**A community-driven nature-based design framework for the regeneration of neglected urban public spaces**

**Gloria Osei1, Alison Pooley1, Federica Pascale1**

1School of Engineering and the Built Environment, Anglia Ruskin University, Faculty of Science and Engineering, Chelmsford, CM1 1SQ, United Kingdom

**Keywords:** Community-driven design, Nature Based Solutions, Design framework, Urban public spaces.

*Nature based solutions are a popularising concept within current urban regeneration literature, exploring differing themes in the context of optimising public spaces. Focus on the adaptation of public space design, with the community at the forefront, has been documented to a limited degree, with few studies concentrating on possible design strategies.   
  
This literature review revealed that the majority of nature based design frameworks, since 2017, have suggested the benefits of nature in public spaces to human health and wellbeing: whether physically or psychologically, and either within the full framework or as part of the framework’s scope. There are however variations in the number and clarity of steps needed to follow each framework, and it is evident that the importance of community driven designs are understated within built environment literature. Many frameworks favoured the use of academic studies as a secondary source for their creation, with few using primary analysis of community acceptance and co-creation.   
  
This paper explores the literature available on nature based solutions and their design frameworks. It maps out the existing studies, to date, and reports on the initial findings for this progressing PhD research. Public spaces are, in their very definition, a space for the public; despite this, development of these spaces, as well as the literature around the subject, are far more theoretical and professionally inclined, rather than community influenced. With an emphasis on sustainable development, this paper suggests that community views on nature based public spaces need to be the focal point of design frameworks for public urban spaces, which may then be used as a protocol for the production of optimal and effective nature-based public space regeneration.*

**Definitions**

The paper will have the corresponding word definitions, unless stated:

***Urban****: An environment of high population density and advanced infrastructure.*

***Sustainability****: The built environment’s ability to value social, economic and environmental factors in equal measure, enduring into the future.*

***Community****: The local users of nature-based public spaces including residents and local workers.*

***Nature****: Land containing green and/or blue spaces within the ability of human management.*

***Public space****: Spaces designed for access to all the community, and to be utilised for leisure and respite, not just for passage, e.g. walkway.*

***Neglected****: Public spaces that have been socially abandoned because of, or leading to, failure to accomplish its designed purpose.*

**INTRODUCTION**

**Nature Based Solutions in Urban environments**

Nature based solutions are approaches stimulated by nature through the use of green and/or blue spaces and interventions. Nature based solutions are currently found in coastal, river, watershed, freshwater, forested, mountainous, rural, and urban ecosystems (IUCN, 2019). The term Nature based solution is a recent concept and is currently being used for the UNFCCC (2018) Paris Agreement to help ‘combat climate change and adapt to its effects’, and the EU Horizon 2020 (European Commission, 2017) in their innovation and research program for ‘smart, sustainable and inclusive growth’. The implementation of nature based solutions in urban environments has been considered for: climate change adaptation by aiding heat, energy and flood regulations (Kabisch, et al., 2017); natural disaster regeneration by allowing ecosystems to restore and increase (Asian Development Bank, 2016); agricultural sustainability by improved integrity of water management and food security (Sonneveld, Ben G J S, et al., 2018).

**Public space**

Public spaces such as coasts, canal fronts, walkways and parks are used daily as an accessible domain, vital to the day to day activities of human beings. The nineteenth century saw the beginning of public parks as a space for social control as well as a meaningful way to draw communities out of their busy lifestyle and into the appreciation of the opposing, natural environment (Holland, et al., 2007). Modern urban public spaces are becoming less individual in their national identity and increasingly completive with other nations as a factor of development. This competitive drive has therefore meant a movement from the traditional aims of community centred space, to achieving international value. As space is expensive in the urban environment (Nabarro and Smart, 1978), there is demand for commercial development over ‘other’ types of space, potentially squeezing out nature based solution spaces. This has proven a strain on local councils in reduced funds for such developments. Nature-based public spaces have hence been seen as unprofitable developments, that need justification of cost effectiveness and value, demonstrated by the debate for a housing development to replace the Limehouse Triangle biodiversity scheme originally formed by the Tower Hamlet council’s, Locksley Environment project (Brooke, 2019).

An inevitable consequence on the contending attitude of public space development, has been the effect on originality of design; steering designs from representing the individual location/community identity to attention on globally accepted design. Public spaces are now therefore designed with geometric shapes to satisfy a modern, clean, global design, such as that adopted by the design of Granary Square, King’s Cross, contrary to the emphasis of unconfined nature with an assortment of reminders of the past. Kim and Kwon (2018) note that new urbanism design and sustainable urbanism design draw inspiration from traditional design and historical relevance whilst post urbanism designs are inspired by contemporary design influenced by globalisation and mediatisation (media shaped communication).

The increase in pseudo-public spaces has seen a reduction in the ‘free’, ‘accessible’ and ‘all-are-welcome’ mode of public spaces, being transformed into areas in which you can potentially be asked to leave if your presence is not wanted, e.g. the prevention of the Occupy London protesters in Paternoster square, London, due to its private ownership. As taxes are used to fund, to an extent, the production of public spaces, there have been calls for the need to look into the distribution of these funds to optimise the desired effects of improved health and wellbeing for the community. This distribution could potentially include neighbourhood percentage shares that allow for the promotion of regeneration amenities, even in underprivileged areas, for the encouragement of human and economical capital (Radoslav, et al., 2012).

**Summary of the problem**

The issue at the core of this research is that public spaces by their very definition are spaces for the public, yet development of these spaces as well as the literature around the subject is far more theoretical and professionally influenced, rather than being community influenced. Communities within many societies are very diverse, ranging in: culture, ethnicity, class, age, and social preference. With the global increase in diversity within urban areas progressing rapidly, it has become necessary for leaders of regeneration to take these diversities into consideration, especially if sustainability is likely to be achieved. The complexity of needs from one region to the other gives an enhanced need for professionals and authorities to regenerate with the community, and not for them (Levy-Storms, Chen and Loukaitou-Sideris, 2018).

**LITERATURE REVIEW**

The literature on urban regeneration gathers a vast range of fields of knowledge, including politics, social science, biodiversity and urban planning. The research divides into differing themes such as crime-prevention, human health, and increased general economy. Within the capacity of this paper, a narrative literature review begins to draw information on community-driven, nature-based public spaces in neglected urban sites.

**Social neglect of spaces**

Social neglect can lead to an area becoming a derelict site; locations that have fallen victim of disuse and been relinquished or abandoned (Bradshaw and Chadwick, 1980). These sites are not only found on built-up development, but could include parks, walkways and open spaces (Lans, Mulder and van Rij, 2007). Socially neglected spaces are not used to their optimal potential as prescribed by the original design, and therefore fail to fulfil their design purpose. This type of neglect is brought about by more complex reasons than that of Brownfield sites, and often as a result of a combination of factors. Some possible factors are: lack of funding for needed facilities (Grimski and Ferber, 2001, p.143; Kim, 2016), need for maintenance (Grimski and Ferber, 2001, p.148; Rosol, 2010, p.551), increase competition of groups within the public for differing uses of the space (Malone, 2002), as well as a simple lack of the ‘right’ facilities provided by the space (Phillips, et al., 2013). For the neglect of public spaces to be averted, design must focus on sustainability through careful strategies.

**Potential of public spaces to the community**

The availability of public spaces to every type of user means that design must be sensitive to all abilities and vulnerabilities. The scope of vulnerability includes, but is not limited to: elderly, physically disabled, young, mentally ill or homeless. Many vulnerable individuals identify little differentiation between their physical and psychological wellbeing, and speak of both as critical aspects when discussing open spaces (Levy-Storms, Chen and Loukaitou-Sideris, 2018). The concentration on the possible adaptations of urban regeneration for the inclusive ease of use by the more vulnerably members of society, have few articles addressing it, with reduced focus on possible design strategies, as spoken by Pani (2016) in *Improving the lives of those with dementia through urban design*.

The public natural environment is aimed at inviting all to use its space without the separation of class or identity. Modern facilities such as seating areas have, on the other hand, been criticised for being arranged in a way that promotes individuality rather than social cohesion. The popular isolated group seating with separating metal handle encourages ‘atomised’ public life, whilst the use of clearly defined narrow pathways promotes the brisk movement of people rather than strolling enjoyment (Byass, 2010).

The unstoppable rise of the use of social media presenting itself as a virtual public space (Floridi, 2015), poses as a competitor for physical public space but with potential of isolation from real life interaction and tangible emotional connections. Albert Mehrabian (2017) in his extensive studies of communication complexities, express the importance of non-verbal, physical communication, more so the limited ability of the dependency on purely words as a mode of interaction. There is therefore an increasing social need to provide effective public space in order to stimulate social cohesion.

**Nature based solutions**

Nature-based solutions are designed to ‘help societies address a variety of environmental, social and economic challenges in a sustainable way’ (ECDG, 2015, p.5). EU Horizon 2020 funded several projects demonstrating innovative nature-based solutions in cities in the 2017 call: Nature-based solutions for inclusive urban regeneration.

Research into the field of nature-based public spaces as a nature based solution, have declared a long list of benefits on the necessities of its presence within urban environments, including: economic development (Buckley and Brough, 2017), improvement of environmental conditions and comfort (Boeri, et al., 2017), aesthetics (Julier, 2005; Kim and Kwon, 2018), social cohesion (Ivanova, 2016) and human health and wellbeing (Van den Bosch and Ode Sang, 2017). Systematic research in the immersion of humans with nature, however, shows that basic physical walks through a natural environment has little effect on a human’s connectedness with nature; amplified contact with nature by emotional and sensory activities, on the other hand, provides a greater connection with nature, potentially resulting in increased human benefits (Lumber, Richardson and Sheffield, 2017). The availability for these experiences within the natural environment is associated both with the size of the natural environment, as well as the distance the individual must travel to access the amenities (Ekkel and de Vries, 2017; Russo and Cirella, 2018). Russo et al. (2017) suggests that residents should have 2 hectares or more of natural green space within 5 minutes or less walking distance from their residence. It is however considered that even when there is availability, ‘it is not just the physical environment that encourages or discourages people to come out in public, but also the opportunity to see something different’ (Holland, et al., 2007, p.64). In order to create a space that encourages community participation, it is essential that the public are involved in the design process of their space.

**Nature-Based public space planning and the community**

The benefit of nature based design has also been documented in its use for the improvement of environmental conditions and comfort (Boeri, et al., 2017), and even as a means of reconnecting communities after national conflict (Ivanova, 2016). The sustainability of the urban environment as a whole has drawn out increased questions regarding whether more contemporary designed public spaces would benefit from a heightened vernacular architectural approach, focusing on traditional and indigenous design (Kim and Kwon, 2018).

Community input has further been assessed in the context of strategies to best involve the public; through open-ended, personal communication prior to development (Golden, 2014), post-psychological response from long-term and recent residents (Bélanger, Cameron and de la Mora, 2012; Salone, Baraldi and Pazzola, 2017), as well as the need of careful design aesthetics to incorporate culture, place identity, and place attachment (Julier, 2005); Mihaylov and Perkins, 2013), aimed at recognising the individuality of the community. Quality of public space due to class prejudice (Wolch, Byrne and Newell, 2014), is also recognised in literature, where it is acknowledged that more vulnerable communities face gaining a less valued public space to those in a more wealthy communities.

It has been argued that the built environment pays little attention to the community as relevant agents when it comes to planning and design (Ravetz, 1980). In *Remaking Cities*, Ravetz gives an analysis of the urban environment and the use of the built environment as a control mechanism for groups within society over others in the community. More recently advancements to produce methods of community involvement have been made in the planning process of public space regeneration (Cilliers and Timmermans, 2014; Cilliers and Nicolene, 2016; Stratigea, et al., 2017).

There are many professional bodies that play as actors in the process of regeneration with some being called in the past to expand their roles to address the needs of the community. In the UK, Town Centre Management has been regarded as a tool for improving town centre environments. The findings of Otsuka and Reeve (2007), identify that Town Centre Managers are influential to local authorities in regeneration by providing information on local community needs and interests. However they are limited as their work does not see them directly communicating with the users for development purposes, but provide report through observation. They are further unable to perform as a tool for social equity in regeneration, as they are usually an under-resourced small team.

The use of public artists as a medium between the community and authorities within urban regeneration projects are increasingly being explored. UK City of Architecture and Design 1999, Glasgow, shows the success of community-driven regeneration from the offset. The use of the new genre public art approach, allowed for the production of identity and ownership through engagement with community (Sharp, 2007). Sharp reflects that for urban regeneration to succeed, there should be “processes through which communities are activated and stimulated into action” (2007, p.288).

**RESEARCH REVIEW AND METHODOLOGY**

To explore current frameworks for nature-based public space design, this research uses a meta-synthesis literature review method (Walsh and Downe, 2005) to build and analyse secondary data on the available nature-based public space design frameworks to date. The research looks into a number of frameworks and analyses their focus and content, evaluating the extent in which community preference is considered. The methodological approach employed is a grounded theory analysis. This approach is used to gather data to the point of saturation, with the intention of analysing if current design frameworks are community-driven. For this purpose, an inductive research approach is necessary. Other alternative techniques using a deductive approach are not used. This is because the paper intends to explore the phenomena of design representation in nature-based public space frameworks. This search is best done by analysing and reanalysing different aspects of existing nature-based pubic space design frameworks. It will interpret and interrogate the theories adopted and evaluate the common consensus of representation.

**RESEARCH METHOD**

When looking at the available public space design frameworks, this paper considers a search into the available academic articles providing this service to designers and planners. The records were identified through database searching. With the exact phrases located anywhere within the article, ‘“public space” “nature based” “framework”’ was placed into the search engine. The search originally brought up 728 results from the year 2015 onwards, patents and citations excluded. Those results that had a new design aiding ‘framework’ mentioned as part of the title, abstract or keyword was then further investigated. The frameworks were also limited to design for general multiuse spaces for the open use of the community, and restricted frameworks for specified areas were disregard.

There were found very little results between the years 2015 and 2016 and therefore the search was restricted to 2017 onwards, allowing for the evaluation of frameworks following a time were the concept of nature based solutions were more popular. After this date the authors would have the availability of a wide range of literature. In so doing, the thesis looks at 14 frameworks from 2017 focusing primarily on nature-based public space design. In reducing the search of design frameworks to that of nature-based public spaces only, the literature review focuses on analysing the frameworks on the basis of: 1) themes covers, 2) steps required to enforce the framework, 3) the source of information used to produce the framework, and 4) testing of the framework. The source of information is generalised into two categories in this research: literature review and community participation. Community participation is considered as interacting with the community to gain their views, and therefore site observations are not considered a valid community participation method.

**RESEARCH RESULTS**

The Literature review on nature based solutions show significant potential in its use to benefit society and the urban environment, with nature-based public spaces providing a possible forum in which these solutions could be actualised. To allow for the optimum implementation of public spaces as a nature based solution the paper looks into the articles providing frameworks that could aid the design of these spaces. As the frameworks would be considered as a protocol for design, the paper aims to evaluate the considerations given towards providing tangible user requirements in public space development.

To explore the extent community preference is considered in current nature-base public space design frameworks, the paper compares the existing studies in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Author/s** | **Title** | **Steps to enforce** | **Source** |
| (Raymond, et al., 2017) | NBS co-benefits FW | 1) identify problem or opportunity  2) select NBS and related actions  3) design NBS implementation processes  4) implement NBS  5) frequently engage stakeholders and communicate co-benefits  6) transfer and upscale NBS  7) monitor and evaluate co-benefits | **Literature review** |
| (Artmann and Sartison, 2018) | peri-Urban Agriculture (UPA) FW | 1) Vision Definition  2) Implementation efficiency  3) Impact efficiency | **Literature review** *(166 Academic articles)* |
| (Chiabai, et al., 2018) | Nexus FW | 1) identify "driver"- climate change  2) analyse "pressure" on green space due to driver  3) evaluate the "state" needed - size or quality of green space and ecosystem services  4) select "exposure" to space - passive, consumptive, active  5) evaluate health "effects" - direct and indirect, positively or negatively  6) apply any "adaptations" throughout and enforce any "mitigations" | **Literature review** *(117 study articles)* |
| (Swierad and Huang, 2018) | Human centred FW | 1) identify options for park activities  2) build action strategies: conventional planning + human-cantered design  3) evaluate connection to: family and loved ones, community and neighbourhood, self, nature  4) analyse improved health and well-being  5) improve community engagement | **Community participation** *(20 residential interviews)* |
| (Dezio and Marino, 2018) | Urban resilience in food practices FW | 1)Pressures - look at problems that need to be addressed  2) Action - plan and implement the individual actions needed to address pressures  3) Expected impact - note expected results, and the planned and/or performed monitoring  4) Indicator - evaluate impact indicators that verify effectiveness of actions | **Community participation** *(50 practices - activation of gardens and training for community)* |
| (Buckley and Brough, 2017) | Human mental health FW | 1) quantify types of park users and park uses in a manageably small number of categories  2) Quantify proportional changes in mental health parameters, for different categories of people and experiences  3) Quantify economic values of mental health outcomes, using national economic statistics for public health | **Literature review** |
| (Mukherjee and Takara, 2018) | Urban Green Space - 3 stage FW (UGS-3CC) | 1) contextual concept - thinkers - corresponds to the pre-design stage  2) core competency - makers - corresponds to the design and implementation  3) contribution calculation - traders - corresponds to monitoring, evaluation and improvement | **Literature review** *(Lit. review and site observations)* |
| **Author/s** | **Title** | **Steps to enforce** | **Source** |
| (Currie, 2017) | small park design FW | \*"not to construct a list...but identify foundational design principles" | **Literature review** **and community participation** *(site observations,*  *Lit. Review,*  *8 professional*  *&7communityinterview)* |
| (Nesbitt, et al., 2018) | Urban green equity FW | 1) Consider temporality  2) Investigate condition and preference  3) Deal with ownership  4)Representation  5) Procedure  6)Analyse community desire to participate  7) Analyse community ability to participate | **Literature review** *(45 articles*  *9 studies from books*  *8 professional reports)* |
| (Giusti, et al., 2018) | FW for Children's Human Nature Situations- (ACHUNAS) | 1)Identify qualities of Significant Nature Situations with the potential to "connect"  2)List abilities of Human Nature Connection: 1. Being IN Nature, 2. Being FOR Nature, 3) Being WITH Nature | **Literature review** *(26 Professional Interviews*  *275 Studies in Literature)* |
| (Lennon, Douglas and Scott, 2017) | An affordance FW for green space | 1) Encourage the desire to actualise affordance  2) Enhance confidence among potential users in the use of that green space  3) Prompt greater frequency and range of uses of that green space  4) enhance potential of that green space to assist societal health and wellbeing | **Literature review** |
| (Douglas, Lennon and Scott, 2017) | An integrated green space FW- health & wellbeing | 1) Maximise streetscape greenness and green space provision  2) Engage all users in planning  3) Provide differing: lengths of paths, environment and varying degrees of challenge  4) Institutionalise good maintenance and renovation regimes | **Literature review** |
| (Charras, et al., 2018) | Conceptual FW for landscape design intended for frail elderly | 1) Attract curiosity of users and secure the environment  2) Allow for social uses: occupancy opportunities of spaces  3) Evaluate way spaces invites curiosity of users  4) Provide functional and ergonomic characteristics of setting  5) Facilitate orientation by identification and structuring of landscapes  6) Insure maintenance of uses of gardens by integrating the evolution and growth of natural elements that compose them | **Literature review** *(7 Articles*  *Secondary data: Quantitative & Qualitative)* |
| (Jennings and Bamkole, 2019) | Social cohesion & urban green space conceptual FW | 1) Locate presence and/or access to urban green spaces  2) Identify social determinants of health: social cohesion/ social capital  3) Evaluate potential outcomes  4) Analyse physiological and behavioural responses  5) Note benefits to physical and psychological health | **Literature review** |

**Table 1, Framework comparisons.**

**1) Themes covered by the framework**

The frameworks have all suggested the benefits of nature in public spaces to human health: whether physically or psychologically and either within the full framework or as part of the frameworks scope. They highlight the multi-beneficial aspects of nature towards human living, from social cohesion (Jennings and Bamkole 2018) and the feeling of belonging or ownership, to the chemical benefits that are implied to the environment (Chiabai et al. 2018) for cleaner air and therefore health. Some frameworks where specifically designed with a set of people at its centre, for example for the benefit of children (Giusti, et al., 2018), or the elderly (Charras et al. 2018).

**2) Clarity of framework for design purposes**

When considering the steps required in enforcing the framework, there are obvious variations in the number and clarity of steps needed to follow the framework. In terms of readability and ease of following the pathways given by the framework, those frameworks posing more steps, tend to provide a clearer guide for assessment of design and planning of nature-based public spaces. Raymond, et al., (2017) and Chiabai, et al., (2018) are examples of frameworks that identify precise stages needed to achieve the necessary results from nature-based design as well as classifying a necessary stage of monitoring and adaptation throughout the design process relevant for a sustainable design.

**3) Source of information for development of framework**

The source of information used to produce the framework show that 11 frameworks out of the possible 14, favoured the use of academic studies as secondary supply, with limited interactions with human participants, for the creation of the framework. However, Swierad and Huang, (2018), and, Dezio and Marino (2018) both provide frameworks from primary analysis of community preference, and Currie (2017) made use of both academic documentation and community interviews.

**4) Tests for the validity of the framework**

The testing of the framework by others showed that Raymond et al. (2017) have been used by academics such as Frantzeskaki (Frantzeskaki, 2019). Frantzeskaki used the framework to produce seven lessons for nature based planning which combines the case studies of fifteen European nature-based solution spaces. Other frameworks were internally tested by the author through case studies to verify its effect on public space design (Charras et al. 2018).

**DISCUSSION**

For nature-based public space frameworks to provide an efficient guide for the design, incorporating the diverse benefits nature based solutions offer, it is evident a broad theme must be covered so as the physical and physiological profits may be realised. Clear and precise steps that link the designer or planner to the tangible requirements of community needs are also vital for an effective protocol. A majority of the frameworks express the necessity for regular maintenance within the lifespan of nature-based public spaces to ensure sustainability of design purpose.

Considering the validity of current frameworks to provide considerations towards tangible user requirements in public space developments, those that used a community centred source of primary investigation also consequently provided a framework for the active participation of users within public spaces. Dezio and Marino (2018) further provide a step for the improvement of community engagement as a final stage in their Human Centred Framework. The high proportion of literature reviews for framework sources, provide evidence of underrepresented community input within public space planning.

Very few frameworks had been tested for their validity of use, yet in the situations where these tests had taken place, it was necessary to use case studies to validate and draw conclusions; these points to the need of actualised representations to enable clear validity. The physical adaptations of the framework could be internally represented by community involvement at the initial stages of development. The need for actualised testing of frameworks using case studies shows that the use of only literature review is limiting, and therefore a bottom-up approach would prove more efficient. Hollander, Foster-Karim and Wiley (Hollander, Foster-Karim and Wiley, 2018) identify the need of literature review to draw general understanding when looking at public spaces and urban inclusivity, yet for in-depth analysis, there is need for addressing community reactions.

**Lessons to be learnt**

Care needs to be taken in order to represent the whole community so as to accomplish a democratic and well-informed basis of design research. Ball (2004) explores the negative views associated with community-driven regeneration and expressed the concern of non-representative data; where middle class, elderly and Caucasian people, are far greatly represented. Individuals with dominant personalities and/or unrealistic aims also contribute to un-representative data. Other negative experiences researched are that community-driven processes are: time consuming, over democratic, and hindered by a lack of trust between community and authority. These concerns reflect the need to collect community insight in an inclusive and broad way; this could be by active outreach involvement.

Van den Bosch and Ode Sang (2017) supplied a review on literature focused on the health benefits that could be provided to the public by nature-based solutions. Their analysis showed there is limited research into the psychological effects exposure to nature based solutions has compared to physical effects. Acquiring evidence on nature’s effects can be difficult as other factors must be eliminated to ensure nature is the stimulus of human health, as well as the length of time needed to ensure significant results are achieved. The extent of psychological benefits of nature on the community’s daily wellbeing need further investigation.

**CONCLUSION**

The literature review of nature based solutions express significant findings on the diversity of benefits associated with the use of nature within urban environments. Nature shows great potential in enhancing environmental, economical and human progress, allowing sustainable development. The reviews on human enhancements have however been dominated by the physical benefits of nature, rather than psychological health and wellbeing. The research results shows literature on nature based design frameworks is skewed towards theoretical and professional influence, disregarding community involvement. For the research on nature based solutions benefits to be realised in practice, design frameworks for public spaces must open dialogues with communities, unlocking the psychological profits that could be available. This paper brings to light some themes covered by current design frameworks, such as design tailored for specific vulnerable groups. Out of the 14 frameworks analysed, only Raymond, et al. (2017), Artmann and Sartison (2018), Chiabai, et al. (2018), and Mukherjee and Takara (2018), did not primarily focus on direct human benefits. Nevertheless this paper notes, that though 10/14 framework themes identified humans as key beneficiaries to nature-based public spaces, only 3/14 frameworks actively incorporated communities in their process of framework production.

**The next step**

The progressing PhD research consequently focuses on the direct benefits nature provides to human daily wellbeing, not by replicating the research of its potential benefits, but by considering how design of nature-based public spaces could be used to increase the experience of humans within this environment. The PhD research focuses of primary qualitative data collection to place the community at the focal point of design and suggestive changes. This will look at how increased immersion of vulnerable people within neighbouring neglected nature-based public spaces could be improved. The contribution to knowledge in the field of the built environment is therefore the production of a new nature-based public spaces framework for redeveloping neglected sites in urban areas. In addressing community needs and therefore encouraging social cohesion the project will aim to: gain an understanding of current and future needs of local communities in nature-based public space design, and implement unobtrusive strategies to improve usability and safety of all users.

**Limitations**

The limitations of this research paper, is the reduced timeframe in which potential frameworks were collected and analysed, between 2017 and 2019. Analysis of frameworks from a wider range of time, is beneficial to correlated clear proportions between professional preference on the use of literature review to community interaction.

**References**

Artmann, M. and Sartison, K., 2018. The Role of Urban Agriculture as a Nature-Based Solution: A Review for Developing a Systemic Assessment Framework. *Sustainability,* [e-journal]. http://dx.doi.org/10.3390/su10061937.

Asian Development Bank, 2016. *Nature-Based Solutions for Building Resilience in Towns and Cities: Case Studies from the Greater Mekong Region.* Manila: Asian Development Bank Institute.

Ball, M., 2004. Co‐operation with the community in property‐led urban regeneration. *Journal of Property Research,* [e-journal] 21 (2), pp.119-142.

Bélanger, H., Cameron, S. and de la Mora, C., 2012. Revitalization of Public Spaces in a Working Class Neighborhood: Appropriation identity and urban imaginary. In: H. Casakin and F. Bernardo, eds. 2012. *The Role of Place Identity in the Perception, Understanding, and Design of Built Environments.* United Arab Emirates: Bentham Science. Chapter: 4. pp.47-62.

Boeri, A., Gaspari, J., Gianfrate, V. and Longo, D., 2017. Accelerating urban transition: An approach to greening the built environment. *WIT Transactions on Ecology and the Environment,* 223, pp.3-14.

Bradshaw, A.D. and Chadwick, M.J., 1980. *The restoration of land: the ecology and reclamation of derelict and degraded land.* Berkley and Los Angeles: Univ of California Press.

Brooke, M., 2019. *Limehouse Triangle green space lost by Tower Hamlets Council vote for building scheme next to Regent's Canal.* [on-line] Available at: <<https://www.eastlondonadvertiser.co.uk/news/politics/limehouse-triangle-lost-by-council-vote-for-tower-block-1-5972204>> [Accessed: April 6, 2019].

Buckley, R.C. and Brough, P., 2017. Economic Value of Parks via Human Mental Health: An Analytical Framework. *Frontiers in Ecology and Evolution,* [e-journal] 5 (16), pp.1-9.

Byass, R., 2010. From public garden to corporate plaza: Piccadilly Gardens and the new civic landscape. *Journal of Landscape Architecture,* 5 (1), pp.72-83.

Charras, K., Bébin, C., Laulier, V., Mabire, J. and Aquino, J., 2018. Designing dementia-friendly gardens: A workshop for landscape architects: Innovative Practice. *Dementia (London, England),* [e-journal], pp.1-9.

Chiabai, A., Quiroga, S., Martinez-Juarez, P., Higgins, S. and Taylor, T., 2018. The nexus between climate change, ecosystem services and human health: Towards a conceptual framework. *Science of the Total Environment,* 635, pp.1191-1204.

Cilliers, E.J. and Timmermans, W., 2014. The importance of creative participatory planning in the public place-making process. *Environment and Planning B: Planning and Design,* 41 (3), pp.413-429.

Cilliers, E.J. and Nicolene, D.E., eds. 2016. *49th ISOCARP Congress* Brisbane, October 2014, The Netherlands: ISOCARP.

Currie, M.A., 2017. A design framework for small parks in ultra-urban, metropolitan, suburban and small town settings. *Journal of Urban Design,* 22 (1), pp.76-95.

Dezio, C. and Marino, D., 2018. Towards an Impact Evaluation Framework to Measure Urban Resilience in Food Practices. *Sustainability,* [e-journal]. http://dx.doi.org/10.3390/su10062042.

Douglas, O., Lennon, M. and Scott, M., 2017. Green space benefits for health and well-being: A life-course approach for urban planning, design and management. *Cities,* 66, pp.53-62.

ECDG, 2015. *Towards an EU research and innovate policy agenda for nature-based solutions and re-naturing cities.* Luxembourg: European Commission.

Ekkel, E.D. and de Vries, S., 2017. Nearby green space and human health: Evaluating accessibility metrics. *Landscape and Urban Planning,* 157, pp.214-220.

European Commission, 2017. *H2020-SCC-NBS-2stage-2016.* [on-line] Available at: <[https://cordis.europa.eu/projects/result\_en?q=(relatedProgramme/programme/code%3D%27SCC-02-2016-2017\*%27%20OR%20relatedSubProgramme/programme/code%3D%27SCC-02-2016-2017\*%27)%20AND%20contenttype%3D%27project%27](https://cordis.europa.eu/projects/result_en?q=(relatedProgramme/programme/code%3D%27SCC-02-2016-2017*%27%20OR%20relatedSubProgramme/programme/code%3D%27SCC-02-2016-2017*%27)%20AND%20contenttype%3D%27project%27)> [Accessed: 11 February 2019].

Floridi, L., 2015. *The Online Manifesto: Being Human in a Hyperconnected Era.* Cham Heidelberg New York Dordrecht London: Springer.

Frantzeskaki, N., 2019. Seven lessons for planning nature-based solutions in cities. *Environmental Science & Policy,* 93, pp.101-111.

Giusti, M., Svane, U., Raymond, C.M. and Beery, T.H., 2018. A framework to assess where and how children connect to nature. *Frontiers in psychology,* [e-journal] 8. http://dx.doi.org/10.3389/fpsyg.2017.02283.

Golden, S.M., 2014. Occupied By Design: Evaluating Performative Tactics For More Sustainable Shared City Space In Private-led Regeneration Projects. *WIT Transactions on Ecology and the Environment,* 191, pp.441-452.

Grimski, D. and Ferber, U., 2001. Urban Brownfields in Europe. *Land Contamination and Reclamation,* 9 (1), pp.143-148.

Holland, C., Clark, A., Katz, J. and Peace, S., 2007. *social interaction with urban spaces.* Bristol: The Policy Press.

Hollander, J.B., Foster-Karim, C. and Wiley, A., 2018. Urban inclusivity through a service design framework. *Journal of Place Management and Development,* 12 (1), pp.71-87.

IUCN, 2019. *Nature-based Solutions.* Switzerland: Commision on Ecosystem Management.

Ivanova, E., 2016. Public Gardening and the Challenges of Neighbourhood Regeneration in Moscow. *Critical Housing Analysis,* 3 (2), pp.26-32.

Jennings, V. and Bamkole, O., 2019. The Relationship between Social Cohesion and Urban Green Space: An Avenue for Health Promotion. *International journal of environmental research and public health,* [e-journal] 16 (3), p.452.

Julier, G., 2005. Urban designscapes and the production of aesthetic consent. *Urban Studies,* 42 (5-6), pp.869-887.

Kabisch, N., Korn, H., Stadler, J. and Bonn, A., 2017. *Nature-Based Solutions to Climate Change Adaptation in Urban Areas: Linkages between Science, Policy and Practice.* Cham: Springer.

Kim, G., 2016. The public value of urban vacant land: Social responses and ecological value. *Sustainability,* [e-journal] 8 (5). Available through: google <<https://www.mdpi.com/2071-1050/8/5/486>>.

Kim, S. and Kwon, H., 2018. Urban Sustainability through Public Architecture. *Sustainability,* [e-journal] 10 (4). Available through: google <<https://www.mdpi.com/2071-1050/10/4/1249/pdf>>.

Lans, W., Mulder, A. and van Rij, A., 2007. Open space and social contact. *International Journal for Housing Science and Its Applications,* 31 (1), pp.13-24.

Lennon, M., Douglas, O. and Scott, M., 2017. Urban green space for health and well-being: developing an ‘affordances’ framework for planning and design. *Journal of Urban Design,* [e-journal] 22 (6), pp.778-795.

Levy-Storms, L., Chen, L. and Loukaitou-Sideris, A., 2018. Older adults’ needs and preferences for open space and physical activity in and near parks: a systematic review. *Journal of Aging and Physical Activity,* 26 (4), pp.682-696.

Lumber, R., Richardson, M. and Sheffield, D., 2017. Beyond knowing nature: Contact, emotion, compassion, meaning, and beauty are pathways to nature connection. *PloS one,* 12 (5), pp.1-24.

Malone, K., 2002. Street life: youth, culture and competing uses of public space. *Environment and Urbanization,* 14 (2), pp.157-168.

Mehrabian, A., 2017. *Nonverbal communication.* New York: Routledge.

Mihaylov, N. and Perkins, D.D., 2014. Community place attachment and its role in social capital development. In: L.C. Manzo and P. Devine-Wright, eds. 2014. *Place attachment: Advances in theory, methods and applications.* London and New York: Routledge New York, NY. Chapter: 5. pp.61-74.

Mukherjee, M. and Takara, K., 2018. Urban green space as a countermeasure to increasing urban risk and the UGS-3CC resilience framework. *International Journal of Disaster Risk Reduction,* 28, pp.854-861.

Nesbitt, L., Meitner, M.J., Sheppard, S.R. and Girling, C., 2018. The dimensions of urban green equity: A framework for analysis. *Urban Forestry & Urban Greening,* 34, pp.240-248.

Otsuka, N. and Reeve, A., 2007. The contribution and potential of town centre management for regeneration: Shifting its focus from'management'to'regeneration'. *Town Planning Review,* 78 (2), pp.225-250.

Pani, B., 2016. Improving the lives of people with dementia through urban design. *Journal of Urban Design and Mental Health,* [e-journal] 1. Available through: <<https://www.ccities.org/improving-the-lives-of-people-with-dementia-through-urban-design/>>.

Phillips, J., Walford, N., Hockey, A., Foreman, N. and Lewis, M., 2013. Older people and outdoor environments: Pedestrian anxieties and barriers in the use of familiar and unfamiliar spaces. *Geoforum,* 47, pp.113-124.

Radoslav, R., Găman, M.S., Morar, T., Bădescu, S. and Branea, A. eds., Ghena, C., 2012. *Sustainable Urban Development Through the Empowering of Local Communities.* Croatia:InTech.

Ravetz, A., 1980. *Remaking Cities (Routledge Revivals).* 1st ed. London: Routledge Ltd.

Raymond, C.M., Frantzeskaki, N., Kabisch, N., Berry, P., Breil, M., Nita, M.R., Geneletti, D. and Calfapietra, C., 2017. A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas. *Environmental Science and Policy,* 77, pp.15-24.

Rosol, M., 2010. Public participation in post-Fordist urban green space governance: The case of community gardens in Berlin. *International Journal of Urban and Regional Research,* 34 (3), pp.548-563.

Rupert Nabarro and Gerald Smart, 1978. High Cost and Low Value in Urban Land. *Built Environment,* [e-journal] 4 (3), pp.229-236.

Russo, A. and Cirella, G., 2018. Modern compact cities: how much greenery do we need? *International journal of environmental research and public health,* [e-journal] 15 (10). Available through: google <<https://www.ncbi.nlm.nih.gov/pubmed/30301177>>.

Russo, A., Ignatieva, M., Cirella, G., Marchesini, L., Krestov, P., Korzhov, E., Kalita, V., Pavlovsky, V. and Escobedo, F., 2017. Biophilia: Nature-based solutions for sustainable cities.

Salone, C., Baraldi, S.B. and Pazzola, G., 2017. Cultural production in peripheral urban spaces: lessons from Barriera, Turin (Italy). *European Planning Studies,* 25 (12), pp.2117-2137.

Sharp, J., 2007. The life and death of five spaces: public art and community regeneration in Glasgow. *cultural geographies,* 14 (2), pp.274-292.

Sonneveld, B., Merbis, M.D., Alfarra, A., Unver, O. and Arnal, M.F., 2018. *Nature-Based Solutions for agricultural water management and food security 12 Nature-Based Solutions for agricultural water management and food security FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS Rome, 2018.*Unpublished.

Stratigea, A., Kikidou, M., Patelida, M. and Somarakis, G., 2017. Engaging Citizens in Planning Open Public Space Regeneration: Pedio Agora Framework. *Journal of Urban Planning and Development.*

Swierad, E.M. and Huang, T.T.K., 2018. An Exploration of Psychosocial Pathways of Parks' Effects on Health: A Qualitative Study. *International journal of environmental research and public health,* [e-journal] 15 (8). http://dx.doi.org/10.3390/ijerph15081693.

UNFCCC, 2018. *The Paris Agreement.* Germany: United Nations Climate Change.

van den Bosch, M. and Ode Sang, Å., 2017. Urban natural environments as nature-based solutions for improved public health – A systematic review of reviews. *Environmental Research,* 158, pp.373-384.

Walsh, D. and Downe, S., 2005. Meta-synthesis method for qualitative research: a literature review. *Journal of Advanced Nursing,* 50 (2), pp. 204-211.

Wolch, J.R., Byrne, J. and Newell, J.P., 2014. Urban green space, public health, and environmental justice: The challenge of making cities ‘just green enough’. *Landscape and Urban Planning,* 125, pp.234-244.