

# More-than-human urban foraging: designing landscapes for multispecies sustainability in shrinking urban Japan

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## Abstract

Can a city be turned into a more-than-human feast? Edible landscapes are increasingly valued for their multiple socio-ecological benefits. Here we propose that making the urban fabric fertile grounds for foraging by humans, birds, bees and other inhabitants alike expands the potential of edible cities as a paradigm for sustainability transformations to answer recent calls in sustainability research for meeting more-than-human needs. To this end, we reflect on ongoing landscape design research across shrinking Japanese cities: 1) a multispecies community garden concept, 2) bird and pollinator-oriented edible restoration of vacant lots, 3) wild-keeping of Japanese honeybees in urban contexts as entry to multispecies landscape stewardship.

## Introduction

Urban foraging as a practice is both widespread and diverse. Researchers are finding that benefits exceed nutrition alone (Sardeshpande and Shackleton, 2019). Yet urban design providing opportunities for foraging remains limited. One reason may be that foraging implies a search for food without guarantee of success, rather than being associated with the certainty that a visit to a grocery store or home garden will lead to a meal. For some, the term foraging in an urban environment might evoke mental images of observing crows or stray cats and dogs on the lookout for treats. Positive acknowledgements of urban foraging as a ubiquitous activity, not necessarily the result of food insecurity or underprovision, are conspicuously rare in the literature. Yet recent historical research suggests that modern heavy reliance on what might be called formal agriculture, and especially on food being grown by specialists for profit to be sold across vast distances as a commodity, may be the outlier rather than the norm (Graeber and Wengrow, 2021). For example, some Indigenous peoples apparently chose to forgo cultivation involving labour-intensive human planting, harvesting and preparation in favour of strategic stewardship of the surrounding ecosystem to increase opportunities for foraging. Such practices are attracting increasing attention both in the context of considering the role of worldviews in biodiversity conservation (Figure 1, (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2022) and in relation to urgent calls in sustainability science for a radical re-thinking of agrifood systems to shift to a post-growth metabolism (Figure 2, McGreevy et al., 2022).

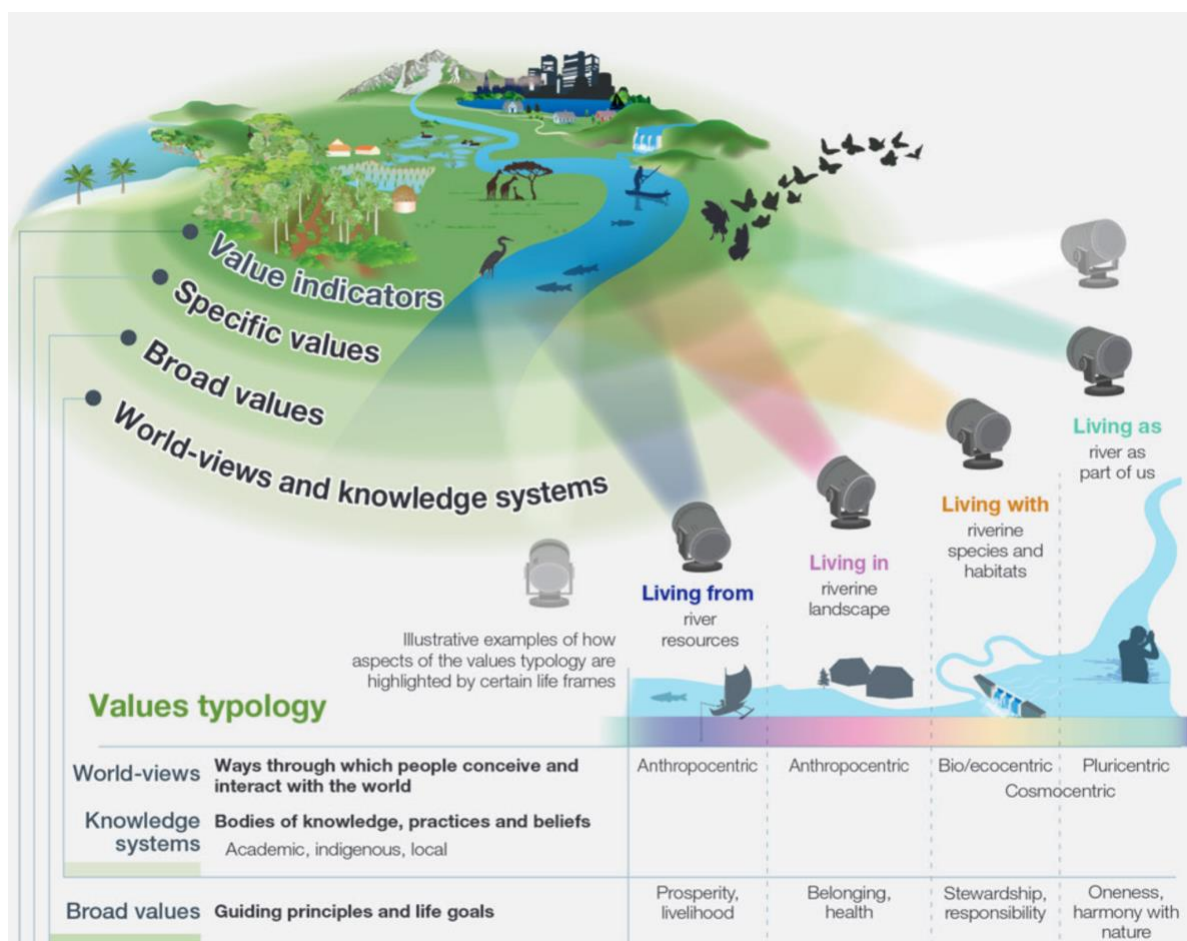


Figure 1. Typology of human-nature relationship (modified from IPBES 2022, Figure SPM2)

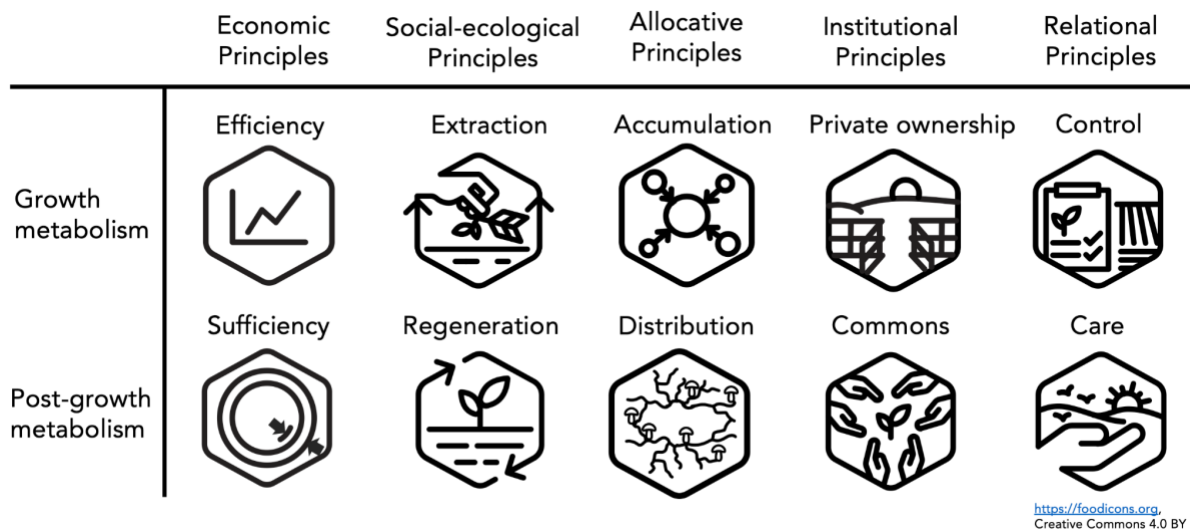


Figure 2. Principles of growth and post-growth metabolisms (based on McGreevy et al, 2022)

Applying this way of thinking to a high-level approach of urban planning and design opens up conceptual space for reconsidering how cities might feed their inhabitants. Designating space for urban agriculture often leads to multi-faceted constraints, from regulatory hurdles to land prices and questions of what type of land use belongs in urban space. Concepts such as edible cities and edible landscapes instead aim to transform urban space to be edible by design (Creasy, 2010). However, recent work on edible landscapes shows that these concepts have thus far mostly understood edibility to mean edible for humans (Rupprecht et al., 2023). In contrast, availability of food for non-human species has largely remained a question for urban ecology and biodiversity-supportive landscape design. In this chapter, we conceptually build on previous work on multispecies edible landscapes (Rupprecht et al., 2023) and edible urban commons (Sardeshpande et al., 2021) as a potential tool initiating a paradigm shift towards multispecies sustainability – meeting multiple species’ needs as a requirement to create truly sustainable futures given the interdependence of human and non-human well-being (Rupprecht et al., 2020). We propose to maximise foraging opportunities for both humans and more-than-human urban inhabitants through an edible-by-design approach that fosters multispecies flourishing. Such an approach could be especially beneficial for shrinking cities, a phenomenon prevalent in Japan, but also being observed in countries such as Spain and New Zealand (Matanle and Sáez-Pérez, 2019).

Japanese cities tend to confuse foreign observers at first glance. Despite featuring some of the highest densities worldwide, tiny buildings persist next to towering apartment complexes, rice paddies in designated urban development zones, and informal gardens next to metropolitan train stations (Yokohari and Khew, 2017). Beyond its idiosyncrasies, however, urban Japan faces the same urgent need for sustainable transformation as all other cities. Not only does the ecological footprint of Japanese cities far exceed the national biocapacity, per capita footprint increases with degree of urbanization (Tsuchiya et al., 2021). Researchers have thus called for decentralization as a sustainability strategy, with local food as a key area for driving change. In this context, some have argued that the projected steep decline in population of cities reaching in some cases over 30% in the next 20 years could offer unprecedented opportunities, rather than the crisis it is commonly understood to imply (Matanle and Sáez-Pérez, 2019). On the one hand, urban shrinkage does usually follow a pattern of spongification, with unused lots appearing across the urban matrix (Aiba, 2015).

Their individual ownership is already causing significant issues such as unclear inheritance lines, leaving municipalities administratively overburdened in a time of shrinking tax bases. Legal reform adequate to the extent of this issue has yet to arrive. Furthermore, domestic demand for detached housing with substantial garden space is in decline, with many new house owners opting to forgo the creation of a garden altogether in favor of savings through reduced lot size requirements and the use of gravel to minimize maintenance work load. On the other hand, demand for opportunities to participate in urban agriculture is rising, signified for example through waiting lists for publicly owned allotment use. Notable Japanese urban agriculture projects include Saseragi Nouen, a community garden using kitchen waste collected in the neighborhood as fertilizer and with strong ties to stakeholders such as the local elementary school (Shimpo, 2021a), and Hirano Coop Nouen, a community garden established within an existing urban park in Kobe (Shimpo, 2021b). Urban agriculture is also practiced on land owned by utility or railway companies, or informally on road and river verges (Rupprecht & Byrne 2017). This points towards a need for deemphasizing individual and family-scale ownership and management of urban greenspace in general and food producing spaces in particular. Instead, a re-commoning and collective stewardship appears to be a strategy well-situated to simultaneously address large fluctuations in land ownership, changes in residents' preferences and life styles, and pressing needs for sustainability transformation (Sardeshpande et al., 2021).

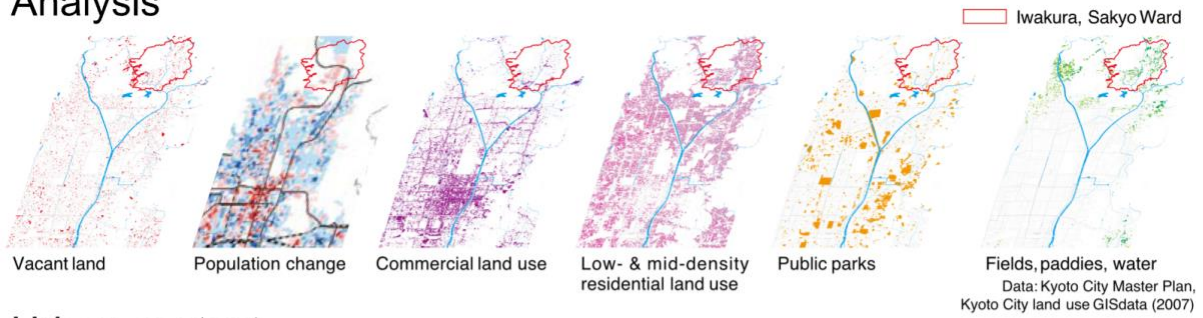
Against this background, we offer three entry points to more-than-human urban foraging through edible-by-design cities based on ongoing landscape design research in shrinking Japanese cities. All three examples ultimately aim towards increasing overall multispecies sustainability by meeting multiple species' needs.

## A more-than-human gathering: Multispecies community gardens

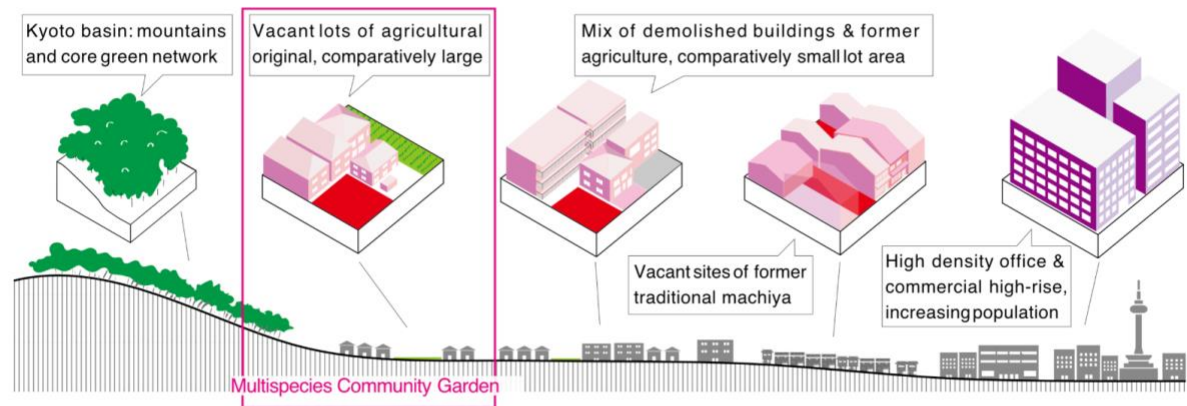
Community gardens are well-known for providing a plethora of benefits to urban residents (Guitart et al., 2012). Could we extend the community at the heart of these gardens to include all species they consist of? This idea was the starting point for a landscape design proposal aiming to explore options for Kyoto's contexts of predicted depopulation and transition to a post-growth society. In a multi-stage project (KAKEN, 2023), land use data analysis was combined with fieldwork to identify spatial unit types to consider where to best site a multispecies community garden. Focusing on Iwakura in Sakyo Ward, a suburban area surrounded by forest-covered mountains, suitable sites of abandoned former agricultural land were plentiful. Concept-wise, the design embraces changing urban land use dynamics while inviting multispecies agency to co-create space with support from trees and shrubs serving as wild-life support infrastructure (Figure 3). As the city shrinks, sites are open for expansion with the potential to facilitate shifts from economic growth to post-growth lifestyles by providing meaningful engagement and more-than-human community interactions to improve well-being. Structurally, horizontal diversity aims to maximise habitat potential for a wide range of species, with special consideration in the form of fruit trees to local bird species to balance an increase in insects and open up opportunities for bird-human interactions. Spatially, the design integrates into a wider ecological network, with the garden functioning as a stepping stone while contributing through increased green and canopy cover to climate change adaptation.



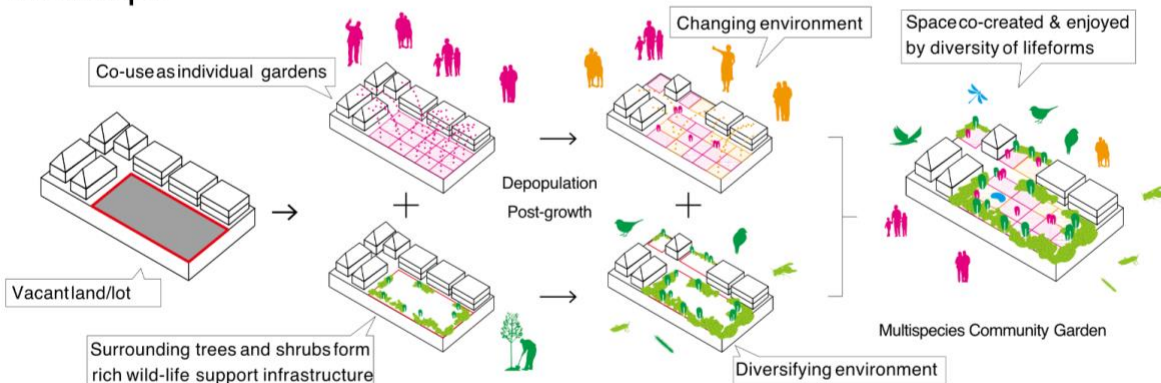
## Analysis



## Urban context



## Concept



## Structure

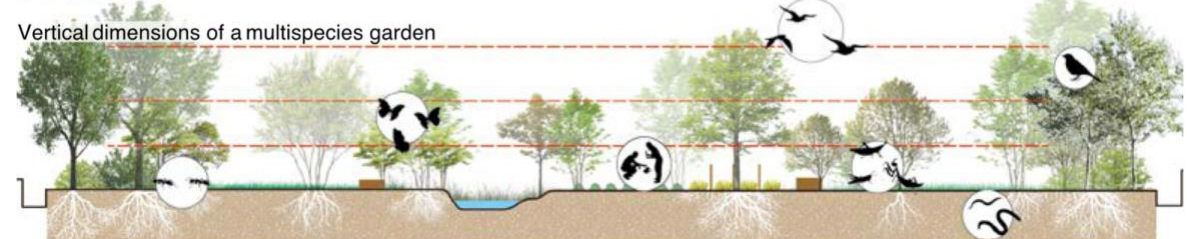


Figure 3. Multispecies community garden design proposal process (design: AOI LANDSCAPE)

The multispecies community garden design also responds to changes in its socio-ecology over time, allowing shifts from active gardening to hands-off stewardship (Figure 4). For example, replacing vegetable beds with flowering perennials offering pollen and nectar to communally kept Japanese honeybees reduces maintenance work required while increasing more-than-human foraging opportunities. This in turn enables responsible beekeeping (and

thus honey harvesting) that avoids simply depending on surrounding nectar and pollen sources, and also serves a wider community of pollinators. For periods of very low human engagement capacity, plots can be utilized through insect hotels and self-rewilding that creates space for multispecies agency to co-shape the community garden. Open questions remain around legal and procedural options for transitioning to a commons-oriented land ownership model for the garden, what approach to select for sustainable membership management and to what degree membership should be open to non-residents, and whether multispecies community gardens could be integrated into urban planning schemes for biodiversity conservation, disaster resilience, payments for eco-system services, and carbon sequestration. Inclusion into such schemes, however, frequently requires initial stock take and application procedures as well as ongoing monitoring and quantification of services provided, possible deterrents that might be overcome through municipal or Non Governmental Organisation-led support. Welcoming multispecies agency in shaping the space could also pose challenges in formulating or committing to specific management outcomes.

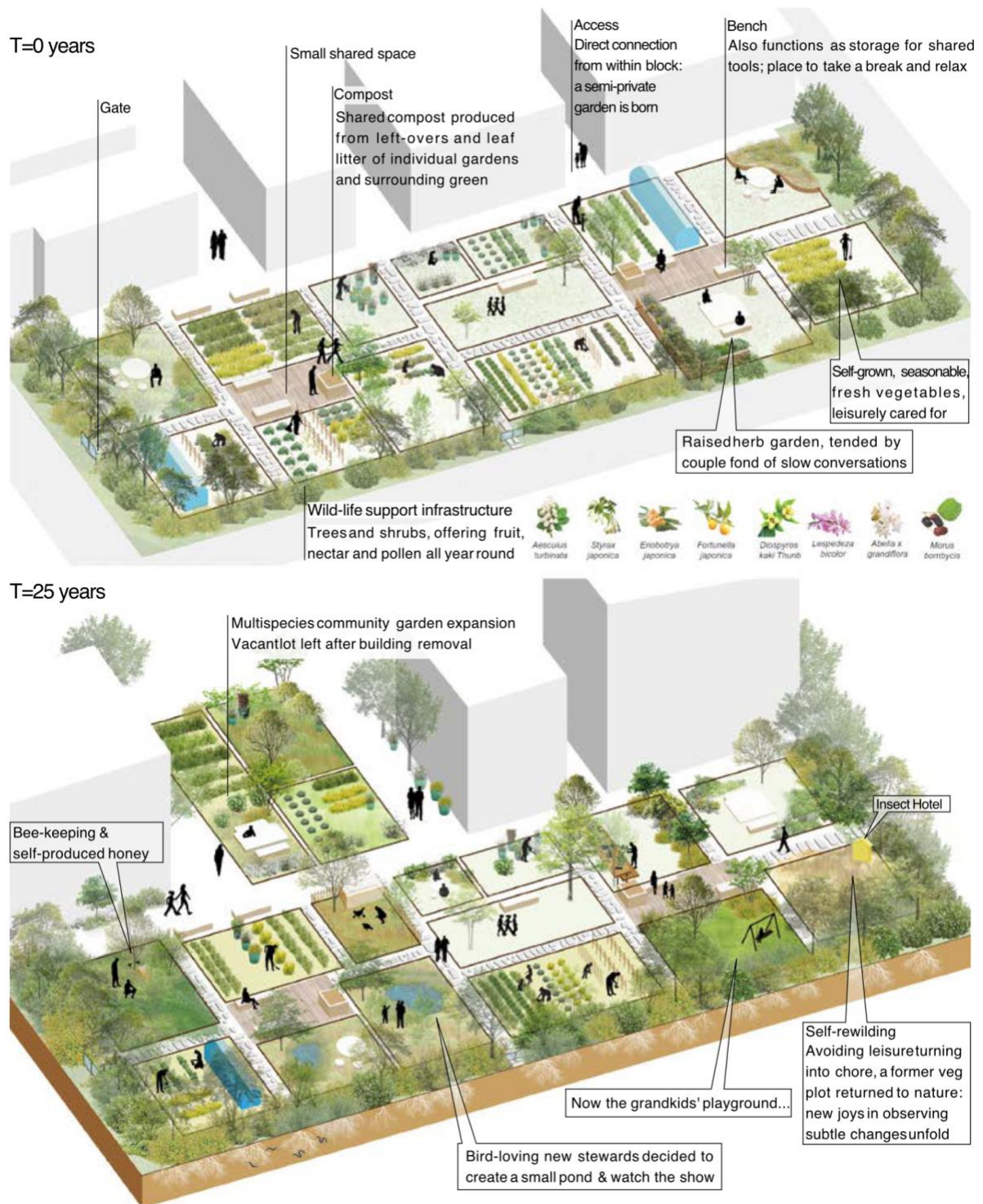


Figure 4. Multispecies community garden design proposal envisioning dynamic changes in use over a 25 year time period (design: AOI LANDSCAPE)

## Foraging in more-than-human edible landscapes: socio-ecological restoration of vacant lots

The example given above is only one option for addressing the increase in vacant urban land. Vacant lots come in all sizes and shapes, meaning diverse design options will prove vital in accessing their full potential (Rupprecht and Byrne, 2014). Yet despite the clear need for ecological restoration, research on informal urban greenspaces shows that a classic biological conservation approach of excluding humans from spaces and leaving nature to its own devices is unlikely to succeed. For one, urban residents' perception of vacant lots changes drastically based on whether they are perceived to be neglected and abandoned or intentionally less manicured but still actively managed (Rupprecht, 2017). Drawing upon insights from traditional Japanese satoyama landscape management and biocultural diversity theory, we were interested in whether fruit and nut trees and shrubs are viable options for socio-ecological restoration of vacant lots.

Transforming vacant lots into low-maintenance informal distributed community orchards for local consumption promises several benefits (Figure 5). For human residents, they provide both physical health benefits in the form of added nutrients currently understood to be lacking in Japanese diets, and social benefits in strengthened community ties – ties that have disintegrated as modern life styles leave people with less time and connection to place, but that are vital for community resilience in a disaster-prone nation. For more-than-human inhabitants, a careful selection of plants to maximize edibility of fruits as well as nectar/pollen production and habitat potential while taking into account site characteristics means a more densely knit habitat mosaic and expanded, more diverse food sources (Baldock et al., 2019; Wenzel et al., 2020). Socio-ecologically, a focus on indigenous plant species and varieties can not only help best meet the needs of local animal species, but also contribute towards creating an increased sense of place through a regionally situated landscape characteristic. Efforts to preserve traditional plant varieties including fruit cultivars have experienced challenges in sourcing the necessary land and resources. A crowd-sourced approach through in-situ conservation (Raggi et al., 2022) could not only avoid an increasing homogenization of garden fruit cultivation driven by centralized sapling procurement, but opens up potential for (re-)establishing plants traditionally cultivated, including those grown by Indigenous people such as the Ainu in Hokkaido. As a community endeavor, such community orchards might also be isolated from economic pressures that lead to productivity being prioritized over ecological function and conservation benefits.



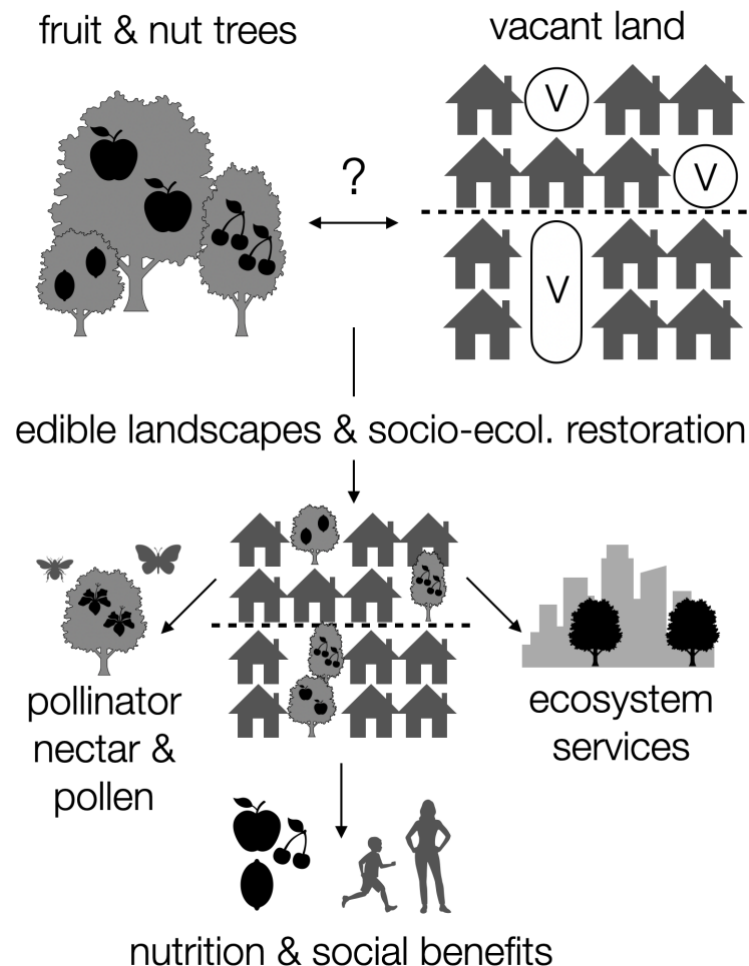


Figure 5. Conceptual model for socio-ecological restoration of vacant lots into distributed communal orchards.

However, in conducting fieldwork in Kyoto and Sapporo to explore the viability of this model, we encountered several constraints to be considered and addressed in the future. First, data availability for heterodox fruit types (e.g. *Lonicera caerulea*/haskap, *Myrica rubra*/red bayberry, *Elaeagnus multiflora*/gumi, *Actinidia arguta*/hardy kiwi) was highly limited both in regard to nutrition and yield, making it impossible to calculate nutritional provision gains for local populations without extensive basic research. Second, few producers of heterodox fruit and nut tree saplings (e.g. *Juglans ailantifolia*/Japanese walnut) exist in Japan, leading to a chicken-or-egg problem where residents interested in exploring alternative options have few choices to get started. An informant in Sapporo suggested the best, and possibly only, chance to access traditional indigenous plants would be to locate them in forests in the wild – an option few residents are likely to consider given the logistic and legal questions involved. Sapporo's colonial origins and the devastating effects of cultural assimilation pressure on Indigenous Ainu in Hokkaido likely contributed to this through loss in biocultural knowledge (Gayman, 2020; Grunow et al., 2019). Providing municipal and prefectural support for efforts to revive an ecosystem of cultural knowledge and stewardship skills could be a powerful means to boost local engagement in biodiversity conservation efforts as well as sustainability transformations. We suggest the goal should be to democratise the whole knowledge and supply chain, integrating social, cultural and ecological learning to build stewardship skills for managing a distributed, patchy network of lots forming a more-than-human edible landscape while

providing residents with increased means to meet their own needs. In the spirit of food sovereignty (Patel, 2009), experts could contribute through helping to select and curate a menu of locally viable plant species, while residents have the final choice and thus decision what kind of edible landscape to create.

## From more-than-human foraging to multispecies edible landscape stewardship: Urban wild-keeping of Japanese honeybees

One issue prevalent in the literature on urban more-than-human co-existence is that of wildlife conflicts. In fieldwork on urban beekeeping practices conducted across sites in Japan, we learned about how beekeepers navigate their role as multispecies intermediaries. Having experienced a steep decline in beekeeping from 1979 to 2009, Japan has recently seen a resurgence in the practice with a shift from occupational to hobby beekeeping (Shinkai et al., 2020). We argue this shift has several important implications for more-than-human urban foraging. What distinguishes hobby from commercial beekeeping in Japan are usually scale, intent, and the species of bee involved. Based on a survey of beekeeping practices, hobby beekeepers often keep only a few hives and do not harvest honey with the intention to sell it. Linked to this is their choice of the Japanese honeybee (*Apis cerana japonica*), which produces less honey per hive on average than Western honeybees (*Apis mellifera*), can better self-defend against natural predators in contrast to the Western honeybee, yet is also widely understood to be less aggressive. However, the main difference lies in how beekeepers are engaging in care practices.

To keep Japanese honeybees, the lack of control over their reproduction means that every swarm is necessarily sourced from the wild. Japanese honeybee keepers have developed highly diverse ways of attracting and enticing wild swarms to remain in the hive rather than abscond. These include using orchids, swarm catchers, numerous variations in hive design, harvesting practices and tools, but also a keen understanding for how to meet the bees' needs for shelter, water, nectar, pollen, protection from predators and other environmental factors (Figure 6). Queen gates, separators, and wing clipping common in industrial beekeeping to limit the queen's freedom of movement are not part of the practices. While this is evidence of an intricate relationship between keeper and bee, the Japanese honeybee nevertheless remains undomesticated. Indeed, little effort is made to complete the domestication process, or domestication is intentionally rejected (Takekawa, 2021). Instead, wild-keeping has been proposed as a form of beekeeping in which absolute control over reproduction and behaviour is forgone in favor of an arrangement in which bees remain highly autonomous. The practice is also open for an alternative interpretation from a multispecies perspective. Whether a hive is used or not is no doubt highly influenced by knowledge, skill and care the beekeeper invests, but the ultimate decision remains with the more-than-human agency of the bee swarm. Beekeepers understand this, and our survey reflects that beyond the points raised above, the human-bee relationship and beekeepers' awareness of it also differ in comparison to commercial beekeeping. Rather than seeing the bees as livestock, beekeepers report a bond of partnership. Through their multispecies partners, beekeepers then learn new skills that do not end at the hive entrance, but rather extend to the landscape and its stewardship at large. The nature of knowledge and knowledge exchange is transformed as well, as best practices

are no longer seen as a business secret but increasingly shared over open online platforms such as MitsubachiQ&A with over 10,000 users (MitsubachiQ&A 2023).



Figure 6. NGO-led community beekeeping on the roof-top of the Kyoto Nakagyō Ward Office. In addition to the box hive, bees are provided with shade, shelter, water and a highly biodiverse environment with 130 species of plants (e.g. biwa, cherry, plum, kiwi, lemon, loquat, kumquat, blueberry, strawberry, persimmon etc.), many of them selected to provide nectar and pollen throughout the year (personal communication).

Against this background, we suggest that wild-keeping of Japanese honeybees may have the potential of serving as a model to revolutionize human-nonhuman relationships more broadly. Learning about and seeking to meet multispecies needs for a forage-able urban matrix could provide countless opportunities for new insights into urban ecosystems, including interspecies relationships between animals, insects, plants and microbes we have only begun to grasp. More-than-human care relationships thus can also be seen as extending our sensory perception beyond the capabilities of our immediate body, opening access to multispecies perspectives on urban landscapes in which nectar and pollen sources are as relevant as traffic conditions.

## Conclusion

In this chapter, we have argued that expanding urban foraging to make the city edible for a variety of species has the potential of increasing urban multispecies sustainability through better meeting more-than-human needs. Opportunities abound especially in shrinking cities



with growing areas of vacant land, a phenomenon prevalent in but not unique to Japan. The shared need for food in this regard points to the importance of urban foraging as a concept in transforming cities to sustainably serve more-than-human needs. Whether designing a multispecies community garden, exploring options for socio-ecological vacant lot restoration through communal orchards, or considering the potential of transformed human-nonhuman relationships in fostering multispecies landscape stewardship, such approaches to landscape design provide not only immediate benefits on the ground, but also a chance to transform our thinking. Working with multispecies partners to develop landscape stewardship practices appears to be one promising pathway to transform not only the built environment, but shift from anthropocentric world views and value sets towards a focus on more-than-human relationships as outlined in a recent report on biodiversity conservation.

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