THE POTENTIAL FOR MALTA'S URBAN OPEN SPACES TO ACT AS GREEN INFRASTRUCTURE: CONSIDERATIONS FOR PLANNING AND GOVERNANCE

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INTRODUCTION

Urban concentrations of population, if not appropriately managed, result in a number of problems.[1] Challenges engendered by the need to address trends such as: increasing mobility while decreasing dependence on private vehicles; reducing sprawl and land take up; improving micro-climates and the increasing need for effective water management in urban areas are all topics relating to the development and management of the urban environment. Such issues have a direct impact on the quality and sustainability of urban environments.[2] Although numerous nations and cities have embraced the concept of sustainable urbanization, we have yet "to successfully design and plan cities that will accommodate our economic and demographic needs while uplifting and elevating us, and…the planet and its natural systems".[3]

This paper discusses some of the research outcomes when exploring the potential for Malta's urban open spaces to act as green infrastructure, as a means to addressing urban challenges and contribute to sustainable development. In particular, it presents some of the key planning and governance considerations in doing this.

Sustainable Development and the Role Played by Urban Open Spaces

The planning and design of urban open spaces is one area within the dimensions of urban form. Various authors [4][5][6][7] clearly establish the importance of open spaces in improving the sustainability and quality of the built environment. Open spaces have a direct influence on how local people and visitors perceive urban areas and how well social life functions. They also influence economic prosperity through increase in real estate value, increasing attractiveness and hence competitiveness of cities. Their environmental importance is underlined by their potential to mitigate adverse effects of climate change. [8] In fact, if urban open spaces function as green infrastructure they are "capable of addressing a broad range of urban challenges such as conserving biodiversity, adapting to climate change, supporting the green economy and improving social cohesion. To capture this potential, local governments need to plan carefully and holistically". [9]

Urban Open Spaces in Malta

In Malta, both the National Environmental Policy (NEP)[10] and the Strategic Plan for Environment and Development (SPED)[11] identify the need to move towards sustainable development. The SPED

comments on the importance of open spaces when increasing densities and states that the increase in densities has "had a number of negative effects manifested to different degrees in certain localities with impacts on the quality of streetscapes and public open spaces…increased traffic flows and on residential amenity and the general upkeep of the environment".[11] Additionally, the low provision of urban green spaces does not encourage healthy lifestyles. Factors such as congestion, pedestrian safety, air and noise pollution, have reduced the amenity and quality of life. This has led to the gradual erosion of the degree of social integration within communities. [11]
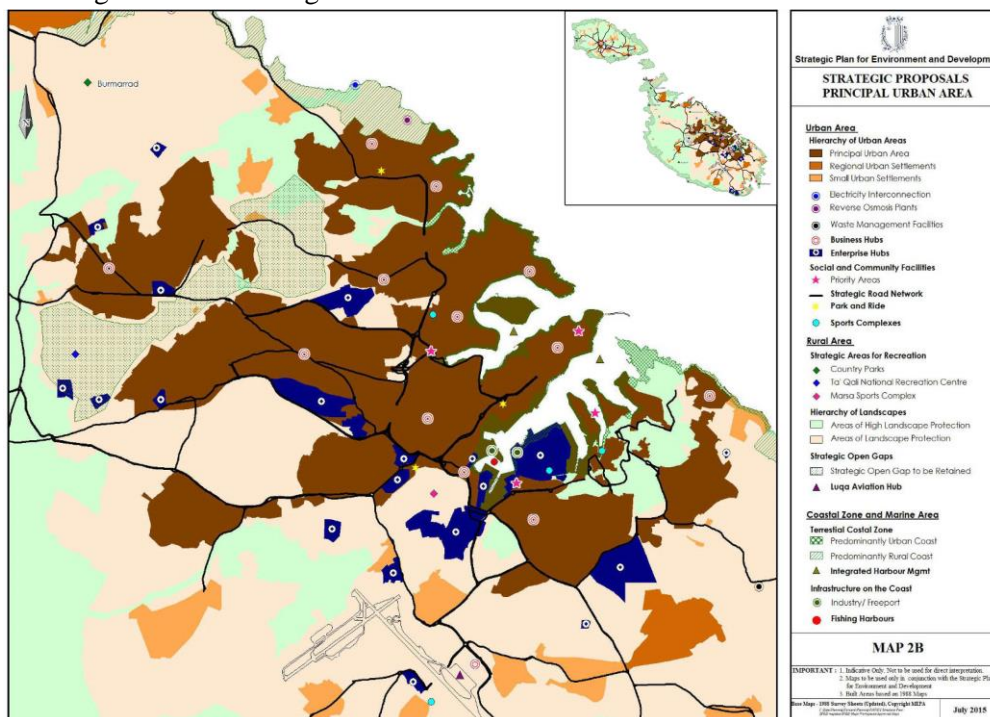

Figure 1: Malta's principal urban area as outlined in the SPED [11]

A review of existing policy (spatial planning and others) and other publications, identified the poor quality of open spaces in Malta [10][11][12][13] in relation to the sustainability agenda. This led to the research problem suggesting that: a 'gap' exists in relation to the planning and design of urban open spaces. As a result, the research aimed to investigate the planning and design of urban open spaces in Malta and use the outcomes to develop proposals for improving their contribution to sustainable development. The specific objectives were to:

- understand existing urban open space policies and identify gaps
- identify design principles/themes relevant and specific to the design of urban open spaces in Malta and their potential to contribute to sustainable development
- develop proposals for an urban open space policy / planning framework in Malta including understanding the process for its development
- identify barriers/implications for its implementation

Methodology Overview

A mixed method approach using Malta's urban conurbation as a case study is adopted.[14] The methodology is developed in two phases. The first phase gathers a substantial amount of data with the aim of developing proposals. Depending on the objectives, different data collection techniques are used. These are outlined in Figure 2. The five data collection techniques used for phase one are:

physical surveys of existing open spaces; in depth qualitative review of three case study open space projects; interviews with local councils; an online survey with users; and a review of existing strategies and policies. The second phase develops proposals in response to the first set of results and explores potential barriers to implementation using focus groups.

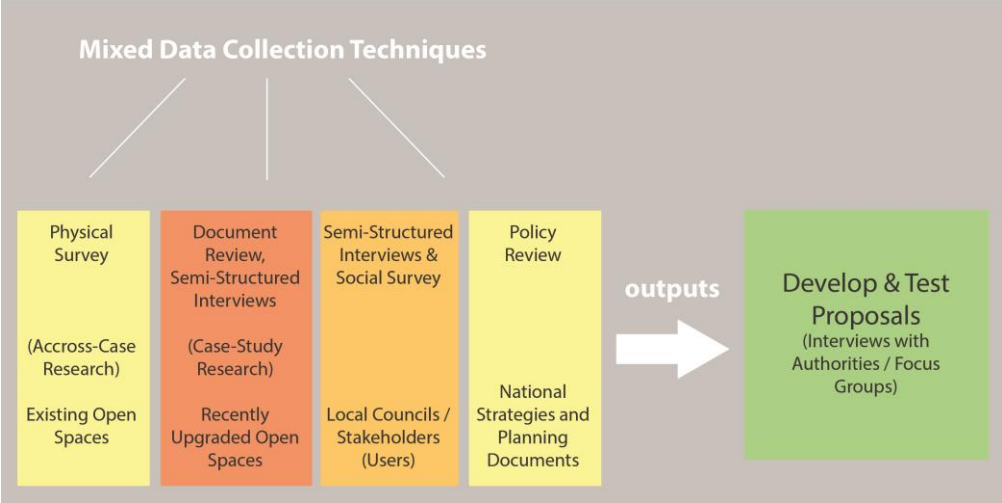A Single City Case Study - The Case of Malta

Mixed Data Collection Techniques

Physical Survey	Document Review, Semi-Structured Interviews	Semi-Structured Interviews & Social Survey	Policy Review		Develop & Test Proposals
(Accross-Case Research)	(Case-Study Research)			outputs	(Interviews with Authorities / Focus Groups)
Existing Open Spaces	Recently Upgraded Open Spaces	Local Councils / Stakeholders (Users)	National Strategies and Planning Documents		

Figure 2: The methodology adopting a two phased ´mixed method´ approach

Theoretical Underpinning

This research deals with the operationalization of ´Sustainability´ in the context of designing and planning urban open spaces. The framework adopted is based on, the Brundtland report´s[15] three dimensions of sustainable development that should be considered in an integrated way: society, environment and economy. There are various discussions defining how urban open spaces should be designed. [16 17 18 19 20 21] Some of these focus in particular on the design of urban open space in relation to achieving sustainable development. [22 23 24] Through such literature, a number of design principles were identified through which urban open spaces can add social, environmental and economic value and hence contribute towards sustainable development. They have been grouped into twelve main categories as listed in Figure 3 and this framework informed the data gathering for phase one.

The results revealed that urban open spaces in Malta are lacking in their potential contribution to sustainable development. Moreover, the evidence base identified the design principles which should be targeted in the Maltese context. [25]

Design Categories	Sub-categories
Spatial & Structuring Qualities	open space as structuring element, connectivity
Contextual Relationships	physical, functional, socio-cultural
Character & Form	typology, visual interest, spatial proportion & enclosure, responding to site & identity
Activities & Functionality	recreational facilities & functionality, user preferences, diversity, multi-functionality & flexibility, supplementary equipment
Accessibility	vicinity & availability, legibility, movement
Climatic Response	responding to seasonality, micro-climatic comfort
Water Management & Use	surface water drainage, ground coverage & storage areas, use of water
Use of Vegetation	presence, location, form & type
Lighting	energy efficiency
Resources Management	locally sourced & recyclability, durability
Maintenance & Management	operations, roles & responsibilities
Community Involvement	voluntary schemes, participation during the design & planning process

Figure 3: Design categories as extracted through the literature review

PLANNING AND GOVERNANCE: CHALLENGES AND PROPOSALS

In exploring the potential of urban open spaces to tackle urban challenges and contribute to sustainable development the green surge project has proposed the urban green infrastructure planning approach. This is a "strategic planning approach that aims to develop networks of green and blue spaces in urban areas, designed and managed to deliver a wide range of ecosystem services and other benefits at all spatial scales."[9] A review of such green infrastructure literature [26][27][28][29][30][31] provided a framework for consolidating the results. As a result, the need to explore the potential for Malta's urban open spaces to act as green infrastructure was identified.[14] In adopting such an approach, the planning process and governance context is also crucial. The underlying principles need to be understood as part of a holistic approach adapted to suit the local context, meaning the planning system, social, economic and environmental conditions, as well as the available actors.[9]

When analyzing the case study and local council interview data, an open more inductive approach was maintained, such that any additional issues not directly related to the design principles, but also the process, may be identified. It emerged that the planning process and urban open space policy together with governance aspects are also contributing to the existing state of urban open spaces. These results are an important contribution in informing the adoption of a green infrastructure approach.

What are some of the Planning and Governance Challenges Identified?

When adopting a green infrastructure approach the literature advocates the need for strategic, integrated and proactive planning across multiple scale.[9][27][29][30] Additionally, stakeholder, interdisciplinary and inter-sectorial co-operation is crucial.[9][27][30] Finally, as is the case with other

infrastructure systems, the organizational systems, structures and operational aspects need to be in place. The role and function of the entities which regulate, build, operate and maintain green infrastructure must be defined. [30] Keeping this in mind, the planning and governance challenges identified, as illustrated in Figure 4, meant that further research was required in relation to the planning and governance of green infrastructure to try and identify what mechanisms could be used / would be more suitable to move towards a green infrastructure approach for Malta's urban open spaces.

Figure 4: Some of the key planning and governance challenges

Developing Potential Proposals

Extensive best practice literature was consulted focusing on the areas which required attention in the Maltese context. This informed the development of a set of proposals related to planning and governance aspects. The aim was to develop a policy framework for urban open spaces in Malta with a view to their potential to act as green infrastructure, but also to understand the process for its development. These initial proposals are illustrated in Figure 5 and Figure 6.
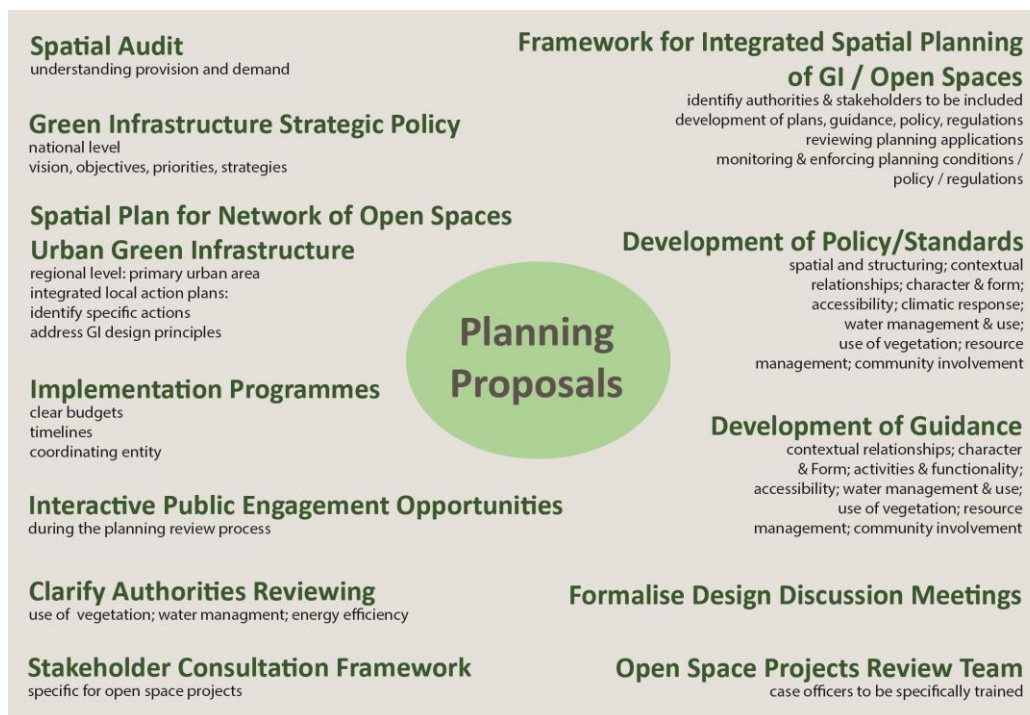
Figure 5: Planning proposals

Figure 6: Governance proposals

DISCUSSION: EMERGING CONSIDERATIONS AND IMPLICATIONS

Developing such a policy framework is however not simply about applying international best practice. A context specific approach needs to be developed.[9] While the proposals already respond to the context as they have been developed in reaction to the results from the first set of data analysis, further

refinement was deemed necessary. The proposals were therefore subjected to focus group discussions made up of participants from authorities, non-governmental organisations and academia. The specific aim here was to identify barriers and implications to implementing the proposals and use this to further refine the framework. While the refinement of the proposals is still ongoing, this paper discusses some of the key considerations and implications which emerged through the focus group discussions. These are summarised below. Parallels can be noted with emerging literature[9 26 27 30 31] and reinforces some of the approaches being advocated. Others suggest that adopting best practice from other countries/cities would not be that straightforward.

A New Type of Public Infrastructure: Image, Branding and Creating Social Demand

Such an approach should emphasize that this is a new type of public infrastructure where the benefits are not just environmental but also social and economic. In this sense the image, branding and awareness building of the importance of this type of infrastructure is crucial. It needs to be recognized as such and there is the need to create social demand for it. There needs to be constant communication. Additionally, its multifunctional nature requires a new approach where interdisciplinary, integrated and collaborative and collective working is adopted.

A Strategic Integrated Planning Approach

The approach needs to be part of a wider long-term strategy which is committed to at cabinet (central government) level. Recognizing that this is a new type of multi-functional infrastructure, made up of different components, means, that this concerns multiple ministries. There needs to be coordination between ministries, authorities and departments. Policy making from various sectors and at various levels needs to tie in and contribute so as to move away from a silo thinking sectorial approach. Green infrastructure needs to form an integral part of the planning system, meaning that the inclusion of green infrastructure and its maintenance would also form part of the permitting process.

A Regional Approach

While bottom-up initiatives are important for green infrastructure initiatives, the planning and governance of particular aspects also require a regional approach. This emerged clearly during the first phase of data gathering but also through the focus group discussions. Malta's particular scale means that locality sizes are quite small, and the local council set up lack resources and expertise. The importance of connectivity means that the planning of such infrastructure needs to happen regionally and the role of various spaces as part of a wider network / system needs to be determined. It could also be more efficient to coordinate certain aspects such as the provision of expertise; monitoring and maintenance (to some extent); or funding and implementation programs at a more regional level while still retaining strong local input and facilitating bottom-up initiatives.

An Implementation Driven Approach

There is the need to develop mechanisms which ensure the implementation of plans and policies. While spatial planning systems play an important role, this needs to translate into enforceable legislation and mandatory requirements and standards thus adopting an implementation driven approach. Visions, strategic objectives, guidelines and 'goodwill' are simply not sufficient in a context where popular demand and a cultural lethargy for activism are lacking.

Emphasis the Health Benefits

The availability of green infrastructure or even simply green open space is not common in Malta's urban conurbation. Socio-cultural tendencies have resulted in limited contact and appreciation for

nature and more often than not, the prioritization of other open space uses, such as development or the provision of vehicular movement and car parking. The presence of vegetation in urban areas is sometimes also seen as a nuisance (requires maintenance, creates dirt). Overcoming such tendencies requires a targeted approach. Focusing on the health benefits and the value for enhancing society's wellbeing and quality of life emerged as a potential strategy in this regard.

Capacity Building Strategy

The challenges and proposals identified the need for knowledge building in the form of training or building expertise through certification programs. Capacity building however moves beyond this. A strategy is required to target and build capacity within institutions with respect to having the human resources across the disciplines and different expertise and with the right skill sets to deliver. From planning to operational aspects, from central government to local bodies to the professional community, this needs to be addressed.

Ensuring Transparency and Building Trust

Traditionally, in the Maltese context, public engagement as part of the planning or design process has not been forthcoming. Potential apathy towards what happens in the public realm and prioritizing the public good was identified. There is therefore the need to foster a culture of trust. Youth groups could be particularly targeted as a strategy. In tandem, introducing transparency in the processes to be adopted is crucial. Which spaces are public? Is the public actively engaged? How will the state, private sector and civil society work together? Who gets what and where? Additionally, clear standards need to be set which are known and available for all.

Creating a Sense of Ownership

This ties in with the need to create social demand due to traditional socio-cultural tendencies. However, it goes beyond. It addresses the need to create a sense of love for such places, a sense of ownership amongst the community. Considering the provision of limited property rights could help address this. This sense of ownership is also important amongst the authorities. Fostering a common vision where project objectives are developed horizontally in parallel rather than top down and then sideways is crucial.

Monitoring and Enforcement

The need for maintenance to form an integral part of project planning and design emerged strongly. Moving beyond this however, was also the need for it to be part of any permitting or funding program. In order for this to be successful, constant motoring is crucial, not only in relation to maintenance, but also with respect to learning and re-informing planning and design decisions. Here the need of enforcement and control, in terms of legislation and policy implementation is crucial. What emerged strongly is not simply the existence of regulation but the importance of implementing and enforcing it. Close monitoring in relation to the management and control of such spaces is therefore crucial.

The Role of Political Commitment

While the research has shown that the political interest in the concept of green infrastructure seems to be increasing, the need for strong political will is crucial in adopting such an approach. The various focus groups revealed that discussions and research initiatives have been taking place over the last few years, between authorities and various stakeholders. However, decisions still have to be taken to move forward. The need for real political commitment to do this was considered essential as one of the drivers for change.

A Clear Mandate

Finally, in relation to the previous point, a clear mandate needs to be given. Due to the multi-functional nature, the mandate has to be given for the leadership and co-ordination of such an approach. This mandate also needs to include the identification of the collaborating actors and definition of the different remits, accountability and authority to take decisions. This is crucial for creating ownership. Recognizing, the multi-functional nature is an extremely important consideration in assigning a coordinating role so as to avoid adopting a sectorial approach. The mandate needs to be given both at a regulatory, policy and planning level as well as for the implementation, operational and maintenance side of things.

CONCLUSION

In conclusion, this research contributes to understanding the enablers and constraints relating to the planning, implementation, and management of green infrastructure. Insights relating to the Maltese conurbation allow for comparison with other contexts.

It is clear that a strategic, integrated and proactive planning approach is required as advocated in the literature.[9][26] This also needs to address multiple scales.[9][27][30] However, these particular scales need to be determined in relation to the context in question. While initiatives at the locality (local councils) level and bottom-up grass root initiatives are important, in Malta's case the scale of the conurbation is considered an important one for coordinating initiatives and promoting strategic integrated planning. This is essential in moving towards the concept of a system or network of green infrastructure and promoting multi-functionality. In this sense, one needs to address the "city" and "regional" scale almost interchangeably while establishing strong relationships with the national scale. This then needs to be translated to the "localities" which compares to the "district" or "neighbourhood" scale.

Finally, the socio-cultural context emerges as an extremely important consideration. Much of the governance models advocate the use of grassroots initiatives and transferring of responsibilities to civil society.[31] While, grass-root initiatives for green infrastructure do exist in Malta, there is still the need to generate a kind of "popular demand" where the majority of civil society really wants such open spaces. While it could be said that society does want such space, it is questionable whether it would prioritise this. Such socio-cultural trends also effect the real political commitment to prioritise urban open spaces for green infrastructure over other requirements such as car parking or development. A multi-faceted approach needs to be adopted, to overcome such challenges and create the necessary organisational structures and resources. This is essential if Malta is to move towards a planning and governance model which promotes transparency and trust and successfully integrates active citizen approaches.

AKNOWLEDGMENTS

NOTES

[1] Harry W Richardson, "Economies and Diseconomies of Agglomeration" In *Urban Agglomeration and Economic Growth,* edited by Herbert Giersch Berlin: Springer Verlag,1995

[2] Joao Pedro Costa, Joao Figueira de Sousa, Maria Matos Silva and Andre Santos Nouri, "Climate change adaptation and urbanism: a developing agenda for Lisbon within the twenty-first century" *Urban Design International* 19 (2014) 77–91, doi:10.1057/udi.2013.15.

[3] Tim Beatley, *Green Urbanism: Learning from European Cities.* Washington D.C.: Island Press, 2012, 1.

[4] D. Banister, S. Watson and C. Wood, "Sustainable cities: transport, energy, and urban form" *Environmnet and Planning B: Planning and Design* 24 (1997) 125-43

[5] Simon Bell, *Landscape Pattern, Perception and Process.* Oxon: Routledge, 2012

[6] Charles J. Fausold and Robert J. Lilieholm, "The economic value of open space" *Land Lines* 8 No 5 (1996)

[7] Steffen Lehmann, "Green urbanism: formulating a series of holistic principles" *SAPIENS* 3 No 2 (2010) Accessed 10th August 2016 https://sapiens.revues.org/1057

[8] Richard Stiles, *A Guideline For Making Space: Joint Strategy.* 2009, Accessed 25th June 2019 http://urbanspace.rec.org/files/JOINT_STRATEGY_makingSpace.pdf

[9] Rieke Hansen, Emily Rall, Eleanor Chapman, Werner Rolf, and Stephan Pauleit, *Urban Green Infrastructure Planning: A Guide for Practitioners.* GREEN SURGE, 2017 Accessed 22nd January 2018 http://greensurge.eu/working-packages/wp5/

[10] Government of Malta, *National Environment Policy.* Malta: Ministry for Tourism, the Environment and Culture, 2012

[11] Government of Malta, *Strategic Plan for Environment and Development.* Malta: Malta Environment and Planning Authority, 2015

[12] The Today Public Policy Institute, *Towards a Low Carbon Society.* Malta: The Today Public Policy Institute, 2008

[13] The Today Public Policy Institute, *The environmental dimension of Malta's ill-health and action to prevent obesity, diabetes, cardiovascular disease and dementia.* Malta: The Today Public Policy Institute, 2015

[14] Sarah Scheiber, "A Mixed Method Approach to develop proposals for Malta's Urban Open Spaces to act as Green Infrastructure" In *Qualitative Inquiry towards Sustainability. European Congress of Qualitative Inquiry Proceedings,* edited by Hannes, Karin & Falzon, Ruth & Benozzo, Angelo & Gemignani, Marco & Issari, Philia & Taylor, Carol & Wyatt, Jonathan, 2020. Accessed June 19th 2020 https://www.researchgate.net/publication/339999244_Qualitative_Inquiry_towards_Sustainability_European_Congress_of_Qualitative_Inquiry_Proceedings_2020#fullTextFileContent

[15] Gro Harlem Brundtland, *Our Common Future: Report for the World Commission on Environment and Development.* New York: Oxfrod University Press, 1987

[16] Jane Jacobs, *The Death and Life of Great American Cities.* United States: Random House, 1961

[17] William H. Whyte, *The Social Life of Small Urban Spaces.* Washington, DC:The Conservation Foundation, 1980

[18] Francis Tibbalds, *Making People-Friendly Towns: Improving the publc environment in towns and cities.* UK: Longman Group UK Ltd., 1992

[19] Stephen Carr, Mark Francis, Leanne G Rivlin and Andrew M Stone, *Public Space* Cambridge: Cambrdige University Press, 1992

[20] Clare Cooper Marcus and Carolyn Francis, *People Places: Design Guidelines for Urban Open Space* New Jersey: John Wiley & Sons Inc., 1998

[21] Jan Gehl, *Life Between Buildings: Using Public Space.* Washington: Island Press, 2011

[22] Gary Austin, *Green Infrastructure for Landscape Planning: Integrating human and natural systems.* Oxon: Routledge, 2014

[23] Douglas Farr, *Sustainable Urbanism: Urban Design with Nature.* New Jersey: John Wiley & Sons Inc., 2008

[24] Juan Noguera and Mar Riera, "Sustainable development and the practice of spatial planning: a proposal for measuring the overall sustainability of planning actions in open public urban spaces" *Regional Formation and Development Studies* 19 No 2 (2016), doi: http://dx.doi.org/10.15181/rfds.v19i2.1286

[25] Sarah Schieber, "Investigating the Contribution to Sustainable Development of Public Open Spaces in the Maltese Conurbation" Paper presented at the SBE19 Malta International Conference of Sustainability and Resilience, Malta, November 21-22, 2019.

[26] European Commission, *Environment: Ecosystem services and Green Infrastructure.* European Commission 2019 Accessed 15th March 2020 https://ec.europa.eu/environment/nature/ecosystems/index_en.htm

[27] Raffaele Lafortezza, Cline Davies, Giovanni Sanesi, Cecil C Konijnendijk, "Green Infrastructure as a tool to

support spatial planning in European urban regions" *iForest - Biogeosciences and Forestry* e1-e7, 2013 doi: 10.3832/ifor0723-006

[28] Clive Davies, R. MacFarlane, C. McGloin and Maggie Roe, *Green Infrastructure Planning Guide.* 2015 Doi: 10.13140/RG.2.1.1191.3688

[29] Attila Toth and Doris Damyanovic, *Planning and Implementation of Green Infrastructure in Austrian Cities.* Vienna: University of Natural Resources and Life Sciences, Vienna, 2019

[30] Paulina Schiappacasse and Bernhard Muller, "Planning Green Infrastructure as a Source of Urban and regional Resilience - Towards Institutional Challenges" *Urbani Izziv* 26 (2015)

[31] Bianca Ambrose-Oji, Arjen Buijs, Eva Gerohazi, Thomas Mattijssen, Luca Szaraz, Alexander Van der Jagt, Rieke Hansen, Emily Rall, Erik Andersson, Jakub Kronenberg and Werner Rolf, *Innovative Governance for Urban Green Infrastructure: A Guide for Practitioners.* GREENSURGE. 2017

BIBLIOGRAPHY

Ambrose-Oji, Bianca, Arjen Buijs, Eva Gerohazi, Thomas Mattijssen, Luca Szaraz, Alexander Van der Jagt, Rieke Hansen, Emily Rall, Erik Andersson, Jakub Kronenberg and Werner Rolf. *Innovative Governance for Urban Green Infrastructure: A Guide for Practitioners.* GREENSURGE. 2017.

Antikainen, J. "The concept of Functional Urban Area – Findings of the EPSON project 1.1.1." *Informationen zur Raumentwicklung* 7 (2005) 447-56.

Arvanitidis, P. "Guideline for the Maintenance of Urban Green Spaces." GREENKEYS, 2008, Accessed November 03, 2020. http://www.greenkeys.org/.

Austin, Gary. *Green Infrastructure for Landscape Planning: Integrating human and natural systems.* Oxon: Routledge, 2014.

Banister D, S. Watson and C. Wood. "Sustainable cities: transport, energy, and urban form" *Environmnet and Planning B: Planning and Design* 24 (1997) 125-43.

Baycan-Levent, Tuzin and Peter Nijkamp. "Development and Management of Green Spaces in European Cities: A Comparative Analysis." *Journal of Urban Planning and Development* 135 No1 (2009).

Beatley, Tim. *Green Urbanism: Learning from European Cities.* Washington D.C.: Island Press, 2012, 1.

Bell, Simon. *Landscape Pattern, Perception and Process.* Oxon: Routledge, 2012.

Benedict, Mark A. and Edward T. MacMahon, "Green Infrastructure: Smart Conservation for the 21st Century" *Renewable Resources Journal* 20 No3 (2002).

Brundtland, Gro Harlem. *Our Common Future: Report for the World Commission on Environment and Development.* New York: Oxfrod University Press, 1987.

Carr, Stephen, Mark Francis, Leanne G Rivlin and Andrew M Stone. *Public Space* Cambridge: Cambrdige University Press, 1992.

Chiesura, Anna. "The role of urban parks for the sustainable city" *Landscape and Urban Planning* 68 Issue 1 (2004)129-38.

Cooper Marcus, Clare and Carolyn Francis. *People Places: Design Guidelines for Urban Open Space* New Jersey: John Wiley & Sons Inc., 1998.

Costa, Joao Pedro, Joao Figueira de Sousa, Maria Matos Silva and Andre Santos Nouri. "Climate change adaptation and urbanism: a developing agenda for Lisbon within the twenty-first century" *Urban Design International* 19 (2014) 77–91, doi:10.1057/udi.2013.15.

Davies, Clive and Lafortezza, Raffaele. "Urban green infrastructure in Europe: Is greenspace planning and policy Compliant?" *Land Use Policy* (2017) 93-101.

Davies, Clive., R. MacFarlane, C. McGloin and Maggie Roe. *Green Infrastructure Planning Guide.* 2015 Doi: 10.13140/RG.2.1.1191.3688

European Commission. *Environment: Ecosystem services and Green Infrastructure.* European Commission 2019 Accessed 15th March 2020 https://ec.europa.eu/environment/nature/ecosystems/index_en.htm.

Farr, Douglas. *Sustainable Urbanism: Urban Design with Nature.* New Jersey: John Wiley & Sons Inc., 2008

Fausold, Charles J. and Robert J. Lilieholm. "The economic value of open space" *Land Lines* 8 No 5 (1996)

Forest Research. *Benefits of green infrastructure.* Farnham, UK: Forest Research, 2010.

Gehl, Jan. *Life Between Buildings: Using Public Space.* Washington: Island Press, 2011.

Government of Malta. *National Environment Policy.* Malta: Ministry for Tourism, the Environment and Culture,

2012.

Government of Malta. *Strategic Plan for Environment and Development.* Malta: Malta Environment and Planning Authority, 2015.

Hansen, Rieke, Emily Rall, Eleanor Chapman, Werner Rolf, and Stephan Pauleit. *Urban Green Infrastructure Planning: A Guide for Practitioners.* GREEN SURGE, 2017 Accessed 22nd January 2018 http://greensurge.eu/working-packages/wp5/.

Jacobs, Jane. *The Death and Life of Great American Cities.* United States: Random House, 1961.

Kabisch, Nadja and Haase, Dagmar. "Green spaces of European cities revisited for 1990-2006" *Landscape and Urban Planning* 110 (2013):113-22.

Lafortezza, Raffaele, Cline Davies, Giovanni Sanesi, Cecil C Konijnendijk. "Green Infrastructure as a tool to support spatial planning in European urban regions" *iForest - Biogeosciences and Forestry* e1-e7, 2013 doi: 10.3832/ifor0723-006.

Llewelyn-Davies. *Urban Design Compendium.* London: English Partnership. 2007.

Mattijssen, Thomas, Van der Jagt, Alexander, Buijs, Arjen, Elands, Birgit, Erlwein, Sabrina and Lafortezza, Raffaele. "The long-term prospects of citizens managing urban green space: From place making to place-keeping?" *Urban Forestry & Urban Greening* (2017) 78-84.

Noguera, Juan and Mar Riera. "Sustainable development and the practice of spatial planning: a proposal for measuring the overall sustainability of planning actions in open public urban spaces" *Regional Formation and Development Studies* 19 No 2 **(**2016), doi: http://dx.doi.org/10.15181/rfds.v19i2.1286.

PPS. "Projects for Public Spaces." Accessed November 11, 2020. https://www.pps.org/.

Richardson, Harry W. "Economies and Diseconomies of Agglomeration" In *Urban Agglomeration and Economic Growth,* edited by Herbert Giersch Berlin: Springer Verlag,1995.

Scheiber, Sarah. "Investigating the Contribution to Sustainable Development of Public Open Spaces in the Maltese Conurbation" Paper presented at the SBE19 Malta International Conference of Sustainability and Resilience, Malta, November 21-22, 2019.

Scheiber, Sarah. "A Mixed Method Approach to develop proposals for Malta's Urban Open Spaces to act as Green Infrastructure" In *Qualitative Inquiry towards Sustainability. European Congress of Qualitative Inquiry Proceedings,* edited by Hannes, Karin & Falzon, Ruth & Benozzo, Angelo & Gemignani, Marco & Issari, Philia & Taylor, Carol & Wyatt, Jonathan, 2020. Accessed June 19th 2020. https://www.researchgate.net/publication/339999244_Qualitative_Inquiry_towards_Sustainability_European_Congress_of_Qualitative_Inquiry_Proceedings_2020#fullTextFileContent.

Schiappacasse, Paulina and Bernhard Muller. "Planning Green Infrastructure as a Source of Urban and regional Resilience - Towards Institutional Challenges" *Urbani Izziv* 26 (2015).

Stiles, Richard. *A Guideline For Making Space: Joint Strategy.* 2009*,* Accessed 25th June 2019 http://urbanspace.rec.org/files/JOINT_STRATEGY_makingSpace.pdf.

The Today Public Policy. Institute *Towards a Low Carbon Society.* Malta: The Today Public Policy Institute, 2008

The Today Public Policy. Institute *The environmental dimension of Malta's ill-health and action to prevent obesity, diabetes, cardiovascular disease and dementia.* Malta: The Today Public Policy Institute, 2015.

Thompson, Catherine W. "Urban open space in the 21st century." *Landscape and Urban Planning* 60(2002): 59-72.

Toth, Attila and Doris Damyanovic. *Planning and Implementation of Green Infrastructure in Austrian Cities.* Vienna: University of Natural Resources and Life Sciences, Vienna, 2019.

Tibbalds, Francis. *Making People-Friendly Towns: Improving the publc environment in towns and cities.* UK: Longman Group UK Ltd., 1992.

Tuzin, Baycan-Levent, Eveline van Leeuwen, Caroline Rodenburg and Peter Nijkamp. "Development and Management of Green Spaces in European Cities: A Comparative Analysis." Accessed November 11, 2020, from vrije Universiteit Amsterdam: http://dspace.ubvu.vu.nl/bitstream/handle/1871/1661/20020025.pdf?sequence=1 2002.

Whyte, William H. *The Social Life of Small Urban Spaces.* Washington, DC:The Conservation Foundation, 1980.