Sea Grant GI/ LID Stakeholder Advisory Group Workshop 2:

Finalize strategic recommendations for developing the research grant program

June 9, 2022

Workshop Agenda

Time	Activity
9:00	Welcome
	Purpose of Workshop
	Desired Outcomes
	Introduction of Research Team & Participants
9:10	Overview of Study
	Findings/ Recommendations
9:30	Break-out session: Research Recommendations
10:20	Group Report-Outs
10:40	**Break**
11:00	Break-out session: Education/extension
11:25	Group Report-Outs
11:35	Break-out session: Partnerships
11:50	Group Report-Outs
11:55	Closing Remarks

Welcome

Peter Rowe
Executive Director, New Jersey Sea Grant Consortium

Co-Principal Investigators:

Dr. Dibyendu Sarkar,
Professor, Stevens Institute of Technology

Dr. Zeyuan Qiu
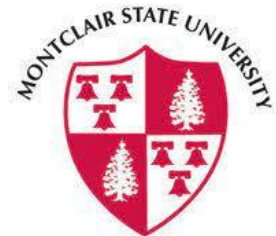Professor, New Jersey Institute of Technology

Dr. Yang Deng,
Professor, Montclair State University

Project team:

Dr. Jaime D. Ewalt Gray
Consultant, C. E. Bugdal, LLC

Dr. Colette Santasieri
Executive Director of the Center for Community Systems
New Jersey Institute of Technology

Lisitai Yang
PhD student, Montclair State University

Workshop Attendees

Group 1

Robyn DeYoung, EPA
Aileen Craig, TNC
Jenna Clark, MD Sea Grant
Mike De Luca, Jacques Cousteau Reserve
Bob Schuster, NJDEP
Rachel Giolitto, Stafford Twp
Kathy Hale, NJ Water Supply Authority
Krissy Hopkins, USGS
Christian Hauser, DE Sea Grant
Listiai Yang, Montclair
Sean Vroom, NJIT
Pete Rowe, NJ Sea Grant
Yang Deng, Montclair

Group 2

Rebecca Shuford, NY Sea Grant
Sandra Wilbur, Durham Public Works
Rosana D Silva, Hudson River Foundation
Ann English , Montgomery County, MD
Dan Van Abs, Rutgers
Harry Zhang, Water Research Foundation
Michael Borst, USEPA
L. Stanton Hales, Jr, BB Partnership
Amin Davis, NC DEQ
Viravid (Gunn) Na Nagara, Stevens
Dibs Sarkar, Stevens
Colette Santasieri, NJIT

Group 3

Kirk Barrett, Rahway River Association
George Schuler, TNC
Mike DeVuono, Arcadis
John Taylor, West Windsor Twp
Matt von der Hayden, Stafford Twp
Troy Hartley, VA Sea Grant
Jessica Brown, GA Sea Grant
Sarah Whitney, PA Sea Grant
Chris Obrupta, Rutgers
Sameer Neve, Stevens
Zeyuan Qui, NJIT
Jaime D. Ewalt Gray, Stevens

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Project Overview

Funding: The National Sea Grant Office, NOAA

Timeline: January 2022 – December 2024

Objective:

Optimize the deployment of innovative GI/LID techniques to mitigate runoff & pollution impacts on freshwater systems & eventually protecting the coastal ecosystems in the U.S.

Specific aims:

- Identify key knowledge gaps
- Prioritize research needs & roles of the Sea Grant Network
- Develop a strategic document to serve as a roadmap for the Sea Grant Network
- Administer a competitive research grant program

Scoping Process

Identify key challenges, knowledge gaps, research needs, & strategies to enhance implementation of GI/ LID through:

- Literature review

- Stakeholder survey

- Stakeholder Advisory Group (SAG) workshops

Strategic document's structure

Executive Summary (1 page)

Introduction (3 pages)

1. Background
2. Definition
3. GI/ LID Implementation Process
4. Project Purpose & Process

Summary of Findings (2 pages)

2. Literature Review
3. Regional Stakeholder Survey
4. SAG Workshops

Recommendations for Sea Grant Network (5 pages)

1. Research
2. Extension
3. Education
4. Partnerships

References

Summary of Findings

Literature Review

- Challenges:
  - Understanding performance especially in field studies & under a variety of environmental & climatic conditions
  - Lack of regulatory support, financial incentives & community acceptance

- Knowledge gaps:
  - Fate & transport of pollutants under a variety of field conditions
  - Optimization of techniques
  - Decision support resources

Summary of Findings
Stakeholder Survey

- Majority of the (220) respondents from consulting, local government, & academic sectors
  - involved in research, planning, policy, communication & implementation of GI/ LID
- Highest ranked perceived benefits:
  - improvement of water quality;
  - reduction of stormwater/ CSO runoff;
  - ecological improvements
- Greatest perceived concerns & obstacles:
  - poor maintenance;
  - costs & available funding;
  - community acceptance

- Knowledge gaps:
  - long-term benefits;
  - performance under varying field conditions
- Identified challenges:
  - funding;
  - misperceptions & community acceptance;
  - proper maintenance
- Identified research needs:
  - GI/ LID project optimization tools;
  - community engagement;
  - field demonstration under varying conditions

Summary of Findings

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- Topics:
  - policy & planning;
  - design & monitoring;
  - implementation & maintenance;
  - environmental justice
- Challenges:
  - community engagement & raising awareness of the long-term co-benefits;
  - incentivization beyond regulatory requirements
- Research needs:
  - determine long-term resilience of GI/ LID to changing climatic conditions;
  - focus on implementation of GI/ LID projects on a watershed scale;
  - lifecycle cost-benefit analyses;
  - more field monitoring to determine fate & transport of various pollutants & resulting watershed & ecological health;
  - development of training for designers, engineers, community members & maintenance workers

Resulting recommended research areas:

- Sustainable design, installation, & maintenance
- Relevant & credible cost-benefit information
- Accelerated resilience & adaptation to climate change impacts
- Efficient & inclusive planning & management

Sustainable design, installation, & maintenance

1. Develop & evaluate the performance of:
   - innovative GI/LID designs,
   - media mixes & reuse thereof,
   - plant-soil combinations, &/or
   - hybrid designs of green-gray infrastructure

   - Investigate in ultra-urban areas, especially retrofits, conducting long-term field evaluations, for both wet & dry seasons, in different eco-regions, & under varying climatic conditions, in addition to lab studies

   - Document:
     - hydrologic performance,
     - pollutant fate, transport, & removal efficiencies, especially of CECs,
     - long-term water quality & groundwater impacts at the watershed scale

2. Compare alternative GI/ LID designs & installations to maximize effectiveness while minimizing maintenance requirements under different environmental & regional conditions through the development of decision-making tool.

3. Develop & evaluate smart technology devices (e.g., smart controls & monitoring systems) to assist communities to best manage, monitor, & maintain installed GI/LID technologies.

Relevant & credible cost-benefit information

1. Identify, quantify, & monetize long-term costs, benefits, & avoided costs, especially in under-served, environmentally burdened communities of GI/LID implementations.

   - May include effects on public health, property values, urban heat islands, air quality, job creation, recreation, safety, pollution load reduction, climate resilience, & flood risk reduction.

2. Evaluate & compare alternative GI/LID designs by cost-benefit analysis over a long-term temporal & spatial horizon, at watershed or community scale, in different climate regions, & in relation to traditional gray infrastructure.

3. Develop a robust decision support tool that demonstrates costs & benefits, avoided costs, & unaccounted-for benefits under different environmental, situational, & climatic conditions.

Accelerated resilience & adaptation to climate change impacts

1. Develop & evaluate optimized GI/LID designs & retrofits to handle different climate change challenges, e.g., droughts, dry periods, sea-level rise, & an increased frequency & intensity of storm events.

   - Examine & assess how design standards should be adapted to address these challenges & how they should vary between geographic regions.

2. Investigate how dynamic stormwater aspects, such as the changes of flow within a storm event & changes in dry periods between storms, including pollutant loading & water quantity, affects GI/LID performance.

   - Examine & assess how design standards should be adapted to address the stressors & shocks of climate change & how they should vary between geographic regions.

3. Investigate plant response & adaptability to various eco-region conditions & climate change stressors & shocks in order to recommend the best plant combinations under varied future conditions.

Efficient & inclusive planning & management

1. Develop & evaluate innovative ways (e.g., virtual reality, games, & mobile apps) to engage the public & stakeholders in all parts of the process from design & installation to maintenance & monitoring

2. Investigate community perceptions & attitudes towards different types of GI/LIDs, how these attitudes vary across demographic regions, especially under-served & environmentally burdened communities, & strategize how this information can be used to foster public acceptance of GI/LID projects in their communities.

3. Investigate & evaluate different types of incentives & how incentives can be incorporated into existing regulatory programs

4. Examine & assess the effectiveness of incentives & programs to plan & organize GI/LID initiatives in different socio-economic, urban, suburban, & rural settings at the watershed scale. Investigate how incentives can be enhanced in regulatory or financing programs.

5. Develop user-friendly decision support tools to: estimate the number of GI/LID projects needed to result in desired outcomes; optimize GI/LID placement; compare & prioritize between GI/LID techniques & traditional gray infrastructure; & to visualize the benefits & tradeoffs to inform investment decisions.
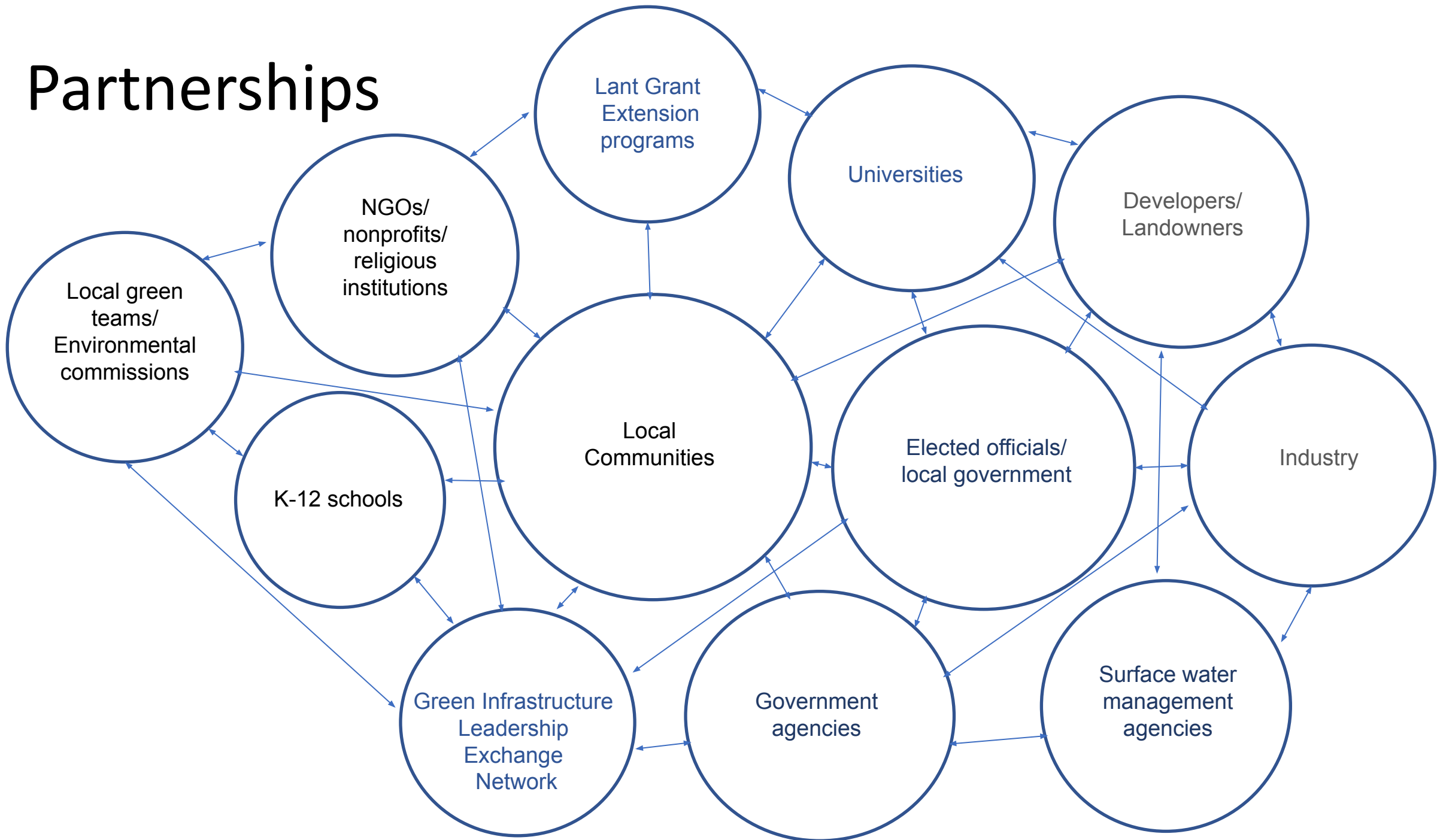
Extension

- Offer certification programs & training courses for those involved in GI/LID planning, implementation, maintenance, & monitoring to deliver sound information on design, material procurement, construction, monitoring, adaptive management, & maintenance practices.

- Provide demonstration projects at accessible locations especially schools, new & retrofitted development, & heavily trafficked areas. Organize regional & local workshops, & other knowledge sharing events for researchers, practitioners, & the public around these demo sites.

- Focus on understanding the needs & desires of underserved & environmentally burdened communities & address any concerns they have with the implementation of GI/ LID projects.

- Develop & maintain a central repository/database for GI/LID information sharing that may include cost-benefit information, community outreach materials, funding opportunities, examples of projects, decision tools, including plant selection lists for various ecoregions or states.

- Encourage regulatory agencies to incentivize GI/ LID in their policies & funding programs, especially for underserved & environmentally burdened communities.

Education

- Offer fellowships & scholarships for GI/LID work (research, design, construction, maintenance, & monitoring).

- Strengthen training on post-construction monitoring & maintenance to not only public work professionals but non-governmental organizations, volunteer corps, & schools.

- Develop curriculum & advocate for GI/LID becoming a part of engineering curricula at high schools, trade & technical schools, colleges & universities, as well as continuing education programs.

Partnerships

Break-out Sessions

1. Research Recommendations (50min)

2. Extension/ Education (25min)

3. Partnerships (15min)

Final Remarks

Dibs Sarkar, PhD

Principal Investigator

Stevens Institute of Technology

Next Steps

- Finalize Strategic Document

- Develop RFP for competitive research grant program

- Technical Advisory Panel for proposal reviews

- Update Strategic Framework to incorporate research project findings