Using an Integrated Assessment Process to Determine Strategies for Removing Barriers to Green Stormwater Infrastructure Implementation

Utilisation d'un processus d'évaluation intégré pour déterminer les stratégies visant à éliminer les obstacles à la mise en œuvre d'une infrastructure écologique de gestion des eaux pluviales

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RÉSUMÉ

Le processus d'évaluation intégré pour traiter des problèmes complexes diffère de la recherche traditionnelle car les chercheurs travaillent en étroite collaboration avec les parties prenantes pour examiner un problème sous de nombreux angles, identifier les défis et évaluer les solutions réalisables. L'objectif est de créer des résultats actuels, fiables, accessibles et utiles. En dépit des nombreux avantages documentés associés à l'infrastructure verte des eaux pluviales (GSI), sa mise en œuvre stratégique à grande échelle n'est pas courante dans la plupart des villes des États-Unis en raison de nombreux défis, notamment des facteurs réglementaires et des cadres politiques concurrents, un financement, des incertitudes en matière de maintenance, etc. se concentre sur l'identification et la résolution des problèmes spécifiques liés à la mise en œuvre de GSI dans l'État du Michigan, aux États-Unis. Le projet a été mis en œuvre par des spécialistes des sciences sociales, des ingénieurs et des professionnels utilisant une approche multidimensionnelle pour impliquer les parties prenantes, notamment des groupes de discussion avec des organisations de parties prenantes professionnelles, le développement et le déploiement d'un sondage complet en ligne et une série d'ateliers de visualisation. Grâce à ces approches, les obstacles à la mise en œuvre de GSI et les stratégies d'élimination ont été identifiés et diffusés selon une approche reproductible.

ABSTRACT

The integrated assessment process for dealing with complex problems is different from traditional research because researchers work closely with stakeholders to examine an issue from many perspectives, identify challenges, and evaluate feasible solutions. The aim is to create results that are current, trusted, accessible, and useful. Despite many documented benefits associated with green stormwater infrastructure (GSI), large-scale strategic implementation of GSI is not common in most United States cities due to many challenges including competing regulatory drivers and policy frameworks, financing, maintenance uncertainties, etc. This specific project focuses on identifying and addressing specific challenges associated with the implementation of GSI in the state of Michigan, USA. The project was undertaken by social scientists, engineers, and professionals using a multi-faceted approach for stakeholder engagement including focus groups with professional stakeholder organizations, development and deployment of a comprehensive online survey, and a series of community engagement visioning workshops. Through these approaches, the barriers to GSI implementation and strategies for removal were identified and disseminated in an approach that is replicable.

KEYWORDS

green stormwater infrastructure, integrated assessment, public policy, stakeholder engagement

1 INTRODUCTION

The current approach to stormwater management in the U.S. is unsustainable. The existing stormwater infrastructure for many communities is rapidly-degrading because of aging infrastructure and under-investment. Public works professionals recognize the need for substantial investment in stormwater management. Before rebuilding and/or expanding their "gray solutions," many have considered green stormwater infrastructure (GSI). GSI is an approach to stormwater management that protects, restores, or mimics the natural water cycle. Used correctly, it is an effective method to improve stormwater management efficiency, reduce flooding, and increase quality of life and safety for the surrounding community, but ultimately, municipalities and decision-makers have been resistant to change.

This research project seeks to address the core research question "what are the long-term sustainable strategies that will enable Michigan communities to begin wide-spread implementation of green stormwater infrastructure and reap triple-bottom-line benefits?" This was accomplished through an integrated assessment approach to stakeholder engagement. An integrated assessment is an interdisciplinary approach that combines, interprets, and communicates knowledge from diverse disciplines in a manner that a problem can be evaluated from multiple perspectives. The main task of any integrated assessment is to provide useful information to politicians, policy makers, and decision-makers such that they may successfully implement solutions.

2 RESULTS AND DISCUSSION

Stakeholder engagement for this project included five focus groups with professional stakeholder organizations at their regional meetings, a widely disseminated online survey, and community visioning sessions at three diverse communities across the state. The format, questions, and activities varied between the three modes of stakeholder engagement, but they were all structured around the core research question which was posed to each audience engaged.

2.1 Stakeholder Focus Groups

The stakeholder focus groups were conducted at five state-wide or regional meetings of professional organizations. Table 1 has the name of each organization, the membership base, and the primary role of the organization. The organizations were chosen to represent a wide range of individuals who make decisions on stormwater management. Each focus group lasted between 60 and 90 minutes and varied in size from 10 to 60 participants. At each focus group, three themes were explored – Familiarity with GSI, Barriers to GSI Implementation, and Ordinances. The responses varied between each organization (for example MACDC, and MACC identified financing as a larger barrier than the other organizations) but there were common themes that arose. Those themes were programmed into the online survey that is discussed in Section 2.2.

Figure 1 is provided as an example of the type of information that arose from the focus groups. Figure 1 is a word cloud schematic where the size of the word is based on the number of participants who identified that topic (i.e. word) as a barrier. "Knowledge" was identified as the largest barrier but contractors, aesthetics and ordinances were also commonly identified as barriers by focus group participants.

Table 1: Focus Group Participants

Organization	Membership	Primary Role
Michigan Municipal League (MML)	Elected Officials, Municipal Staff	Represent Municipal Governments
Michigan Association of Planners (MAP)	Community Planners, Architects, Governmental Representatives	Promote Smart Community Planning and Education
Michigan Water Environment Association (MWEA)	Water Engineers and Scientists	Forum for Water Quality Professionals
Michigan Association of County Drain Commissioners (MACDC)	Elected County Drain Commissioners, Water Management Staff	Professional Association for County Drain Commissioners
Macatawa Area Coordinating Council (MACC)	Elected Officials, Municipal Staff, Regional Planners	Regional Planning Council for West Michigan

Figure 1: Key Barrier to GSI Implementation

2.2 Survey

Information from the focus groups was used to develop a web-based survey with six sections including Demographics, Community Infrastructure and Regulations, Familiarity with Stormwater Management and GSI, Prevalence of GSI in Community, Barriers to GSI, and Effective Approaches for Implementing GSI. The survey was distributed to 1000s of individual using various email list serves available through partner organizations. In total, there were 190 responses that were self-selected into one of four categories (Figure 2). There was good survey participation from those who identified themselves with being in a government role or as a technical expert (which included consultants and academics). Unfortunately, contractors and builders were under-represented in the responses despite repeated attempts to increase their number of participants. The survey responses were analyzed both in aggregate as well as by role, experience, knowledge, etc. The findings of the survey are covered in Section 3 but one interesting finding was that individuals who had more experience with GSI projects indicated that costs (design, maintenance, and installation) were less of a barrier than those with less experience with GSI projects. Conversely, those who had more experience indicated that political factors (including codes, ordinances, regulations, etc.) were more of a barrier. In other words, not only did role play a factor in one's perceptions and responses but so did experience.

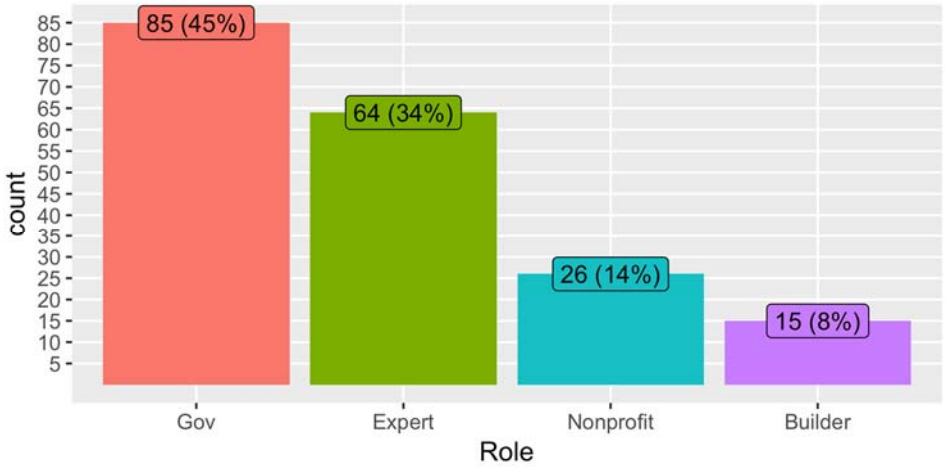

Figure 2: Distribution of Survey Responses

2.3 Community Vision Session

The final method of community engagement was a series of community visioning sessions (one session in each of three communities). These sessions were two hours in length and were advertised to the general public. While broad participation was encouraged, participants tended to be motivated to incorporate GSI in their communities. The sessions were intended to demonstrate how several barriers to GSI implementation could be addressed. The sessions started with a value sort exercise where each person identified what they valued the most about their community from the following categories - Beauty, Economics, Ecosystem Services, Education, Mental Health, Physical Health, Recreation, Sense of Place, Social, Tourism, and Wildlife Habitat. Once the individual sort was completed, small groups repeated the exercise based on how they perceived community values. Once individual and communal values were determined, the participants discussed how GSI could address those values in their community. Finally, the participants were shown renderings of potential GSI project in their community and asked for vote on elements they individually liked, that they thought the community should prioritize, and that they would veto if they could (Figure 3). Ultimately, the goal of the community engagement exercise was to demonstrate methods for removing barriers to GSI by establishing common values and mapping those values to demonstration projects.

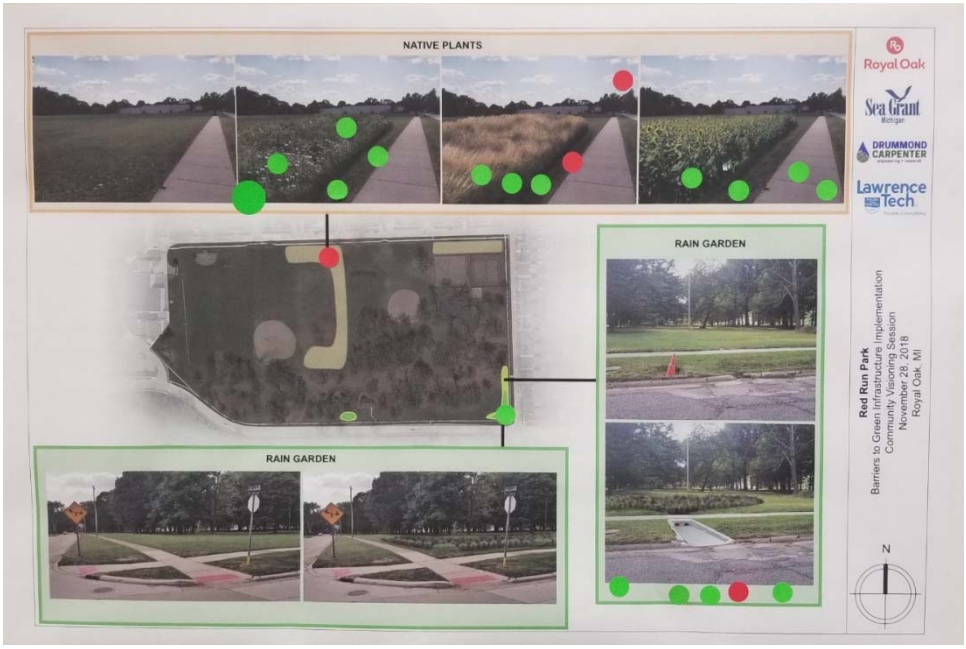

Figure 3: Example of Community Voting on Potential GSI Projects

3 CONCLUSION

Through these approaches, the barriers to GSI implementation and strategies for removal were identified and disseminated. The main perceived barriers included uncertainty in performance, installation and maintenance costs, financing, unfavorable ordinances, and public acceptance. The effective strategies for removing these barriers are performance monitoring, simplifying codes/ordinances, creating stormwater fee structure for dedicated funding, lobbying for political support, and establishing common terminology on values. However, in many cases participants were not familiar with how to initiate these programs. Other findings included that the long-term cost-benefit ratio was perceived to be significantly better than the short-term cost-benefit ratio, that stakeholders overwhelming identified the desire to use GSI more to deal with urban stormwater runoff, and that educating the community on GSI benefits is reliable but may not be as effective for broad implementation. Finally, stakeholders identified that their primary source of information on GSI was colleagues, conferences and internet research with webinars and peer-reviewed journals being deemed not as useful.

With regards to transferability of results, the barriers identified and strategies for removal would only be transferrable to regions with similar legal and organizations structures. However, the methodology of using focus groups, surveys, and community workshops would be transferable to anywhere that has issues with implementing innovative stormwater management systems.