

## Article

# Tensions and Invisible Costs in Co-Creating Nature-Based Health Knowledge in Brussels

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**Abstract:** The main purpose of this study was to provide a critique of the depoliticising funding call for co-creation research on urban resilience and sustainability while advocating that urban sustainability should remain political and require a political sphere. This study illustrated the invisible costs of undertaking co-creation research and, more specifically, the power imbalance between different groups of co-researchers, which creates tensions. Our research on the case study of the Brussels Health Gardens (BHG) project illustrated how a policy instrument such as a funding call depoliticised urban sustainability and nature-based health knowledge and failed to integrate sufficient resources, such as the time needed to care for science, society, and the self. While previous research focused on successful applications across different scales and places, we illustrated the costs and tensions created by an application that was accepted and funded in the first stage and rejected in the second stage. Vulnerable groups, immigrants, and women tried to access the financial resources that were provided by a regional funding application to communicate nature-based health knowledge in their cities, neighbourhoods, and communities while working together with academic institutions. Two authors were involved in all phases of this project and contributed a collaborative autoethnography of the tensions that were experienced during the project co-creation and their perceived causes. The third author interviewed other co-researchers and focused on the tensions. Several tensions were linked with those observed in other co-creation research (inclusion versus control; impact versus solution; and the research topic of health, which is a boundary object), whereas some tensions were linked with the systems of Brussels (and beyond), ecological modernist priorities, and academic entrepreneurial system. The empirical data of both the lived experiences of the first and second authors, enriched with findings of interviews, contribute to the underexplored body of knowledge and critiques on the depoliticisation by ecological modernist research and policy priorities in Europe.

**Keywords:** Belgium; boundary object; collaborative autoethnography; funded research; invisible knowledge; nature-based health solutions; recognition; urban sustainability



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## 1. Introduction

Co-creation is an approach in sustainability research and practice that brings diverse actors together to conduct impactful research and to implement meaningful interventions [1]. Although co-creation plays an important role in sustainability transformations, too little research has been focused on the injustices that were reinforced in these co-creation projects, including those that were funded and those not (yet) funded. We were interested in the tensions and the invisible costs of a co-creation project at the intersection of urban health science and nature-based solutions. These costs are the result of tensions created by systems permeated by a damaging power dynamic and distribution of resources and

benefits [2], which were observed by researchers in other co-creation projects (e.g., [3,4]). Previous research showed how tensions typical of co-creation processes, such as control, trust, and inclusion in the process, focus too much on the impact or solution [3] or diverging rationalities [5]. However, there is not much knowledge on how place itself and the systems that advance the way people access health resources, for example, also lead to tensions related to injustice [6]. Even fewer studies highlighted the impact of these tensions on the processes and the individuals and communities involved, especially how multiple forms of oppression are kept from being recognised, leading to a lack of distributional justice [7,8]. There is not much research on the way that “social locations, particularly locations of power and privilege”, hinder or enable environmental justice research [9]. This study sought to illuminate the tensions and the invisible costs of a co-creation project on nature-based health solutions. We achieved this by discovering the practical impacts on co-researchers, providing a self-reflective, qualitative study of a project and a collaborative autoethnography with interview data about the actual lived experiences of the co-researchers. We began by providing background information as well our insights into other tensions arising from the topic of health and nature-based health practices as a boundary object before elaborating on how current policy priorities tilt the balance in favour of the modern ecological and health expertocracy.

As we used collaborative autoethnographies as a method for collecting data, it is important to acknowledge our current feminist position and how we arrived at it [10]. We are highly educated women, and not all of us are White. Our experiments and ideas were framed by the critical feminist, ecofeminist, and post-humanist ideas of Donna Haraway [11], Jane Bennett [12], Tim Ingold [13], Vandana Shiva and Maria Miess [14], and Val Plumwood [15]. We drew on the lived experiences from the Brussels Health Gardens Project our case study, but we cannot deny that our lived experiences, intimately rooted in places with multiple cosmologies, such as Japan, Sri Lanka, and Lithuania, influenced how we envisioned the project. Some of us were not familiar at the beginning of the project (early 2019) with post-humanism, ecofeminism, and critical social science discourse, and we were naïve and unaware of the influence of our background on how we perceived health and health knowledge or on the political sphere of transformation and urban sustainability. The first and second authors grew up familiar with nature-based health knowledge in their birth countries and were surprised when they moved to Belgium and realised that this knowledge was not present in the dominant health services and health knowledge creation systems. The third author worked in and researched nature-based health practices before. They found each other at different moments in the Brussels Health Gardens (BHG) project, which was at the core of this study.

In 2019, the BHG began as an open invitation by the Université Libre de Bruxelles (ULB) Museum of Medicinal Plants and Pharmacy to Brussels’ residents to collectively reflect on how local natural resources, especially medicinal and edible plants, could help to regenerate and promote health, and how self-care could make Brussels a more resilient city (especially in times of health crisis (food and drug provisioning) and ecological crises (e.g., loss of biodiversity)). Many citizens, including unemployed people, single-person enterprises, and representatives of the public health and academic sector, reacted to this invitation. Initially, the BHG collective attempted to understand the issue underlying the limited use of medicinal flora in Brussels, with the bigger goal of creating an urban ecosystem where Brussels inhabitants could discover and explore more accessible nature-based health solutions. The BHG project evolved, and the research objectives have become larger questions related to health and ecological crises. Notably, the first and second authors were immigrants. Because of their immigration background (i.e., they lived in different social worlds), they and the other immigrant researchers, who were involved from the beginning, observed differences in the way health was perceived and managed in Brussels compared with the countries where they lived previously and questioned whether health and health knowledge should be defined only by academics and entrepreneurial and capitalist systems. The authors noticed the incomplete integration of common and nature-

based health knowledge in Brussels' mainstream healthcare system. This antagonism between the existing health system and knowledge creation in Brussels and Belgium and the alternative health (knowledge) systems, especially as experienced by immigrants, made it clear that health is a boundary object (Section 3). This study challenged the situation in northwestern European cities, such as Brussels, where common health knowledge is seen often as inferior—or sometimes even dangerous for citizens—when compared with scientifically validated knowledge. This sets the scene for possible forms of oppression of these witnesses of alternative health knowledge systems (e.g., the aforementioned immigrant researchers), such as not being heard and recognised. The lack of recognition of other knowledge systems is a widely discussed phenomenon, especially in ecofeminist critiques [15,16]. The lack of recognition, or the presence of oppression, was visible to the co-researchers in the BHG, who experienced alternatives or researched the history of nature-based solutions for health in Belgium. Historically, nature-based health practices are deeply rooted in the local cultures of communities in various countries [17], contribute to the population's cultural identity and well-being, and extend beyond utilitarian purposes. Common health knowledge covers different worldviews, practices, and innovations that are developed by local communities over time, including common nature-based remedies, health foods and diets, social networks, and reciprocity agreements [18]. In northwestern European countries, such as Belgium, common knowledge is oppressed, leading to a perceived monology of health practice, which is promoted and guarded by an elite of so-called experts and reliant on a supply of medicines from the pharmaceutical sector.

## 2. Theoretical Considerations

As aforementioned, the evolution of the BHG project generated multiple tensions and personal costs, particularly during the project co-creation and the negotiation processes of resource and task distribution, agenda setting, and the definitions of health and health knowledge. The main purpose of this study was to provide a critique of the depoliticising funding call for co-creation for urban sustainability, while advocating that urban sustainability should remain political and require a political sphere. This political dimension of why the project failed and created tensions and costs was a finding of months-long reflection and was not the goal of the project itself. Many co-researchers were blind for the political aspects, which is common in many co-creation and urban sustainability projects (see, e.g., [7,19]). Health and health research is often seen as personal and practical but apolitical; however, during the pandemic, this aspect was questioned [20]. In Section 2.3, we explain the different spheres of transformation (personal, practical, and political) in approaching urban health science and BHG that we applied to our empirical data. First, we explain how health, the main subject of the BHG project, was a boundary object that generated tensions that were not automatically bad and may have had advantages. However, as demonstrated, the depoliticising context removed (many of) the benefits, especially for the oppressed.

### 2.1. Health as a Boundary Object

Boundary objects are entities that are both vague enough to adapt to the needs of the involved actors and can be interpreted differently to some extent, yet anchoring enough to maintain a common identity among all involved actors [21]. Tensions in the co-creation process might lie in boundary management, as co-creation introduces a variety of worldviews and different knowledge systems that are situated in cultural diversity [5] that influence the way core objects are defined during the process [22]. One of the challenges of the BHG project is that it deals with vast, complex, and vague concepts such as health and nature and aims for trans-contextual goals such as sustainability and resilience, all of which can be considered boundary objects [23,24]. We focused on health as a boundary object, as this was at the project's core. We speculated that health has a communicative and coordinating function among co-researchers with different positions and interests. Boundary objects seem useful in contexts of addressing diverse local needs [25] and forming a common

identity in landscape-making [26]. In healthcare, the use of boundary objects seem to bring patients and practitioners together [27]. Hilverda et al. [27] enumerated three types of boundary management: (1) protection, which refers to the status quo; (2) expulsion, which enhances the expertocracy of the professional; and (3) expansion, which means finding a better and newer condition where both the patient and professional are satisfied. Boundary management is also key in the implementation strategies of co-creation, which implies not only creating a good co-creation mix and diversity of participants by involving different systems of knowledge but also expanding current boundaries [22]. In sustainability science, boundary management is essential in translating knowledge into solutions and impact [28]; it implies communication (channels), translation (mutual understanding), and mediation (conflict management). Good boundary management leads to salient, credible, and legitimate knowledge for sustainability [28]. Translation refers to people using specific jargon, even languages and forms of communication, owing to their backgrounds, experiences, and worldviews. In various co-creation processes and transdisciplinary research, participants can get “lost in translation” because of different cultural values, epistemologies, languages, and other backgrounds [5,29].

Diver [30] examined the role of boundary objects in co-creation, wherein the topics of investigation are so vague that they have contradictory definitions and connotations. Community involvement is also a boundary object, but owing to the importance of local context, there are no clear definitions and guidelines regarding how this should be accomplished.

## 2.2. *Why Co-Creation Projects Can Fail*

Chambers et al. [3], who studied co-creation projects worldwide, found that several initiatives failed because the focus was on knowledge production and not enough focus was on the learning process itself. Another reason for failure is the lack of previous experience in co-creation methods. Co-researchers are unsure at the beginning about their role in the process, and the existing power structures, along with no special strategies being put in place, reinforce the power asymmetries [31]. Some authors reflected on the traditional power that academic researchers embody owing to their numerous skills [32] and superiority in the decision-making process [33]. Other authors have highlighted a lack of preparation in concrete design methodologies and the need for social and collaborative skills in the different roles that academics can undertake, such as facilitators, when collaborating with, rather than investigating or working on communities [34,35]. This lack of familiarity with certain balanced choices in management can lead to tensions, which can, in turn, lead to failure or a project falling apart if they are not used as starting points for the required transformations.

## 2.3. *When Tensions Can Lead to Transformation*

We do not want to simplify that tensions are necessarily bad. Tensions can lead to insights at different levels, which can lead to transformation. Transformation is a “powerful unleashing of human potential to commit, care, and affect change for a better life” [36]. O’Brien and Sygna [37] referred to the three interconnected spheres of transformation drawn from the work of Sharma [36] as practical, political, and personal. Practical transformation refers to technological and behavioural changes, whereas political changes refer to social and even ecological systems and structures that limit or accelerate certain trends in a particular context. The personal sphere comprises individual and collective beliefs, values, and perspectives that influence the ways that the systems and structures (political sphere) are viewed, along with the consideration of the types of solutions and impact (practical sphere) that are feasible and legitimate. The personal sphere, specifically, is strongly intertwined with the practical and the political and explains the tensions that Chambers et al. [3] identified.

On the other hand, the transformation process is often over-romanticised; many participants expect a beautiful transition without tensions and troubles. On the contrary, it involves turbulence from objects and beliefs falling apart or cultural learnings being

deconstructed. Power relations were investigated in co-creation research [2,4,37–39]. If co-creation research involves political topics such as health and urban sustainability, it is no surprise that power dynamics can happen. For example, Val Plumwood, an ecofeminist, criticised some knowledge systems and skills for being superior to others because of the master–servant dualism, even in environmental and sustainability debates. These power relations are visible in the injustices and distribution of human constraints that some people face more than others because of their background [15]. Even if a person has the drive to contribute, the lack of time, information, networks, and money can be limiting [40]. In addition to environmental justice research, there are other fields, such as urban political ecology and transition studies, that investigate the transforming power relations as part of transitions (e.g., [41]). As we mentioned before, the first and second authors were not trained in fields such as urban political ecology and transition studies when they became involved in the project. Therefore, they learned by experiencing the political sphere of co-creation, health, and urban sustainability.

### 3. Materials and Methods

In this section, we present the chronological evolution of BHG case study (Figure 1, Table 1), and the methods we used to retrospectively analyse our personal experiences that were related to tensions. We conducted a qualitative study where we applied two methods and collected data from two sources. The first method used to collect material was the collaborative auto-ethnography of two immigrant researchers, which linked abstract theories and ideas with lived experiences in Brussels without generalising their experiences to all immigrants in Brussels (see Section 3.2). Their autoethnography described the tensions and costs they experienced in the first two phases of the BHG project (see Appendix B). As we wanted to validate their insights and to identify other blind spots, the third author interviewed the other co-researchers. We did not mix the two separate methodologies and their associated materials; we presented them separately (Sections 4 and 5) to include different voices in the process.

**Table 1.** Summary of the BHG research project characteristics.

Project Proposal Name and Time	BHG 1.0 (January 2019–May 2020)	BHG 2.0 (May 2020–June 2021)
Proposal co-created with	12 publicly announced meetings 69 internal meetings and workshops 142 contributors	4 publicly announced meetings 38 internal meetings and workshops 102 contributors
Question	What is the relationship between humans and plants (nature, urban gardens) in Brussels, and how does it influence the health of citizens?	How can medicinal plants contribute to the overall health of Brussels residents and urban resilience?
Fields involved	Biology, pharmacy, health science, and landscape architecture	Health science and anthropology
Consortium partners	Three academic institutions and four associations	Two academic institutions and two associations
No. of core co-researchers	31	30
Project type	Broad (focused on nature-based health practices)	Narrow (focused on medicinal plants)
Approach	Anthropocentric	In a transition towards a biocentric worldview
Nature connection	Provisional ecosystem services	Towards relational (cultural) ecosystem services
Methods used during project building	Open forums, science cafés, forest bathing sessions, workshops, dialogues, discussions, and work groups	Face-to-face and online discussions: online surveys, discussions, dialogues, and online co-creation sessions



**Figure 1.** The development and timeline of the BHG project. Graphical work by graphic designer Juliette Nguyen.

### 3.1. Co-Creation Method and Evolution Timeline of the Brussels Health Gardens

We considered this project as co-research because the scientific exploration of the BHG started as a response to the co-creation research call of the regional public organisation that funds and supports research and innovation in the Brussels-Capital Region. This call “Co-creation” aimed to foster urban resilience in Brussels and, in our case, was centred around the co-creation of nature-based health knowledge. As observed in other funding calls dealing with urban sustainability and justice [7], applicants, often in precarious situations, followed the guidelines set up by the funding organisation to increase their chances of receiving the funding. The funding institution, or the ministries that set the agenda for funding programmes, established the idea that every participant in this new knowledge creation contributed their own knowledge, which was considered equal [42]. The call did not provide any framework or rules for the co-creation process. The BHG expressed this value of egalitarianism and wanted to experiment to avoid power unbalances and reinforcing injustices that some participants had observed in their previous research and innovation projects or in their own lived experiences in the creation and diffusion of nature-based health knowledge. Therefore, everyone, including the facilitators, who joined the BHG journey in one or several co-creation sessions and contributed to new knowledge creation was considered a co-researcher without applying specific participation criteria or rules. Many co-researchers during the research process took or exchanged different roles at various stages and contexts. Public and internal meetings/workshops were part of the research activities that aimed to co-create the research questions and design based on the preliminary observations and lived experiences, methodology, and collection of scientific data.

Different tensions arose at various stages of the project, and although the project might be perceived as having failed to secure financial funding for the 3–4 years to come or to retain most of its co-researchers, the BHG community continued to learn from their experiences, especially regarding the co-creation process, and reinvented itself in a new form with emerging research questions, where plants played a more prominent role as active subjects in their own right rather than mere objects.

As it evolved, the project was divided into different phases (Figure 1). The first phase (BHG 1.0), which was linearly envisaged and led by an academic institution, illustrated the anthropocentric perspective of the first research proposal, which was financially supported by the funding institution; it focused on how plants can benefit humans for therapeutic purposes. Twelve live events were organised. Both the first and second authors were already involved in this phase.

The second phase (BHG 2.0) was focused on the insufficiencies referred to by the funding evaluators and the improvement in the full proposal. For the preparation of this second version of the full proposal, which was undertaken without funding over the year after phase 1, several events were organised online owing to the COVID-19 pandemic, where information was shared through various digital platforms and tools. Towards the end of this phase, the third author joined the project but was not intensively involved in the negotiation of resources and tasks for the second-stage proposal.

The third phase (BHG 3.0), which is still ongoing, refers to the period after the rejection of the second full proposal in spring–summer 2021; it covers the progressive expansion of its perspective by including a multispecies perspective that included an understanding of the mutual benefits of including plants as agents and as living beings rather than as dead matter. Many co-researchers left the project, and even though it is now independently governed and ongoing, only a few wanted to explore a more post-humanist and ecocentric perspective on nature-based health practices and working with plants.

The evolution of the BHG project generated multiple tensions and personal costs, particularly during the negotiation processes for resource and task distribution, agenda setting, and the definition of health and health knowledge.

Figure 2 provides an overview of the project in Brussels from 2019–2021: how the project design evolved from the original university museum project into a more inclusive project that aimed to address the perceived alienation from the natural world (both human and more-than-human world).



**Figure 2.** The screenshot of a video which presents an overview of the project in Brussels from 2019–2021. To watch the video: [43].

### 3.2. Collaborative Autoethnography

Autoethnography is a combination of biography (lived experiences) and ethnography (study of the cultural context in which these experiences happened) [44]. The first draft of this manuscript was the result of deep self-reflective work [45] by the first and second authors, who had been involved as facilitators and observers in the co-creation process that became the collaborative autoethnography [46]. These two authors organised and attended numerous live and online community meetings and co-creation sessions in Brussels in 2019 and 2021 that were related to sustainable care, plant medicine, environment, biodiversity and health, nature connection, and nature-based health practices. Thoughts from reflections and conversations, especially recurring themes and topics, were recorded in online diaries and classified as personal, theoretical, observational (motivation, drivers, and tensions between themselves and other co-researchers, mainly institutional, involved in the co-creation process), methodological (co-creation process), and research notes (current knowledge and perceptions of plant medicine in Brussels). The third author became involved only in the later phase of BHG 2.0 (February 2021). Section 4 on the “Results of the Collaborative Autoethnography” was mainly written from the perspective of the first and the second authors, whereas the third author edited it and helped to frame their thoughts and reflections. When the initial thoughts and reflections were analysed and rewritten for Section 5, we used an inductive–iterative process [47]. We—the first, second, and third authors—were informed by theory and underwent iterative rounds, where we were open to more surprises and further readings of theories that described what we had observed or experienced.

### 3.3. Additional Semi-Structured Interviews

The initial list of tensions and their causes was composed by the first and second authors. Although these lists were shared with other co-researchers and validated, we decided to organise additional semi-structured interviews to gather other perspectives on the tensions and costs of the co-creation process. Thirty-four invitations were delivered to co-researchers who participated in one or more stages of the co-creation research. The third author conducted nine interviews (six via video conference and three via email) between December 2021 and early January 2022, analysed them, and then compared the findings with the previous draft to confirm or challenge the tensions and reasons that the two authors had proposed initially. The questions (see Appendix A) were based on the initial list and observations in the autoethnographic and self-reflective work of the months before, complemented by literature on the co-creation process. The interviews, as well as the stories that the first and second authors told the third author in the past year, were read and analysed through the lens of the personal, practical, and political spheres [37] and in terms of concepts such as boundary management and boundary objects (applying to health) and the politics around health and time, which automatically emerge when co-creating and discussing a topic such as health and care. While the results in Section 4 were written by only the first and second authors, Section 5 is a retelling by the third author of the lived experiences of the first and second authors and their co-researchers in the first and/or second phase of the BHG.

## 4. Results of the Collaborative Autoethnography

This subsection was written by the first and second authors. The third author contributed via editing. This subsection can also be seen as a source of data that was integrated in the deeper analysis in Section 6.

In 2019, we conceived the BHG as a network of gardens and other metaphorical spaces that promote health in both wild and cultivated urban places, which can be defined as in-between places/spaces (gardens, urban farms, libraries, hospitals, museums, educational/cultural institutions, and community places). We, the first and second authors, discussed metaphorical spaces because gardens in our research were not limited to physical places but also covered inner imaginary spaces where people cultivate dreams, values,



and desirable futures. We envisioned these places as being characterised by flexibility, spontaneity, and curiosity to discover the most flourishing zones of exploration, experimentation, and diversity. However, we faced obstructions to achieving these visions of the first and second authors that were brought about by the prominent public and/or private institutions that took part in the project. The tensions observed by the first and second authors (Appendix B, Table A1) throughout the BHG project were not exclusive to the co-creation research methodology. The results of the collaborative autoethnography section reflected the analysis of these data.

#### *4.1. The Role of the Institutional in the Access to Resources*

Since 2016, we have followed the development of Belgian and global discourse about nature-based health practices. Furthermore, we identified several “innovative” groups of stakeholders that challenged the old regime of the symptomatic treatment of diseases rather than integrative healthcare, which looks at the roots of the diseases. This integrative healthcare includes common health knowledge and self-care.

The first group of stakeholders included actors who engaged in transforming healthcare—especially mental health—in Belgium during the past few years. Several initiatives by local governments and other institutes took place to demarginalise and destigmatise certain mental conditions and shift a few treatment responsibilities from hospital care to ambulatory care, and social or community services outside hospital contexts [48]. However, health-related dialogues remain sectorial.

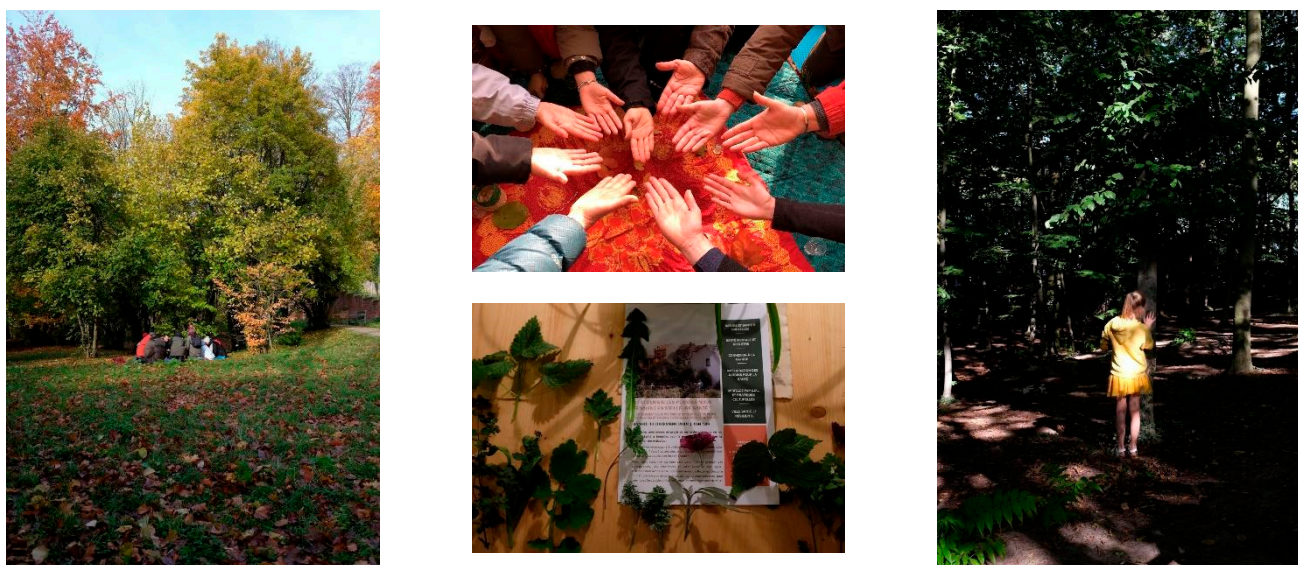
The second group included the carriers of the One Health concept, which originated from the nature conservation sector. They engage with nature’s multifunctionality for regional capacity-building by mainstreaming biodiversity–health linkages and attempting to bring together policymakers, researchers, and practitioners in the following sectors: environment, nature, education, nutrition, and biocultural diversity [49]. However, this transdisciplinary work remains challenging at the local or regional level.

The third group included citizens and smaller grassroots communities that were strongly interested in relational nature-based health practices and the discovery of their own living traditions; however, they were often spatially fragmented. We observed growing attention to personalised care that considered health holistically and systemically, such as integrative medicine, by promoting the use of herbal remedies and nature-based health practices and by including gardening and urban agriculture in conventional healthcare practices.

#### *4.2. The Call for Co-Researchers*

Responding to the funding call from a regional public funding institution to co-create radical and sustainable social transformation in Brussels to foster urban resilience, the second author, who worked for the ULB Museum of Medicinal Plants and Pharmacy, and other staff members sent invitations to representatives of these stakeholder groups. We distributed invitations in organic food shops; health, well-being, and community centres; universities; and schools. The first author was one of the citizens in Brussels who responded to this call. An all-inclusive group of citizens joined, and the BHG project was born.

The BHG community comprised more than 200 co-researchers, of which more than 30 remained active in one or more stages of the process (BHG 1.0 and BHG 2.0). They included botanists, pharmacists, medical doctors, midwives, academics, activists, artists, ecologists, and people of diverse ages and paths of life that were interested in urban resilience, plant medicine, urbanism, city greening, and urban agriculture (Figure 3). Each of them had different expectations and visions of the BHG’s evolution. One of the first lessons of the co-creation was that everyone had different ways of seeing and naming nature and health, understanding our relationship with our own bodies and the natural world, and perceiving nature as a therapeutic agent. We, the first and second authors, saw this diversity as beneficial and enriching and not as a hindrance to the process. However, as Smit et al. [5] observed in similar projects, those multiple perceptions also fragilised the community.



**Figure 3.** Moments from the BHG co-creation sessions that involved different co-researchers and places in Brussels.

#### 4.3. Coping with the Rules and Eligibility Criteria of the Funding Call

Moreover, early in the process, our focus was on the preparation of a full proposal that requested three to four years' funding to experiment with different types of healthcare focused on human relationships with nature and plants. One of the main challenges that generated tensions was imprinted in the funding scheme. All types of knowledge systems were invited to be evaluated and treated equally by the funding programme; however, practical implementation was difficult in such a short period owing to the existing power structures and hierarchical culture related to the healthcare system. Therefore, a co-creation process of three or four or more years could enable this slow transformation.

During BHG 2.0, when the COVID-19 pandemic started, the first and second authors became interested in the transformation process triggered by the health crisis itself rather than the possible solutions. The pandemic reinforced the relevance of such an initiative. They experienced this period as an accelerator of change and as a trigger for raising consciousness about the many societal failures that had been ignored previously. They compromised and followed a new rhythm of work (combining caring for families, communities, gardens, and the city), became receptive to exploring deeper transformation, and engaged in emerging new forms of co-creation (online meetings combined with face-to-face gatherings in open green spaces when pandemic management rules allowed). New online learning opportunities in social transformation became available during the pandemic, with rapidly growing local and global digital communities that contributed to growing levels of ecological awareness.

Another challenging experience lay in the accessibility of the funds: only institutionalised groups that were legal entities and had proven financial management capability could receive the funding, which is common for many public financing schemes in Belgium and Europe. Therefore, the BHG had to look for institutional partners to be eligible to receive this funding in the second stage; this led to changes in the dynamics of the project. In addition, the BHG co-creation project proposal was designed in such a way that some co-researchers as facilitators or coordinators were expecting remuneration, whereas others engaged as volunteers; thus, divisions were created based on financial advantages and attributed project responsibilities. Finally, given the environment in which the academic and associat (underfunded) sectors operated, there were strong incentives for some to engage in these projects to fund their interest (career development) and capacity-building (establishing new research on sustainability and transformations in academia) rather than

to support co-creation or deep social transformation. This difference in priorities and interests between the self, community, and institution emerged as an important tension.

#### 4.4. *Oppression of Other Knowledge Systems*

Unsurprisingly, the hierarchical structure where some people are seen as masters and others are backgrounded [15,16] is omnipresent in almost all fields of society in Brussels and Belgium and in existing knowledge systems. The different actors in the health sector (including health managers and insurance drivers) consider changes to the system based on “hard” data, preferably from studies in a Belgian or local regional context. However, the production of “hard” data requires research and funding, which is difficult to obtain in a regime that favours biomedical sciences and follows certain standards, protocols, and methods that are sectorial and exclude transdisciplinary methods. In Belgium, the regime of the curative health sector is still focused on optimising its status, and plant medicine innovations remain in the experimental phase. Health professionals may, therefore, find it difficult to question existing practices, where they are caught between a duty of “loyalty” to an established institution and the desire to offer integrative, human-centred care. For medical professionals, it seems difficult to initiate a discussion on the use of medicinal plants owing to the lack of relevant field knowledge, time, and resources. Moreover, questioning established practices is often resisted. By opening the door to experiential and common knowledge about the use of medicinal plants, the professional accepts questions, at least implicitly, about their knowledge and status. There have been attempts to include patients’ experiential knowledge in healthcare and biomedical research (concepts of “expert patients” and “experts by experience”), which medical institutions strongly support [50]. According to Blume [51], “the unstated assumption is that the patient’s understanding has been sufficiently infused with medical thinking that the way he or she deals with the condition is pretty close to what the doctor would advise”. This approach is somewhat elitist as it targets already empowered patients whose choices must be validated by the medical professionals that are deciding who to include in the studies. Conversations with co-researchers, many of which were representatives of the health sector, elucidated tensions with the European and Belgian legislation on health products, services, and medicinal plants, as well as experiments involving humans regarding the legal and ethical safeguards of this project. Meetings with herbalists (considered non-essential businesses with no legal recognition) in Brussels during the summer of 2020 highlighted the first point of tension: they were forced to remain closed during the COVID-19 lockdowns, even though the same medicinal plant products were on sale in pharmacies, which remained open. Similar concerns were valid when discussing self-medication. During BHG 1.0, we worked with researchers from the biological and pharmaceutical sciences, who showed great caution and scepticism in engaging in this topic and saw their participation as an act promoting self-medication. This reluctance is reinforced by a system of research evaluation and, in turn, career progression, and is based entirely on scientific publications with high impact factors. Although service to society is part of the mission of academic researchers, it is not considered essential to their daily work and is often limited to participating in committees of projects that are already established and funded. This is not necessarily the individual choice of the researcher but rather the system of academic evaluation that forces them to choose science over sustainability and publishing over engaging in research on societal transformations and prioritising self-care for themselves [46]. The outcomes of this societal work and care are not sufficiently rewarded and appreciated, which causes stress among those who are committed to these causes [4,46].

Another indicator of different underlying rationalities was found in discussions on the terminology of key concepts and substantive issues that were driven by ideological, educational, contextual, and personal factors [5]. For example, the notions of “ecosystem services” or “nature-based solutions” were seen by some co-researchers as life-supporting systems—i.e., gifts provided by nature for humanity or survival in interconnectedness—

but for others, those terms remained largely undefined, unless some services, especially cultural ecosystem services, could be translated into monetary values.

#### *4.5. Co-Creation in an Ecosystem That No Longer Knows Plurality*

Conducting co-creation with different co-researchers when there is a limited collective feeling and in a city context where multiple ways of knowing are backgrounded is difficult. Thus, the co-creation approach with different stakeholders implies stepping beyond one's comfort zone, tolerating discomfort, and transcending individualist interests to form a shared collective purpose by co-evolving or transforming the relationships by creating new identities and knowledge. Hence, before proceeding to the experimental stages, the BHG project highlighted the need for self-reflection about its position and the preconceptions about situated knowledge it brought [45] as well as for mutual understanding and agreement on common definitions (e.g., health, garden, nature, resilience, community, sustainability). This implied creating a collective safe space that allowed addressing topics with transparency and care; unlearning humancentric blindness to realities; and rediscovering the plurality and different worldviews, even within a city. Furthermore, these common definitions were not considered static and needed to be validated during the evolution of the project. The two-and-a-half years of exploration revealed that the collective culture was largely forgotten in Brussels. For example, the first phase reflected a more extractivist and anthropocentric initiative (Table 1 and Figure 1), whereas, in the second phase, these critics continued to express backgrounding and polarisation from the team and made autonomous decisions in key steps of the project. This conflict unearthed the fragility of the collective power of the community and the need for time to build empathy and create common ground in the experimental steps.

### **5. Retelling of the Experiences of the Co-Authors and the Other Co-Researchers**

This section is the results of interviews but was also informed by listening to the first and second authors and editing their words into Section 4.

#### *5.1. The Personal Sphere of the BHG*

Inspired by the work of O'Brien and Sygna [37], in the co-creation process, the first and second authors addressed the personal sphere by involving participants from different fields and backgrounds in transformation circles as whole persons with multiple identities who were connected to the political sphere and practical sphere through their cultural heritage, work, families, communities, and formal and informal social and professional networks. The first and second authors soon noticed that addressing personal questions related to nature and health touched on their co-researchers' most intimate spheres of beliefs, moral and ethical values, and behaviours, which strongly influenced their daily decisions, political actions, and level of participation. Many tensions appeared relating to the underlying rationalities driven by ideological, cultural, contextual, and personal factors (Appendix B). These topics addressed the inner spheres of integrity, psychological safety, belonging, and relationship with the natural world [52].

The third author felt that this was also a matter of practicality and depoliticisation. Therefore, she selected representative quotes from the interviews to offer more insight into what she thought was occurring in the management of health as a boundary object, the politics around health (biopolitics), and the politics of how we "should" spend our time (chronopolitics), which highlighted the values that were prioritised in these negotiations and other co-creation processes.

#### *5.2. Going to the Practical and Political: Boundary Management and Biopolitics*

One of the tensions that the BHG co-researchers experienced was the resistance of the expertocracy in health (also noted by [27]), which challenged the ownership of rights to their bodies. Foucault [53] introduced the idea of biopolitics, where he explained how the body of the individual is controlled in medicalisation. Quotes of some interviewees

echoed these biopolitical concerns. This biopower was visible in the tensions within individual BHG members who often represented the institutions that reflect this expertocracy. These institutions have their own rules to protect themselves, their knowledge, and well-established methodologies and practices that they represent, often legitimating them with the rationale of scientific soundness.

*“In the beginning, they were there as psychiatrists, as microbiologists, or pharmacists. And suddenly they said, ‘No, I can’t anymore. I have to be here as a citizen’. This was a shock. They would not allow anymore or not allowing themselves anymore to exist in this project as professionals because their hierarchy would not allow them to do so even.”*

(Interviewee B)

The BHG touched on the topic of nature-based solutions for health, specifically medicinal plants. Evidence exists about positive correlations between nature and health, but its causal explanation and long-term effects are not well understood by not only citizens and policymakers but also experts in health or natural sciences. It became more complicated when the political level was unearthed (un)consciously. One of the interviewees highlighted the political concern of environmental injustices: the lack of living labs and participants from less green areas. Vegetation covers 54% of Brussels’ surface but is unevenly distributed among the public green spaces of the 19 municipalities; this is a health injustice that has been made more apparent in COVID-19 pandemic times [54].

*“I saw that many actors were integrated who were active in greener and more affluent peripheral neighbourhoods and it seemed absurd to me to work on this theme without taking into account the neighbourhoods where there are the most challenges.”*

(Interviewee A)

Various interviewees, indirectly or directly, said that they joined the project because they were interested more in the political than in the scientific dimension of health.

*“[BHG aimed to] to make this [invisible] knowledge [about medical plants and ideas of self-care] visible, there was to me the part I was the most interested in.”* (Interviewee H)

However, there was no capacity among the consortium to engage them, which led to the following.

### 5.3. Lack of Ethical Guidelines and Frameworks for Reference

Various interviewees highlighted the lack of commonality. According to different interviewees who were part of the decision-making process, the project carriers wanted to pursue inclusion and did not have clear rules or reference frameworks for expanding participatory design, which is something that was observed in other participatory design projects [55]. One of the interviewees, who compared the project with a favourite band, noted that *“it was more noise than music ( . . . ) lacking the bassline”* (interviewee H). There was a lack of reference frameworks for how to co-create and expand the process to include more knowledge systems. Additionally, some tensions were related to open science and the ownership of ideas, which is typical of a lack of clear guidelines. In the beginning, the BHG co-researchers were naïve and unprepared for the co-creation methodologies, which became obvious at times of feeling the pressure of deadlines or defending collective ideas. Regarding the first proposal, one of the judges asked about their methodology (interviewees G and H).

*“The question of the judge about co-creation methods opened a new world for the ones that remained.”* (Interviewee G)

Eventually, for some co-researchers, the BHG stood for the transformative power of co-creation itself, and that is why co-researchers who were merely interested in health withdrew from the project. New tensions and a transformation occurred mostly at the end of BHG 2.0 when a funding proposal had to be developed and submitted. Co-researchers

who were already active in BHG 1.0 were not trained in co-creation methodologies, public funding writing, and preparing structures and agreements on ethics and procedures, especially for instances of managing diversity of views. In addition, there were already ethical debates about the agency of the plants in the project, which were considered more as objects at the beginning of BHG 1.0. Tension developed when they had to work with more experienced grant writers. The interviewees with experience tried to align the project proposal with funding expectations. Various researchers noted how funding mechanisms help to set the agenda and methodology of a project [7,56]. The tension emerged when co-researchers who were involved in BHG at an earlier stage were confronted with the perceived risk of losing ownership and control of the project. This tension led to reflections about missing “ethical guidelines” for where to draw boundaries regarding social impacts, safety measurement, or agreements on the ownership of the co-productions. These realisations further resulted in a transformation of the project and community and hence evolved into BHG edition 3.0. The current project developments, in which the remaining BHG members are involved, are more concerned about rules, structures, and methodologies, but at the same time, there is the acknowledgement that they can affect spontaneous dynamics, creative imagination, and innovative ideas.

#### 5.4. Chronopolitics and Care

In our current system, financial resources are needed to remove human constraints, thus allowing participation in long co-creation processes. The role of time is often neglected in transformation research, which can lead to undesirable and unintended effects for some people [57]. Many interviewees pointed out how the BHG was subsidised by voluntary time. Various interviewees noted that the co-creation projects that they know of (including the BHG) are like burnout machines (interviewees C and G) because the funding does not cover all the costs and time investments needed to have both scientific and societal impacts. Academics and persons with full-time jobs shared that they had to find time outside their working hours to support the project (interviewees B and G). Others hoped for an income for their passion, especially if they had no other income, and when they realised that they would not be compensated for their time and knowledge, they abandoned the project; thus, in this regard, quitting was actually self-care (interviewee B). Some co-researchers lived predominantly in vegetal or rock time and were comfortable with slower processes. Others were bound to human time; they needed or wanted fast results because of the chronopolitics [58,59] that forced them to work fast to produce project deliverables before unfeasible deadlines. This led to the perception of a lack of time management as highlighted by various interviewees and related to the BHG community’s lack of purpose, except in the proposal submissions. On the other hand, there was also expressed need to create more time for care for the self and the group.

*“I think in co-creative process and in Health Garden, when I think of some person (...) who were so involved and are still so involved in this project, at some point, the project is also a form of therapy for the person.” (Interviewee H)*

Feelings were often unavoidable side effects of thinking with care [60] and led to an unexpected development in the project [61]. They implied different levels of emotional involvement and different care needs, especially in cases of rejection. The rejected funding, for example, was taken personally by the more emotionally involved people (interviewee H). Tensions arose regarding different needs for the care of the self, which might have been interlinked with chronopolitics. Care requires time and was seen by some interviewees as counterproductive.

## 6. Discussion

### 6.1. How the Rules and Eligibility Criteria of the Funding Call Reinforced the Injustices That the Funding Agency Wanted to Overcome in the First Place

As the first and second authors explained, one of the challenges that the funding calls caused was the eligibility criteria. Only organisations with legal status were eligible

for funding. This was not an issue in the first phase when the project was supported by the university museum. The third author entered after the first rejection, when the institutional partners left the project owing to missing human resources, and the remaining co-researchers sought institutions that would support the second stage of project proposal re-submission and experienced the stress of finding the right partners. The best pool of supporting partners was from academia. However, these academics were also often in precarious situations since they were dependent on external funding from organisations, where they must follow the rules of the funding organisations to increase their chances of acceptance. As Luger et al. [7] remarked about European funding, the power stays with the funder. However, when new partners were added to make the second stage proposal more eligible, the renegotiation of resources (salaries) and task distribution created many tensions, as described above. We observed some forms of oppression that translated to personal and practical tensions, which we saw as a consequence of (1) the capitalist and modernist values in the policy instrument of the Brussels authorities that shaped the co-creation funding call, and (2) the lack of training of the co-researchers to recognise and cope with injustices and other forms of oppression in co-creation processes and urban sustainability. It can be argued that the funding agency should explicitly provide training or integrate experts to clearly communicate urban political ecology and design justice to remind participants of the political aspects of building a consortium of co-researchers.

### *6.2. Resisting Depoliticising Healthy City Science by Higher Institutions*

The lived experience of this case study demonstrated how the funding call for co-creation research with its eligibility criteria and rules led to greater oppression of co-researchers representing alternative knowledge; this was not the first case where funding calls reinforced unbalanced resource distribution and existing power dynamics (see [7]). Some co-researchers in the BHG project resisted the depoliticisation, but the ecological modernist and capitalist values were so embedded in the Brussels research environment and policy priorities that this resistance came with some costs, which remained invisible for to the same institutions that might have the right intentions but failed to provide the right means and enough timing to overcome the injustices.

This co-creation journey led us to the following realisation: Although we initially aimed at the scientific co-creation of common knowledge about medicinal plants and nature-based health practices for resilience and integrating invisible knowledge, we needed to first co-create fundamental relational knowledge on the arborescent knowledge systems in the city, acknowledge it as a post-natural city, and create grounds for co-creative initiatives like BHG. At the end of BHG 2.0, we concluded that a resilient place is like a rhizomatic environment where people and communities, through their relational experiences, can be resilient. The BHG was positioned as being similar to smaller-scale rhizomes embedded in the city rhizome. However, the reason BHG did not flourish to its full potential was due to both the tensions and the constraints of its environment and the local soil. The latter was dominated by parallel arborescent systems and regimes of patriarchy and capitalism that have been imprinted for centuries in places like Brussels [62].

### *6.3. More Vitality of the Individual and the City*

Various project co-researchers shared what they learned about themselves (personal), the project management and co-creation methods (practical), and the problems at higher levels that hindered societal transformation (political). Regarding the political aspect, the community promoted ecofeminist ideas that resisted the dominant arborescent hierarchies that became clear to the involved parties, also informing them about biopolitical, chronopolitical, and other political concerns regarding the structures in which the BHG was embedded. The community realised the need to step back from the initial project intention, shifting from co-creation on health to experimenting with methods in codesign to expand to involving more inclusiveness, but these adaptations and tensions wounded the individuals and community. For instance, one interviewee highlighted how the BHG challenged them

to think differently because the BHG made the invisible apparent. As the BHG community engaged with criticism of health knowledge and resistance, it placed itself in a vulnerable position, thereby exposing its members at the individual level as well.

This led to a discussion of whether tensions in co-creation can lead to the resilience of a person, a community, or even a city (which was the ambition of some co-researchers). In theory, they do; co-creation is a rhizomatic process that acknowledges that we exist, continuously grow, develop, and transform by experiencing various tensions and struggles, especially in our relationships. Group work has the potential to generate a collective sense of sociability and vitality, especially through aesthetic nature experiences (Dale, Undated). A co-creation environment exposes co-researchers to emerging tensions but also generates a collective vitality or “communal energy”. However, as a consequence, the BHG lost co-researchers who could/did not unlearn the plurality blindness of post-natural cities such as Brussels. The facilitators did not have the reference frameworks to expand the participatory design and to reap the benefits of boundary objects, especially when the project became more concerned with the more-than-human world as an agent rather than an object. The design research literature on the funding agency did not provide these frameworks, and future debates should focus more on developing reference frameworks for the co-creation of a pluridiverse world in a post-natural society such as Brussels.

#### *6.4. Methodological Approach of This Study*

Working with two methods and two sources of materials provided different insights into why there were perceived tensions and invisible costs during these first phases of the co-creation processes and especially the negotiation processes. By having a third author in an outsider role and more insights on environmental justice and urban sustainability, we could identify more patterns and dive into a deeper analysis. This helped the first and second authors to understand that the rejection by the funder in the second stage, the oppression of alternative knowledge systems, and the uneven distribution of benefits were to be taken not only personally and practically (e.g., lack of their management skills), but especially politically.

This methodological approach helped us to understand—and argue for—the need for more care in research, co-creation, and their processes. Experiencing one or multiple forms of knowledge oppression in co-creation harms the people that embody this knowledge system. The previous sections provided insights through the collaborative autoethnography of the first and second authors as they interviewed other co-researchers on how the lack of balance of resources and tasks led to hurt feelings. The rejection of a funding acquisition process can open these wounds and create new wounds. Finding a balance of caring between society, science, and the self is challenging [46,63,64]. Staffa et al. [63] argued that it is not only an individual’s responsibility to take care of the self but also the system’s responsibility. However, it is often systems such as the academic system that appear disruptive to academic researchers. Moriggi et al. [64] argued that radical and transformative change can be fostered via three mutually reinforcing dimensions: (a) ethically informed practices, (b) relational responsibility, and (c) emotional awareness. However, these dimensions were not incorporated at the beginning of BHG 1.0 and only gradually emerged during BHG 3.0 when acknowledging the need for care and healing. In line with the calls of Staffa et al. [63] and Sellberg et al. [46], we call on future co-researchers to investigate the role of care in coping with the tensions that co-creation research automatically produces and to do so in an early stage. We also call attention to the care needed for tending wounds created in funding application processes, especially for people who are already in precarious positions (see [7]), especially if these wounds cannot be repaired in successive research phases because of rejected proposals. Policymakers, managers of funding application processes, and designers of these policy instruments should investigate how to support the funding applicants, especially the ones in disadvantaged positions, and foreground the value of care in how they design their policy instruments. They should also



search for opportunities to valorise rejected projects and create local fail spaces for repair, healing, and long-term co-creation research (similar to FailSpace [65]).

#### 6.5. Towards BHG 3.0.: *The More-Than-Human World Turn*

The BHG is still “becoming”. In autumn 2021, BHG entered a continuum according to its initial *modus operandi*. Furthermore, a signifying rupture was the principle of the concept of rhizomes [66]. The new form of Brussels Health Gardens (BHG 3.0) established the core of the shared vision of multispecies justice in a post-natural city. During the interviews, we asked which urban plant had taught or inspired co-researchers between 2019 and 2021. Some had no answer because they admitted their plant blindness and had no chance to intimately acquaint themselves with the plants in the BHG. One interviewee talked about knotgrass, a weed that grows in the most difficult places regardless of how often it is trampled by people but added that the resemblance between the story of knotgrass and the BHG journey was only recognised recently. This highlighted the lack of post-humanism and multispecies justice in BHG in the first two editions (until spring–summer 2021). The main activities for the coming year(s) will be exploring the art of co-writing with urban plants; engaging more with a feminist ethos of care [63]; and cultivating care for the self, society, and science [46]. We already conducted the first experimental virtual sessions, which included urban plants in co-creation circles, and began with stories, scientific facts, and memories to cultivate care for the self, others, and even for growing in relationship with plants. Some co-researchers gave feedback not only on the therapeutic effect of such workshops but also about how they became aware of the plants in their own damaged (urban) landscapes. Another reflection we will take to the next phase is the consideration of more vegetal time in our curation to influence the perception of events and hopefully decrease tensions related to the pressure of time. BHG 3.0 implies embodying transformation across diverse wild and cultivated micro- and macro-spaces and time at different scales with more-than-human inhabitants and connecting in rhizomatic ways.

## 7. Conclusions

Several identified tensions in the BHG project can be linked with tensions observed in other co-creation research (inclusion versus control; impact versus solution; and the research topic of health, which is a boundary object), whereas some tensions are linked with the systems of Brussels (and beyond), with ecological modernist priorities, and with the academic entrepreneurial system.

The intimate case study of the BHG project, which focused on nature-based health, demonstrated the power balances and injustices in the distribution of resources and tasks in healthy city science projects deploying co-creation research. The co-creation subject of this research was “health”, which, in our contemporary Western society, is more expert-based and science-validated than knowledge-oriented. In this case study, we observed how the funding framework tends to privilege the academic and institutional co-researchers. Theoretically, even independent co-researchers from multiple paths of life can organise and apply for funding to undertake social innovation research, but the timeframe proposed by the funder is short, and the researchers are unlikely to fulfil all call requirements to compete with well-established organisations such as academic institutions, which have the resources and experience that independent co-researchers do not have. The power dynamics shifted during the different negotiation processes of the co-creation project, including the initial funding acquisition, demonstrating the methodological difficulties caused by restrictions on the time and human resources needed for this kind of research. The case study showed the lack of recognition and integration of non-scientific, nature-based health knowledge and alternative knowledge carriers that are external to institutions or academia in the health sciences in Brussels and how difficult it is to recognise existing, almost invisible, knowledge. This paper contributes to the body of research that criticizes political programs and policy instruments that depoliticise urban science and nature-based health knowledge processes and calls for a radical revision of these policy instruments, including providing

more time and additional resources (e.g., training in political ecology, as well as tools for the care of science, society, and the self) and a follow-up that allows for revising rejected proposals of vulnerable groups of co-researchers. This paper also advocates for more research, including more autoethnographic work on the actual experiences related to resource allocation in negotiation processes during the co-creation of urban sustainability, justice, and/or nature-based health practices.

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## Appendix A. The Interview Questions for the Other Co-Researchers

Part 1: Getting to know the participant (max 10 min)

What was the nicest memory about HGB?

Which associations do you make with urban plants in Brussels?

How would you describe HGB very shortly?

Did you have other definitions for HGB before? (When you described the project to outsiders, what did you mention)?

What is your HGB story?

What was your relationship with HGB?

Why did you join?

Why did you stay or quit?

Part 2: Let us talk about barriers and tensions in the co-creation process (max 15 min)

Did you experience any barriers or tensions during the co-creation process?

If yes, how, when, and why? What were the sources of tensions you experienced?

Which factors seem prevalent for creating tensions? How did you deal with those tensions?

What were your strategies to deal with tensions? Who (humans, plants, etc.) were your alliances to deal with tensions?

If no, according to Sugir and Vitalija (with whom I wrote the first draft of this article), there were tensions and barriers that made this co-creation process difficult (during the interview itself, I can give more details), why do you think they perceived tensions?

Part 3: Conclusion

What would be your recommendation to others who would like to participate in a similar project?

Lastly, which urban plant in Brussels inspires you—taught you most—and why in this period of 2019–2021?

## Appendix B

**Table A1.** Original thoughts of tensions identified during co-creation by the first and second authors (collaborative autoethnographic results), mostly compiled in late 2019, early 2020.

Origins of Tensions	Types of Tensions and Way They Manifest
	<i>Imprinted in funding call design</i>
Diversity of knowledge systems	Knowledge hierarchy: academic (scientific) vs. other types and systems of knowledge such as folk (or common, or traditional, all terms are used interchangeably) knowledge, ancient inherited, native or indigenous wisdom, lived experiential knowledge. Opposing hard data vs. soft, warm data. Reinforcement of the master-servant dynamics.
Hierarchy in sciences and research types	Difficulty to engage researchers into transdisciplinary sustainable transformations research due to existing hierarchies between sciences. Societal co-creation research is not equally valued and appreciated comparing with fundamental research resulting into peer-reviewed papers.
Co-creation methodology	Different understanding how to approach existing knowledge and co-create new knowledge. Tensions in creating common vision and definitions.
Diversity of co-researchers and institutions	Hierarchy of the social entity. Academic institutions vs. associative or citizens voices. Financial advantages, decision taking and ownership of results (innovation).
Scheme of financial support	Financial remunerations vs. volunteer contributions: degree of involvement, contributions, responsibilities and appropriations.
Legal entity of co-researchers	Non-institutionalised learning community without legal status vs. institutional partners, informal vs. formal. Different degree of freedom, responsibility, access to institutional scientific and financial support, power tensions on decision taking, degree of credibility and trust among peers and funder.
Creation of learning community	Setting priority and orientation in the community: Goal (project proposal co-creation) oriented vs. community (nurturing and building) oriented. Tensions in following deadlines and reflecting needs of community.
Project sustainability	Timeframe of the project and assuring continue after funding is finished. Long vs. short term. Doubts on being able to capture possible outcomes in short time (3–4 years project) of long term transformational processes.
Degree of freedom for exploration	Assessment criteria do not include co-researchers desire to co-create the new culture and experience inner transformation as part of social change. Hierarchy between external vs. inner transformation. Work foreseen for individual and collective inner transformation is not seen as valuable due to its intrinsic origin of being intimate and out of record.
Identified system change	Funders and co-researchers framing societal problems and seeking solutions for them. Do they meet? During assessment process priorities and needs for system change identified by the project co-researchers (community) not necessarily will be considered of the same importance and urgency by those of project evaluators and funders.
Radical system transformation	Different understandings by the co-researchers and funders what radical transformation means or could be imagined.
	<i>Project topic and field related tensions</i>
Health promotion	Health promotion vs. need of healing. Many co-researchers gave signs of different degrees of self-awareness and readiness to engage into health promotion process, rather their need of healing.

Table A1. Cont.

Origins of Tensions	Types of Tensions and Way They Manifest
Health definition	Health as intimate personal sphere that touches our vulnerability, stigmas, individual and collective traumas. Not sufficient level of social and psychological support in co-creation work. Absence of communal structures for containment and support.
Nature definition	Many diverse definitions what actually nature means: from feeling nature to seeing nature as outdoor space.
Medicinal plants	Use of medicinal plants are covered by national and European legislations. Some medicinal plants are also food plants from legislative point of view which can lead some people to impression that project promotes "auto-medication".
Commoning of green spaces	Green spaces for nature-based health practices considered as common good lead to different understanding how they can be designed and managed. <i>Imprinted in societal functioning and personal choices</i>
Alignment between personal and professional values	Different levels of contributions. Personal contributions vs. institutional contributions. Difficulty for some co-researchers to attribute their voices and opinions, when having different personal views comparing to institutional of the organisation they belong.
Civic participation	Different degrees of commitment of self. Duty vs. optional. Our duties to engage into change and transformation as researchers and citizens. Fear to engage into new and unknown, uncertain.
Social norms and their acceptance/challenging	Social conformity and pressure. Equilibrium between normativity, accepted societal values and grounded scientific evidence. Daring to break barriers vs. conformity. Need of courage and capacity of taking risks, engaging into change and challenging current situation.
Personal and collective traumas	Dariness vs. numbness. Need of being informed about individual and collective trauma that leads to compartmentalisation and fragmentation. Avoiding derangement. Denying reality of broken, fragmented, polarised world in which we live, being in state of collective anesthesia to be able to function in traumatised western culture.
Societal model	Diversity of values. Collective vs. individualistic values. Diversity of co-researchers originating both from individualistic or collective cultures.
Co-creation	Trust in methodology. Relevance of co-creation research to political agenda. Bottom up vs. top down. Having doubts about possible impacts of co-creation research.
Trans-generational and multicultural learning	Learning context. Trans-generational and multicultural learning. Need of time and deep interactions to understand challenges that each generation or ethnic group is facing.
Personal objectives toward the project	Personal interests (what is there for me?) vs. deep societal concern, community purpose or societal advantage (how can I contribute to a bigger cause?). Difficulty to feel interconnectedness and being part of life web. Values of individualised/individualistic society.
Personal growth	Desire for a change and growth (engaging into personal development and flourishing and making it life priority) vs. fear to keep status quo, stay accepted by the community or society to which individual belongs. Difficulties to expose own vulnerability, in decision making, different contributions degree, appropriations of project and innovation willingness
Transformation	Leading change vs. observing and witnessing transformation. Sense is disappointment, unfulfilled expectations
Attitude toward challenges	Addressing root (deepest values and intentions) vs. surface (simple linear, technical solutions) causes (metaphor of soil work). Decision making, contributions degree, ownership of project and innovation willingness.

Table A1. Cont.

Origins of Tensions	Types of Tensions and Way They Manifest
Anthropocentrism	Trying to find deeper ways of perceiving, going out of Anthropocentric worldview towards new creative ways of being together with other human and more than human beings and intelligence. Need of addressing different temporalities (like human, vegetal, seasonal, slow time).
Knowledge acquisition	Going out from purely cognitive to embodied experiences. Creating conditions for our intuition, ability to sense what is needed for others and society, recognising patterns in processes. Need of openness, methodologies and space for embracing different types and ways of knowledge than cognitive.
Learning context	Depending where and with whom health, nature, care, co-creation is being discussed, it will give different perspectives and understandings what those concepts mean.
Posture for change	Engaging into dreaming and imagining living differently vs. focusing in pragmatic search of simplistic solutions. Different degree of contributions and project, ownership.
Liminal space of change	Building personal and collective capacity of deep listening, observation and sensing. Creating spaces where identity and personal beliefs dissolve and new collective liminal space of transformation immerse, where change is happening. Need of being informed about process how change and transformation happen. Different degree of contributions and project, ownership.
Trust	Need to control (conditioned beliefs and mistrust of people) vs. openness and trust (embracing ongoing constant spontaneous societal transformation, natural flow, uncertainty and unpredictability), co-learning about complexity, identifying patterns and multifactorial influences, understanding of interrelatedness and inter (intra) connectedness. Power tensions in decision taking and ownership.
Collaboration	Collaboration vs. competition. Decision making, language (us vs. them), interpersonal behaviourism, and contributions degree.
Sharing	Extractivistic practices vs. sharing, connecting, recognising gifts and encouraging others. Language (lack of coherence language and actions), interpersonal behaviourism, decision making and ownership degree.
Agency	Sense of agency, courage vs. hopeless and powerlessness. Language (passiveness vs. urgent to act) and ownership.
Web of life	Holistic, integrated, and relational approach (feeling part of living web of life) vs. fragmented and siloed. Interpersonal behaviourism, language (“only/first us”) and decision making.
Consciousness	Conscious agency, awareness and real connection vs. alienation. Lack deeper connection to the fundamental values.
Oneness	Separation, dualistic, reductionist divide leading to loneliness vs. feeling part of the bigger world and whole. Dissociation of oneself from the whole.
Collective learning	Teaching vs. transformative co-learning for growth individually or collectively. Searching for learning opportunities, prioritising one over other.
Prioritising action	Local vs. global possible actions and impacts for change. Personal conflict, division of available dedicated time for local and global actions, making priorities between them.
Perception of nature	Preserve nature as a resource for human needs and appreciate nature’s intrinsic value and wholeness. Expand possibilities and explore further potentialities of human creation and interconnectedness. Reciprocal vs. extractive relationship with nature. Move towards richer relationships including nature as kin rather than only resource or material.
Societal impact	Individual action vs. collective move: Anthropocene has been described as an unpredictable and dangerous era in planetary history when humanity has become a major force of nature that is changing the dynamics and functioning of Earth itself. How much does my individual action matter?

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