



Knowledge transfer between stakeholders in the field of urban forestry and green infrastructure: Results of a European survey



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ABSTRACT

The establishment and management of green infrastructure in cities require the involvement of a complex network of stakeholder groups, who may differ sharply from one another in their expectations and approaches. Bridging the communication gaps between them is essential for creating and maintaining urban green spaces and expressing their full potential and multi-functionality. In this research, we investigate the ways that knowledge is transferred from one stakeholder group to another, and we identify the relative strengths and weaknesses of the different modes by which these actors collaborate and interact in practice. Data obtained from this first-ever exploratory survey of public administrators, practitioners and academic researchers involved with urban green infrastructure in Italy and other European – but also some extra-European – countries indicate that there are positive attitudes toward forms of collaboration, mainly because of the need to achieve common aims such as encouraging innovation, identifying practical problem solutions and accessing sources of funding. Our analysis suggests that stakeholders need to better understand the importance of forming cohesive teams, of optimizing financial resources, and of finding a common language to bridge their diverse disciplinary backgrounds. To be effective, future models of knowledge transfer will have to consider the current needs of end users without neglecting the long-term potential of emerging communication technologies such as e-learning, and vocational training must not only be based on high-quality content, it must also include practical activities and facilitate personal contact that can lead to enhanced collaboration.

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1. Introduction

Green spaces in urban and peri-urban areas provide a variety of environmental services and benefits to citizens (Nowak and Crane, 2002; Davies et al., 2011; Sanesi et al., 2011; Shashua-Bar et al., 2011; Susca et al., 2011; European Commission, 2013a; Haase et al., 2014; Petralli et al., 2014). They are also part of the city's "green infrastructure" (GI), a concept which has been elaborated in recent years under several definitions, including "... the spatial structure of natural and semi-natural areas enabling citizens to benefit from its multiple services..." (European Commission, 2010), and "a strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity..." (European Commission, 2013b).

Green infrastructure networks are discernible at different scales, and across urban, peri-urban and rural landscapes: they include Natura 2000 sites, multifunctional zones, and specifically urban elements such as green parks, green walls and green roofs. GI is considered to be supportive of ecological processes whilst simultaneously contributing to better human health and well-being (Lafortezza et al., 2013); in fact, an important common denominator of these diverse GI components is that they all contribute to the overall capacity of the urban region to host biodiversity and allow for ecosystems to function and deliver their essential services (European Commission, 2013b). Considering the challenges faced by urban communities in the planning and management of landscape amenities and controlling urban sprawl, the integrity of a green infrastructure network is considered vital for guaranteeing the maintenance of environmental benefits and services with respect to the needs of the local population (Maes et al., 2014).

While over the last decade there has been an upsurge of interest in urban green spaces, and even in the broader notion of urban green infrastructure, less attention has been paid to the gover-

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nance processes—i.e., the decisions of responsible organizations and the interactions between them—which are required for the establishment and maintenance of these public assets (Lawrence et al., 2013; Besse et al., 2014). Such scrutiny is essential if we are to address the widening gap between knowledge and policy in urban environmental governance, and the subsequent demand for more effective collaboration between scientists, practitioners and decision-makers.

The communication gap between academic research and the productive sectors is by now a ubiquitous and well-known phenomenon, which crosses disciplines and is rooted in our shared cultural assumptions (Folke et al., 2005). This gap has been attributed to limitations in the adaptive capacity of institutions (Smith et al., 2010), and bridging it is especially important for ensuring that researchers and industry work together to maximize the social and economic benefits of new ideas. While institutional change is undoubtedly still gradual, the European Commission has intervened to address this gap by providing operational guidelines (European Commission, 2007).

However, a recent analysis by Chapman (2013) showed that even the intensive engagement of stakeholders, which tends to catalyze relationships between scientists and other actors, does not guarantee success in terms of the actual knowledge acquired or the application of research in practice. The dynamics underlying the establishment, management and maintenance of GI can be especially complex, given the diversity of the stakeholders involved in the process. This web of actors may include administrators of green areas, landscape planners, arboriculturists, foresters, field workers, private citizens, environmentalists, volunteers, researchers and others – all of whom tend to have different points of view, goals, perspectives, skills, and means, which in many cases inhibit productive collaboration among them.

These different actors may be divided into different typological groupings, and in this research we identified three broad categories of stakeholders: 1) academicians, 2) public administrators and 3) practitioners. Thus on one side we have the academic world—generally considered to be a source of ideas and innovation, as well as a basic provider of graduates who are continually entering the work force and filling the needs of a constantly changing economy. On the other side, there are public administrators and practitioners (i.e., private professionals and associations), two groups who are, respectively, responsible for formulating and implementing policies based on the scientific results provided by academics.

However, the need for more and better science communication is continuously emphasized by organizations and programs that are dedicated to building stronger interfaces between science and society. Achieving this goal requires attention to the full range of boundary-spanning activities, such as public engagement, decision-relevant synthesis, distillation of results, and science translation and dissemination, through a variety of media to meet the needs of diverse audiences (Cash et al., 2003; Driscoll et al., 2011, 2012).

Moreover, it is clear that in order to be useful, scientific information must be salient, credible, and legitimate—and its production must relate to process, not just product (McNie, 2007). It is understood that building credibility, salience, and legitimacy with stakeholders helps to solidify long-term relationships and increases the influence of scientific research in the decision making process over time (Cash et al., 2003) – and in the sector of urban forestry, the demand for sound scientific information and public participation is particularly pronounced (Janse and Konijnendijk, 2007; Wolf and Dilley, 2008).

Historically, this gap between scientific knowledge and the public may be explained by the fact that science has been seen as an objective and value-free pursuit, which is entirely separate from

political processes in society (Chilvers and Evans, 2009). Increasingly, however, science and society are becoming more closely intertwined, and politicians have concurrently started paying more attention to the need to improve the transfer of knowledge between scientists and end-users, particularly in the field of forestry (UNESCO, 2004; COM, 2006). This interest has been documented in several scientific publications addressing the need to improve communication between scientists and policy-makers on environmental issues (Cortner, 2000; Mills and Clark, 2001; Shields et al., 2002; Guldin, 2003; Innes, 2003; Mayer and Rametsteiner, 2004; Spilsbury and Nasi, 2006). These studies have suggested that communication, preferably addressed to the public at large (including private landowners and politicians), should take the form of consultation and proactive participation and should be conducted by experts such as foresters and arboriculturists—even though they may currently be lacking in the necessary communication skills (Konijnendijk, 2000, 2004; Janse and Konijnendijk, 2007; Wolf and Dilley, 2008; Wolf and Kruger, 2010; Mincey et al., 2013).

Chilvers (2012) argued that one underexplored way of improving the dialogue between scientists and users of scientific knowledge is through the intervention of expert mediators, who are increasingly recognized as an important source of 'public participation expertise'. This study revealed the emerging role of alternative forms of dialogue—including participatory and informal public debate, and events that use art, performance, or new media to catalyze discussion between stakeholders. These experimental approaches are evolving into new and diverse "ecologies of participation" that are richer, more complex and more interconnected than in the past (Wilson, 2011).

If on one hand we realize the importance of collaboration between diverse professional actors, and on the other hand recognize the difficulties involved, how may we conceive of an environment that is indeed conducive for new collaborations? Part of the answer no doubt lies with public policy-makers, and it is noteworthy that existing policies in Europe (Faehnle et al., 2014) already encourage collaborative urban governance (Forester, 1993; Campbell, 2006).

An important role can be also played by professional organisations and associations at the national or international level (e.g., International Society of Arboriculture, European Arboriculture Council, European Council on Spatial Planners, International Federation of Parks and Recreation Administration, etc.), which support research and education, certification systems, and connections between professional stakeholders in their related sectors. In fact, associations like the International Society of Arboriculture recognize the high-quality skills and competences that may be achieved by professionals through the cultivation of fruitful relationships with clients and the pursuit of successful initiatives in community education (<http://www.isa-arbor.com/>). These efforts make it clear that bridging the existing gaps between different stakeholders is vital for improving collaboration, and in turn facilitating the effective transfer of knowledge, between them. In particular, this requires a fundamental re-examination of the *means* that are used in the dialogue between stakeholders (Janse, 2008).

These issues are at the core of the present research—which investigates, though an exploratory survey, the nature of knowledge transfer and the state of collaboration and interaction between public, academic and professional stakeholders in the sectors of urban GI and UF. Assessing the characteristics and the effectiveness of the current situation is undertaken with the goal of gleaning useful indications of future trends, and better understanding the role of training in scientific knowledge transfer.

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