Public Ideas and Local Policy in Urban Forestry: Reflections on a Program of Portable Science

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Abstract

The status of urban forestry is still at the “public idea” level in many communities, evolving to become policy in some municipalities. Planning for trees in the midst of high-density human settlements entails a complex mosaic of land use conditions, diverse stakeholders, and institutional practices. Many research outreach efforts address practical urban tree management practices. Policy-oriented technology transfer is also needed, as local decisionmakers may not be adequately informed of the benefits and functions of trees in cities. Policy outreach focuses on “why” rather than “how” concerning trees in cities. This paper features reflections-in-action about a policy-oriented technology transfer program. Key approaches are described such as (1) audience identification and access, (2) character and content of informational tools, (3) information dissemination practices, and (4) the role of “problem pioneers” and “champions.” These efforts would benefit from formal appraisal and assessment, helping to refocus the program and provide insights for other similar programs. Specific evaluations might include (1) development of performance guidelines for print materials, (2) methodologies for tracing and tracking diffusion pathways, (3) monitoring the performance of technology transfer efforts in terms of innovation adoption, (4) focused assessment of “problem pioneer” and “champion” activities and influences, and (5) opportunities for integrating this outreach program with other similar efforts considering potential efficiencies and synergies.

Keywords: Urban forestry, policy, public ideas, technology transfer, innovation diffusion.

Introduction

Urban forests are “green infrastructure” systems that provide many public goods, and may include patches of native forests, street trees, park groves, and any other trees growing on public or private property. Extensive research has demonstrated environmental, community economics, and psychosocial benefits (Dwyer and Schroeder 1994, Kuo 2003, Wolf 2005). Such benefits are best achieved through comprehensive planning and management of urban trees and forests. Yet many U.S. communities conduct urban forestry work on an ad hoc basis in reaction to citizen complaints or emergencies, rather than in a proactive, systematic way.

Policy guidance is needed to address the complexity of urban forest conditions and implement best practices in a systematic way. Policy development and adoption can be difficult. Urban forestry touches the lives of many community groups. Planting and managing trees in the midst of high-density human settlements entails acknowledgment and involvement of diverse stakeholders.

Technology transfer is essentially a communication process through which the results of scientific research are put into use (Eveland 1987). Urban forestry research has addressed “how” to sustain trees in cities (such as planting and pruning practices) and the reasons “why” communities should invest in an urban forestry program (such as benefit/costs analysis).

This paper presents the products of a social science research program that has focused on “why” local governments should consider and adopt urban forestry
policy. The research has addressed the values and interests of urban stakeholder groups that may not be fully aware of the benefits and functions of trees in cities. Such groups may have significant influence with local decisionmakers.

Urban forestry policy outcomes are the result of interactions of community values, stakeholder perceptions, and political solutions. This paper first provides background on public ideas and the role of science, then describes outcomes of an extended urban forestry technology transfer program, and ends with recommendations for future research.

**Public Ideas and Policy**

Forestry has a long tradition of technology transfer, often associated with extension systems of universities and research stations. Technology transfer serves as a mechanism for dispersing new ideas, and subsequent adoption is dependent on complex cultural and interpersonal processes (Rogers 2003).

Many technology transfer efforts are aimed at economic optimization by landowners or industries through production enhancement, efficiency gains, and costs management. Urban forestry, on the other hand, is rarely a revenue-generating enterprise. It is a “public idea” that can potentially guide public action for the purposes of improved community health and welfare (Moore 1988).

The ideas that matter to communities and organizations are those that first conceptualize or frame a problem, then articulate solutions, often focusing on a subset of all possible strategies. Public ideas can give coherence and meaning to organizations (including local government), and guide investments for the future (Moore 1988). With regard to science, public ideas often set out the questions for which evidence is necessary.

There are many examples of well-established policy concerning systems or institutions that generate public goods but started as innovative public ideas: lighthouse installations, seatbelt laws, pollution abatement, and emergency response systems. Public ideas span various geographic scales and locations. They also differ in the degree to which they involve capital investment or individual behavior change. Some policies that originated as public ideas maintain their relevance as time passes; others are replaced by emergent innovations.

Change agents may be able to move public ideas to broader acceptance through careful analysis and strategic action (Moore 1988). Important steps include (1) diagnosis of what is already in place and its precedents, (2) respect for existing ideas and policies and the circumstances of their earlier adoption, (3) being able to clarify how existing or old ideas are limited, (4) communicate new ideas (though complex) in a straightforward and practical way; and (5) careful judgment of the capacity of the new idea to significantly improve existing systems.

In many locales, urban forestry is a public idea, with varying degrees of transition to policy. Most research on the study of innovation diffusion has focused on adoption of tangible products or processes, often focusing on the individual consumer as the unit of analysis (Owen et al. 2002). In contrast, a significant amount of urban forestry technology transfer efforts are aimed at addressing the large-scale needs of environmental and social systems of communities.

There has been little research to understand how effective such R&D efforts have been and their causal relationship to adoption of urban forestry innovations. Social systems complicate the science-to-policy process, but attention to this dimension is essential for effective information transfer (Spilsbury and Nasi 2006). Particular challenges include (1) diversity of change agents and adopters, (2) political jurisdiction types and geographic scale, (3) varied governance and decisionmaking mechanisms, and (4) diversity of professional disciplines within local government and their associated networks of technology dispersal (planners versus engineers, for instance).
Science Contributions

There is a strong, though often indirect, relationship between science and public ideas. Public ideas entail public deliberation and, if adopted, then action. Science is often the source of innovative ideas and practices. Science can inform public debate, providing models of how a community should deal with an issue or delineating a range of practical actions to fulfill public choices of desired outcomes.

Scientists and technology managers often underestimate the difficulty of the technology transfer process. Technologists may think of the technology transfer process as a one-way movement of a technology from a research and development source to a receptor system of key individuals. When technology transfer occurs too slowly, it is thought to be the fault of the receptors.

Public ideas rarely become powerful based on empirical evidence and science communications alone (Moore 1988). Clear reasoning or carefully developed and interpreted facts are important, yet rarely make ideas convincing to the general populace. Rather, ideas become anchored in people’s minds through illustrative anecdotes, simple diagrams and pictures, or connections with broad generalities about human nature and social responsibilities. Fact and logic can reinforce and strengthen the hold of idea but will rarely replace simpler public perceptions.

The process of sharing research results might more accurately be thought of as a communication process. Such an interactive process is two-way, with messages flowing in both directions. Individuals in a receptor organization may actively seek information about possible answers to self-perceived problems. Or they may be directed to information by issue advocates. Thus, the science transfer process is a transaction in which questions, answers, clarifications, and other information flow in both directions.

Urban Forestry Science

Forests, trees, and canopy cover are being reduced at alarming rates as urbanization continues in the United States. Actual and projected decline in extent and condition of the urban forest has been documented in many U.S. communities (American Forests 2006, Nowak and Walton 2005). Forest loss increasingly affects human health and welfare, as nearly 80 percent of the U.S. population resides in urbanized areas.

Much of the recent research in urban forestry articulates various urban environmental problems, and then illustrates how the presence of urban forests diminishes or mitigates impacts. The psychosocial significance of trees in cities has become another substantial scientific contribution. Experiences of nature are profoundly important to individuals, small groups, and entire communities (Kuo 2003).

In addition, social research has assessed the assumptions of stakeholders who are not resource managers, but whose practices impact forest resources. For instance, law enforcement officers may encourage vegetation removal within high-density residential areas to eliminate the supposed hiding places of criminals, yet analysis does not support an association of landscape planting and crime (Kuo and Sullivan 2001).

Scientific efforts will continue to address situations of perceived conflicts concerning trees in cities. The resulting knowledge can be applied to counter both public underestimations of benefits and overstatement of risks of urban trees. Yet integration of science with policy will never be as straightforward as scientists may hope for. Moore (1998) noted that, “instead of thinking of [public] ideas as scientific conclusions, we must recognize them as society’s effort, groping in the dark, to help itself deal with intractable problems” (p. 83).

A Program of Portable Science

I have conducted a research program on the human dimensions of urban forestry for about 10 years during
my affiliation with the College of Forest Resources at the University of Washington. Much of the science has addressed public perceptions with regard to trees in particular urban land use contexts, such as central business districts and transportation systems.

An associated policy-oriented technology transfer program has been developed. Outreach materials have been derived from my own and other sources of social science research. These portable science products are a condensed packaging of scientific results and are readily accessible by nonacademics. They are targeted to decisionmakers and key stakeholders within municipal governments and organizations.

The materials of this research program differ little from the standard practices of most technology transfer programs. The key elements are research summaries presented as fact sheets, a Web site portal that provides access to print materials, research outcomes summarized as PowerPoint presentations, and submittal of research outcomes to professional publications. Materials can be accessed at www.cfr.washington.edu/research.envmind.

Construction and distribution of the materials has been based both on theory and user feedback. Some elements and content of the technology transfer efforts were intentional and have been sustained throughout the program. Others were adaptive in that there were changes prompted by anecdotal feedback on product effects and consequences.

Schön (1983) described the knowledge-building potential of the “reflective practitioner.” Knowing-in-practice can be achieved if a person makes intentional effort to reflect on what was done and learned within professional activity. Using “reflection-in-action” a self-evaluator enters an “experiment” by weighing the problem situation and the solution response. One initiates an interaction within a situation of uncertainty with repeated efforts, and with each attempt attains a greater degree of insight and understanding. This process includes an appreciation for the unintended and secondary effects of action.

Through successive actions and practices the reflective practitioner generates a capacity to understand broader actions and implications. In a “conversation” with a situation, the practitioner strives to generate ideas or artifacts that are coherent and understandable. Although the content of the outreach materials has been derived from rigorous science, I have used reflection-in-action to develop and expand the technology transfer program.

Products, Processes, and Reflections

Print products have been constructed based on theoretical principles about how people process information. Early work in cognitive psychology suggests that people actively retain five plus-or-minus two information bits. Although readers and viewers can certainly understand greater content complexity, chunking the content into a small number of categories enables both comprehension and memorableness. Thus, all fact sheets are organized by about five ideas (using headings and subheadings), and primary messages are graphically highlighted. Web site content is likewise “chunked” into topics that are readily distinguished. This telegraphs major content to viewers and conveys an informational structure that may be retained.

My social science research typically involves extensive collaborations with urban stakeholder organizations and key informants, such as nonprofit directors, urban planners, and community development specialists. These relationships provide insights for technology transfer. The language and presentation of outreach materials is crafted to coalesce with the communications norms of professional cultures (such as business people or transportation officials). Thus the outreach materials depart from the standard scientific article format. Results and conclusions often precede a brief overview of methods. Statistical outcomes are used to highlight key findings. Practical applications are featured. All material is presented in a graphic format that is visually appealing and readily understood. A balance of scientific tone and
readability is pursued in order to project scientific credibility yet acknowledge the needs of various reader audiences.

The Web site serves multiple functions. The main page displays a comprehensive outline of my entire research program. Each research subarea has been prepared as a separate page so that public requests for information can be referred to a distinct Web portal. Print materials—fact sheets, higher quality professional publications and scientific articles—are downloadable as PDF files. Associated Web sites and information sources are linked, enhancing both the substantive content of the messages and the credibility of a small-scale research program.

I strategically share outreach products to enhance their position in policy situations. Strategies have included (1) announcements in professional list serves and organization membership lists, (2) submittal of research notes to professional publications, (3) requests for placement of my Web links on related Web sites, (4) mailing or e-mailing new publications to people or organizations known for their high level of networking activity, and (5) inclusion of Web access information in all my presentations or meeting announcements.

The emergence of transfer pathways beyond my primary efforts has been quite interesting. Fact sheet and PowerPoint content has been adapted to secondary publications by professional and advocacy groups. Maintaining the fidelity of the scientific information can be a challenge as newsletter and trade publications editors may not understand the scientific derivation of fact bits. Some authors or editors will corroborate with the source, others rely on the clarity of the source materials for accuracy. Of particular concern are the tertiary publications, as second-generation interpretations seem prone to inaccuracy or overstatement.

It’s been said that technology transfer is a body contact sport. Technologies are transferred through interpersonal networks (Valente 1994), and the nature of these networks, in large part, contributes to effectiveness of technology transfer.

Rogers (2003) articulated phases of the innovation adoption process. Agenda setting is the first formal stage and is the process whereby organizations seek innovations to cope with a problem. Agenda setting is typically followed by matching, redefining/restructuring, clarifying, and routinizing processes. Public ideas may precede agenda setting as communities take some time to recognize and frame incipient problems, such as those associated with trees and forests in cities. If a public idea concerning urban forestry matures into a policy response within local government, then other science-based sources provide implementation guidelines.

My research appears to be used to promote the public idea of urban forestry, and for local agenda setting. My initial efforts in technology transfer involved creating products. As products moved into use, my outreach activity expanded to include stakeholder interactions.

“Problem pioneers” are individuals that perceive a problem that is not only new, but is destined to be important to an entire field or the community at some time in the future. They are often ahead of their time, and feel compelled to address a problem before others either detect it or recognize its significance (Patton 2002). Local problem pioneers are often the initiators of uptake of my research outreach, and later either become champions or recruit others to endorse urban forestry.

“Champions” are influential agents in the science-to-policy transfer. Rogers (2003) defined a champion as a charismatic individual who provides enthusiastic support for an innovation, thus overcoming indifference or resistance. Champions may occupy key positions or have other means of influence. They are often respected as opinion leaders both within their organizations and in their extended professional networks. They typically demonstrate well-honed interpersonal and negotiating skills in working with other people.

Problem pioneers and champions throughout North America have accessed print materials or sponsored travel for public presentations in order to initiate public
dialog about urban forestry in their communities. I have made presentations to city councils, planning commissions, municipal agency staff, community service groups (such as Kiwanis), and business organizations (such as Chambers of Commerce). These personalized presentations appear to magnify the influence of the scientific data, owing to interpretations that connect to local conditions and social circumstances.

**Proposed Research**

My formal research program has addressed issues associated with the social and institutional contexts of urban forestry. This series of national-level studies has focused on questions of “why” trees belong in cities, rather than providing technologies about “how” to best plant and manage urban forests. Communities can use this knowledge to build public ideas about urban forestry that may evolve into policy.

My reflection-in-action has generated knowledge that is different from, but can become the basis of scholarly investigation. A formal appraisal and assessment would help to refine the technology transfer program and provide insights for other similar programs.

Evaluation should include feedback loops so that end-users can provide information about their experiences with products and perceived effectiveness. Such feedback would provide guidance on the format and presentation of information tools such that they more rapidly enter the policy process and better inform decisionmaking. Scientists typically avoid becoming advocates for policy, so soliciting information from informed and effective policy participants could enhance production and delivery of research outcomes.

Second, identification of key audiences within policy development settings is essential but not readily done. The full range of potential receivers and their policy inclinations has not been analyzed. Once receivers are identified, the character and the content of the informational tools could be crafted to better meet their informational needs.

Research opportunities are endless; here are possibilities:

- Develop evaluative performance guidelines for print materials.
- Develop methods for tracing and tracking materials diffusion pathways.
- Monitor the performance of technology transfer efforts, in terms of innovation adoption, from outreach to action.
- Conduct focused assessment of “problem pioneer” and “champion” activities and influences.
- Discover sociopolitical dynamics that may encourage a decisionmaker to be more receptive to urban forestry policy development (such as Tree City USA awards or community sense of place).
- Present opportunities for integrating this outreach program with other similar programs, considering potential efficiencies and synergies.

Rogers (2002) noted that, given the tremendous public investment in research and development, it is surprising that more research attention has not been given to investigating technology transfer. The scholarly study of this process is underfunded and dissipated among a variety of disciplines. Better theoretical conceptualization and more effective methodological approaches are needed to illuminate the nature of the technology transfer process. These limitations have been observed concerning tangible products but apply to policy-oriented technology transfer as well. Improved science-based policy interventions could encourage greater quantity and quality of urban forests, improving quality of life for millions of people.

**Acknowledgments**

Grant support for the research and technology transfer products reported here was provided by the USDA Forest Service on recommendation of the National Urban and Community Forestry Advisory Council.
Literature Cited


