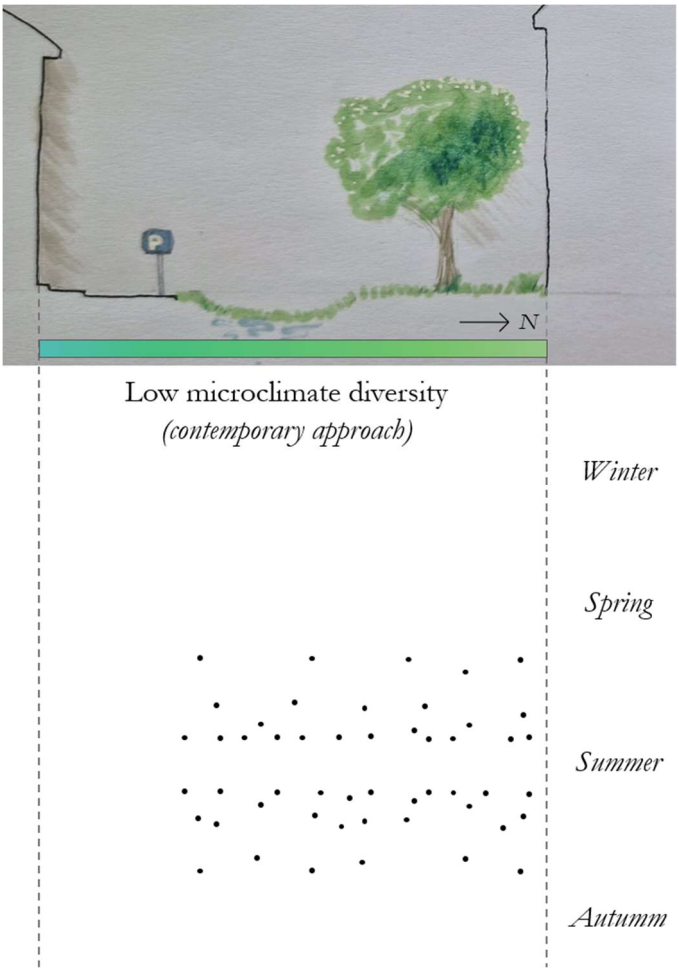
In this street canyon, the use throughout the year may follow this pattern:

In January the spaces are too cold for occupation. People move through spaces, actively.

In early spring, they remain too cold.

Come late spring or early summer, the spaces begin to be warm enough to stay. Occupation may happen in any part of the canyon, as any place is as comfortable as the other. Yet, though many people may find this place both comfortable and lovely, if they find it empty they may be less likely to stop (or stop only briefly), thus rendering it stuck in a state below critical mass.

At the height of summer, this street canyon may be abandoned in favor of places with water. As the days become cooler again, another period of use ensues, before autumn marks the end of the season.



Theorized use pattern in area of low microclimatic diversity. It is expected that the parking in the shade will be rendered unused even when it is comfortable; effectively a non-place.

Form, following pro-diversity approach

Meanwhile, a pro-diversity approach may find that:

- The south facing edge has potential as a warm niche, wherefore dry surfaces (such as drained paths) may be placed here to amplify the heat island effect, which in this context is attractive.

Insofar as the warm niches have the aim of appealing on the short days of early spring, their appeal is amplified when they are hyper-accessible, as they are when they constitute the *soft edge* of interactive buildings (particularly ones in which it is possible to fetch a warm beverage), such as cafés and libraries, if not businesses, institutions and homes; virtually every building which may have occupants in it around mid-day.

It may also find that the comfort window can be extended without sacrificing sun exposure in early spring, through overhangs that extend

Form of street canyon shaped according to alternative heuristics promoting microclimate diversity.

from above, forming below them a "blessed triangle" into which the low rays of spring sun may penetrate, while blocking out the higher rays of midsummer sun.

- The middle of the canyon has potential as a mild niche, which may constitute both rainwater gardens, but also mowed fields for games and for leisure, which may be appreciated particularly at the height of spring, where congregating on the grass is among the most widely appreciated seasonal affordances.

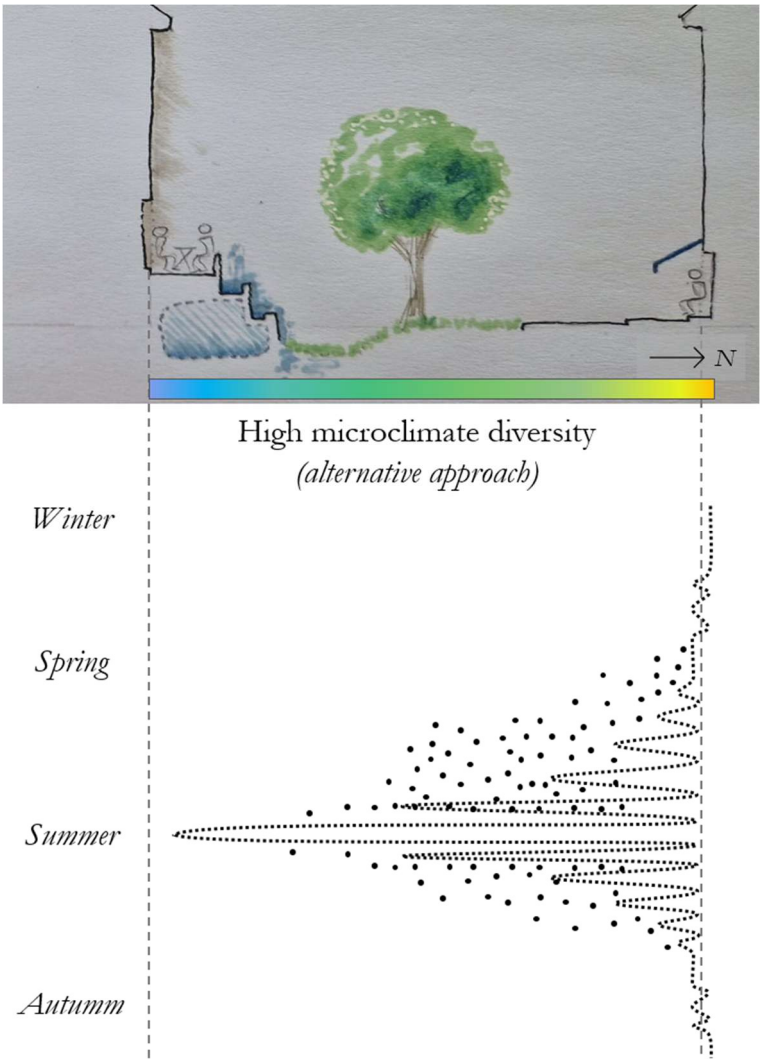
- The north facing edge has potential as a cool niche, but insofar as 'cool niches' have the aim of appealing during the height of heat waves, it is a necessary but insufficient prerequisite that they are cool; to appeal when the heat is oppressive, it greatly adds to their appeal that they offer water and lush vegetation – not to mention iced or frozen refreshments.

Use, following pro-diversity approach

And so it may go that, at the depth of winter, the use pattern here resembles the microclimatically monotonous street canyon, as even the warmest microclimate remains too cold for occupation.

But already in the earliest onset of spring – on days with blue skies and little wind, where the sun strikes the dry and dark surface below the feet in the warm niche - small heat islands emerge, comfortable for opening up the jacket and taking in sun, which at this time of year, is dear and missed.

And soon the warm microclimates develop an emergent appeal: As these places are unique in offering this affordance, these places soon become highly sought out, even contested, places to be. They take on a status not unlike Schelling points, known as places to go if one wants to be near other people; popular because they are popular.



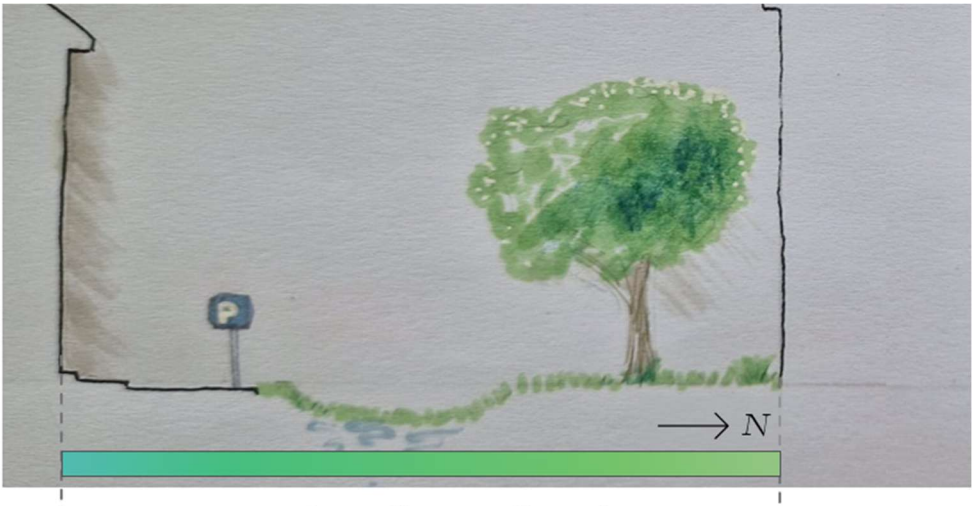
Theorized use pattern in area of high microclimatic diversity, anticipating the active season to be elongated, and intensified.

As spring turns into summer, people spill into adjacent cooler spaces, until eventually they occupy the deepest shade at the height of the heatwaves.

But even during the heatwaves, the pattern that repeats throughout the year – from the warm niches to the cool ones - repeats throughout the day. This pattern around the warm, soft edges resembles a pulsing, gravitational pull, and may be known as *the gravitational pull of the warm, soft edge*.

Thus the warm, soft edges function as *catalyst* for activity, while the diversity of microclimates function to *sustain* that activity, helping the area remain occupied in a prolonged state of critical mass, abandoned as the exception rather than as the norm.

Thus, insofar as people in this area seek places where other people are, and converging on a place constitutes a coordination problem, microclimate diversity solves that problem.



Low microclimate diversity

(contemporary approach)

Winter

Spring

Summer

Autumm

High microclimate diversity

(alternative approach)

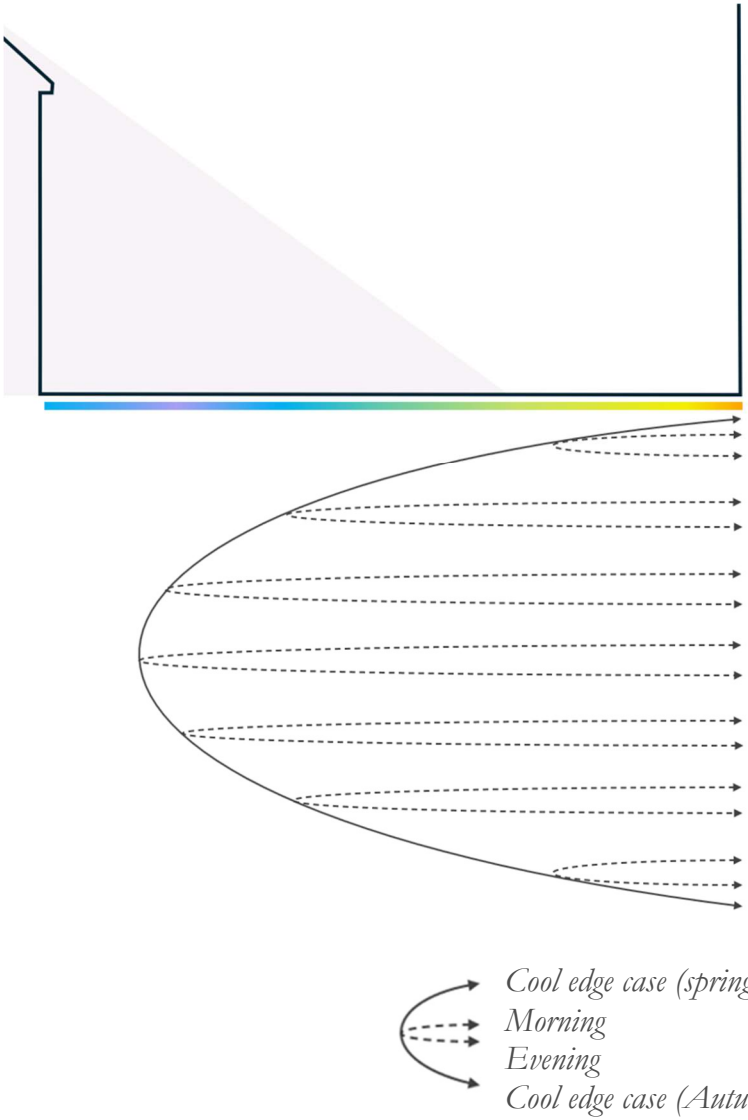
Winter

Spring

Summer

Autumm

The gravitational pull of the warm, soft edges



II. … for climate resilience

The second dimension we will explore is **climate resilience**, which is practically inseparable from microclimate.

Climate resilience alongside contemporary microclimate approach

How may climate resilience be pursued alongside the contemporary approach to microclimates? It may involve:

- Modelling the area during an extreme rain event, seeking to manage the rain with a combination of redirection, permeation and retention. If the area has already at this stage been planned as a mild microclimate with green surfaces, establishing the green surfaces as rain gardens constitutes an obvious point of synergy.

- Modelling the area during a heat wave to identify heat islands, and seeking to mitigate them enough that they are brought into the thermal comfort zone.

Whichever the order, these heuristics tend to converge on achieving heat wave mitigation strictly with shading and vegetation, and without water, as water would necessitate prolonged retention of water which directly conflicts with the aim of efficiently sinking water into the ground.

But – as suggested in the previous chapter - evaluating places' appeal during heat waves through thermal comfort alone, and not through access to water, may be misguided, as water has well-documented well-being effects during heat waves, and observations indicate that water is an unusually strong attractor during heat waves.

Climate resilience alongside pro-diversity approach

Meanwhile, the pro-diversity approach may aim for climate resilience by:

- Modelling the area during an extreme rain event, seeking to manage the rain with a combination of redirection, permeation and retention. Here it may be found that the mild

and the warm niches may be constructed as rain gardens (the mild niches with mostly grassy surfaces, and the warm niches with mostly stony surfaces), and that the cool niche may include a hidden retention reservoir, which circulates water into an exposed water feature, and which may spill into the adjacent, permeable microclimatically mild area when full.

This approach would, unlike the contemporary approach, place little emphasis on modelling heat islands during heat waves. Rather, it would aspire to reach an adequate distribution of microclimates, whereby heat islands would be understood as a non-problem as long as they were in proximity to cooler microclimates. To demonstrate adequate distribution, it may employ a buffer analysis, finding the places with three overlapping buffers (of cool, mild and warm microclimates) to have satisfactory diversity.

This is not to say that the pro diversity approach would not include modelling specific times or scenarios. On the contrary, it may include modelling of several different scenarios, or edge cases. For example:

- The peak of heat waves, which may be dubbed the warm edge case, to document that the cool niches are adequate for this intended use case.

- Sunny days in early spring, which may be dubbed the cool edge case, to document that the warm niches are adequate for this intended use case.

Driven more by potential benefits rather than potential risks, the range of edge cases (and niches) may, in this framework, be expanded to facilitate closer connection to the passage of time - of day and year – to create "cities for seasons", such as:

- Sunny summer nights, focusing on places bathed in direct evening sun, potentially facilitating sunset views;

- Rainy summer days, focusing on places in proximity to nature and with opportunities to seek cover from rain (or even get something warm to drink), completely removed from traffic, as rain amplifies the sound of traffic.

- Sunny days in winter, in places facilitating sunny walks, likewise removed from traffic, as thawing snow amplifies the sound of traffic. Not to mention winter days on the north facing slopes of hills, where the snow lingers longer and accumulates more than on south-facing slopes, stretching the opportunities for snow-based play...

Insight #1: Resilience to extreme heat events

The pro-diversity approach may accommodate more extreme heat events than the contemporary approach, as the contemporary approach tends to aim for moderately cooled

climates (utilizing cooling tools in moderation, such as green surfaces and tree cover), while the pro-diversity approach encourages the combination of a wider range of cooling tools (such as wind tunnel effects, deeper shade and evaporative cooling). Combined, these tools may render the place well within the comfortable range significantly further into heatwaves than the moderately cooled microclimates.

Insight #2: Placemaking on the north side of buildings

The pro-diversity approach may also yield more instances of placemaking along north facing building edges than the contemporary approach, which tends to replicate these places as *non places*[3]. If this leads to the development of non-places as places, it may lead to a range

[3] Non places are places which we tend to pass through out of necessity, and which do not register as destinations, such as parking lots, some train stations and some airports. Term coined by Marc Augé, 1992.

of positive secondary effects – see Jacobs' concept of *eyes on the street* etc.

Insight #3: Lower tree mortality

Following the pro-diversity approach may also yield lower rates of tree mortality. When trees, as suggested by the pro-diversity approach, are planted in mild and cool niches, they may receive moderate sun, and sit in relatively hydrated soil, which may lead to less stress and lower mortality. By comparison, when trees are placed to mitigate the most pronounced heat islands – as some may be, when following the contemporary approach - they are at increased risk of being scorched or dried, compromising their health and increasing their risk of disease.

Insight #4: Resilience to unknown future climates

Insofar as the contemporary approach aims for one optimal microclimate, it necessitates a correct guess at what the future will be – and that this future remains static.

By comparison the diversity that ensures comfort at various seasons and times of day when following the pro-diversity approach, may also ensure comfort in entirely different futures – whether they are slightly warmer, significantly warmer, or even cooler.

Insight #5: Climate resilience: more signal than impact?

This comparison throws into relief that though the term 'climate resilience' carries a strong signal of responsivity, it may have a somewhat limited impact on experienced microclimatic wellbeing, following that just as it seeks to render a place less affected by climate change, it may also seek to render a place less affected by seasonal change.

Thus the term 'climate resilience', much like 'microclimate optimization', can be understood as inherently biased toward resistance to dynamism, leaving it blind to – or even biased *against* - a more opportunistic approach that embraces dynamism.

III. …for biodiversity

The third dimension we will explore is **biodiversity**, as it is an increasing concern in urban planning, and it is deeply intertwined with microclimate.

Biodiversity alongside contemporary microclimate approach

When biodiversity is pursued along the contemporary approach to microclimates it is at risk of manifesting as a relatively narrow range of habitat, also known as an underdeveloped *mosaic* of habitat. These habitats may resemble wooded meadows, made as cloudburst parks to drain relatively effectively after rain events.

Biodiversity alongside pro-diversity approach

By comparison, the variety in thermal niches in the pro-diversity approach may lend itself well to a relatively developed mosaic of habitat.

Following the pro-diversity approach may yield:

- Mild microclimates resembling the wooded meadow cloudburst parks.

- Cool microclimates with water which pervades through heat events, offering reliable habitat and drinking water.

- Warm microclimates with well-drained soil with low organic content, such as sandy or rocky soil, lending itself well to rock gardens and dry wall features, which may offer shelter and warmth for various species.

IV. …as shorthand

Finally, let us compare the approaches by their ability to function as **shorthand**.

The contemporary approach is often pursued through the shorthand of greening, particularly *trees*. In fact, 'trees' appears as a ubiquitous shorthand in the contemporary landscape[4].

This is unsurprising, as trees is a remarkably elegant shorthand, covering (to some degree) parameters such as: thermal comfort, heat island mitigation, drought resilience, flood prevention, biodiversity, psychological wellbeing – and perhaps even beauty and attractive spaces. It covers this all while being a completely transparent concept, immediately understood by everyone – and low tech at the

[4] Several cities even have dedicated tree- and greening strategies, ex.: London's "Urban Forest Plan" (2020), Melbourne's "Urban Forest Strategy" (2012), or Vancouver's "Maximizing Climate Adaptation Benefits with Trees" (2017), and their later "Urban Forest Strategy" (2025).

same time. It may seem unlikely that there should ever be a more elegant shorthand.

Let us compare it to microclimate diversity by the same parameters.

	Trees	Micro-climate diversity
Thermal comfort	✓	✓
Heat Island Mitigation	✓	✓[5]
Drought Resilience	✓	✓
Flood prevention	✓	✓
Biodiversity	✓	✓
Psychological wellbeing	✓	✓
Beauty	*?*	*?*
Attractive/animated spaces	✓	✓
Legibility	✓	-

Comparison of two shorthands

[5] If heat island mitigation in cool and mild niches is accepted as sufficient for solving the problem of overheating.

Microclimate diversity, as a shorthand, appears to function as proxy for the same parameters as trees, *and then some*.

But – at least for now – the concept of microclimate diversity remains completely opaque, compared to trees. Here, a prescient question is:

Could there be a scenario in which microclimate diversity is as widely and intimately understood as trees?

5. Outro

We have found that an alternative, pro-diversity approach to microclimates seems to hold more potential as a basis for competitively livable cities in temperate climates than the contemporary optimization-oriented approach, as it:

1. Accommodates life between buildings throughout extended periods of time, thereby elongating and intensifying the active season
2. Offers heatwave destinations, where deeper shade, vegetation and water may combine into thermally robust oases
3. Promotes more biodiversity by yielding a more varied mosaic of habitat, with warm, sunlit stone gardens, mild wooded meadows and cool, green fountain gardens with water that continues to flow all through the heatwaves, never failing to offer habitat and life-saving drinking water.

Altogether, the contemporary approach is thrown into relief as narrow and conservative, while the pro-diversity approach appears comparatively opportunistic, with a wider solution window, inviting us to approach the subject significantly more creatively.

What may be our next steps? Microclimate diversity may be pursued as an extension of the branch of microclimate design, based not just on modelling, but also on urban studies, experiments and meta-studies, studying not only physical form but also forms of engagement. These studies may lay the foundation for guidelines, and longer term strategies – the effects of which are studied, thereby closing the information feedback loop.

Studies may be conducted to answer:

- How do we approach this with high levels of engagement, with accountability and feedback between actors?
- How do we ensure feasibility and minimal conflict with other parameters?

- What edge cases should we accommodate, and at what physical interval should they be accommodated? Ie. What is the maximum tolerable distance to see the setting sun in September, and what is the maximum tolerable distance to a seat in green surroundings near trickling water during a heat wave…
- How do we ensure synergistic effects between microclimates and their intended use cases?

Though pilot projects may build knowledge, a more profound effect may stem from them setting precedence:

Once these varied microclimates are used, or even just seen to be in use, they alter the shared lived experience of the city thereby contributing to a growing intuitive, shared understanding that, in the temperate climate, there is no such thing as a bad microclimate.

On the contrary, when varied microclimates appear in combination with synergistic

complementary appeals, they combine to offer a rich palette of experiences and affordances throughout the year, leading the city to feel alive and welcoming as the norm, rather than as the exception.

And so it seems that Jan Gehl's insights on the topic were not entirely outdated after all: the warm microclimates *are* important. But not just in the summer. And the mild and cool microclimates have valuable roles to play as well.

Maybe one day soon, the contemporary optimization-oriented approach will seem about as quaint as when we agreed it was future-proof to pave our rivers to make room for cars; a trend that did not stand the test of time.

But urban planning is a field that is clearly still developing. It would be surprising if, just now, we had exhausted our opportunities to pivot to new directions.

In the following:
A selection of photographs showcasing high levels of synergy between microclimates and their supplementary parameters, during a variety of use cases throughout the seasons.


ENGRAVELHOUS
ANNO 1898
LIQOR KIOSK
ELLIS


46
ORSA

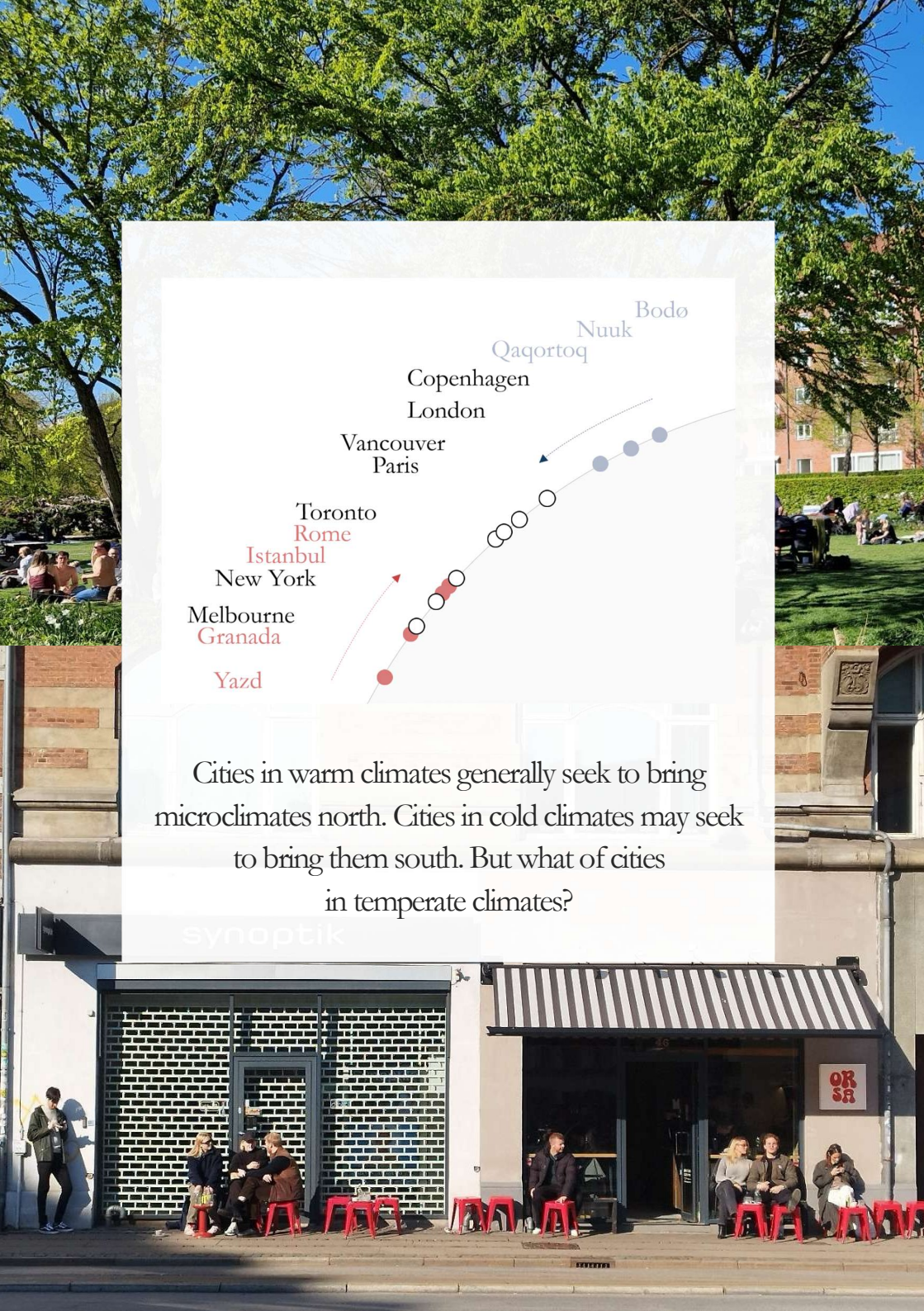

4


46
OR
SA


Ricco's Mad & Kaffe


TAND LÆGE
NAVNLØS
NAVNLØS KAFFE & BAR
BEER


Jyske Bank



Cities in warm climates generally seek to bring microclimates north. Cities in cold climates may seek to bring them south. But what of cities in temperate climates?