

NRSP12: Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities

Contents

Non-Technical Summary	2
Statement of Issues and Justification	2
Prerequisite Criteria	3
How is the NRSP consistent with the mission.....	3
How does this NRSP pertain to a national issue?	6
Rationale	9
Priority Established by agInnovation.....	9
Relevance to stakeholders:.....	12
Implementation:	16
A. Objectives and Projected Outcomes:	16
B. Management, Budget, and Business Plan	20
C. Integration and Documentation of Research Support	27
D. Outreach, Communications, and Assessment	29
Two-Year Milestones and Deliverables.....	32
Literature Cited	39
Appendices.....	43
Appendix 1: Letters of Intent to Engage.....	43
Appendix 2: Interviews with Researchers	90
Appendix 3: Evaluation Plan Overview	94
Appendix 4: MOU between NLC and NUREC.....	98
Appendix 5: Green Infrastructure Report	100

Non-Technical Summary

The land-grant university (LGU) system was established when most U.S. residents lived in rural areas. Today, over 80% of the population lives in metropolitan regions, meaning the LGU research and Extension enterprise must evolve to meet urban needs in the 21st century. NRSP12 will address this need by focusing on urban systems using collaborative research. By building a national network and data infrastructure, NRSP12 will align research outputs with municipal decision-making needs and facilitate comparative studies across cities.

Specifically, this project will:

- **Support new research through a national network of Integrated Research Nodes (IRNs)** connecting researchers, Extension professionals, and urban stakeholders across key topical areas – including urban agriculture systems, nature-based solutions (NbS), and urban soils – to foster new research that scales knowledge across disciplines and regions and shares best practices.
- **Develop data archiving and sharing infrastructure** that includes an interactive *Urban Map Room* that provides researchers and practitioners with access to a vast, existing urban spatial database and an *IRN Repository* that aims to assemble, catalogue, and disseminate new NRSP12 research outputs, methods, and resources related to urban agriculture systems, nature-based solutions, and urban soils.
- **Provide professional development and training** for scientists and Extension agents in team science, interdisciplinary collaboration, and community-driven research approaches tailored to urban contexts.

Housed within the National Urban Research and Extension Center (NUREC) at WSU, this NRSP will leverage NUREC's established network of researchers, Extension professionals, and municipal leaders to ensure that knowledge is co-created with communities and translated into practice. Ultimately, NRSP12 will reinforce productive connections between public universities and urban communities, positioning the LGU system to deliver science-based solutions for complex urban challenges.

Statement of Issues and Justification

This National Research Support Project (NRSP) is rooted in the fundamental mission of the LGU system by integrating research and Extension to advance science as well as support communities. The focus of NRSP12 is on urban areas, which present unique and urgent knowledge gaps in the development of evidence-based solutions for climate resilience, food security, and public well-being for millions of people across the US.

Urbanization has historically aimed to exclude the natural world, leaning on man-made infrastructure, technology, and ingenuity to create an optimal space for humans to gather, create, and thrive. However, the near total exclusion of green spaces, food production, and non-human habitat have introduced fundamental, systematic weaknesses into cities that urbanites are now seeking to address. Over the last two decades, interest in urban agriculture and ecosystem service initiatives have proliferated in cities nationwide and are viewed as promising pathways for

shrinking food deserts, increasing local and regional biodiversity, and buffering negative impacts from changing patterns in regional temperature and precipitation. Yet, our understanding of how best to re-integrate the "green" world into urban environments is nascent. First, many perceived benefits used by cities to justify investments and structural changes to support urban agriculture and green space are derived from assumptions based on non-urban ecosystem and agricultural systems, or on urban-based findings from a specific location, neither of which may adequately capture the benefits and trade-offs of urban systems will face. Second, we know that relevant research has been generated in hundreds of urban locations but efforts to align evaluation metrics to better synthesize and compare results across locations related to the benefits and challenges of integrating agriculture and related ecosystem services into our urban landscapes is lacking. [1] [2]

Currently, the data required to achieve these research goals exists in fragmented or inaccessible data streams, reporting results in different units, scales of measurement, nomenclature, and data repositories. Difficulties in accessing and comparing these data hinder our ability to create a new, comprehensive understanding of urban agricultural and ecosystem services that can offer cross-city insights to reduce major barriers to effective decision-making and long-term planning (see Appendix 1: Letters of Intent to Engage, Appendix 2: Interviews with Researchers, [3] [1] [2]).

NRSP12 is conceived as a research coordination and acceleration network. It will directly address the gaps and barriers identified above by focusing on select research problem areas and providing supporting infrastructure for collaboration and synthesis. In the sections below, we outline the major research priority areas that structure this project, followed by the plan of work detailing how integrated research nodes (IRNs) and a NRSP data hub will be created and managed to synthesize and accelerate our understanding of urban agricultural and ecosystem services, and how we intend to track and evaluate the success of our network activities and outcomes. This integrated approach is justified by the breadth of urban challenges: urban areas are diverse, complex, and vary greatly from one another, and interdisciplinary approaches are needed to tackle issues like urban climate resilience and food security. By pooling resources and expertise across the national LGU network, NRSP12 will *accelerate* our understanding and knowledge of urban systems by *synthesizing* existing information and encouraging *collaboration* to explore new research areas that inform our *practical capacity* to improve urban quality of life, in alignment with the LGU system's mission to serve all communities.

Prerequisite Criteria

How is the NRSP consistent with the mission

The goal of NRSP12 is to coordinate and advance research efforts across the US to better understand the benefits and trade-offs of investments in urban agriculture and ecosystem provisioning services. This goal will be accomplished through a research network designed to facilitate nationwide coordination of multiple research agendas and best practices, support the incubation of novel, innovative projects, and synthesize existing information to help generalize findings and understand the impacts and benefits of urban agriculture and ecosystem provisioning services at regional and national scales, allowing us to match the NRSP mission directly.

Research Hub Structure

NRSP12 does not propose a single, hypothesis-driven research study. Rather, it is a structured framework for connecting researchers, curating existing information, supporting new research initiatives, and communicating findings through new shared technologies across three scales of key urban agriculture and ecosystem provisioning services: Urban Agriculture Systems; Nature-Based Solutions; and Urban Soils. Each of these three research areas will serve as an Integrated Research Node (IRN) within the NRSP12 research network, allowing researchers to link new knowledge and practical benefits across national, regional, local, and hyper-local areas of study.

Connecting Researchers: Each IRN is envisioned as a national network of peers who collaborate regularly around a broad research theme to rapidly identify and address urban challenges across scales and disciplines. Each IRN will have a Program Leader to steer the broader NRSP12 effort, assisting leadership in identifying evolving cross-cutting themes and emerging issues, and coordinating the research community. These leaders will be responsible for facilitating communication and collaboration around thematically relevant data synthesis efforts and for creating opportunities for accelerating new research efforts between researchers and with stakeholders, such as municipalities, NGOs, and federal agencies to ensure that science is co-produced with those responsible for implementation. The project will leverage existing networks such as the National Urban Research & Extension Center (NUREC) to recruit researchers and will coordinate with other entities such as the National Urban Extension Leaders (NUEL), the National League of Cities (NLC), the National Association of Counties (NACo) and others to share resultant information, data, and outputs to decision makers and practitioners (see Figure 1).

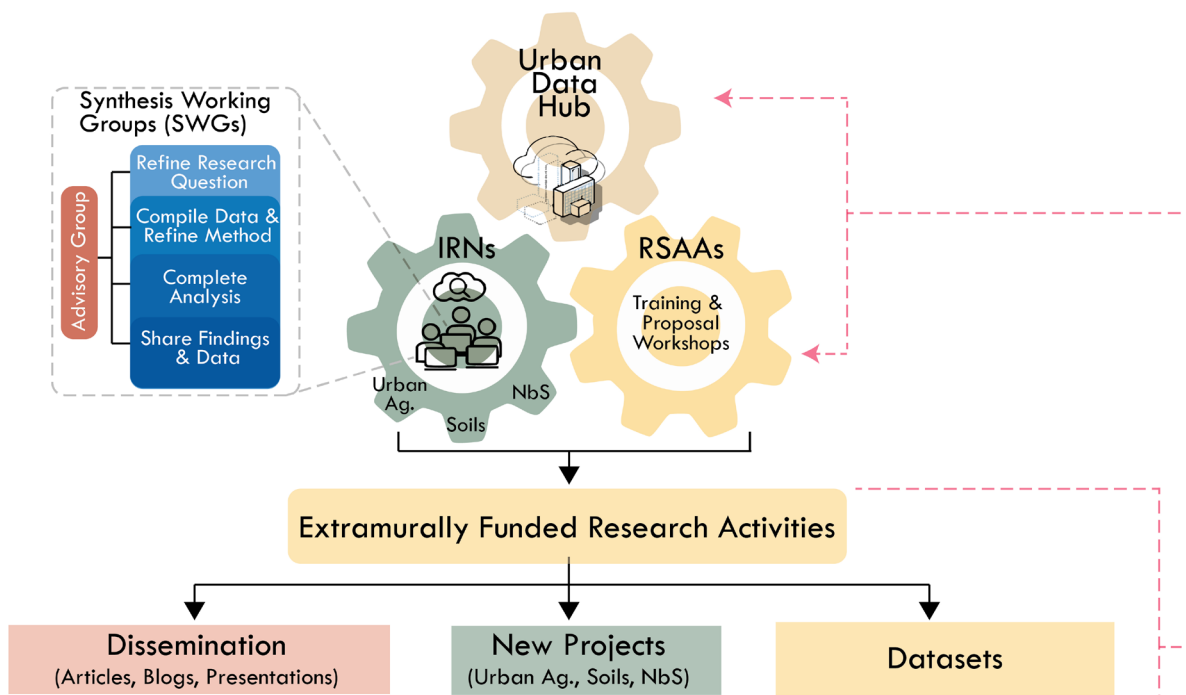


Figure 1. Diagram showing NRSP12's core elements, how they connect with each other to support the development of high quality research across urban agriculture and ecosystem services. The 3 Integrated Research Nodes (IRNs) of Urban Agriculture Systems, Nature-based Solutions (NbS) and Urban Soils are supported by Research Synthesis and Acceleration Activities (RSAs), including Synthesis Working Groups (SWGs) and an Urban Data Hub consisting of an Urban Map Room and an IRN

Repository. Through these interconnecting components, NRSP will support researchers in developing new research projects that will produce products and data sets disseminated through NRSP and feed back into the Data Hub and RSAAs to generate new projects that integrate new research as well as existing work.

Accelerating New Research: To support IRN-themed research efforts, each IRN will have access to a breadth of Research Synthesis and Acceleration Activities (RSAAs) (see Figure 1). Led by the Toolbox Dialogue Initiative (TDI) Center from Michigan State University and the Center for Environmental Research, Education, and Outreach (CEREO) from Washington State University, the RSAAs are designed to provide the additional knowledge and tools for facilitating inter-institutional, interdisciplinary networking and collaboration to tackle IRN-related challenges. Activities will include

- 1) Webinars and workshops aimed at nurturing interdisciplinary teams and ideas to increase shared understanding in heterogeneous teams and make it easier to establish collaborations among groups with different experiences, goals, cultures, and values.
- 2) Monthly “Link & Learn” virtual events structured to share disciplinary and practical expertise widely across the NRSP network and connect researchers across institutions.
- 3) Annual Synthesis Working Groups (SWGs) designed to take advantage of existing data to answer pressing questions at new scales.
- 4) Regular Proposal Development Workshops that will help participants form interdisciplinary teams, refine research questions, and craft compelling extramural grant proposals.
- 5) Seed and Travel Grant opportunities to immediately catalyze promising new research ideas and provide opportunities for high intensity, short-term, in-person collaboration.

Enabling Technologies for Communicating Findings: The Urban Data Hub, consisting of an urban mapping database (Urban Map Room) and IRN repository, will serve as a national, open, standards-based data platform that collects, assembles, curates, and distributes urban datasets (incl., soil, green infrastructure performance, urban agriculture, socio-demographic data) alongside methods, instruments, and protocols so that nuance and results from different cities and studies can be compared consistently. The Urban Data Hub will be used to support research teams (see Figure 1). The *Urban Map Room* serves as an existing resource for IRN researchers by leveraging the University of Missouri’s current repository of thousands of mappable data layers (<https://careshq.org/map-room>) and data exploration tools. Users will immediately be able to view data within customized geographic boundaries; create custom reports and data visualizations; and explore comparisons across cities and states. The *IRN repository* will support the collection, cataloging, and distribution of information and empirical data related to research results, needs assessment, and impact generated by the NRSP12. A secure portal will be developed allowing NRSP participants to submit standardized information regarding their research and related extension activities. The new data will undergo a review and approval process through IRN peer-review. The repository will also support a search and visualization interface that allows users to identify existing partnerships and potential research and Extension connections between faculty and institutions. Online support materials as well as training opportunities will be provided to users of the system, including protocol for helping researchers clean data, write metadata, find an archival location for hosting the data (externally) thereby reducing barriers for teams to launch comparative and multi-site studies.

Complementarity and non-duplication

As designed, NRSP12 complements, rather than duplicates, existing multistate projects by supplying the core and foundational services (e.g., data, methods, collaboration venues, training, evaluation) that those projects can leverage. Housed within WSU's National Urban Research and Extension Center (NUREC) and governed by a multi-region steering committee with State Agricultural Experiment Stations (SAES) and Extension representation, NRSP12 will link research and Extension from the outset, ensuring that research support activities are mission-aligned with the land-grant system's obligation to deliver public benefit. Where appropriate, NRSP12 will coordinate with related efforts (e.g., urban agriculture (NE2401) and green infrastructure (NE2206) initiatives) to share their datasets, align metrics, and amplify dissemination.

Long-term Planning

An important outcome of building these IRNs is the creation of a sustainable national network that persists beyond the NRSP's funding period. To support ongoing collaboration and mutual benefit, each IRN will develop a sustainability plan that either identifies long-term host institutions or outlines plans for integrating into existing national networks (such as NUREC, NUEL, or professional societies for researchers). By the end of the project, we anticipate that our IRNs will have created strong national networks of their own through extramurally funded projects and in doing so, become largely self-sufficient communities that continue to drive urban research and innovation beyond the lifespan of the NRSP12. This approach enables continuous, structured collaboration across institutions, which is essential for tackling the multifaceted problems outlined in our research priorities.

Conclusion

Our goal is to support research that addresses emerging and pressing issues related to urban agricultural and ecosystem service sustainability, thereby adding to our academic and practical understanding of integrated food systems, ecological infrastructure, and soil health in urban environments. To meet this goal, our NRSP12 structure is designed to connect researchers rapidly and meaningfully across institutions and with stakeholders and practitioners and sustain engagement along related research themes. Our IRNs serve as intellectual focal points for guiding and fostering new research. Our RSAs provide soft skills and technical training for participants, creative opportunities for interdisciplinary research development and practice, and financial incentives for fast-tracking promising research. Our Urban Data Hub provides support for easily sharing, accessing, and engaging with related data and promoting research outcomes. The activities and structure of the NRSP complements NUREC's national network of policymakers and practitioners – streamlining the translation of science to action.

How does this NRSP pertain to a national issue?

Urbanization is a defining demographic and environmental trend in the United States. Urban communities face complex and interlinked challenges from climate change impacts, degraded soils, food and water insecurity, public health inequities, aging infrastructure, and limited access to nature and nature-based benefits. These issues are not confined to a single region; they affect cities in every state and across all land-grant university regions. As such, they represent a truly national challenge requiring coordinated support through shared infrastructure, robust research networks, and the translation of science to action through the integration of research, Extension,

and stakeholder communities. NRSP12 offers a research network structure that coordinates researchers across three pressing research themes and across multiple spatial scales. Through its innovative approaches it will increase research quality and comparability, accelerate new research efforts by providing structured support for team building and proposal generation, strengthen Extension translation, and leave a lasting legacy of open data, shared methods, and a trained, connected community. This fulfills the NRSP mission to support, enable, and facilitate high-priority research across the LGU system.

Addressing National Issues

Urban Agriculture Systems

Urban agriculture (UA) has re-emerged as a multifaceted strategy for urban sustainability and resilience, integrating food production directly into city systems. Managing UA requires thinking differently to traditional agriculture, especially in how limited resources (space, light, water, etc.) can be used creatively to maximize productivity. A growing body of work has emphasized examining UA through the food-energy-water system (FEWS) nexus lens to better manage these resource trade-offs and potential synergies in holistic ways [4]. However, in practice most cities continue to address food, energy, and water in isolation [5]. Given that UA has the potential to provide numerous benefits- ranging from improved food security to enhanced ecosystem services and social well-being- there could be substantial, compounding economic and societal benefits to UA when managed as a FEWS [6] [7] [8], including helping US cities serve as models for meeting global Sustainable Development Goals (e.g., SDG 2: Zero Hunger, SDG 12: Ensure Sustainable Consumption and Production Patterns) [4] [5] [6] [9].

Managing UA as a FEWS will require addressing several pressing issues. First, many new technological innovations—such as controlled-environment agriculture—have not yet been evaluated for long-term sustainability in supporting urban agriculture needs [9]. Second, in-ground, uncontrolled environment UA systems differ substantially in both form and function from rural agroecosystems [8] [10]. UA often is situated in urban soils and fragmented urban ecosystems [11] [12]. Interdisciplinary approaches using a FEWS lens could help address these challenges through new research that aims to help UA take a different approach to nutrient and pest management, irrigation, harvesting, processing, and marketing.

Nature-Based Solutions and Ecosystem Services

Nature-based solutions (NbS) go hand-in-hand with UA efforts to address urban challenges by leveraging ecosystem services and green infrastructure, providing services like stormwater management, pollination, urban cooling, carbon sequestration, and public health benefits. NbS have gained prominence as multi-benefit strategies for urban sustainability and climate resilience [13]. Studies show that well-designed NbS can reduce flooding, mitigate heat islands, support biodiversity, and enhance human well-being. However, key debates center on their effectiveness and equitable implementation. Poorly planned projects may reinforce system deficiencies such as unequal access to green infrastructure or improper planning and zoning ordinances for conditions that may limit community access to clean water, food, and infrastructure.

Another challenge is the gap between research and practice in deploying NbS at scale. Many cities pilot NbS projects but mainstreaming them into policy and infrastructure investment remains slow [1] [2]. Obstacles include fragmented governance, lack of long-term monitoring,

and design approaches that do not account for local ecological conditions [14] [1] [2]. To overcome these barriers, scholars recommend developing global knowledge networks for sharing NbS best practices, innovating financing models that value ecosystem services, and creating regionally adapted implementation strategies [14]. Interdisciplinary collaboration is likewise critical, integrating ecology, urban planning, engineering, and social sciences to fully quantify NbS benefits and optimize co-benefits [13] [15].

Urban Soils and Anthropogenic Landscapes

Urban soils, often heavily altered by construction, pollution, and other human activities, form the foundation of urban green infrastructure and UA. Although frequently overlooked, recent research shows that these soils provide essential ecosystem services, including carbon storage, stormwater regulation, nutrient cycling, and support for vegetation that improves air quality, reduces urban heat, and enables sustainable food production [16] [17].

A major recurring issue in urban soil science is contamination. Many city soils contain legacy pollutants such as lead from older house paints and gasoline, posing health risks and constraining the growth of UA [18] [19]. Toxic metals and other contaminants often necessitate soil testing, remediation, or the use of clean substrates or raised beds to ensure food safety [18]. Identifying effective strategies to manage contamination, especially in-situ techniques, is an increasingly important topic for future research [20].

Meanwhile, the physical and biological properties of urban soils remain comparatively understudied. These properties influence soil structure, water retention, microbial activity, and plant growth, yet they are rarely assessed, or their unique structure integrated into planning decisions [17]. For cities to effectively incorporate soil considerations into urban planning and design, particularly for NbS and UA, interdisciplinary approaches are required. Collaboration among soil scientists, ecologists, engineers, and public health researchers is essential for developing strategies that address contamination while also improving soil function and food production [16]. Ultimately, improving urban soils is a key step toward building sustainable, healthy, and climate-resilient cities.

Leveraging the Best Minds and Resources

Urban sustainability and resilience cannot be addressed by individual institutions acting alone. NRSP12 will promote interdisciplinary collaboration to generate new research and will draw on expertise across the SAES system and beyond, integrating soil scientists, ecologists, engineers, social scientists, planners, and Extension professionals into coordinated IRNs. Within these networks, we will provide platforms for cross-pollination of ideas, avoiding duplication of effort, and enabling more rapid progress. Importantly, IRNs will encourage researchers to work with municipalities, NGOs, and federal agencies to ensure that science addresses real management concerns.

NRSP12 is complementary to other NRSPs by providing support services that enable multistate research. While other NRSPs focus on specific agricultural production systems or specific components of production systems, NRSP12 focuses on the urban interface, a space that is often underrepresented but critically important for national sustainability. Its role is to provide opportunities for multi-state researcher networking, curation of existing information, support of new research initiatives, and mechanisms for communicating findings through new shared

technologies. By filling this gap, NRSP12 ensures that urban issues are fully integrated into the national agricultural experiment station and Extension agenda.

This proposal builds directly on the increasing recognition of urban systems as a national priority for the land-grant system. Initiatives like NUREC, NUEL and recent USDA investments in urban agriculture, urban forestry, and heat health highlight the continuing need. NRSP12, and its integration with NUREC, provides a logical progression by offering a durable support framework to institutionalize and scale this work. Rather than a temporary project, it embeds the NRSP12 framework into existing, well-known institutions, enhancing our existing ability to support a wide array of multistate research and Extension efforts for years to come.

Rationale

Priority Established by agInnovation

This project aligns directly with national priorities identified by agInnovation and the ESCOP Science and Technology Committee (STC). The ESCOP Science [21] and Land-grant University [22] and National Climate Change [23] roadmaps highlight the need for research support activities that advance agricultural science by addressing cross-cutting challenges such as sustainable production, resilient ecosystems, climate adaptation, water and soil stewardship, and stakeholder engagement. NRSP12 IRNs address priority issues related to Climate Change and Resilient Ecosystems (P1), Water Resilience (P2), Sustainable Food Systems (P3), Resilient Lands (P4), and Human Health and Nutrition (P5) through their focus on urban agricultural systems and ecosystem services.

IRN Research Priority Areas

NRSP12 IRNs focus on three research priority areas that are critical for urban agricultural and ecosystem science and are well suited to a collaborative, multi-state approach. Each IRN will support opportunities where a national effort can accelerate discovery and application across new ideas and knowledge scales within AgInnovation priorities.

1. Urban Agriculture Systems

New and innovative approaches are needed for agricultural production in non-traditional systems that benefit the farmer, the urban community, and the urban ecosystem. In particular, the structure and management of urban agriculture and agriculture-adjacent resources will determine how well communities can support and sustain effective and productive UA systems such as community gardens, rooftop and Building-Integrated Agriculture (BIA), hydroponic and aquaponic systems, other forms of Controlled Environment Agriculture (CEA), etc.

To maximize the efficiency, benefits, and profitability of UA, research on urban-adapted integrated pest management, scalable nutrient management, appropriate irrigation and harvesting strategies and technologies is crucial [12] [24] [25] [26] [27] [28] [28]. In contrast, soil-based systems provide social and nutritional benefits but are space-limited, often encounter contaminated soil, and are restricted by lack of infrastructure and urban-adapted technical support [10] [29]. This IRN will support research that explores these UA production systems and their human and environmental interactions through topical areas such as:

- **FEW trade-offs (P1, P3, P4, P5):** What types of energy, water, labor, and yield trade-offs exist among indoor, rooftop, agrivoltaics, soil-based, and other types of urban agriculture systems? What connections exist between urban food production and regional agriculture systems to enhance resilience under climate and supply-chain stress?
- **Efficient scaling of technology (P2, P3, P4):** How can urban agriculture systems be designed to optimize water reuse, renewable energy integration, and nutrient cycling without compromising food safety and economic viability?
- **Climate Resilience (P1, P4, P5):** How do different urban agriculture models (e.g., rooftop farms, vertical farming, CEA, community gardens) influence the resilience of FEW systems under climate extremes, and what role can smart technologies and novel governance frameworks play in enhancing adaptive capacity and supporting equitable access to benefits?

These topical areas align with existing multi-state and SAES Hatch or McIntire–Stennis projects such as:

- NE2401: Urban Agriculture: Innovation, Stewardship, and Local Engagement
- NE2335: Resource Optimization in Controlled Environment Agriculture
- W5185: Biological Control in Pest Management Systems of Plants
- NCERA101: Controlled Environment Technology and Use
- NE2206 Green Stormwater Infrastructure and Agriculture
- WERA 1053: Urban Agriculture and Food Systems
- SAES – Improving pest management in urban ecosystems through comprehensive integrated pest management plans.

2. Nature-Based Solutions (NbS) and Ecosystem Services

Cities worldwide are turning to non-agricultural nature-based solutions (NbS), such as green roofs, street tree plantings, rain gardens, bioswales, urban wetlands, and pocket parks, to address challenges like flooding, extreme heat, air and water pollution, and declining biodiversity [13] [30] [31] [32]. While NbS hold great promise for urban resilience, their adoption and effectiveness in U.S. cities are not yet well understood in a systematic way. Performance data on urban NbS (e.g., stormwater retention, temperature reduction, air quality improvement, human health benefits) are often inconsistent or localized, making it difficult for planners to predict outcomes in new contexts [1] [2]. Governance of NbS can be fragmented. For example, responsibilities may be split between public works and parks departments, or between city and homeowner actions which complicate maintenance and long-term success. There is also a need to examine trade-offs and unintended consequences. At present, much of the evidence for NbS benefits in urban areas remains anecdotal or site-specific. A coordinated research effort can help move from isolated case studies to a generalizable understanding of what works, where, and why in deploying NbS across different urban contexts. Examples of AgInnovation related research in this area include work exploring:

- **The role and function of ecosystem services (P1, P2, P3, P4):** Understanding how urban agriculture and other NbS can mitigate heat stress, manage stormwater, increase biodiversity to support pollination and nutrient cycling and improve urban environmental health.

- **Decentralized vs. centralized solutions (P1, P2, P3, P4).** Comparing the effectiveness and cost-benefit of decentralized green infrastructure versus traditional centralized infrastructure. This includes analyzing how different urban density or land-use contexts influence which approach performs better.
- **Unintended consequences and trade-offs (P1, P2, P4, P5).** Developing cross-site protocols to study potential unintended impacts of urban greening (e.g., does installing bioswales in a community lead to any displacement to maximize societal benefits and minimize inequities?).

These topical areas align with existing multi-state and SAES Hatch or McIntire–Stennis projects such as:

- NE2206 Green Stormwater Infrastructure and Agriculture
- WERA1508: Western Water Network for Addressing Complex Water Issues
- NE1962: Outdoor Recreation, Parks and Other Green Environments: Understanding Human and Community Benefits and Mechanisms
- NE1962: Outdoor Recreation, Parks and Other Green Environments: Understanding Human and Community Benefits and Mechanisms
- MAS 00554 Rebirth and Resilience: Building Social, Cultural, and Green Infrastructure to Revitalize Legacy Cities and Make Them More Resilient to the Effects of Climate Change
- SAES – Urban tree ecosystem services, disservices, and net benefits.
- FRST – St. Univ. of New York - Increasing Community Resilience and Reducing Disaster Risk through Equitable Urban Forest Planning
- FRST – Univ. of Washington - Translating Urban and Community Forestry Human Health Evidence to Integrated Urban Planning and Policy
- SAES – Decoding urban soil landscapes – A framework for improving ecosystem services and lifescape quality.

3. Urban Soils and Anthropogenic Landscapes

Urban soils are often disturbed or manufactured, composed of fill, construction debris, and legacy contamination affect our urban community’s health, infrastructure, agricultural, and ecosystem security [33] [34] [35] [36]. Yet these soils are frequently used to support urban food production and green infrastructure initiatives [37]. Understanding and improving these soils is crucial for maintaining environmental health, sustaining food production, and promoting sustainable urban design.

Research that explores efficiencies in implantation practices (e.g., faulty implementation without geotextiles, properly sized perforated pipes, or sufficient clay liners may contribute to contamination of groundwater in a filtration basin), nutrient cycling and leaching in urban soils, legacy contamination (e.g., heavy metals, PFAS, microplastics) and impacts on community health, physical properties (i.e., infiltration and structure) that affect urban design and infrastructure, and biophysical properties such as microbial communities that are key to preserving ecosystem services, are all urgently needed.

Examples of AgInnovation related research in this area include work exploring:

- **Soil Contamination and Community Health (P3, P4, P5):** How do legacy pollutants and emerging contaminants in urban soils influence crop nutrient quality? What remediation strategies can balance food production with soil ecosystem integrity? What is the impact of specific contaminants in urban soils on humans and the environment (e.g. lead, PFAS, and microplastics)?
- **Soil-Ecosystem Links (P1, P3, P4, P5):** How does soil microbial diversity in urban agricultural and NbS sites affect nutrient cycling, carbon sequestration, and resilience to climate stressors, and what design interventions can enhance these ecosystem services?
- **Soil-Structure Interactions (P2, P3, P4):** In what ways can urban soil management practices (e.g., compaction reduction, organic amendments) improve stormwater infiltration and structural stability of green infrastructure while supporting productive and profitable urban agriculture?

These topical areas align with existing multi-state and SAES Hatch or McIntire–Stennis projects such as:

- NE2401 Urban Agriculture: Innovation, Stewardship, and Local Engagement
- W525: Evaluation of Outcomes-Driven, Aspirational Goals to Achieve National Food Security
- NE2206 Green Stormwater Infrastructure and Agriculture
- NCERA59: Soil Organic Matter: Formation, Function and Management
- NCERA3: Soil and Landscape Assessment, Function and Interpretation
- W5188: Soil, Water, and Environmental Physics to Sustain Agriculture and Natural Resources
- NCERA103: Specialized Soil Amendments and Products, Growth Stimulants and Soil Fertility Management Programs
- NCERA13: Soil Testing and Plant Analysis.

Relevance to stakeholders:

Identification of Stakeholders and Related Needs

The project is designed with a wide stakeholder base that spans the research, Extension, policy, and community landscape. Primary stakeholders include:

Land-Grant University (LGU) Researchers and Experiment Stations: Faculty, postdoctoral researchers, and graduate students across SAES institutions, including ecologists, biologists, soil scientists, hydrologists, engineers, urban planners and social scientists will be engaged to develop standardized evaluation frameworks and to synthesize knowledge across cities, thereby accelerating the smart implementation of NRSP12 outcomes. NRSP12 will offer researchers unique opportunities to collaborate at broader scales and across disciplines and leverage the Urban Data Hub, which should lower barriers to entry for urban research, provide standardized datasets, and enable cross-site comparisons. Appendix 1 includes 30 letters of intended engagement with NRSP12, including businesses (1), NGOs (4), foundations (1), and university faculty, centers, institutes, or colleges (24). Of those from universities, 9 were from individual faculty members and 15 were from centers, institutes, or colleges as well as from all regions of the country: 13 from the West; 3 from the South; 2 from the Northeast; 5 from the North central,

and 1 national. We also conducted interviews with researchers about the NRSP as a project (see Appendix 2: Interviews with Researchers) and more specifically about the research priorities for urban agriculture [3].

Extension Professionals: County and urban Extension agents, NUEL members, and program leaders who serve as translators of research to communities and managers interested in ensuring land and water resiliency for urban agricultural and ecological systems in the face of climate change and urbanization pressures. NRSP12 will allow Extension to access new research results, connect communities with research teams, and be more proactive in responding to urban agricultural and ecosystem challenges more easily (see attached letter of commitment from NUEL).

Government Agencies: Local level city planners and sustainability offices [2] and individuals at state public health, environmental and agricultural departments require credible science-based outputs to inform policy and decision-making. Federal agencies (e.g., USDA, EPA, HUD, NOAA) that support urban sustainability require national datasets and methods to inform programs and investments. NRSP12 will provide managers and policymakers with access to a centralized, reliable platform for urban data that complements and extends existing datasets (e.g., USDA urban agriculture toolkit, EPA green infrastructure guidance). We have letters of intent to engage from the National League of Cities (see Appendix 1)

Community-Based Organizations and NGOs: Urban agriculture groups, neighborhood associations, food justice coalitions, and nonprofits often provide frontline services to urban communities and would benefit from research-based information, including data sets and standardized metrics of ecosystems services provided by NbS, on which to base local programming ([1] and letters of intent to engage from Landscape Architecture Foundation, Scholars Strategy Network, and ICLEI USA in Appendix 1)

Industry and Private Sector Partners: As interest in NbS and urban agriculture grow, companies working in green infrastructure, urban technology, consulting, and engineering fields need a reliable research base and open datasets on which to build their businesses and standardized metrics to use in evaluating performance([38], and letter of intent to engage from Green City Growers in Appendix 1).

Stakeholder Involvement in Project Development and Activities

Stakeholders and participants have been actively engaged in shaping NRSP12 since its inception [3] [1] [39] (see Appendix 1 and Appendix 2). During the concept-building stage, municipal officials, Extension leaders, and community-based organizations have participated in several NUREC activities, listening sessions and webinars, including:

Building Collaborative Research and Extension Networks to Advance the Application of Science with Urban Communities. In July 2024, NUREC and NLC co-convened a by-invitation summit with 43 individuals representing federal agencies, local governments, non-profits/membership organizations, land-grant universities, and a non-land-grant urban serving university to identify research priorities and potential educational/Extension programs in the issue areas of: 1) urban agriculture and food systems, 2) health and wellness, and 3) the built environment [40].

Generating Research Opportunities Workshop (GROW) for Urban Agriculture. This 2023 workshop was a virtual event designed to engage potential research, Extension, education, industry, and community collaborators from across the nation in integrated urban agriculture proposal development. During this conference, interdisciplinary teams collaborated to develop creative and effective proposals rather than spend resources competing against one another. (<https://sites.google.com/msu.edu/grow-uaconf/home>).

Leading Edge Dialogues: In 2019, NUREC (formerly WCMER) hosted the National Urban Extension Conference and launched the Leading Edge Dialogues, a series of 90-minute interactive workshops which explored critical issues facing our cities and our universities and developed recommendations and opportunities for collaboration [41].

Urban, Indoor, and Emerging Agriculture: During May 2020, NUREC, in conjunction with NUEL and several urban Farm Bureau county organizations, conducted four on-line listening sessions to solicit, collect, and submit responses from a broad group of stakeholders to inform NIFA’s development of Urban, Indoor, and Emerging Agriculture program [42].

Sustainable Urban Systems: In 2019 NUREC brought together a select group of 40 scientists and practitioners across an array of disciplines, sectors, and locations as part of the National Science Foundation’s development of their Sustainable Regional Systems program. Publications include a guide for city planners, a guide for developing community outreach and engagement for researchers, and a project report, all available at: <https://nurec.extension.org/portfolio-item/sustainable-urban-systems/>.

Urban Green Infrastructure: In early 2018, NUREC hosted a summit to connect scientists, Extension professionals, practitioners, and community leaders to share existing resources, inform education and research priorities, and build new collaborative, problem-solving networks program [43].

Promoting Urban Food, Energy and Water Resource Resilience via the Regional Food System. This 2016 summit built on 27 key-informant interviews and convened researchers, Extension professionals, urban food producers and policy makers to understand how food, energy, and water are interdependent in the context of changing environmental pressures and policies [27].

Built Environment Rx Series. NUREC’s 2025 Built Environment Rx Series [44] explored how urban design, planning, landscape architecture, and construction practices can improve human and ecological well-being across U.S. communities. This four-part series brought together scholars, practitioners, and community partners to examine “living systems” in the built environment including water, vegetation, soil, and the city itself and to highlight emerging research, metrics, and collaborative approaches for healthier, climate-adaptive urban systems. Sessions featured national experts and fostered dialogue across universities, agencies, and community organizations.

<https://nurec.extension.org/portfolio-item/built-environment-rx-series/>.

This input directly shaped our IRN and SWG structure and focus. To ensure that our network stays relevant to urban issues, each IRN will have mechanisms to involve community stakeholders and end-users in meaningful ways. This will build on the Memorandum of

Understanding between NUREC and NLC (Appendix 4 and their engagement letter in Appendix 1) to include a municipal representative or community organization leader as a co-chair of each IRN, hosting listening sessions or “urban needs” panels at IRN meetings and stakeholder meetings (e.g., NLC’s annual City Summit), and partnering with Extension in each state to connect research teams with local stakeholder groups to co-design research agendas, contribute datasets, and participate in case studies. This engagement ensures that the research conducted addresses real-world needs and that outreach pathways are built in from the start.

Involvement in Review and Management Plans

NRSP12 governance includes an Advisory Committee with stakeholder representation across SAES, Extension, and partner organizations. The Advisory Committee will help to guide project priorities, facilitate partnerships for pilot projects, and provide feedback on overall network structure and achievements, ensuring that activities respond to real-world needs rather than academic abstraction. This ensures balanced oversight and responsiveness to community and practitioner needs. Members of the Advisory Committee will also contribute through annual advisory forums, where they can review progress, assess outputs, and suggest course corrections.

Relationship of Stakeholders with Research Support

Stakeholders are not passive recipients but active partners. By embedding Extension educators and municipal representatives within leadership structures, NRSP12 ensures that research support activities are continually informed by practice. The Urban Data Hub will provide stakeholders with access to open, standardized datasets and visualization tools, reducing reliance on fragmented or proprietary information. In turn, stakeholders will contribute local data, knowledge, and feedback, creating a reciprocal relationship between research support and application.

Mechanism for Assessing Stakeholder Use of Outputs

NRSP12 incorporates a comprehensive evaluation and assessment framework that includes:

- Usage Analytics: Tracking downloads, dataset contributions, and visualizations accessed from the Urban Data Hub.
- Surveys and Feedback Loops: Periodic surveys of researchers, Extension professionals, municipal staff, and community organizations to measure adoption, satisfaction, and impact of tools.
- Advisory Forums: Annual convenings where stakeholders review outputs, share use cases, and recommend adjustments.
- External Evaluation: A mid-term independent review that includes stakeholder interviews and case studies of use.
- Outcome Indicators: Metrics such as number of municipalities adopting standardized NbS metrics, number of Extension programs using urban soil curricula, or new policies informed by project outputs.

See Appendix 3: Evaluation Plan Overview for more details.

By establishing robust mechanisms for tracking stakeholder use and producing policy-relevant outcomes, NRSP12 ensures that its research support activities will directly inform decision-making, advance national priorities, and strengthen the land-grant system's public value.

Implementation:

A. Objectives and Projected Outcomes:

Objectives:

O1: Building Networks. The goal of each IRN is to recruit and foster a research community that can identify innovative, collaborative research strategies to tackle challenging issues. To accomplish this goal, each IRN will provide regular opportunities to contribute expertise, share ideas, and collaborate with others across institutions nationally.

YEARS 1 & 2

- IRN Program Leaders will articulate key thematic area priorities and create flyers and presentations to introduce IRNs to different groups, units, or institutions to build interest and recruit participants nationally.
- RSAA leads will work with IRN Leaders to structure regular workshops aimed at building interdisciplinary team skills, and Link & Learn events aimed at sharing expert knowledge and providing opportunities for dialogue and learning about new work.
- Urban Data Hub leads will meet with IRNs to review existing data in the CARES Map Room and host seminars on the services that they provide to NRSP12 participants.
- IRN Program Leaders, project PI's, and Advisory Committee members will recruit individuals from municipalities, NGOs, and federal agencies to ensure that science is co-produced with those responsible for implementation

YEARS 3-5

- IRN Program Leads will continue to recruit from new groups, units, or institutions as would be relevant to the research efforts.
- RSAA leads will continue to work with IRNs to host training and seminar events.
- Networking activities and Hub use would be embedded in research acceleration through Synthesis Working Groups, proposal development workshops, and seed grant opportunities.

O2: Synthesizing Knowledge. Given the vast amount of existing data available, the NRSP12 will specifically support efforts that leverage these data to create new knowledge, resolve contradictions, enhance generalizability of findings, and inform policy and practice.

YEARS 1 & 2

- Each IRN will support one Synthesis Working Group (SWG) annually (3 total per year). IRN leads will identify a specific, compelling research question related to their thematic area that could be answered with the integration and analysis of existing, related datasets. These questions should support scientific advances aimed at improving regional

generalizability, resolving contradictory findings from different studies or locations, or creating new conceptual models or insights. Each SWG will be comprised of a research committee made up of faculty and other experts in this area with the support of one graduate student Research Fellow (9mo, 0.5FTE). Together, this team will review existing datasets and papers, identify a methodological approach, coordinate the analysis (kick-started through an in-person workshop), and draft communications about findings (see Figure 1, Figure 2).

- The Urban Data Hub will play a key role in research synthesis, providing rapid access to, and manipulation of, existing data. In this initial phase, we will focus on assembling readily available, high-value datasets and work with the SWGs to visualize and archive outcomes from the group’s efforts. We will develop beta versions of standardized “data reports” for each SWG modeled after existing CARES reports (see Appendix 5 for an example).

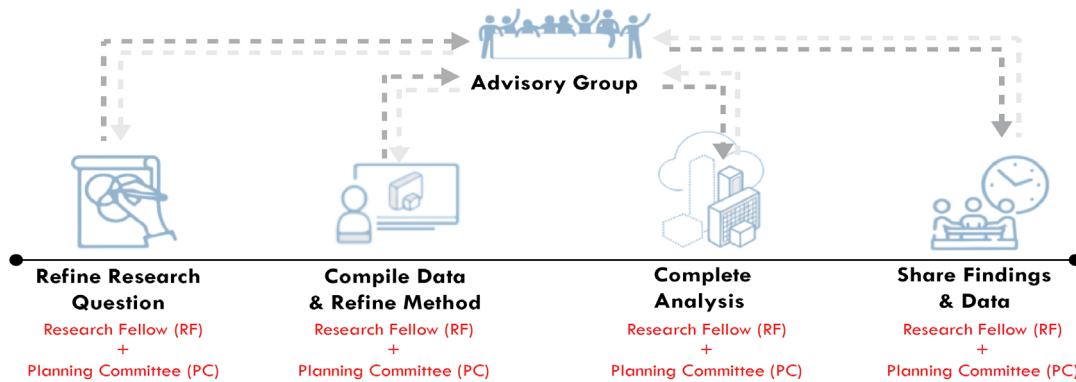


Figure 2. Diagram depicting how Synthesis Working Groups (SWGs) will operate through four core stages supporting by a Research Fellows, Planning / Research Committee and the NRSP Advisory Group.

YEARS 3-5

- Each IRN will continue to host one SWG each per year (three annually) through Year 4.
- In the fifth year, instead of IRN-specific SWGs, representatives from each SWG hosted in Years 1-4 will be invited to come together to provide a five-year perspective for the NRSP12 network.
- Establish the Data Hub as a national urban atlas. Revise and update data reports to include custom geographical boundaries for urban areas, and custom indicator taxonomy along with 100 existing indicators. Finalize and implement a log-in function to the Urban Map Room to allow for uploading of IRN-based data sets and custom mapping and report development.

O3: Accelerate New Research. IRN leads will use SWG findings and community feedback to develop and evolve priority areas in which to support new research across the NRSP12.

YEARS 1 & 2

- Virtual proposal workshops will run annually and will support the formation of interdisciplinary teams to create competitive proposals for extramural funding using platforms and facilitation strategies led by our MSU and WSU teams, with proven success in the urban agriculture domain.

- Seed grant opportunities are sources of internal funding for research acceleration. We anticipate offering 3 seed grants across Years 1 & 2 (\$30,000 each) to support innovative new ideas that advance our science and understanding on IRN-related topics.
- Travel grant opportunities also support research acceleration. We anticipate offering 10 travel grants across Years 1 & 2 (for up to \$2,500 each) to support inter-institutional collaboration for dedicated ideation and writing time with colleagues at different locations.
- We will develop and test a beta version of the IRN Repository, similar to other data repository portals where you can filter data by standardized fields, and established metadata standards. Training will be provided on how to use the tools and the CARES team will work with NRSP12 leadership to develop customized tools for issue leaders and scientists.

YEARS 3-5

- Virtual proposal workshops will run annually in Years 3-5 and will support the formation of interdisciplinary teams to create competitive proposals for extramural funding using platforms and facilitation strategies led by our MSU and WSU teams.
- We anticipate offering 7 seed grants total in Years 3-5 (\$30,000 each) to support innovative new ideas that advance our science and understanding on IRN-related topics.
- We anticipate offering 4 travel grants per year in Years 3-5 (for up to \$2,500 each) to support inter-institutional collaboration for dedicated ideation and writing time with colleagues at different locations.
- Finalize operational aspects of the IRN Repository for both users (e.g. interface and access) and researchers uploading information (e.g. meta data standards, trainings, IRN peer-review process).

O4: Communicating Outcomes. A nationwide network requires nimble, timely, and thoughtful sharing of information, news, and opportunities across a wide audience of interested members.

YEARS 1 & 2

- We will use the existing NUREC website to provide a known and trusted entry point to the NRSP12 including its goals, IRN and RSAA opportunities and activities, Urban Data Hub, and news and updates.
- We will collect evaluation data on participation and engagement in IRNs, and on how RSAAs are being attended and used by participants.
- The Urban Data Hub platform will allow users to register free-of-charge and will offer regular training opportunities on how to upload and access scholarly products, policy documents, and presentations. The CARES team will also work towards developing customized tools for NRSP12 academic and non-academic needs. By Year 2, we will develop and beta-test the integration of evaluation metrics to document use, implementation, and impact of Data Hub elements.
- We will develop and operationalize how the NUREC website, Urban Data Hub, and CRM will collect evaluation data for the NRSP and develop reporting templates to share use of NRSP elements (see Measuring Accomplishments and Impacts and Appendix 3: Evaluation Plan Overview).
- The Steering Committee and Advisory Committee will develop the communication pieces detailed in the Outreach, Communications, and Assessment section.

YEARS 3-5

- We will continue to collect evaluation data on our IRNs and on RSAA use. We will use this Year 2 reflection point as an opportunity to course correct or improve our offerings for the remaining years.
- In addition to NRSP12 activities and results disseminated through disciplinary channels and AES networks, we will also leverage partnerships with NUEL, NLC, NACo and others to get information, data, and outputs to decision makers and practitioners.
- Finalize and implement evaluation metrics to track use across all elements of the Urban Data Hub, including customizable reports of use by institution, region, and topic to tailor communicating value to stakeholders.

Projected Outcomes

Given the scope and goals of the NRSP12, we anticipate a diversity of cross-institution, high-impact outcomes that make major scientific advancements in the field of urban agricultural-ecosystem research, benefitting both academia and our nation's cities. Our anticipated outcomes include:

- Establishment of robust, national networks of researchers who collaborate to solve pressing urban challenges across disciplines and scales.
 - Our IRNs will provide a structured approach for building insights across disciplinary domains and scales of interest to strategically link regional, local, and hyper-local work that leverages disciplinary expertise and local knowledge towards interdisciplinary solutions to complex challenges at the national scale.
 - Our RSAAs will provide researchers with training and engagement opportunities aimed at helping them build lasting relationships with colleagues across the nation.
 - Our digital presence, RSAAs, virtual networking, and Urban Data Hub will create a robust network for researchers, decision-makers, and practitioners to learn, engage, share, and connect across pressing urban agricultural-ecosystem issues.
- A new national cohort of researchers who have been trained in interdisciplinary best practices and have experience leading research teams in research synthesis and acceleration.
 - By focusing on both synthesis and research acceleration, the NRSP12 positions participants to serve as national and global research leaders through SWGs that provide the structure and support to rapidly make new connections across existing knowledge, and our proposal development and support (i.e., workshops, seed grants, travel grants, networking) provide resources to help launch novel ideas into scientific successes and applied solutions to real-world challenges.
 - NRSP12 will capitalize on the decades of experience our PIs bring related to team science, interdisciplinary skills building, convergence science, and proposal development. The core structure of NRSP12 is based on building and sustaining strong, collaborative, innovative teams of researchers through novel, engaging, and incentive-based opportunities.
 - Our approach includes opportunities for faculty to continually develop and hone their interdisciplinary and collaborative soft skills, and Train-the-Trainers experience so NRSP12 researchers can apply what they have learned at their home institutions.

- A high-visibility, easily accessible data platform for housing a diversity of urban data.
 - The Urban Map Room and IRN Repository offer a unique service for centralizing and maintaining access to a breadth of interrelated urban data. The results of the archiving, visualizing, and training efforts funded here will support research efforts for decades to come.
- A viable plan for sustaining the NRSP12 network beyond the lifetime of this project.
 - Our efforts for building strong networks, training teams to conduct deep interdisciplinary research, and curating and sharing urban data will create deep roots in our participant’s home organizations, institutionalizing core pieces of our network through a distributed support system.
 - By integrating NRSP12 within NUREC, a long-term sustainability plan is envisioned from the beginning which will ensure that OTT funds invested in NRSP12 will have a lasting impact on SAES research and the land-grant university system. NUREC’s business plan to transition into a Research and Extension Consortium is consistent with this plan.

B. Management, Budget, and Business Plan

Management and Organizational Structure

Steering Committee: NRSP12 will be managed by a steering comprised of the two IRN leads (Dr Dan Cronan and Dr Joshua Arnold), Data hub leadership (Chris Barnett), professional development leadership (Dr Julie Padowski and Dr Edgar Cardenas) and project director (Dr Brad Gaolach). The steering committee will meet virtually each of the first six months of the project, every other month for the balance of year 1, and then quarterly during years 2-5 of the project. The steering committee, advisory committee and external reviewer will meet in person annually. The steering committee will review progress and ensure that activities remain aligned with project goals and stakeholder needs. This committee also plays a role in evaluation oversight and in planning for sustainability (e.g., identifying opportunities to institutionalize parts of the project into existing national programs).

Advisory Committee: In addition to the AAs and NIFA representative, it will include representatives from research (Bret Hess, Executive Director AgInnovations – West); Extension (designee of NUEL, see Appendix 1); Extension Foundation (TBN); NLC (Dr. Chistine Baker-Smith, Director of Research); National Association of Counties Large Urban County Caucus (TBN); and a representative from a non LGU urban serving university (TN). They will provide strategic guidance for the NRSP, review performance of the NRSP, provide a feedback loop to ESCOP, ECOP, and USDA and identify further action and/or communication needed to be shared with constituents and stakeholders. They will meet annually with the steering committee.

External Evaluation: We will employ an external evaluator throughout the project to measure the overall outcomes, successes, and challenges of the NRSP and identify areas for improvement. The evaluator will use qualitative, quantitative, and mixed methods, employing focus groups and individual in-depth interviews to collect primary data. Additional data will also be collected from the documents and other outputs developed as part of the NRSP activities. They will provide summative reviews in years 2 and 5. They will meet annually with the steering and advisory committees at a minimum and more frequently (virtually) as needed

Executive Team: NRSP12 will be administered within NUREC, which has been hosted by Washington State University since inception. This will allow integration with and leveraging of NURECs established research, Extension, and stakeholder connections. WSU currently provides fiscal administration of NUREC as well as overall organizational support for the Director (Brad Gaolach), operational management (Martha Aitken), an urban Extension specialist and a project specialist. NRSP12 will have access to WSU's resources such as communications hosting and document repositories. The executive team, consisting of the project director, operations director and assistant, will meet weekly as part of NUREC's standing operations meeting to ensure smooth operation of the NRSP, that all milestones are being met, and support to all aspects of the NRSP are being provided.

Budget

Budget Justification

University of Massachusetts is requesting salary and benefits for 0.10 FTE annually for Dr Josh Arnold to provide leadership for the Urban Agriculture Systems and Soils IRNs and annual travel to the in-person steering committee (\$1,771). Dr Arnold is an agroecologist who combines research, Extension, and teaching to impact the health of cities and increase food security. He specializes in integrated pest management, soils, and the social-ecological factors that influence and create urban agroecosystems. Total five-year salary requested for Dr. Arnold: \$54,480 plus \$17,051 benefits

Michigan State University is requesting salary and benefits 4 staff (cumulative 0.33 FTE) from the Toolbox Dialogue Initiative (TDI) to support the Research Synthesis and Acceleration Activities (RSAAs) and travel for 1 person to the annual in-person steering committee meeting (\$1,771). Total five-year salary requested: \$182,243 plus \$68,515 benefits

TDI has developed and provide training similar to the RSAAs to National Science Foundation projects (AceelNet, Convergence Accelerator, Growing Convergence Research Programs, EPSCoR and BEACON programs), NASA, the Swiss National Science Foundation, European Commission and 6 US-based Institutions (5 LGUs), among many others.

Dr. Edgar Cardenas will lead activities focused on interdisciplinary training. He will contribute to the design and delivery of quarterly team science and research synthesis webinars, Link & Learn events focused on networking and idea cross-pollination, team science and participatory research capacity building activities, and office hours. He will also co-lead the development and management of Synthesis Working Groups (SWG) and serve as a reviewer for evaluating travel grant and seed grant competition applications. Dr. Cardenas will serve as the institutional lead for Michigan State University.

Dr. Michael O'Rourke will support Dr. Cardenas in designing interdisciplinary activities, co-managing SWGs, and in overseeing MSU contributions.

A Project Senior Specialist (TBN) will support Dr. Cardenas in designing and delivering all interdisciplinary training activities, including quarterly team science and research synthesis webinars, Link & Learn events focused on networking and idea cross-pollination, Team science and participatory research capacity building activities, and office hours. They will also participate in supporting the development of SWGs.

A Project Manager (TBN) will support Dr. Cardenas by scheduling and running planning meetings, scheduling events, coordinating with NRSP staff, and running budget and personnel reports and will coordinate with the NRSP project assistant.

University of Missouri is requesting funds to support 6 staff (cumulative 0.46 FTE annually) from the Center for Applied Research and Engagement Systems (CARES); travel for 1 person to the annual in-person steering committee meeting (\$1,771; software licensing (\$4,500 in years 1 and 3-5 and \$6,500 in year 2); and \$9,000 for additional computer storage in year 1. Total five-year salary requested: \$182,402 plus \$70,775 benefits.

CARES will provide leadership for the Urban Data Hub. CARES develops and hosts web-based resources that support access to thousands of geographic data sets, supports tools that provide tailored insight into data impacting local condition, and provides information and tools with the goal of helping communities obtain and understand how to use data to better support decision making. Aside from the limited software and hardware storage costs requested, the project will leverage the existing infrastructure to maintain the CARES map room (<https://careshq.org/map-rooms/>) at no cost to the project.

Over the last three decades, CARES has worked with state and federal agencies, researchers and non-profits, and local communities and organizations, to better visualize and communicate issues in a manner that supports informed decision-making.

<https://extension.missouri.edu/programs/cares/>. Since 1992, CARES has collaborated on projects with support from several foundations, non-profit organizations, government agencies, and partnering university researchers. Selected funders include Robert Wood Johnson Foundation, WK Kellogg Foundation, Kaiser Permanente, National Science Foundation, US Department of Agriculture, Environmental Protection Agency, US News, Missouri Department of Economic Development, and the Missouri Department of Natural Resources. Through these collaborations, CARES has developed a significant portfolio for data collection and management, web-based content delivery, and spatial analysis.

Chris Barnett, CARES Director, will direct implementation of the Urban Data Hub, collaborate with project partners, oversee CARES staff assignments and budget allocations, and contribute to project evaluation and distribution of results.

Project Coordinator (TBN) will support the CARES Director on management of the project, oversee daily project operations, coordinate with project partners on project issues and milestones, and assist with project reporting and evaluation.

Data and Database (TBN) staff will identify and integrate the data supporting the project systems, design and support an optimal database structure, implement and maintain map and report content, and manage data-related website content.

Programmer and website developer (TBN) staff will design and implement project system web interfaces, ensure compliance with digital accessibility and other applicable standards, develop programs supporting Urban Data Hub tools, and collaborate with broader project staff on Hub review and modifications.

Fiscal and systems administer (TBN) staff will ensure project systems are current and compliant with standards, set up required data storage and management systems, and collaborate with

project management and University of Missouri fiscal officers on project expenditures and fiscal reporting.

Communications staff will be responsible for website content development, supporting communications events, and preparing reports and user support documents.

Washington State University is requesting funds to support:

Senior Personnel:

Dr. Brad Gaolach is requesting salary and benefits for 1.5 months in Year 1, and 1.0 months in Years 2-5 to provide overall project direction and oversee Martha Aitkin and Maggie Anderson. Total five-year salary requested for Dr. Gaolach: \$66,122 plus \$19,890 in benefits.

Dr. Dan Cronan is requesting salary and benefits for 2.0 months per year for the duration of the project. Cronan will lead efforts related to the Nature-Based Solutions and Ecosystem Services IRN and co-lead the Urban Agriculture Systems IRN. Total five-year salary requested for Dr. Cronan: \$106,442 plus \$33,316 in benefits.

Dr. Julie Padowski is requesting salary and benefits for 2.0 months per year for the duration of the project with a projected inflation of 4% per year. Padowski will lead the Research Synthesis and Acceleration Activities, including overseeing SWG Research fellows, Travel Grants, Seed Grants, and SWG Workshops. Total five-year salary requested for Dr. Padowski: \$125,722 plus \$37,351 in benefits.

Other personnel:

Marth Aitkin is requesting salary and benefits for 5% FTE each year to administratively support IRN leads and travel of all participants during the NRSP. Total five-year salary requested for Aitkin: \$25,835 plus \$9,015 in benefits.

Maggie Anderson is requesting salary and benefits for 50% FTE per year to programmatic support to the IRN, RSAA, SWG leads and the activities of the NRSP. Total five-year salary requested for Anderson: \$175,294 plus \$96,850 in benefits.

Synthesis Working Group Graduate Research Fellows will play a major role in conducting science synthesis. SWGs will identify a specific, compelling research question related to their thematic area that could be answered with the integration of existing, related datasets. These questions will support scientific advances aimed at improving regional generalizability, resolving contradictory findings from different studies or locations, or creating new conceptual models or insights. This opportunity will provide twelve early career scientists (one for each IRN for Yrs 1-4) with unique research and networking experiences that are shown to increase the successfulness of research careers for rising scientists [45]. Each fellow will receive a 9-month Research Assistantship (0.5 FTE). New fellows will be selected each year for Years 1-4, and fellows will be chosen for their interest and expertise in the SWG questions selected for that year. Fellows will be selected through an application process and reviewed by the Steering Committee plus 3-6 ad hoc review committee members; these positions will be open to graduate students at any participating University. Fellows will help lead efforts for compiling the SWG-related literature, identifying key knowledge gaps and relevant datasets, and engaging in feedback discussions with the SWG research committee, SWG Advisory Group, and other

workshop participants. Research Fellows would receive \$31.20/hr at 0.5 FTE, with an expected 4% increase per year for inflation. Total salaries requested are \$272,669 and \$50,988 in benefits.

Travel:

Steering Committee: We are requesting funds to allow the steering committee to meet in-person each year to discuss overall project accomplishments and goals. Funds are requested for Gaolach, Anderson, WSU Evaluator, Padowski, and Cronan. Expected costs for this 3-day / 2-night meeting include \$800 for airfare, \$100 for misc. travel, \$248 for lodging and \$92 for per diem for a total of \$1,771 per person or \$44,275 across the project.

Advisory Committee: We are requesting funds to support one, in-person NRSP Advisory Committee per year for Years 1, 3, and 5. Funds would cover five participants, and for this 1 day / 2 night meeting would include \$800/person for airfare, \$100/person for misc. travel, \$248/night/person for lodging, and \$92/person/day for per diem. Total costs per person are \$1,587. Total costs across the project are \$23,808.

Other Costs:

Travel Grant Awards: Travel grants are small, but critical, resources for enabling the exchange of ideas across disciplines, fostering innovation, and broadening research networks for successful collaboration. We request funds to support 24 travel grant awards at \$2,500 each. We anticipate awarding 6 grants each in Years 1 and 5 (\$30,000 total), and 4 grants each in Years 2-4 (\$30,000 total). Total funds requested across Yrs 1-5 are \$60,000.

Research Seed Grant Awards: We request funds to support 10 seed grant awards at \$30,000 each. We anticipate awarding 1 grant Year 1 (\$30,000 total), 2 grants each in Years 2-4 (\$180,000 total), and 3 grants in Year 5 (\$90,000 total). Total funds requested across Yrs 1-5 are \$300,000.

SWG Annual Workshops: We request funds to support one, in-person workshop per year for Years 1-5. Workshops will provide an opportunity for SWG teams to meet once in person to work towards synthesis research goals and recommendations. In Year 5, we will hold a final summative SWG that convenes the Steering Committee and representatives from all SWGs in Yr 1-4 to develop a final set of recommendations for the NRSP. These three-day workshops will cover costs for 25 attendees, and include conference room rental (\$2,000), flights (\$600/person), lodging (\$150/night for 3 nights), meeting refreshments and working lunches (\$4,000/day) and partial per diem (\$35/person/day). Total workshop costs per year are \$47,500. Total workshop costs across the project are \$237,500.

Publication fees: We request \$9,000 annually in Years 1-4, and \$12,000 in Year 5 to cover open access publication fees for NRSP members. Funds will be available by request and based on need. Total requested: \$48,000.

External Evaluation: We request \$59,184 for evaluator costs for the project. This is based on a projected fee of \$9,864 in year 1 for 10% FTE; \$19,728 (20% FTE in years 2 & 5 to support synthesis, analysis, and reporting); and \$4,932 (5% FTE) in years 3 and 4 for basic data collection.

Software licenses: We request \$2,000 per year to cover Gather virtual meeting costs in Years 1-5 (total: \$10,000) and 10,680 in HubSpot subscription fees in Years 1-5 (total: \$53,400). Total costs: \$63,400.

Equipment: We request funds for two Owl 3 plus extra microphone (\$1,483 ea) to support inclusive virtual meeting engagement. Total costs for Year 1 are: \$2,966.

Cloud Storage: Dr. Cronan requests data cloud storage for IRN related activities. We request \$288 per year for Years 1-5. Total requested: \$1,440.

WSU Personnel Details

Dr. Dan Cronan, Assistant Professor in the School of Design and Landscape Architecture at WSU. He is providing leadership for the Built Environment IRN. Dr. Cronan's research interests include Landscape Planning and Landscape Architecture with an emphasis: Food, Energy, and Water Systems (FEWS); Alternative Futures Landscape Analysis (GeoDesign Scenario Planning); Agricultural and Stormwater Best Management Practices (BMP) siting, sizing, and implementation; Urban Sustainability; Urban Ecology; Landscape Planning and Site Planning; and Sustainable construction practices for Landscape Architects; Landscape Planning and Systems suitability analysis and geospatial analytical tools; and Landscape Architecture pedagogical evaluation tools.

He was a team lead and member on an NSF INFEWS grant (# 1639529), contributing scenario modeling and planning to align stakeholder perspectives and researcher-based trajectories of change. The scenario-based land use projections are intended to provide guidance for community planning and a framework for future development in socio-ecological systems, specifically food systems within the urban and rural context. Dr. Cronan has contributed extensively to major national and international research initiatives. He has served as Co-PI on the UNESCO-funded CABN-FABN Atlas of Climate and Environmental Change, where he led atlas architecture and production to support climate-informed decision-making across biosphere reserves. His work also includes co-leading a MetLife Foundation and Lender Center project with Syracuse University and SUNY-ESF in which he directed the production of digital twins to advance placemaking and community engagement.

His ongoing scholarship builds on significant NSF-funded projects, including leading an EPSCoR GEM3 Large Seed project that coupled stakeholder-informed and biophysical scenarios to address uncertainty in socio-ecological systems. He also played a central role in the NSF INFEWS ATLAS initiative, where he guided scenario modeling, GeoDesign workflows, representational strategies, and stakeholder facilitation to create actionable land-use projections for food-energy-water systems resilience. Earlier, as a Geodesign and Representation Team Lead for the NSF GEM3 "Genes by Environment" program, he contributed integrative visualizations and scenario-based planning tools for a \$20 million research effort examining climate-ecosystem interactions. Cronan's work advances scenario-based, stakeholder-driven futures that guide community planning and provide frameworks for resilient development in complex socio-ecological systems, particularly food systems in both urban and rural contexts.

Dr. Julie Padowski serves as the Director for WSU's Center for Environmental Research, Education, and Outreach (CEREO) https://cereow.su.edu/about_us/, and is a Research Associate

Professor with the School of the Environment. Through her work with CEREO, Padowski brings a decade of experience working with students, faculty, staff, administrators, and community partners in advancing interdisciplinary, environmental scholarship and engagement through grant-funded projects. She specializes in approaches that use systems thinking and community engaged scholarship strategies to develop flexible, collaborative structures that bring thought leadership, convene and support multi-, inter-, and transdisciplinary research projects, and will leverage this expertise to build integrated opportunities for research, education, and outreach through the NRSP.

She has been a PI or Co-PI on 23 grants since 2017 that have collectively brought in \$21M in grant-related funding. Notable projects of Padowski's include an NSF Sustainable Regional Systems Research Network grant entitled "Transforming Rural-Urban Systems: Trajectories for Sustainability in the Intermountain West" (#2115169); an NSF Research Experiences for Undergraduates program entitled "Stakeholder Informed Modeling of Innovations in the Food, Energy, and Water (FEW) Nexus" (#1950877); an NSF INFEWS/T1 grant entitled "Increasing regional to global-scale resilience in Food-Energy-Water systems through coordinated management, technology, and institutions" (#1639458); and an NSF NRT graduate training program award entitled, "Rivers, Watersheds and Communities: Training an Innovative, Cross-Sector Workforce for Equitable, Multi-Scale Decision-Making Towards Human and Ecosystem Health" (#2125758).

Dr Brad Gaolach will serve as the project director. He is the founding director of NUREC and WSU's Metropolitan Center for Applied Research and Extension, both focusing on bridging the gap between research and community through extramurally funded projects, NSF and USDA funded workshops, and listening sessions.

Dr Gaolach is trained as a population biologist and community ecologist; he is recognized for bringing systems and sustainability-based approaches to community-based applied research and education programs. Dr. Gaolach utilizes his training as a research scientist and ecologist to bridge the world of academia with community-based applications. He provides leadership on Center projects related to environmental stewardship, systems thinking, and organizational development. He has additionally conducted applied research and developed Extension programs relating to water quality, climate change, agriculture, food systems, and community and economic development.

Martha Aitken will support operations of the NRSP across all universities, ensuring successful operational and administrative collaboration amongst all project partners and subcontractors, including primary oversight over fiscal and contract matters related to the NRSP. Ms. Aitken has performed these activities for over 20 years with WSU.

Maggie Anderson will provide broad-based support to the project, supporting the IRN leads in scheduling meetings, events, and coordination with RSAA participants. Ms. Anderson currently performs these activities on NUREC projects, including their Knowledge and Practice Networks and grant-funded projects.

Business Plan

NRSP12 will be hosted by Washington State University (WSU), within NUREC. WSU is providing significant in-kind support (staff time, fiscal management, integration into WSU

operational and management systems, office space, etc.) to ensure the success of NUREC and NRSP12, reflecting a strong institutional commitment to this initiative. NRSP12 Director (Dr. Gaolach) will oversee day-to-day operations, coordination among teams, and serve as the primary liaison to the NRSP governing bodies.

With long-term sustainability in mind, financially, NRSP12 will operate within the NUREC business plan which currently includes Smith-Lever funding, NUREC membership dues (\$85,000 annually), external grants, and in-kind contributions. While NUREC is currently modest in size (0.6 FTE) and fiscal revenue (membership dues plus active grant projects), it is organizing as a Research and Extension Consortium to increase its capacity to develop fiscal resources from corporate and philanthropic sources. The synergistic activities of NUREC and NRSP12 will provide a strong foundation for a research and Extension consortium. NUREC's goal is to grow LGU institutional memberships from the current 17 to over 25, with a target of at least 5 institutions from each of the 4 geographic regions of AgInnovations/ECOP (west, south, northeast, and north central) as well as membership from non-LGU urbans serving universities. NUREC's business plan also includes working through our USDA federal partnership to facilitate fiscal opportunities with other federal agencies (e.g., HUD, EPA, NOAA) to support existing and developing new IRNs.

NUREC has established an MOU with NLC around core pillars of synthesis and acceleration and best practices development and expansion. This MOU will be used to mutually develop revenue streams for conducting research and Extension projects that augment NRSP12 and base NUREC funding—either through joint funding opportunities (e.g., grants) or direct funding from NLC to NUREC to complete targeted research projects (see Appendix 4). NUREC's business plan is to develop this fiscal and programmatic (research and Extension) model with NLC and then replicate it in similar ways with the NACo's Large Urban County Caucus as near-term growth opportunities.

C. Integration and Documentation of Research Support

Integration with Extension is a core design feature of NRSP12, ensuring that research results translate into on-the-ground impact. The project's housing within NUREC provides a structural link to Extension from the start, as NUREC's mission is explicitly to bridge research and practice in urban areas. We will leverage NUREC's existing networks and partnerships (such with the NUCL and NLC) to disseminate NRSP12 insights widely. The goal is that every research activity also has an outreach pathway, and every Extension activity is informed by current research.

Key strategies for Extension integration include:

- **Extension Representation in Leadership and IRNs:** Extension professionals are part of the leadership team and Advisory Committee of NRSP12 and are actively involved in each IRN. This ensures Extension perspectives (such as the feasibility of applying research recommendations in community programs) shape the research from the beginning. Extension members also act as liaisons to state and local Extension networks, communicating needs and findings in both directions.

- **Urban Extension Program Development:** Applied research projects undertaken through NRSP12 will be connected to urban Extension programming from the outset. For example, if a research team is developing a new soil testing protocol for urban gardens, we will coordinate with Extension educators to pilot that protocol in urban gardening programs and gather feedback. Similarly, if research identifies a successful intervention (e.g., a particularly effective design for a community cooling center or a high-yield rooftop farming technique), NRSP12 and/or NUREC will help package those findings into Extension curricula, toolkits, or demonstration projects that can be delivered by Extension in cities nationwide. By weaving research and Extension together, we accelerate the adoption of innovations.
- **National Urban Extension Leaders Partnership:** We will maintain a close partnership with NUEL, which is a network of 1,300+ urban-focused Extension professionals across the country. The NRSP12 Director (who is also NUREC Director) sits on the NUEL Steering Committee, which facilitates ongoing exchange of information. Through NUEL, we will share NRSP12 outputs (datasets, case studies, policy briefs) with Extension leadership in all Extension regions. NUEL’s biannual National Urban Extension Conference and other forums will be used to showcase NRSP12 projects and glean input on emerging urban issues that research should address. NUEL has agreed to have an urban research track in the conference to highlight research from the NRSP (see Appendix 1).
- **Community Outreach and Engagement:** The project will follow best practices for community engagement, emphasizing respect, mutual benefit, and transparency. We will promote and support the use of tools like community advisory boards for certain research projects and create accessible outreach materials (such as fact sheets or neighborhood workshops) to share results in non-technical language. Extension personnel will be crucial in translating scientific findings into culturally relevant outreach and education materials. The Urban Data Hub will also have a public-facing component that allows community users to access information (e.g., a community group could use the map room to visualize conditions in their neighborhood). In this way, the Hub supports outreach by serving as a data resource for the public, facilitated by Extension.
- **Feedback Loop from Practice to Research:** Integration with Extension not only helps push research out, but also pulls community needs in. Through Extension’s on-the-ground connections, NRSP12 will stay attuned to the evolving needs and questions that urban communities have. For example, if Extension agents report increasing inquiries about urban pollinator conservation or safe techniques for rooftop gardening, the NRSP can respond by encouraging research in those areas. This responsiveness to community-voiced issues helps keep the NRSP relevant and demand-driven.

Overall, Extension integration ensures that NRSP12 remains firmly grounded in application. Success will be measured not just by academic outputs, but by evidence of use—city agencies using data from the Hub to make decisions, community gardens adopting new practices from our research, or new Extension programs (like urban soil health workshops) launched as a result of NRSP12 findings. By embedding Extension throughout the project, we will bridge the notorious gap between research and practice, fulfilling the “extension” of knowledge that is the hallmark of the LGU system.

D. Outreach, Communications, and Assessment

Intended Audiences

Our target audiences include:

- The scientific community at land-grant universities; urban serving universities; local, state, federal, and tribal governmental agencies. This would include graduate students and postdoctoral researchers, and fellows.
- Policy makers at local, state, federal agencies and their associated organizations such as NLC as a conduit to their members nationally and tribal governmental agencies.
- Extension and other non-governmental organizations, and practitioners at local, state, and national levels.

In addition to fostering high quality urban research, this NRSP complements the mission of NUREC to bridge the gap between community and research and support the translation and application of that research by Extension.

Stakeholder Engagement

Primary stakeholder engagement will be through participation in the NRSP12 activities (i.e., RSAAs, IRNs, and the data hub). The IRN leads will engage the research community through existing professional connections, the researchers who have provided letters of commitment in Appendix 2, relevant professional societies and their meetings (e.g., American Ecological Engineering Society), and regional SAES networks. We will leverage our practitioner connections (e.g., NUEL, NLC, Landscape Architecture Foundation) to incorporate them into IRNs and project activities, thereby connecting researchers and communities to identify and prioritize research that is important to both, and then elevate those issues for collaborative problem solving, program development and dissemination of results and products. This approach will ensure an on-going feedback loop of evaluating NRSP activities, how they are being used by stakeholders, and how they are supporting researchers' needs.

NUREC has established Knowledge and Practice Networks for the Built Environment and Urban Food Resilience by engaging relevant stakeholders (e.g., the Built Environment Rx: web series [44] engaged 285 individuals during the first 4 events: <https://nurec.extension.org/portfolio-item/built-environment-rx-series/>). NUREC will leverage these existing activities to promote NRSP12 opportunities and track engagement.

NUREC has established a customer relationship management (CRM) system with currently over 1,700 researchers, policy makers, practitioners, and industry members, using it to actively track engagement in activities. NUREC will use this CRM to build and track stakeholder engagement with NRSP activities. NUREC will incorporate NRSP12 into their website (<http://nurec.extension.org>), directly connecting the Data Hub elements housed on the CARES website in a seamless fashion and showcasing NRSP activities, products, and accomplishments. NUREC and CARES are in the final stages of launching a urban data portal similar in function to the propose Data Hub for NUREC member institutions.

Measuring Accomplishments and Impacts

Evaluation and accountability: NRSP12 will bring a holistic evaluation framework to bear that supports integrated tracking (participation, datasets contributed or used, collaborations formed, outputs, stakeholder use cases) and a mid-term external review to ensure the support functions are effective and responsive. The evaluation plan is designed to monitor progress toward three primary outcomes: fostering national and cross-institutional research collaboration, improving the quality and accessibility of urban agriculture and ecosystem services data, and accelerating the development and dissemination of high-quality research. See Appendix 3 for the complete evaluation plan

To measure these outcomes, the plan integrates process evaluation (ongoing monitoring) and summative evaluation (mid-term and final assessments).

Process evaluation

We will include assessing the extent to which project activities (IRN development and activities, Data Hub development and utilization, and RSAAs) are advancing toward their goals. IRN development and collaborative work will be assessed using meeting agendas, minutes, and a description of the IRN composition, deliverables (e.g., standardized metrics developed) and pilot projects supported. The Data Hub, comprised of the Map Room and IRN Repository, will create a data and research project inventory to establish a baseline rate of utilization overall and by key stakeholder characteristics. Utilization of the Data Hub elements by stakeholder characteristics will also be assessed using database analytics. RSAAs will be assessed using rates of registration, participation, satisfaction, and pre/post assessments of knowledge, self-efficacy, and intention to implement skills. Annual surveys, listening sessions, and/or case studies will be used to understand needs and utilization of IRN, Data Hub, and RSAAs. Hubspot will be used to track participation in IRN and RSAAs and will house data to be utilized as a sampling frame for annual surveys, listening sessions, and/or case studies for mid-project and long-term outcomes.

Summative evaluation

We will assess long-term impact through indicators such as adoption of IRN frameworks by stakeholder groups, utilization of IRN-developed best practices, number of developed and funded research projects, and publications in high-impact journals among those participating in RSAAs and/or using Data Hub resources. Comparative analyses will examine differences in research development and dissemination (e.g., acceptance rates by journals and impact factors) overall and by stakeholder type, region, and utilization of the project's resources (high vs. low) levels, as well as against publications rates identified in the peer-reviewed literature. Case studies and interviews will provide deeper insights into how IRNs, the Data Hub, and RSAAs influence the longer-term outcomes. Annual surveys, listening sessions, and/or case studies will also be used to understand how the IRNs, Data Hub, and RSAAs support the development of research, adoption of best practices or IRN frameworks, and the faster dissemination of research to peer review.

Specific Metrics include:

- Rates of participation by participant and organizational characteristics (e.g., tenure status, LGU type, expertise, state, EAS region) and by stakeholder type

- Engagement level of participant measured by repeat interactions with NRSP12 activities and opportunities
- # of IRN projects identified and/or supported by topic and stakeholder type
- # of submitted and funded research projects within IRN topical areas
- # of publications by type (e.g., technical bulletins, policy briefs, high impact factor journals) and response of journal (e.g., desk acceptance, major revision, minor revision)
- # of publications in high impact factor journals and response of journal (e.g., desk acceptance, major revision, minor revision)
- # and rate of publications in high impact factor journals compared to national averages identified in the peer reviewed literature
- # and rate of publications in high impact factor journals overall and by participant engagement level
- # of abstracts submitted, accepted, or invited overall and by participant engagement level
- #, institution, discipline, and career-stage of participants engaging interdisciplinary and team science workshops
- #, institution, discipline, and career-stage of participants engaging monthly Link & Learn events
- # and diversity of presenters at Link & Learn events
- #, institution, discipline, and career-stage of participants engaging Synthesis Working Groups
- # of applications received for seed grants and travel grants
- # of proposal development workshop attendees, their institutions, disciplines, and career-stage
- # of proposal development workshop teams formed
- # of proposal development workshop teams that submit a proposal for extramural funding, and # of proposals from such teams that are awarded.
- Research agenda and best practices development by meeting agenda, minutes, action items completed; # of RFAs responded to within research agenda topical areas; # of and type of best practice offerings developed and disseminated
- Annual survey and/or listening sessions to identify research gaps and support needs of stakeholders
- #, %, rates of change related to adoption/implementation of IRN frameworks key stakeholders overall and by AES region
- Annual surveys, case studies, and/or interviews with stakeholders to assess the extent to which goals were achieved
- Establishment and use of an inventory of research projects related to the NRSP
- #/% of changes in products available to researchers and stakeholders (type, topic area)
- Rates of product utilization by user characteristics (LGU/org type; researcher type/tenure); e.g., the Data Hub will include features to help track performance and products by logging key metrics such as the number of datasets contributed, the usage statistics of the platform, the collaborative projects and proposals that emerge, and policy or community applications informed by Hub data
- #/% of cross-institutional research projects using Hub
- # of standardized metrics developed and utilized overall, by IRN area, and by service user characteristics
- # of funded research projects using Data Hub products

- # of publications or funded proposals using Data Hub products
- Changes in rates of participation with professional development offerings overall and by stakeholder type
- Participant characteristics (e.g., LGU type, tenure status); stakeholder type
- Pre/Post tests to examine changes in knowledge, beliefs, and behavior intention
- Participant satisfaction ratings
- Identification of needs through interviews or listening sessions
- Annual needs assessment and service utilization survey
- # and rate of research proposals development overall and by high and low-service user

Stakeholder Advisory Feedback: In addition to formal evaluation, the annual meeting of the Advisory Committee will review progress. They will examine data such as the usage of the Data Hub, participation stats, and examples of research or Extension success, and provide feedback and guidance. Having this external perspective built-in will keep us accountable to the broader community and help flag any issues early.

Two-Year Milestones and Deliverables

YEAR 1

IRNs:

- Establish each IRN, to have membership that includes researchers, Extension professionals, and individuals from municipalities, NGOs, and federal agencies to ensure that science is co-produced with those responsible for implementation.
- Develop governance frameworks for each IRN, including leadership roles, decision-making processes, and annual work plans published on the NRSP website.
- Draft white papers and webinar content for each IRN, to articulate key thematic areas and compelling research questions identified by SWGs to the broader agInnovation community.
- Develop materials to advertise IRNs and recruit membership
- Meet with National League of Cities to identify NLC staff or city leaders to participate in IRNs and how to recruit to SWGs

SWGs

- Each IRN will convene an annual SWG to explore questions that will support scientific advances aimed at improving regional generalizability, resolving contradictory findings from different studies or locations, or creating new conceptual models or insights. SWGs will include associated research committees and a graduate Research Fellow as well as Extension and policy development individuals.
- Submit at least one high-profile, peer-reviewed publication and publish three other broader communication pieces about findings from each SWG in year 1
- One seed grant is awarded. Seed grants will generate preliminary data, methods, or partnerships that can feed into competitive external proposals.

RSAs:

- Develop schedule and topics for RSAA activities to include team science workshops, and Link & Learn discussions.
- Offer at least 20 RSAs with combined attendance of at least 250 individuals

- 6 travel grants awarded to support in-person collaboration.

Data Hub:

- Launch a beta version of the Urban Map Room, prioritizing up to 30 key topics (10 per IRN) to draft maps, data, and resources for the IRNs and SWGs.
- Develop and pilot ‘data reports’ based on existing CARES platform (see Appendix 5: Green Infrastructure Report as an example) in consultation with IRN and SWGs.
- Draft set of metadata protocols for uploading of information to the IRN Repository

YEAR 2

NRSP wide

- At least 300 individuals from at least 30 LGUs have engaged in NRSP related activities (IRNs, SWGs, or RSAAs).
- Establish the NRSP “credit system” to incentivize and reward researchers for engagement in the NRSP. Accumulated credits will be used to weight applications for seed grant and travel grant opportunities. In addition, these efforts will drive adoption so that the Hub becomes an active, living resource.

IRNs

- Expand membership to include researchers across at least 30 or more LGUs, ensuring disciplinary diversity and institutional buy-in.
- Submit and/or publish at least 5 white papers or peer-reviewed publications in each IRN and promote them through NRSP12 communication channels.
- Each IRN will convene an annual SWG to explore questions that will support scientific advances aimed at improving regional generalizability, resolving contradictory findings from different studies or locations, or creating new conceptual models or insights.
- Informed by our IRN, SWG, and RSAAs, the NbS IRN will draft and evaluate performance indicators for urban NbS (similar Holistic Key Performance Indicators (H-KPIs) to evaluate and document NbS ecosystem services.

SWGs

- Establish 3 new SWGs with associated research committees and graduate Research Fellows.
- Submit at least one high-profile, peer-reviewed publication and publish three other broader communication pieces about findings from each SWG in year 2.
- Report from Yr 1 Seed Grant is submitted and made available on the project website (only if it does not interfere with peer-review publication opportunities)
- Two new seed grants approved

RSAAs:

- Offer at least 20 RSAAs with combined attendance of at least 250 individuals
- Support 200 participants in virtual proposal workshops with at least 5 teams drafting or have submitted competitive grant proposals or Hatch Multistate proposals
- 4 travel grants awarded

Data Hub:

- Expand data and resources around additional key topics spanning additional cities and variables along with 100 existing indicators.

- Finalize metadata standards for all data (using, for example, Dublin Core or ISO standards for geospatial data).
- Beta launch the IRN Repository. Researchers will be able to upload their own datasets (e.g., results from a multi-state urban soil experiment) through a guided submission process ensuring standardized formatting and documentation. The Repository will accommodate data in a variety of formats, including spatial, and will support integration with other Hub components.
- Initiate training workshops and tutorials to promote the Hub’s use, showing the community how to find data, add data, and use the mapping tools in their research and Extension work.
- 100+ registered Data Hub users
- Finalizing existing data reports and revise, update, or develop new reports base on IRN and SWG needs.

Communication Pieces

We will produce an annual report that provides a comprehensive accounting of NRSP12 activities, accomplishments, outcomes, and impacts along with 1-page overviews for each of the IRNs, seed-grant projects, and data hub elements. These will be provided to the Review Committee, NIFA, SAES and ARD directors and shared through the NIMSS system, with all members of the NRSP, on the NRSP webpage, with regional executive directors for both AgInnovations and Extension, other stakeholders, and to use as recruitment and engagement mechanisms for new participants.

Where possible, we will also publish or present on our evaluation approach and lessons learned (e.g., sharing how the IRN model worked) through venues like the *Journal of Extension* or at the AEA conference for evaluators. This contributes to the knowledge base on how to effectively evaluate transdisciplinary, networked projects.

Data Management Plan

Urban Data Hub

The Urban Data Hub will be developed and housed on University of Missouri (MU) Center for Applied Research and Engagement Systems (CARES) supported systems. The Urban Data Hub will consist of an Urban Map Room and a Research Repository.

The Urban Map Room will leverage existing national data repositories at CARES consisting of thousands of mappable data layers. The data layers comprise geographic information stored in ESRI geodatabases, SQL Server, and MySQL databases or accessed via standard data sharing protocols (open map services, APIs, etc.). These data are based on common data resources, such the American Community Survey, and include current and (limited) historical data. A complete listing of data layers can be found at <https://allthingsmissouri.org/atm-map-data-list/>.

The data will be maintained by CARES staff, who will integrate updated information on a regular basis, including acquisition and integration of new data, preparation of map symbolization, documentation of new data, and development of map services. CARES will be responsible for ensuring data security and backup and will collaborate to identify and integrate

information directly supporting urban research. No personally identifiable information (PII), including data subject to HIPAA or FERPA regulation, will be housed in the Map Room.

The Map Room will also support integration of local data developed by researchers. The supported formats for this information include standard geographic data formats (shapefiles, KML/KMZ files, or geojson data), spreadsheet data that can be associated with common geographic features (e.g., counties) based on a standard geographic identification code, and geocodable address data. Researchers submitting data will be required to participate in a short training event, certify that the information they are providing does not include PII, enter basic metadata for each dataset uploaded, provide citation and sharing permissions, and develop mapping symbology for their data set. Tools and assistance for the latter will be provided. All data submissions will be conducted using a secure, permissions-based interface and will be reviewed for content before being made publicly accessible in the Map Room.

All mapping data will be publicly accessible through a mapping interface that allows for discovery, display, and interaction with available map layers. The interface will include tools for overlay of multiple data layers, data query and selection, discovery of metadata, generation of map outputs (JPG, GIF, PNG, and PDF formats), and map sharing (via email or social media). Logged-in users will be able to save maps and retrieve maps previously constructed within the Map Room.

A chief component of the Map Room will be the reporting tools, which will provide indicator-based reports for an identified geographic area. A list of supported indicators will be developed for Map Room users to select and build custom reports and logged-in users will be able to generate and save reports on the system. All users will be able to download reports in PDF or Microsoft Word formats.

The IRN Repository will be designed to include systems for submitting and documenting urban research, storing and cataloging submitted research, and allowing user discovery and retrieval of research documentation.

Research descriptions will be collected through a standardized, login only, WordPress-based interface and stored in a MySQL database. Researchers will be asked to provide standard information about their research, including (but not limited to) information on subject, sponsors, methods, findings and publications. A standard taxonomy related to research description will be developed to aid data entry and facilitate data query. Researchers will also supply citation information and use permissions and will be able to update the information submitted. Researchers will have the ability to provide links to research websites and online publications related to their projects. Optionally, researchers can submit a photograph related to their research for inclusion in search results. The information submitted to the repository will be immediately available for user discovery, but CARES staff will exercise the ability to remove or block public access to submitted data as warranted.

User discovery tools will consist of an interface allowing users to search, filter, and sort information within the repository. Information will be displayed as an array of tiles with basic information that can be selected by the user for display of the complete information related to the urban research project. The user will have the option to mark a particular project as research of interest. It is anticipated that users will select multiple research projects of interest, or even all results of their query, for further action. The user will then be able to generate and download a

formatted report (PDF or similar) of all projects of interest with basic research information included.

An optional login for the user discovery tools will be designed and implemented. Logged-in users will be able to save and return to their queries, so that as more research is added to the repository over time, their results will automatically update. In addition, these logged-in users will be able to save their search results reports and use them in the future to link directly to the full research project description stored in the repository.

User support and training materials will be developed and made available within the repository. Regular backup of the systems and data will be supported, and systems security scans and compliance will be provided in collaboration with the University of Missouri Division of Information Technology.

At the conclusion of the project, data DOIs will be uploaded to Urban Data Hub for dissemination and sharing with the larger research community. Redistribution of raw data sets (excluding personally identifying information) will be limited and only granted by permission from the research lead.

Integrated Research Nodes

IRN-related data management will be overseen by IRN leads and the University of Missouri, and will follow the below protocols.

Roles and Responsibilities. Adherence to DMP protocols will be the responsibility of the PIs and IRN leads. All researchers participating in an IRN will receive instruction in, and be encouraged to, use a common revision control system (RCS) to ensure consistent access to source code, documentation and other artifacts generated by the project. Many faculty already use a RCS in their research groups, but we anticipate that others will need more support. Data products will be stored in the RCS during development and archived using a DataONE member node such as Dryad or the KNB (Knowledge Network for Biocomplexity), when data sets reach maturity. Ultimately, the responsibility for deposition is that of the investigator, or group of investigators developing the product. The PI and IRN lead will ensure that personnel receive training (e.g. Library Carpentry- <https://librarycarpentry.org/>) and will be the first contact for questions about data management and sharing, with NRSP staff prepared to offer support as needed.

Types of Data. Research will involve both existing data and diverse data sets generated from experiments, simulation, or field observation. DOIs for existing data will be documented in publications and software and in the Urban Data Hub. The content of data templates will be defined to meet the requirements for generating ISO 19115-1(2014) metadata records for newly created or derived data products. For example, field collected data will include fields to document location, time, methods, individuals, instruments, weather conditions, QA/QC procedures, etc. to be associated with every database entry. Computer codes will be commented to maintain clarity of the code, using best practices for software development. The PI and IRN leads will ensure that standardized metadata format/content are adopted for the collection and archiving of the code.

Data Access and Sharing. All project artifacts such as source code, documentation and case examples will be available under a liberal open source license. Content stored in the RCS will be publicly readable with the exception of personally identifiable information. We anticipate that

project content will be available for at least several years after project completion, and by using DataONE infrastructure, we anticipate that all data will be available indefinitely. Where new data sets are generated, they will be released upon publication of the first research product that uses them or within two years of generation, whichever is first. We do not anticipate that any new data produced will generate confidentiality issues; however, we are prepared to discuss and take appropriate precautions (e.g., location obfuscation) in the event that a particular data set raises ethical questions when working with communities and tribes. When data from communities and partners are included in the Urban Data Hub, we will set up mutually agreed upon ethical and privacy guidelines, including limits and timing for data sharing.

Data Storage and Preservation. All public data generated on the project will be documented and deposited in a Member Node of DataONE (e.g., Dryad, KNB) to leverage the DataONE federation capabilities to manage, archive and share the digital project content. DataONE allows access to the public via persistent URLs, provides tools for long-term data management, and permits permanent storage. DataONE has built-in contingencies for disaster recovery, including redundancy and recovery plans. Source code, documentation, and other artifacts of the project will be stored in a revision control system.

Evaluation and Assessment Data

Roles and Responsibilities. The external evaluator from the Extension Foundation will be responsible for DMP adherence. Complete data management guidelines and requirements will be prepared for all researchers and will contain instructions on when and how to record metadata. Project researchers will be required to create metadata information as data are captured.

Types of Data. The types of data are 1) instruments for collecting data from relevant stakeholder and participant groups to include project-designed surveys and interview protocols; 2) data from these instruments; and 3) program leadership meeting minutes.

Participant and other stakeholder data will be collected. Quantitative data will be collected through online surveys, meeting minutes, and project records. Qualitative data will be collected through open-ended survey questions and interviews. Quantitative data will be recorded in a database, and qualitative data will be transcribed by trained personnel. Data will be stored digitally in common standard formats for text files (Word, PDF) and data files (Excel, Access) to facilitate the ease of use among researchers as appropriate. Project-created surveys will also be stored in commonly used formats and stored with participant data. The project will adhere to The Library of Congress Metadata Encoding and Transmission Standard (METS).

Contextual data consists of file names, dates created, and where created. Before new data are created, a procedure will be outlined to define metadata to be captured, where on the university systems the files will reside, and who will have access. Data curation procedures for the project will be defined along with the development of evaluation instruments.

Data Access and Sharing. Data collected from and about program participants and other stakeholders will be shared with relevant stakeholders without personally identifying information. Data will be shared openly between the project research initiatives and the external evaluation team throughout the project to maximize the quality of programmatic decisions and facilitate thorough annual reporting.

Data Storage and Preservation. Evaluation data will be required to be stored and backed up through a secure server at the evaluator's home institution. Most universities have multiple

technologies employed to ensure the availability of data for immediate retrieval by principal investigators and senior personnel. In the case such a system does not exist, Washington State University will assume data storage and preservation for the evaluator.

Confidentiality and Security. All required Institutional Review Board (IRB) protocols will be followed rigorously throughout the project, as necessary. Any data collected through pen and paper, along with consent forms, as necessary, will be stored in a locked cabinet in the lead PI's office, accessible only to the PIs. All transcribed data will be stored on password protected computers accessible only by project staff. All survey data will be entered into SPSS and stored on the same password-protected computer.

Distribution of Results

The primary mechanism for distributing results through NRSP12 will be the project website on the NUREC website, which will include access to the RR. Outreach and engagement efforts will drive traffic to the website so it will be seen as the primary portal to engage with and from which to access results. We will also present the results at scientific discipline-related professional meetings and annual meetings of stakeholders. We are intentionally choosing not to host our own NRSP12-related annual meetings of stakeholders as we feel there are enough existing venues. Instead of competing for participation, we think that resources could be better, and more effectively, spent by engaging stakeholders at their respective meetings and demonstrating how we support their work and missions (e.g., the National League of Cities annual City Summit and the National Urban Extension Conference).

We will engage with and distribute materials to appropriate organizations and committees within the land-grant system, to include the Executive Director for each of the regional AgInnovations and Extension Directors associations, for dissemination across the research and Extension networks, appropriate APLU committees, Extension Committee on Organization and Policy (ECOP), and the National Urban Extension Leaders.

Literature Cited

- [1] J. Grannis, Interviewee, *Director of Programs, ICLEI - Local Governments for Sustainability, USA*. [Interview]. November 2005.
- [2] C. Leos, Interviewee, *Strategy & Impact Manager, Office of Strategy and Innovation; City of Raleigh, NC*. [Interview]. November 2025.
- [3] J. Arnold, "Urban Food Systems - Research Synthesis," unpublished synopsis of recurring research themes and questions in urban agriculture, 2025.
- [4] R. Fox-Kamper, C. K. Kirby, K. Specht, N. Cohen, R. T. Ilieva, S. Caputo, V. Schoen, J. K. Hawes, L. Ponizy and B. e. a. Bechet, "The role of urban agriculture in food–energy–water nexus policies," *Landscape and Urban Planning*, vol. 239, 2023.
- [5] J. L. Jones-Crank, "Pathways for FEW nexus collaboration in U.S. city resilience planning," *Ecology and Society*, vol. 29, no. 3, 2024.
- [6] R. Senthamizh and P. Anbarasan, "Urban agriculture in a changing world," *Frontiers in Sustainable Food Systems*, 2025.
- [7] G. Ebissa et. al, "Urban Agriculture and Environmental Sustainability," *Environment, Development and Sustainability*, vol. 26, no. 6, pp. 14583-99, 2023.
- [8] M. A. Altieri et. al., "Unleashing the Potential of Urban Agroecology to Reach Biodiversity Conservation, Food Security and Climate Resilience," *Agriculture*, vol. 15, no. 9, 2025.
- [9] M. Karpe et. al., "Potential for Urban Agriculture: Expert Insights on Sustainable Development Goals and Future Challenges.," *Sustainable Production and Consumption*, vol. 57, pp. 16-34, 2025.
- [10] J. E. Arnold, "On-Farm Spatial Composition, Management Practices and Estimated Productivity of Urban Farms in the San Francisco Bay Area.," *Processes*, vol. 10, no. 3, 2022.
- [11] S. H. Faeth et. al, "Urban Biodiversity: Patterns and Mechanisms: Urban Biodiversity," *Annals of the New York Academy of Sciences*, vol. 1223, no. 1, pp. 69-81, 2011.
- [12] F. Feldmann and U. Vogle, "Towards Sustainable Performance of Urban Horticulture: Ten Challenging Fields of Action for Modern Integrated Pest Management in Cities.," *Journal of Pland Diseases and Protection*, vol. 128, no. 1, pp. 55-66, 2021.
- [13] E. M. Cook, Y. Kim, N. B. Brinn, T. McPhearson, P. Anderson, H. Bulkeley, M. J. Collier, L. Diep, J. Morato and W. Ahou, "Nature- based solutions for urban sustainability," *Proceedings of the National Academy of Sciences*, vol. 121, no. 3, pp. 1-8, 2025.

- [14] T. McPhearson, N. Frantzeskaki, A. Ossola, L. Diep, P. Anderson, T. Blatch and W. Zhou, "Global synthesis for mainstreaming urban nature-based solutions," *Proceedings of the National Academy of Sciences*, vol. 29, p. 122, 2025.
- [15] N. Frantzeskaik, K. Wijsman, N. Kabisch and T. McPhearson, "Inter- and transdisciplinary knowledge for just urban transformations," *Proceedings of the National Academy of Sciences*, vol. 122, no. 29, 2025.
- [16] R. O'Riordan, J. Davies, C. Stevens, J. N. Quinton and C. Boyko, "The ecosystem services of urban soils," *Geoderma*, vol. 395, 2021.
- [17] M. Vuono et. al., "Advancing Urban Soil Health: Challenges, Knowledge Gaps, and Future Research Perspectives," *Landscapes and Urban Planning*, vol. 266, 2026.
- [18] A. A. Paltseva, Z. Chen, M. McBride, M. Deeb, S. P. Egender and P. M. Grffman, "Legacy lead in urban garden soils," *Frontiers in Ecology and Evolution*, vol. 10, 2022.
- [19] A. J. Adewumi and O. D. Ogundele, "Hidden Hazards in Urban Soils: A Meta-Analysis Review of Global Heavy Metal Contamination (2010-2022), Sources and Its Ecological and Health Consequences.," *Sustainable Environment*, vol. 10, no. 1, 2024.
- [20] K. Kumar and L. S. Hundal, "Soil in the City: Sustainably Improving Urban Soils," *Journal of Environmental Quality*, vol. 45, no. 1, pp. 2-8, 2016.
- [21] Association of Public and Land-grant Universities, Experiment Station Committee on Organization and Policy—Science and Technology Committee., "A Science Roadmap for Food and Agriculture," 2019.
- [22] Cooperative Extension and AgInnovation, "2025-2035 Land-grant University Roadmap," 2025.
- [23] E. Kelly, J. Leach, C. Schultz and E. Jackson, "National Climate Change Roadmap: A research framework for U.S. agriculture, forestry, and working lands," Colorado State University, 2023.
- [24] G. T. Daigger, J. P. Newell, N. G. Love, N. McClintock, M. Gardiner, E. Mohareb, M. Horst, J. Blesh and A. Ramaswami, "Scaling Up Agriculture in City-Regions to Mitigate FEW System Impacts," in *FEW Workshop: "Scaling Up" Urban Agriculture to Mitigate Food-Energy-Water-Impacts*, Ann Arbor, 2015.
- [25] M. Horst, N. McClintock and L. Hoey, "The Intersection of Planning, Urban Agriculture, and Food Justice: A Review of the Literature," *Journal of the American Planning Association*, vol. 83, no. 3, pp. 277-295, 2017.
- [26] E. Sanye-Mengual, I. Anguelovski, J. Oliver-Sola, J. I. Montero and J. Rieradevall, "Resolving Differing Stakeholder Perceptions of Urban Rooftop Farming in Mediterranean Cities: Promoting Food Production as a Driver for Innovative Forms of Urban Agriculture," *Agriculture and Human Values*, vol. 33, no. 1, pp. 101-120, 2016.

- [27] B. Gaolach, D. Collins, E. Allen, J. Padowski, K. Moffett, K. Rajagopalan, M. Brady and S. Richey, "Perspectives from stakeholders on the food-energy-water nexus in metropolitan Seattle," Washington State University Extension, 2020.
- [28] S. Marvin, L. Rickards and J. Rutherford, "The Urbanisation of Controlled Environment Agriculture: Why Does It Matter for Urban Studies?," *Urban Studies*, vol. 61, no. 8, 2024.
- [29] B. B. Lin, S. M. Philpott and S. Jha, "The Future of Urban Agriculture and Biodiversity-Ecosystem Services: Challenges and next Steps," *Basic and Applied Ecology*, vol. 16, no. 3, pp. 189-201, 2015.
- [30] M. Li, R. P. Remme, P. M. Van Bodegom and A. P.E. Van Oudenhoven, "Solution to what? Global assessment of nature-based solutions, urban challenges, and outcomes," *Landscape and Urban Planning*, vol. 256, no. 105294, 2025.
- [31] E. Penning, R. P. Burgos, Mens, Marjolein, R. Dahm and K. de Bruijn, "Nature-based solutions for floods AND droughts AND biodiversity: Do we have sufficient proof of their functioning?," *Cambridge Prisms: Water*, 2023.
- [32] K. Nair, C. Firoz, L. Dashora and R. Shaw, "Nature-Based Solutions for Urban and Peri-Urban Areas for a Sustainable and Resilient Future: An Introduction.," in *Nature-Based Solutions for Urban and Peri-Urban Areas. Disaster Risk Reduction*, C. Firoz, L. Dashora and R. Shaw, Eds., Singapore, Springer, 2025.
- [33] H. W. Mielke, "Soils and Health: Closing the Soil Knowledge Gap," *Soil Horizons*, vol. 56, no. 4, pp. 1-2, 2015.
- [34] S. E. Wortman and S. T. Lovell, "Environmental Challenges Threatening the Growth of Urban Agriculture in the United States," *Journal of Environment Quality*, vol. 42, no. 5, 2013.
- [35] J. L. Howard and W. L. Daniels, "Soils of Urban and Human-Impacted Landscapes.," in *International Encyclopedia of Geography*, 1st ed., D. Richardson et. al., Ed., Wiley, 2018, pp. 1-11.
- [36] A. Lehmann and K. Stahr, "Nature and Significance of Anthropogenic Urban Soils.," *Journal of Soils and Sediments*, vol. 7, no. 4, pp. 247-60, 2007.
- [37] J. P. Kay, P. M. Groffman, N. B. Grinn, L. A. Baker and R. V. Pouyat, "A Distinct Urban Biogeochemistry?," *Trends in Ecology & Evolution*, vol. 21, no. 4, pp. 192-99, 2006.
- [38] B. Gaolach, "NRSP12 Letters of Support," unpublished, 2025.
- [39] B. Gaolach, "Interviews with researchers for NRSP12," unpublished, 2025.
- [40] National Urban Research and Extension Center, "Building Collaborative Research and Extension Networks to Advance the Application of Science with Urban Communities:

NUREC 2024 Washington D.C. Co-convenign Summary," National Urban Research and Extension Center, 2025.

- [41] Western Center for Metropolitan Extension and Research, "Leading Edge Dialogue Series," Western Center for Metrpolitian Extension and Research, 2019.
- [42] Western Center for Metropolitan Extension and Research, "Urban Agriculture Llistening Sessions," WCMER, 2020.
- [43] National Urban Research and Extension Center, "Urban Green Infrastructure Summit," 2018. [Online]. Available: [https://nurec.extension.org/portfolio-item/urban-green-infrastructure-summit/..](https://nurec.extension.org/portfolio-item/urban-green-infrastructure-summit/)
- [44] National Urban Research and Extension Center, "Built Environment Rx: Healing urban systems through design, policy, and practice: webinar series," 2025. [Online]. Available: [https://nurec.extension.org/portfolio-item/built-environment-rx-series/.](https://nurec.extension.org/portfolio-item/built-environment-rx-series/)
- [45] J. Lienard, T. Achalkulvisut, D. Acuna and S. David, "Intellectual synthesis in mentorship determines success in academic careers," *Nature Communications*, vol. 9, no. 4840, 2018.
- [46] A. A. Paltseva, "Participatory Science in Urban Soil Research: A Framework for Overcoming Challenges and Expanding Public Engagement," *iScience*, vol. 28, no. 5, 2025.
- [47] D. T. Armando, J. B. Buinee and A. Tukker, "The Second Green Revolution: Innovative Urban Agriculture's Contribution to Food Security and Sustainability – A Review," *Global Food Security*, vol. 22, pp. 13-24, 2019.
- [48] M. Behnisch, T. Kruger and J. A. G. Jaeger, "Rapid Rise in Urban Sprawl: Global Hotspots and Trends since 1990," *PLOS Sustainability and Transformation*, vol. 1, no. 11, 2022.
- [49] M. Serrano, E. Griffor, D. Wollman, M. Dunaway, M. Burns, S. Rhee and C. Greer, "Smart Cities and Communities: A Key Performance Indicators Framework," National Institue of Standards and Technology: U.S. Department of Commerce, 2022.

Appendices

Appendix 1: Letters of Intent to Engage

GREEN CITY GROWERS



Thursday, November 20, 2025

Dr Gaolach,

My name is Christopher Grallert and I am CEO of Green City Growers based in Somerville, Massachusetts. We are a major force in the industry sector referred to as Farming as a Service. Currently, GCG manages over 180 active farms and gardens in New England and beyond, including at public schools, at corporate office parks, at hospitals, senior centers, and residential complexes. We build the infrastructure as well as maintain and programmatically activate each location, teaching agricultural literacy and food systems capacity building. Green City Growers is an employee owned, certified Benefit Corporation.

The proposed project, Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities, has a breadth of support services that would help our organization in supporting the expansion of a localized, short supply chain food systems. If funded, we would actively participate in and benefit from.

- Participating in national Integrated Research Networks (IRNs) that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- Use a data archiving and sharing platform that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to a Urban Research Repository that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- Participate in professional development and training in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- Participate in Research Synthesis and Acceleration Activities, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,

CHRISTOPHER P. GRALLERT

Christopher P. Grallert
CEO



LANDSCAPE ARCHITECTURE FOUNDATION

1200 17th St NW, Suite 210
Washington, DC 20036

November 24, 2025

Dear Dr. Gaolach,

The Landscape Architecture Foundation (LAF) is a nonprofit organization based in Washington, DC and its mission is to support the preservation, improvement and enhancement of the environment. LAF does this by investing in research, scholarship, and leadership to increase the collective capacity of landscape architects and other designers of the built environment to achieve sustainability.

Our primary research focus is on landscape performance: the evaluation and documentation of quantified environmental, social, and economic benefits of sustainable landscape solutions. Our award-winning [*Landscape Performance Series*](#) is an online set of resources to help designers, agencies, and advocates evaluate performance, share best practices, and make the case for sustainable landscape solutions. The database of over 210 Case Study Briefs of built projects with quantified performance benefits, 215 Fast Facts from published research, and over 30 tools and calculators to estimate performance is visited by over one hundred thousand users per year. This includes research and data on a wide range of nature-based solutions as well as information pertaining to urban agriculture and food systems and green infrastructure.

This proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has a breadth of support services that would help my organization in disseminating high quality research related to urban resiliency that would be of great value to our audience of landscape architects and others interested in the sustainability of the exterior built environment. If funded, LAF would participate in and benefit from:

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders like my organization across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of this application and the ability to start participating in the activities of this project.

Sincerely,

Megan Barnes
Sr. Program Manager
Landscape Architecture Foundation



SCHOLARS STRATEGY NETWORK

Dear Dr. Brad Gaolach,

I am writing on behalf of the Scholars Strategy Network (SSN), a national membership organization made up of college- and university-based researchers interested in using research to improve public policy in the United States. Over the past 14 years, SSN has grown into a network of over 2,000 researchers in 47 states. SSN members organize themselves into state and regional chapters, working to advance the use of research wherever policy decisions are made. Our scholars regularly contribute their research to inform debates related to public health, food systems, and urban ecosystems.

Your proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, offers a breadth of support services that would help SSN members conduct high quality research related to urban resiliency and then share those findings with key practitioners and policymakers. If funded, SSN members would actively participate in the project in a number of ways, including:

- Participating in national Integrated Research Networks (IRNs) that connect researchers, Extension professionals, and urban stakeholders across key topic areas outlined in the application
- Participating in Research Synthesis and Acceleration Activities, including working groups to address knowledge gaps between policy actors, practitioners, and scholars and workshops to facilitate acceleration of research to action on emerging ideas

In addition to the participation of SSN members with the project, the SSN national staff would offer public engagement training for participants. The training program emphasizes generalizable and repeatable skills that help participants communicate their research and its significance to policy, media, and practitioner audiences. The final training options will ultimately depend on the participants, but will include:

- Policy-focused sessions that help participants identify how to move from scholarly research to policy recommendations, how to identify relevant policymakers and build a relationship with them, and how to write persuasively for policy audiences
- Media-focused workshops that equip participants with the skills necessary to share their research with reporters through media interviews and how to disseminate their findings by successfully writing and pitching op-eds



SCHOLARS
STRATEGY NETWORK

By pairing the research support described in the project with policy and media professional development opportunities, the project as a whole promises to boost the capacity of researchers to build meaningful relationships with diverse stakeholders, conduct more relevant research, and share that research with a range of audiences so that it has an impact.

I look forward to the success of your application and working on this project together.

Sincerely,

Andrew Pope, PhD

Director of Policy, Scholars Strategy Network

December 2, 2025

Dr. Brad Gaolach
Director, National Urban Research and Extension Center
Washington State University – Everett
915 N. Broadway
Everett, WA 98201

Dear Dr. Gaolach,

On behalf of the nation's 19,000 cities, towns and villages, the National League of Cities (NLC) supports local leaders to improve the quality of life for their current and future constituents.

The National Urban Research and Extension Center's proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, aligns with NLC's efforts in supporting cities to adapt to climate change and build community resilience through green infrastructure and other nature-based solutions (NbS).

If funded, NLC would participate in and benefit from the following activities:

- **Promote national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas, including urban agriculture and food systems, NbS and urban ecosystem services, to co-create research agendas and share best practices.
- **Pilot a data archiving and sharing platform** that includes an interactive "Urban Map Room" that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to an **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Participate in professional development and training** in systems thinking, resilience planning, and community-driven research approaches tailored to urban contexts.
- **Support Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas.

We look forward to the success of your application and to your ability to start participating in this project's activities. If you have any questions, don't hesitate to reach out to Christine Baker-Smith, PhD, Director of Research at baker-smith@nlc.org.

Sincerely,

A handwritten signature in black ink, appearing to read 'Clarence E. Anthony', with a long horizontal line extending to the right.

Clarence E. Anthony
CEO and Executive Director



December 4, 2024

RE: Letter of Support for the *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*

Dr Gaolach,

I am writing this letter of support on behalf of ICLEI – Local Governments for Sustainability USA (ICLEI USA). For over 34 years, ICLEI USA has been the largest and longest-established network of local governments committed to sustainability and climate action. With a national network including nearly 400 local governments and Tribal nations across 49 states, ICLEI USA supports local governments as they pursue their priorities across five sustainable development pathways: zero emissions, nature, equity, resilience, and circular economy. Since 1991, ICLEI USA has served as an affiliate office of the global ICLEI network, operating as an independent 501(c)(3) nonprofit while being a part of a community of more than 2,500 local and regional governments in 125+ countries.

Local governments in the ICLEI USA network are leading efforts to implement nature-based solutions that contribute to their sustainable development and resilience goals. They need practical tools to help them understand the climate benefits they can deliver through green infrastructure, urban forestry, and urban agricultural initiatives - including carbon removal, risk reduction, food security, water and air quality improvements and more.

The proposed project, Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities, has a breadth of support services that would help our network of leading local governments implement solutions informed by high quality research related to urban resiliency. If funded, ICLEI USA would benefit from the ability to connect the local practitioners in our network with leading researchers and the research products developed through this grant, as follows:


- ICLEI USA would participate in the national Integrated Research Networks (IRNs) designed to connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.

ICLEI – Local Governments for Sustainability USA

1536 Wynkoop Street #901
Denver, Colorado 80202

Phone: (510) 844-0699
Email: icle-usai@iclei.org
Web: icleiusa.org

ICLEI – Local Governments for Sustainability is a global network of more than 1,750 local and regional governments committed to sustainable urban development.

- 
- We would use the data archiving and sharing platform that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to the Urban Research Repository to share local use cases of how data is being deployed to support local urban resiliency initiatives.

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,



Jess Grannis
Director of Programs
ICLEI- Local Governments for Sustainability - USA
Jess.Grannis@iclei.org



October 11, 2024

MEMORANDUM:

To: Whom it may concern

From: Katherine R. Williams, Chair, National Urban Extension Leaders,
NC State Extension, Wake County Extension Director

The National Urban Extension Leaders (NUEL) are excited to provide a letter of support for the National Research Support Project (NRSP) *Building Collaborative Research and Extension Networks to Advance the Research & Application of Science with Urban Communities*, administered by the National Urban Research & Extension Center (NUREC) and its director, Dr. Brad Gaolach.

NUEL provides Program Leadership nationally to advance the strategic importance and long-term value of Cooperative Extension in urban communities. Our reach is broad, includes all regions of the country and more than 1600 professionals through our Connect Extension Urban Network. NUEL hosts annual professional development conferences promoting scholarship at the National or Regional level. NUREC is an important strategic partner, working specifically to advance external partnerships and to leverage LGU expertise through integrated research initiatives.

As Extension leaders in urban communities, we understand and value the research capabilities that our land grant institutions offer to drive positive transformation across our 5 focus areas: Feeding our Future, Enriching Our Youth, Improving our Health, Protecting our Environment and Strengthening our Communities. As Extension professionals we work very closely with municipal, county and state leaders in our urban centers to deploy community-led, data-driven and research informed solutions. We often serve as convenors, who are trusted by grassroots leaders and community partners to drive policy change. We are charged with the mission of offering critical services and research-based educational programs that are relevant to the needs of our people and communities. We understand that urban

residents, organizations and policy makers are often overwhelmed with many voices and demands they encounter; making cross sector collaboration important, complex and difficult to sustain.

Urban Extension leaders are positioned with extensive networks in communities, with relationships to emerging grassroots leadership, established business & industry leaders as well as with allied organizations. Moreover, we are challenged, as an Extension system to evaluate programs and collect data establishing the impact of our efforts; resources that are inherently more accessible through research integrated initiatives. Our Land Grant Universities, leveraging an intentionally integrated Extension & Research capability, has an unparalleled opportunity to partner with local communities for enhanced impact.

NUEL is proud to support this proposal to help us build new pathways to connect with faculty and specialists in more meaningful and more intentional ways. We will provide a member of our Executive Leadership Team to serve as an Advisory Committee member for this project and are willing to work with NUREC leadership to host a dedicated track during or adjacent to our National Urban Extension Conference to highlight research, outcomes and integrated efforts underway for the 450+ professionals who attend.

We look forward to the opportunity to work together on a shared agenda that integrates both the research and extension capabilities in our Land Grant universities to enhance the future of all.

December 8, 2025

Dr. Gaolach,

I am a PhD Candidate in Environmental and Natural Resource Sciences at WSU Vancouver, a consulting arborist certified as an Urban Forest Professional by the International Society of Arboriculture, and a former Environmental Technician with the City of Portland Bureau of Environmental Services. My transition from city employee to PhD student was in part fueled by a desire to better understand and help to address the knowledge gap I saw between applied green infrastructure work and most current research. I have observed directly the dilemma that cities have the interest, need, and potential funds to implement green infrastructure projects but lack the technical expertise to adapt projects to local conditions, or the mission orientation to monitor their projects, learn from them, and share their findings in a systematic way. Cities will sometimes turn to consultants to fill knowledge gaps, but consultants themselves are not always up to date on the most current science, nor does this solve the need for long-term monitoring and high quality, systematic research. There is a logical and much-needed role for Extension here to connect urban practitioners with researchers and researchers with real-life projects and useful contexts for their research. I especially see a need for 1) increased understanding of the conditions of urban soils in supporting plant life and microbial communities on which nature-based solutions (green infrastructure) fundamentally rely; and 2) coordinating monitoring and research agendas between small, more resource and expertise-limited municipalities at a state/regional scale.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, offers a range of support services that would have helped me both in my former role as an urban green infrastructure technician and as an early-stage PhD student. Looking forward to my career following the completion of my degree, I am heartened that I might be able to contribute to such a network. My post-degree career is not yet set, so I can imagine multiple ways to stay involved. If funded, I would actively:

- **Co-create research agendas and share best practices in national Integrated Research Networks (IRNs)** as a researcher, Extension professional, or urban stakeholder (municipal employee or consultant), especially in the key focus areas of nature-based solutions and urban ecosystem services.
- **Participate in or help to design and deliver professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,



LEA WILSON

PHD CANDIDATE

School of the Environment

Washington State University – Vancouver

ISA Certified Arborist, PN-8204AM

ISA Certified Urban Forestry Professional

ISA Tree Risk Assessment Qualified

Phone: 971-319-2637

Email: lea.wilson@wsu.edu

November 25, 2025

Dear Dr. Gaolach,

I am writing to confirm my support and enthusiasm for the proposed NRSP project entitled “*Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities.*” I serve as Associate Director of Healthy Living for the Institute for Advancing Health Through Agriculture (IHA) at Texas A&M AgriLife Research.

The IHA is the world’s first academic institute to bring together precision nutrition, responsive agriculture, and social and behavioral healthy living research. Uniquely, the Healthy Living arm of IHA encompasses expertise in community engagement, Extension and outreach, and clinical-community partnerships in research. This project is well-matched to our focus areas as it relates to urban agriculture and food systems, nature-based solutions (NbS), and urban ecosystem services. If funded, I would actively participate in activities related to urban resiliency. In particular, I would be involved in:

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS), and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Using a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and using and contributing to an Urban Research Repository that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Supporting professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.

I look forward to the opportunity to participate in the activities of this project.

Sincerely,



Rebecca A. Seguin-Fowler, PhD, RDN, LD, CSCS

November 18, 2025

Dear Dr. Gaolach:

I am pleased to write this support letter for the proposed NRSP project entitled “*Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities.*” This project is a good match to ongoing efforts at the Human Behavior Lab in collaboration with colleagues in the School of Public Health and the Institute for Advancing Health through Agriculture. If funded, I would actively participate in activities related to human behavior. More specifically, I would be involved in:

- **National Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,



Dr. Marco A. Palma
Professor, Department of Agricultural Economics
Director, Human Behavior Laboratory
Presidential Impact Fellow
[IHA](#) Associate Director
Texas A&M University
College Station, TX 77843-2124
Office (979) 845-5284
Fax (979) 845-7444
E-mail: mapalma@tamu.edu
<http://hbl.tamu.edu>



Monday December 15, 2025

Dr. Brad Gaolach
Director, National Urban Research & Extension Center
WSU Everett
915 N. Broadway
Everett, WA 98201

Dr. Gaolach,

On behalf of the University of Georgia Center for Urban Agriculture, I am pleased to provide strong support for the proposed National Research Support Project: “Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities”. The Center for Urban Agriculture works across Georgia and the Southeast to support urban agriculture and food systems, green industry professionals, and communities implementing ecological solutions and green infrastructure with particular emphasis on urban soils, water conservation, and sustainable landscape management.

This project’s focus on building integrated research networks, shared data infrastructure, and professional development for urban-focused scientists and Extension professionals aligns closely with our mission and current programming. The breadth of support services envisioned in this proposal would significantly strengthen our ability and that of our partners to conduct high-quality, collaborative research that addresses urban resiliency and municipal decision-making needs.

If funded, the Center for Urban Agriculture would actively participate in and benefit from the following activities: Participating in national Integrated Research Networks (IRNs) that connect researchers, Extension professionals, and urban stakeholders across topic areas such as urban agriculture and food systems, ecological-based solutions, and urban ecosystem services including our ongoing work in urban soils, turf and ornamentals, and green infrastructure.

Using and contributing to the proposed data including archiving and sharing platforms such as the interactive “Urban Map Room” and the Urban Research Repository would assist to support development of new projects and to disseminate our applied research, tools, and educational resources related to urban resilience.

Engaging in professional development and training in systems thinking, resilience planning, team science, and community-driven research approaches would directly benefit our faculty, Extension agents, and partners working in diverse urban communities. Joining in research synthesis and acceleration activities including synthesis working groups and proposal development workshops will help address knowledge gaps and accelerate collaborative multi-city initiatives that inform policy and practice.

Support the University of Georgia | give.uga.edu

Urban Ag Building | 1109 Experiment St | Griffin, Georgia 30223 | Telephone 770-233-6107

An Equal Opportunity, Affirmative Action, Veteran, Disability Institution



**UNIVERSITY OF
GEORGIA**
College of Agricultural &
Environmental Sciences
Center for Urban Agriculture

The Center for Urban Agriculture views this project as a timely and critical step in further expanding the land-grant research and Extension reach to better serve urban communities nationwide. We look forward to the success of your application and the opportunity to participate in and contribute to the activities of this project.

Sincerely,

Bethany Harris

Bethany Harris, PhD
Director of Center for Urban Agriculture
The University of Georgia

Support the University of Georgia | give.uga.edu

Urban Ag Building | 1109 Experiment St | Griffin, Georgia 30223 | Telephone 770-233-6107

An Equal Opportunity, Affirmative Action, Veteran, Disability Institution

January 9, 2026

Dr. Brad Gaolach
Director, National Urban Research & Extension Center
Washington State University
Email: gaolach@wsu.edu

Re: Letter of Support for USDA Hatch Multi-State NRSP Proposal

Dear Dr. Gaolach:

I am writing to express our strong support for the proposed National Research Support Project (NRSP) titled "*Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities.*" As Dean of the College of Agriculture, Urban Sustainability and Environmental Sciences (CAUSES) at the University of the District of Columbia (UDC), I recognize the critical importance of this initiative to the future of land-grant university research and Extension.

The demographic reality you have outlined—that over 80% of Americans now live in metropolitan areas—represents both a challenge and an opportunity for our land-grant system. While our institutions were founded to serve a predominantly rural nation, we must now evolve to address the complex needs of urban communities. This NRSP proposal provides essential infrastructure to facilitate that evolution.

Value and Impact

This project addresses a significant gap in our national research infrastructure. The proposed activities—creating Integrated Research Networks, developing shared data resources, and providing professional development—will enable researchers and Extension professionals across the country to work more effectively in urban contexts. The collaborative, systems-based approach is particularly valuable, as urban challenges rarely respect disciplinary boundaries.

Benefits to UMass Researchers and Extension

Our faculty and Extension professionals at UDC would directly benefit from participation in this NRSP through:

- **Enhanced collaboration** with researchers at other institutions working on similar urban challenges in food systems, urban agriculture, and ecosystem services
- **Access to shared data infrastructure**, including the Urban Map Room and Urban Research Repository, which would amplify the impact of our research and reduce duplication of effort

- **Professional development opportunities** that would strengthen our capacity to engage meaningfully with urban communities and municipal decision-makers
- **Alignment of research outputs** with real-world urban needs, increasing the relevance and application of our scholarship

Commitment

Should this proposal be funded, I am confident that our faculty and Extension professionals would actively participate in the Integrated Research Networks and contribute to the shared resources and collaborative research agendas. We are committed to advancing science that serves all communities, urban and rural alike.

Thank you for your leadership on this important initiative. Please do not hesitate to contact me if you require any additional information to support this proposal.

Sincerely,

A handwritten signature in black ink, appearing to read "Dwane Jones", with a stylized flourish extending to the right.

Dwane Jones, Ph.D.
Dean of CAUSES
University of the District of Columbia
Dwane.jones@udc.edu

December 12, 2025

Dr. Brad Gaolach
Director, National Urban Research & Extension Center
Washington State University
gaolach@wsu.edu

Dear Dr. Gaolach,

I am writing to express my strong support for the proposed National Research Support Project, **Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities**. As a faculty member at Kansas State University and Director of the Urban Food Systems Initiative, my research, teaching, and outreach efforts focus on **urban agriculture and food systems**, postharvest management, and community-engaged approaches that advance resilient and equitable urban food environments. This project's goals are strongly aligned with the needs and opportunities we encounter in our work across the Kansas City metropolitan region and in national collaborations.

The proposed NRSP offers an opportunity to support and elevate high-quality scholarship that responds to the complexity of urban systems. If funded, my team and I would actively participate in and benefit from the project's activities, including:

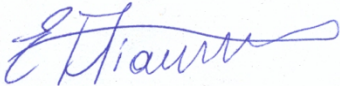
- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders to co-develop research agendas in priority areas such as urban agriculture, food systems resilience, nature-based solutions, and urban ecosystem services.
- **Utilizing and contributing to the national data infrastructure**, including the interactive *Urban Map Room* and the *Urban Research Repository*, to support new research, share methods, and enhance comparative studies across cities.
- **Engaging in professional development and training** in systems thinking, resilience planning, team science, and community-driven research—all essential capacities for researchers working in complex urban environments.
- **Participating in Research Synthesis and Acceleration Activities**, including synthesis working groups, collaborative proposal development, and forums aimed at addressing knowledge gaps and accelerating multi-institutional research partnerships.

The goals of this NRSP align closely with ongoing efforts at Kansas State University to build a **Center of Excellence in Urban Food Systems**. I see a strong synergy between the proposed Integrated Research Networks and our transdisciplinary collaborations across multiple institutions and community partners. The NRSP would directly enhance our capacity to conduct

high-impact, community-engaged scholarship while contributing to a national framework for supporting urban-serving research across the land-grant system.

I fully support this proposal and look forward to the opportunity to participate in its activities should it be funded.

Sincerely,



Eleni D. Pliakoni, Ph.D.

Professor of Urban Food Production and Postharvest Handling

Director of the Urban Food Systems Initiative

Department of Horticulture and Natural Resources

K-State Olathe

22201 W. Innovation Dr.

Olathe, KS 66061

Phone: (913) 307-7370

epliakoni@ksu.edu



1140 E. South Campus Dr., Tucson, AZ 85721 • Phone: (520) 621-7205 • Fax: (520) 621-1314 • extension.arizona.edu

November 21, 2025

Dear Dr. Gaolach,

My name is Dr. Edward Martin, Associate Vice President and Director of the University of Arizona Cooperative Extension. Although Extension addresses many issues, one of our key topics is urban agriculture. In fact, this year, UA Cooperative Extension established a new Center for Urban Smart Agriculture at the Maricopa County Cooperative Extension Office. Serving the fourth-largest populated county in the United States, the new center focuses on issues related to the establishment and success of small and beginning urban food systems, including business plans and production practices in urban-center populations.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has a breadth of support services that would help me/my lab/my organization in conducting high quality research related to urban resiliency. If funded, I/we would actively participate in and benefit from.

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Use a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to a **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Participate in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,

Edward C. Martin, Ph.D.

Associate Vice President and Director
UArizona Cooperative Extension

Division of Agriculture, Life, & Veterinary Sciences, and Cooperative Extension



Office of the Director

4341 E. Broadway Road - Phoenix AZ 85040-8807 - Phone: 602-827-8200 - Fax: 602-827-8292
<http://extension.arizona.edu/maricopa> - <https://extension.arizona.edu/center-urban-smart-agriculture>

November 29, 2025

TO: Dr. Brad Gaolach
FROM: Dr. Ayman Mostafa
SUBJECT Letter/Memo of Collaboration as Co-Principal Investigator

Dear Dr. Gaolach,

As Director of **Maricopa County Cooperative Extension (MCCE)** and the **University of Arizona Center for Urban Smart Agriculture (UA-CUSA)**, I lead these two Departments with a vision to advocate for and support the development, adoption, and implementation of science-based solutions to the unique challenges facing agriculture and food production in urban areas of Arizona and beyond. The UA-CUSA and MCCE facilitate a process to identify environmental, socioeconomic, and political challenges and opportunities that shape the development of urban smart agriculture in Arizona. We engage stakeholders by providing opportunities for applied research and education in urban smart agriculture tailored to their needs and challenges, facilitating collaborations, and increasing the adoption of sustainable, nature-based practices and solutions in the Sonoran Desert. We are collaborating with the University of Arizona faculty and institutions to find science-based solutions to client-identified issues. The two departments are reaching out to thousands of urban agriculture, small-scale, and beginning farmer communities, relevant academic and professional collaborators, government and industry representatives, and graduate and undergraduate students interested in this area.

The proposed project, ***Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities***, includes a wide range of support services to assist the teams at UA-CUSA and MCCE in conducting high-quality research on urban resiliency. If funded, I/we would actively participate in and benefit from:

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, extension professionals, and urban stakeholders across key areas—including urban agriculture and food systems, nature-based solutions (NbS), and urban ecosystem services—with a focus on urban soils and green infrastructure to develop research agendas and share best practices.





Office of the Director

4341 E. Broadway Road - Phoenix AZ 85040-8807 - Phone: 602-827-8200 - Fax: 602-827-8292
<http://extension.arizona.edu/maricopa> - <https://extension.arizona.edu/center-urban-smart-agriculture>

- **Use a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to an **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency. UA-CUSA has built a substantial needs-assessment database over the past four years, highlighting issues of significant concern to the relevant community in Arizona. These needs assessment surveys could help identify research topics and connect them with appropriate researchers.
- **Participate in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs, and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to begin participating in this project's activities.

Sincerely,

Ayman M. Mostafa, Ph.D.





THE UNIVERSITY OF ARIZONA
**Arizona Institute
for Resilience**

ARIZONA INSTITUTE FOR RESILIENCE

Environment & Natural Resources 2

1064 E. Lowell Street

PO Box 210137

Tucson, AZ 85721-0137

Ofc: 520-626-4345

air.arizona.edu

December 5, 2025

Dr. Brad Gaolach
Director, Metropolitan Center for Applied Research & Extension
Washington State University
Everett, WA 98201

Dr Gaolach,

As Director of the Arizona Institute for Resilience at the University of Arizona, I support inter- and transdisciplinary research focused on societal and environmental resilience to environmental change. Several of our Institute's researchers engage with city and county partners to develop solutions for green stormwater infrastructure, biodiversity conservation, and restoration of degraded landscapes.

The proposed project, Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities, has a breadth of support services that would help our Institute in conducting high quality research related to urban resiliency. If funded, our researchers would be enthusiastic about participating in and benefitting from this research network in the following ways:

- Participating in national Integrated Research Networks (IRNs) that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- Use a data archiving and sharing platform that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to an Urban Research Repository that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- Participate in professional development and training in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- Participate in Research Synthesis and Acceleration Activities, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas



I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,

A handwritten signature in blue ink that reads "Sharon K. Collinge". The signature is written in a cursive style with a large initial 'S' and a long, sweeping underline.

Sharon K. Collinge
Director, Arizona Institute for Resilience
University of Arizona



Oregon State
University

Department of Horticulture

Oregon State University
4017 Agricultural and
Life Sciences Building
Corvallis, Oregon, 97331

P 541-737-5175 | **F** 541-737-3479
gail.langello@oregonstate.edu

11/25/2025

Dr Gaolach,

My Gail Langello, and I am a Professor of Horticulture at Oregon State University, where I also Direct the BioResource Research (BRR) Program and serve as Principal Investigator for the Garden Ecology Lab.

BRR is a unique undergraduate major, where students complete 600-800 hours of research, write an undergraduate thesis, and present and defend their research to a faculty committee. Because of the hands-on, highly mentored nature of our program, our students go on to great success upon graduation, including enrollment in highly selective M.D./Ph.D. programs and selection for highly competitive graduate fellowships (e.g. NSF, NIH). Unlike other undergraduate research programs at OSU, BRR is open and accessible to all: we do not require a minimum GPA or payment of additional fees in order to participate.

The Garden Ecology Lab studies garden habitats as a socio-ecological system, with relevance to nature-based solutions, urban ecosystem services, and urban agriculture and food systems. We have several studies of urban soils, microbes, plants, and invertebrates published or in process, with a focus on how garden-level biodiversity translates to ecosystem services and urban resiliency.

Your proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has a breadth of support services that would help me in conducting high quality research related to urban resiliency. If funded, I/we would actively participate in and benefit from:

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Use a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to a **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,

A handwritten signature in cursive script that reads "Gail A. Langellotto". The signature is written in black ink and is positioned below the word "Sincerely,".

Gail A. Langellotto, Ph.D.
Professor of Horticulture

Dear Dr. Gaolach,

On behalf of the Michigan State University - Detroit Partnership for Food, Learning, and Innovation (DPFLI), I express support for the proposed project *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*. The project offers broad and important services that would help my team, and network, conduct high quality research related to urban resiliency. As director of the DPFLI, I direct an urban agriculture center in Detroit.

The 3.3-acre facility conducts research and programs to improve the quality of life for Michigan residents and urban farmers. If funded, my team would participate in and benefit from:

- National Integrated Research Networks (IRNs) that connect researchers, Extension professionals, and urban stakeholders across the project's key topic areas, namely, urban agriculture and food systems, nature-based solutions (NbS), and urban ecosystem services, to co-create research agendas and share best practices
- A data archiving and sharing platform with an interactive "Urban Map Room" that hosts a breadth of urban spatial data to support developing research projects, and an Urban Research Repository that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency
- Professional development and training in systems thinking, resilience planning, and community-driven research approaches tailored to urban contexts
- Research synthesis and acceleration activities, including synthesis working groups to address knowledge gaps and research needs, and proposal development workshops to facilitate acceleration of emerging ideas.



Extension

Michigan State
University - Detroit
Partnership for
Food, Learning,
and Innovation

Naim Edwards
MSU-Detroit Center
3408 Woodward Ave
Detroit, MI 48201

Office: 313-578-9724
Cell: 717-364-2378
Edwar649@msu.edu

I look forward to the success of your application and the opportunity to work with you.

Cordially,

A handwritten signature in black ink that reads "Naim Edwards".

Naim Edwards
Director, Detroit Partnership for Food, Learning and Innovation
Michigan State University Extension

edwar649@msu.edu



Office of the Associate Dean and Director
David Civittolo, *interim*

3 Agricultural Administration Building
2120 Fyffe Road
Columbus, Ohio 43210-1084

November 25, 2025

<http://extension.osu.edu>

Brad Gaolach
Director, National Urban Research and Extension Center
gaolach@wsu.edu

Dear Dr. Gaolach,

As interim Director of Ohio State University Extension, I fully support the Urban Agriculture team that is engaged in applied research programs which address critical needs for urban agricultural producers. Examples of nature-based projects include edible forests for urban communities that enhance ecosystem services; compost enhancement using black soldier flies; creating soil blends from urban waste stream materials that reduce child lead exposure; and a decision support tool for urban agricultural enterprises to evaluate available land.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has a breadth of support services that would help The Ohio State University in conducting high quality research related to urban resiliency. If funded, we would actively participate in and benefit from collaborative work with colleagues in the region and across the nation to enhance the capacity of urban agricultural producers to healthy food production for their communities.

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Use a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to a **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Participate in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas



THE OHIO STATE UNIVERSITY

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,

David Civittolo
Interim Associate Dean and Director, Ohio State University Extension
Chair, Department of Extension



December 1, 2025

Brad Gaolach
Director, National Urban Research and Extension Center
gaolach@wsu.edu

Dear Dr. Gaolach,

As Ohio State University Extension state specialist and co-Leader of the Urban Agriculture Team, I am engaged in applied research programs which address critical needs for urban agricultural producers. Specific nature-based projects include are creating soil blends from urban waste stream materials that reduce child lead exposure; developing a decision support tool for urban agricultural enterprises to evaluate available land; and improving soil health for urban soils.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has a breadth of support services that would help me engage in conducting high quality research related to urban resiliency. If funded, I would actively participate in and benefit from collaborative work with colleagues in the region and across the nation to enhance the capacity of urban agricultural producers to healthy food production for their communities.

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Use a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to a **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Participate in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and



THE OHIO STATE UNIVERSITY

research needs and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,

Jeff Hattey

Professor of Soil Science

OSU Extension State Specialist, Soil Management

OSU Extension, co-Leader Urban Agricultural Team



December 4th, 2025

Dr Gaolach,

UC Agriculture and Natural Resources, specifically the Research and Extension Center (REC) component of the organization, provides UC campus and local county advisors academics with outdoor living laboratories to conduct applied research and facilities to deliver the results of this research to end users through various types of extension activities. Two of the ten RECs serving academics in the UC system are in or near large metropolitan centers in Southern California. South Coast REC and the newly purchased Hansen REC currently conduct or will be conducting applied research and extension in the areas of urban agriculture, integrated pest management in urban environments focusing on nature-based solutions, and the testing and demonstration of technologies to build healthy soils, manage pollutants in urban stormwater, and create healthier built-environments.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has a breadth of support services that would help UC ANR's Research and Extension Center System and its associated researchers in conducting high quality research related to urban resiliency. If funded, we would actively participate in and benefit from the following project activities and products:

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Use of a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to an **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Participating in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.

- **Participating in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,

A handwritten signature in black ink that reads "Darren L. Haver". The signature is written in a cursive style with a large, prominent initial 'D'.

Darren L Haver, PhD
Executive Director of REC System
UC Agriculture & Natural Resources



VILLANOVA UNIVERSITY

DEPARTMENT of CIVIL and ENVIRONMENTAL ENGINEERING

December 15, 2025

Dear Dr. Gaolach,

I am Bridget Wadzuk, the Director of the Villanova Center for Resilient Water Systems. My research center focuses on urban nature-based solutions and green infrastructure for flooding mitigation and stormwater management, which is closely related to the priority issues addressed in your proposed project.

Your project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has broad and important support services that would help my team conduct high-quality research related to urban resiliency. If funded, my team would actively participate in, contribute to, and benefit from:

- National Integrated Research Networks (IRNs) that connect researchers, Extension professionals, and urban stakeholders across the project's key topic areas, namely, Urban Agriculture and Food Systems, Nature-based Solutions (NbS), and Urban Ecosystem Services, to co-create research agendas and share best practices.
- A data archiving and sharing platform with an interactive "Urban Map Room" that hosts a breadth of urban spatial data to support developing research projects, and an Urban Research Repository that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- Professional development and training in systems thinking, resilience planning, and community-driven research approaches tailored to urban contexts.
- Research Synthesis and Acceleration Activities, including synthesis working groups to address knowledge gaps and research needs, and proposal development workshops to facilitate acceleration of emerging ideas.

I look forward to the success of your application and the opportunity to work with you.

Sincerely,

Bridget M. Wadzuk
Professor, Edward A. Daylor Chair of Civil and Environmental Engineering
Director of Villanova Center for Resilient Water Systems
Director of Sustainable Engineering
Villanova University
800 Lancaster Ave
Villanova, PA 19085
610-519-5365



November 19, 2025

Dr Gaolach,

My name is Holly Henning and I am an Associate Professor in the Department of Crop and Soil Sciences at Washington State University. Prior to my time at WSU, I worked two presidential commissions focused on public-private partnerships to advance sustainability. I currently teach undergraduate students in Agriculture and Food Systems about systems thinking while connecting them to the research and Extension resources of our Land Grant University to develop more resilient and sustainable food systems.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has a breadth of support services that would help me and my organization in conducting high quality research related to urban resiliency. If funded, I would actively participate in and benefit from:

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Use a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to a **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Contribute to and participate in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address

knowledge gaps and research needs and proposal development
workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to start
participating in the activities of this project.

Sincerely,

A handwritten signature in black ink, appearing to read "Holly Henning". The signature is fluid and cursive, with a large loop at the end.

Holly Henning
Associate Professor, Crop and Soil Sciences
Swantz Distinguished Professor of Teaching and Learning
College of Agriculture, Human and Natural Resource Sciences
Washington State University

December 3, 2025

Washington State University
Department of Sociology Wilson-Short Hall Room 204
Pullman, WA 99164-4020

Dr Gaolach,

My name is Sarah Whitley and I am an Associate Professor in the Department of Sociology at Washington State University. My qualitative research focuses on urban agriculture, food systems, and food insecurity.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has a breadth of support services that would help me in conducting high quality research related to urban resiliency. If funded, I would actively participate in and benefit from:

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems—to co-create research agendas and share best practices.
- **Using a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to a **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Participate in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas.

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,



Sarah Whitley, Ph.D.
Associate Professor, Department of Sociology
Washington State University



THE UNIVERSITY OF ARIZONA
**Agriculture, I
Veterinary Sc**

Dawn H. Gouge Ph.D.
Professor – Medical Entomologist & IPM Specialist
Extension Interim Associate Director of Agriculture & Natural Resources
University of Arizona, Department of Entomology
MAC Experiment Station, 37860 West Smith-Enke Road, Maricopa, AZ 85138
Office Tel. (520) 374-6223; Fax. (520) 374-6394; Mobil (602) 418-5202
dhgouge@arizona.edu

November 21, 2025

Re. Letter of Support for National Research Support Project Grant - Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities

Dear Dr. Gaolach,

Please accept this letter of support for the National Urban Research & Extension Center National Research Support Project grant application. I am an entomologist with over 25 years of experience both conducting research in urban communities and evaluating science-based operational solutions to real-time challenges in cities. I see great value in activities that support urban research. There is a critical need for an Integrated Research Network and platform support for urban research initiatives.

Hired in 2000 as an Urban Entomologist for the University of Arizona I am based at an Experiment Station site between our two largest metropolitan areas (Phoenix and Tucson). I have been acutely aware of the many unique issues generated by urban living, with zoonotic and vector-borne disease issues central to my own field of research.

The University of Arizona has a number of entomologists, plant scientists and engineers working in urban agriculture, horticulture, and nature-based solutions addressing climate adaptation needs.

Formation of Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities would provide an exceedingly valuable array of

support services that would benefit my own research ability and those I collaborate with across the nation, allowing the expansion of quality research related to urban resiliency. A warming desert climate brings both agricultural opportunities for year-round, urban production and food access improvements, but comes with extreme heat and water scarcity challenges. Research opportunities abound, but collaboration and support systems are needed.

If funded, I would actively participate in and benefit from:

- Participating in national Integrated Research Networks that connect researchers, Extension professionals, and urban stakeholders across key fields of science including urban agriculture and food systems, nature-based solutions and urban ecosystem services (with an emphasis on soil health and green infrastructure) to co-create research agendas.
- Using a data archiving and sharing platform that includes an interactive “Urban Map Room” that hosts spatial data to support developing research projects and would use and contribute to a Urban Research Repository that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- Participating in professional development and training in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- Participating in Research Synthesis and Acceleration Activities, including year-long synthesis working groups to address knowledge gaps, research needs, and proposal development workshops to facilitate acceleration of emerging needs and novel science initiatives.

I look forward to participating in these activities, all of which are urgently needed. Please contact me if you have any questions or would like additional information.

Sincerely,



Dawn H. Gouge
Medical Entomology Professor & Integrated Pest Management Specialist
Department of Entomology,
University of Arizona



Oregon State
University

Department of Horticulture

Oregon State University
4017 Agricultural and
Life Sciences Building
Corvallis, Oregon, 97331

November 17, 2025

Dear Dr Gaolach,

I am an Associate Professor of Pollinator Health Extension in the Department of Horticulture at Oregon State University. I was the first Pollinator Health Extension Specialist in the United States. While there have traditionally been Apiculture Extension programs that primarily serve a rural agricultural clientele (e.g., beekeepers and growers of crops that rent bees for pollination), my position came out of pesticide poisonings in a primarily urban context. Since being hired in 2016, there has been an explosion of interest and need in creating habitat for managed and wild bees in urban landscapes. There has been a commensurate growth in the literature around creating habitat, but much of it is disconnected and difficult to interpret across contexts.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, would fill a gap among researchers working on bee conservation in cities, providing a much needed structure to synergize research and put it into practice on the ground. If funded, my lab would actively participate in and benefit from

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Use a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to a **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Participate in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,

Andony Melathopoulos
Associate Professor

Andony.Melathopoulos@oregonstate.edu

541 452 3038



**HORTICULTURE AND
LANDSCAPE ARCHITECTURE**
COLORADO STATE UNIVERSITY

**College of Agricultural Sciences
Horticulture and Landscape Architecture**
Fort Collins, Colorado 80523-1173
agsci.colostate.edu

December 1, 2025

Dr Gaolach,

My name is Jennifer Boussetol, an Associate Professor of Horticulture at Colorado State University (CSU). I lead the Green Roof and Urban Agriculture research team at the Metropolitan Agricultural Research Center at the CSU Spur campus in Denver, Colorado. We study green roof plant-pollinator interactions, green roof system stormwater capture, rooftop agriculture, and the integration of solar panels on green roofs, also known as rooftop agrivoltaics.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has a breadth of support services that would help my team in conducting high quality research related to urban resiliency. If funded, we would actively participate in and benefit from the following four network/activities:

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Use a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to an **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Participate in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,



Best- Jen

Jennifer Busselot, Ph.D.
Associate Professor, Department of Horticulture and Landscape Architecture,
College of Agricultural Sciences, Colorado State University
Jennifer.Busselot@colostate.edu

C O M E T O

ESTD



1870

T H E T A B L E

COLLEGE OF

Agricultural

SCIENCES



Date: December 02, 2025

Dr. Brad Gaolach
National Urban Research & Extension Center

Re: Letter of Support – *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities* (NRSP)

Dear Dr. Brad,

I am writing to express my strong support for the National Research Support Project, Building Integrated Research Networks to Advance the Conduct and Application of Science in Urban Communities, which is being led by the National Urban Research & Extension Center and Dr. Brad Gaolach. The land-grant university (LGU) system was established when most Americans lived in rural regions. Today, however, I recognize the pressing need for the land-grant system to effectively serve urban neighborhoods, which now account for more than 80% of all Americans, and I consider this project as a key step in modernizing research and Extension to meet those needs. If funded, I will actively participate in project activities, including:

- Joining Integrated Research Networks (IRNs) for urban and indoor agriculture, food systems, nature-based solutions, and urban ecosystem services.
- Contribute data and results to the Urban Map Room and Urban Research Repository for comparative and decision-relevant research on urban resilience.
- Providing professional development and training in systems thinking, resilience planning, team science, and community-driven research.
- Actively participating in research synthesis working groups and proposal preparation to promote collaborative, cross-city research.

This NRSP project will fill a significant gap in the present LGU and urban research environment. This NRSP will accelerate progress on pressing issues like urban resilience, resource-efficient indoor vertical farming, climate adaptation, equitable food systems, and nature-based solutions by establishing structures for long-term, coordinated, and comparative urban research. I highly support this project and look forward to the success of your application; if it is funded, I pledge to support and participate in its activities.

Sincerely,

Most Tahera Naznin, PhD

Associate Professor of Urban & Indoor Agriculture

Department of Agriculture, Veterinary and Rangeland Sciences, University of Nevada, Reno

Office: UNR Extension, 2280 N McDaniel St, N. Las Vegas, NV 89030

Email: mnaznin@unr.edu; work-phone: +1-702-948-5917

11/29/2025

Dr. Gaolach,

I am Joan Wu, a professor at Washington State University (WSU) Puyallup Research and Extension Center. My team conducts hydrological and environmental research, which is closely related to the priority issues addressed in your proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*.

Your project has broad and important support services that would help my team in conducting high-quality research related to urban resiliency. If funded, my team would actively participate in, contribute to, and benefit from:

- National Integrated Research Networks (IRNs) that connect researchers, Extension professionals, and urban stakeholders across the project's key topic areas, namely, Urban Agriculture and Food Systems, Nature-based Solutions (NbS), and Urban Ecosystem Services, to co-create research agendas and share best practices. My team has developed simple, portable computing tools to evaluate and maximize the impact of Green Stormwater Infrastructure, an NbS, in stormwater management. We have also carried out studies assessing soil qualities on small farms in peri-urban areas of South Puget Sound. Currently, we are examining how growth and development have adversely affected streamwater quality and aquatic habitat in an urbanizing watershed in the Puyallup River Basin.
- A data archiving and sharing platform with an interactive "Urban Map Room" that hosts a breadth of urban spatial data to support developing research projects, and an Urban Research Repository that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency. Collaboration and data sharing promote transparency, reproducibility, and faster research discovery while improving efficiency, which is widely recognized and our firsthand experience.
- Professional development and training in systems thinking, resilience planning, and community-driven research approaches tailored to urban contexts. These activities will be invaluable not only to students and junior researchers, but even to senior faculty as we carry out research in an intricate, fast-changing urban environment.
- Research Synthesis and Acceleration Activities, including synthesis working groups to address knowledge gaps and research needs, and proposal development workshops to facilitate acceleration of emerging ideas. These integrative efforts will help generate more comprehensive, deeper understanding of what we have learned and what needs to be done, sharpening and broadening our vision.

I look forward to the success of your application and the opportunity to work with you.

Sincerely,



Joan Wu, Professor, PhD, PE
WSU Puyallup Research & Extension Center



Dr. Gaolach,

12/16/2025

I am a Professor and Green Stormwater Infrastructure Specialist at Washington State University. Green Stormwater Infrastructure (GSI) is a form of urban stormwater management. My program is fundamentally an Extension program that leans heavily on research to develop education and outreach materials for a broad audience. We collaborate with cities, counties, regulatory agencies, and corporations to develop more efficient and resilient stormwater management systems. Managing stormwater isn't just about controlling where the water goes; its fate and transport are intrinsically linked to the ecosystems and communities surrounding stormwater's path from ridge to ocean.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, offers a range of support services that would help my program conduct high-quality research on urban resilience. If funded, I would actively participate in and benefit from this work.

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS), and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Use a data archiving and sharing platform** that includes an interactive “Urban Map Room” that hosts a breadth of urban spatial data to support developing research projects and would use and contribute to an **Urban Research Repository** that assembles, stores, and disseminates research outputs, methods, and resources related to urban resiliency.
- **Participate in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs, and proposal development workshops to facilitate acceleration of emerging ideas.

I look forward to the success of your application and to my ability to start participating in this project's activities.

Sincerely,

Anand Jayakaran, PhD PE – Professor
Green Stormwater Infrastructure Extension Specialist
Washington State University, Puyallup Research and Extension Center
2606 W Pioneer Ave, Puyallup, WA 98371, USA
anand.jayakaran@wsu.edu

UNIVERSITY OF MINNESOTA

Crookston • Duluth • Morris • Rochester • Twin Cities

Department of Horticultural Science
College of Food, Agricultural and
Natural Resource Sciences

305 Alderman Hall
1970 Folwell Avenue
St. Paul, MN 55108

612-624-4742

Fax: 612-624-4941

<http://horticulture.umn.edu>

November 21, 2025

Dear Dr. Gaolach,

As associate professor in the Dept. of Horticultural Science at the University of Minnesota, my responsibilities include teaching, research, and Extension. In my education role, I serve as the Director of Undergraduate Studies for the Sustainable Agriculture and Food Systems program teach both the introductory course and capstone course for this program. This program emphasizes community engagement and experiential learning and supports green infrastructure in the Twin Cities metropolitan area via collective action. In my research role, I am currently exploring the effect of invasive swede midge insects on brassica crops in urban agriculture, a new pest that is constraining local production of high-quality vegetables here. My Extension program is focused on urban agriculture, specifically working with community partners to practice sustainable integrated pest management. These practices are largely preventative and take a holistic approach, including weed management and maintaining soil health and fertility.

The proposed project, *Building Integrated Research Networks to Advance the Conduct and Application of Science with Urban Communities*, has a breadth of support services that would contribute to my team's ability to conduct high quality research related to urban resiliency. If funded, I would actively participate in and benefit from these activities:

- **Participating in national Integrated Research Networks (IRNs)** that connect researchers, Extension professionals, and urban stakeholders across key topic areas – including urban agriculture and food systems, nature-based solutions (NbS) and urban ecosystem services (with an emphasis on urban soils and green infrastructure) – to co-create research agendas and share best practices.
- **Participate in professional development and training** in systems thinking, resilience planning, team science, and community-driven research approaches tailored to urban contexts.
- **Participate in Research Synthesis and Acceleration Activities**, including year-long synthesis working groups to address knowledge gaps and research needs and proposal development workshops to facilitate acceleration of emerging ideas

I look forward to the success of your application and the ability to start participating in the activities of this project.

Sincerely,

Mary Rogers, Ph.D.



Associate Professor
Sustainable & Organic Horticultural Food Production Systems
612-624-8871

Appendix 2: Interviews with Researchers

Interviewee X

Professor, Green Stormwater Infrastructure Specialist, Biological Systems Engineering, Past-President American Ecological Engineering Society.

Urban Resilience Through Nature-Based Solutions

X discussed nature-based solutions for urban resilience, emphasizing trees as the first intervention due to their stormwater management and co-benefits. They identified three key research areas: the role of plants in stormwater systems, the intersection of social sciences with nature-based solutions, and incorporating climate science projections into design. X also highlighted the need for better integration of arborist knowledge with engineering and the importance of understanding community needs and building trust in underserved areas.

Affordable Sensor Technology for Monitoring

X discussed the need for more affordable and reliable sensor technology for monitoring various environmental parameters, such as bacterial contamination and harmful algal blooms, which are currently expensive and difficult to deploy. They emphasized the importance of post-construction monitoring and the development of low-cost asset management systems for nature-based solutions like trees and bioretention systems. Brad suggested the possibility of sensors that could trigger human intervention for maintenance, allowing for better resource allocation.

Synthesis Centers for Research Collaboration

Brad and X discussed establishing synthesis centers for researchers to collaborate and develop research questions beyond specific disciplines. X emphasized the importance of in-person collaboration, incentives like funding opportunities, and the prestige of being part of a curated cohort. They considered the potential outcomes of the project, including building a network of researchers, writing grants, and publishing a manuscript in a journal. X highlighted the value of the process itself, including rigorous thinking and writing, even if the final product is not published.

5-Year Project Outcomes and Metrics

X discussed the desired outcomes for a 5-year project, including securing a grant, graduating students, and measuring tangible impacts such as increased awareness and behavior change. They emphasized the importance of developing standardized metrics to assess the project's success and highlighted the challenge of balancing case studies with broader data synthesis. X expressed willingness to contribute his research to a shared repository, noting the potential benefits of standardized data for AI-driven research and the value of documenting both successes and failures in nature-based solutions.

Mapping Hub for Nature-Based Research

Brad and X discussed the development of a mapping and reporting hub for researchers, focusing on the utility of map-based data for X's field-based research. X emphasized the importance of soil, climate, and plant data for nature-based solutions, highlighting the need to understand regional applicability and sustainability. They explored how such data could support research by providing insights into similar ecosystems and informing the design of nature-based solutions across different regions.

Interviewee Y

Professor, School of Environment and Natural Resources, Interests & Expertise: Soil Management; Soil Science Education; Animal Waste Management; Urban soil; Urban agriculture

Nature-Based Urban Resilience Grant

Brad and Y discussed a grant proposal focused on nature-based solutions to increase the resilience of cities. Y emphasized the importance of addressing community infrastructure, particularly stormwater management, to align with municipal budgets and resident concerns. They highlighted soil health as a key area for research, considering both contamination issues and soil compaction in urban areas. Y also stressed the role of carbon management in improving soil structure and reducing stormwater runoff.

Urban Land Management Challenges

Y and Brad discussed the challenges and opportunities in urban land management, focusing on soil health, land utilization, and reconnecting urban dwellers with the land. Y highlighted the contrast between engineering goals for construction and biological goals for land enhancement, emphasizing the need for a patchwork approach to urban development that balances ecological and social needs. They also touched on the historical conversion of prime farmland to urban areas and the potential for nature-based solutions to address environmental challenges in cities.

Synthesis Centers for Research Collaboration

Brad and Y discussed establishing synthesis centers for researchers to collaborate and develop interdisciplinary research questions. They agreed that bringing people together in person, like at the National League of Cities meeting, is valuable for exchanging ideas and building relationships. Y emphasized the importance of having a mix of researchers, practitioners, and city planners to inform research questions and facilitate funding opportunities. They also discussed the need to incentivize researcher participation, including financial support and the promise of future funding opportunities.

Nature-Based Solutions Impact Assessment

Y outlined the key objectives for a 5-year project focused on nature-based solutions for urban challenges. They emphasized the need for documents that can communicate the project's value at federal, state, and local levels, highlighting its relevance to urban and peri-urban populations. After two years, Y wants to see a tangible document showcasing the project's impact, while after

five years, they envision a multi-state assessment of the project's nationwide impact, including cost-benefit analyses and co-benefits of nature-based solutions.

Urban Advocacy and Research Funding

Y and Brad discussed the challenges of advocating for urban issues compared to agricultural interests, highlighting the lack of a dedicated commodity group for urban concerns. Y emphasized the importance of presenting clear metrics to justify the value of investments in research and education, such as securing external funding and supporting state legislators. They agreed on the need to demonstrate the impact of NSRPs in terms of securing grants, training students, and publishing research to justify their renewal.

Research Repository Collaboration Initiative

Brad discussed creating a research repository to promote discovery and collaboration, sharing documents, results, and tools for integrating data and maps. Y expressed support for sharing research results, emphasizing that much of his work is publicly accessible, especially if funded by taxpayers. They suggested using such a tool for background information when working in unfamiliar areas or for general data comparisons across regions. Brad proposed a mapping tool with thousands of data layers, and Y confirmed this would be useful for his work. No major concerns were raised about the project's viability, and Y expressed his support for the initiative.

Urban Agriculture and Ecological Solutions

Y and Brad discussed the challenges of urban agriculture and ecological solutions in densely populated areas. Y emphasized the need to balance ecological ideals with practical realities, noting that organic farming alone cannot feed the world's population due to insufficient natural resources. They agreed that while urban agriculture cannot meet city food demands, it can contribute to broader benefits like economic streams and co-benefits beyond food production.

Interviewee Z

Professor, Urban Food Production, Postharvest Handling, Department of Horticulture and Natural Resources; Director of the Urban Food Systems Initiative

Grant Planning for Research Support

Brad and Z discussed a grant aimed at supporting research activities rather than conducting research directly. Brad explained that the grant would help make certain activities useful for researchers like Z, and he sought their input on what activities would be most beneficial. He compared the grant to an NSF collaborative network, emphasizing that it is still in the planning stages and they are gathering diverse perspectives to inform its development.

Urban Agriculture for Resilience

Brad and Z discussed nature-based solutions for urban resilience, with Z focusing on urban agriculture as a key area. They explored how urban agriculture could contribute to water storage, food security, and education, while also addressing challenges such as transportation efficiency and cost-effectiveness. Z identified three main research areas: defining urban resilience, improving food transportation within cities, and evaluating the economic viability of urban agriculture for both producers and consumers.

Synthesis Centers for Research Collaboration

Brad and Z discussed establishing synthesis centers for researchers to collaborate on research questions beyond specific disciplines. Z emphasized the importance of a shared vision, funding, and support for grant submissions to bring people together. They explored potential outcomes for a 2-year project, including preliminary data for larger grants and identifying correct team members. For a 5-year grant renewal, Z suggested measuring success through return on investment, successful proposals, and adapting to new funding agents. Both agreed that metrics for renewal would likely include money and publications.

Research Impact and Data Accessibility

Z and Brad discussed the importance of identifying and measuring impact in research, including changes in knowledge, behavior, and situations. They explored the potential of a research repository to promote discovery and collaboration, with Z emphasizing the need for user-friendly organization and accessibility. Brad inquired about Eleni's anticipated use of geographically referenced data layers, to which Z responded that usage would depend on the message they wishes to convey. Z expressed interest in having baseline data on food losses, highlighting the difficulty in accurately measuring this metric, and suggested the need for standardized methods to assess contributions in research.

Urban Agriculture Engagement Strategies

Z and Brad discussed the challenges of engaging a diverse group of people in discussions about urban agriculture and post-harvest physiology. They explored the possibility of using horizon scans as a mechanism to gather input from a core group while allowing for digital engagement from others. Z expressed concern about the viability of projects based on nature-based solutions in cities, citing the need to align priorities with the current administration's funding priorities.

Appendix 3: Evaluation Plan Overview

The evaluation plan is designed to monitor progress toward three primary outcomes: fostering national and cross-institutional research collaboration, improving the quality and accessibility of urban ecosystem and agriculture data, and accelerating the development and dissemination of high-quality research.

To measure these outcomes, the plan integrates process evaluation (ongoing monitoring) and summative evaluation (mid-term and final assessments).

Outcomes:

1. Increase national and/or cross-institutional research collaboration and training efforts
2. Improve the quality and accessibility of data related to urban ecosystem and agriculture research and research products (e.g., de-silo the current fragmented state of urban data systems)
3. Increase the amount and speed at which high quality research is developed, implemented, and disseminated

Process evaluation will include assessing the extent to which project activities (IRN development and activities; Data Hub development and utilization; and professional development offerings) are advancing toward the goals. IRN development and collaborative work will be assessed using meeting agendas, minutes, and a description of the IRN composition, deliverables (e.g., standardized metrics developed) and incubation projects supported. The Data Hub and Repository will create a data and research project inventory to establish a baseline rate of utilization overall and by key stakeholder characteristics. Utilization of the Data Hub and repository by stakeholder characteristics will also be assessed using database analytics. Professional development offerings will be assessed using rates of registration, participation, satisfaction, and pre/post assessments of knowledge, self-efficacy, and intention to implement skills. Annual surveys, listening sessions, and/or case studies will be used to understand needs and utilization of IRN, Data Hub, and professional development offerings. Hubspot will be used to track participation in IRN and professional development offerings. Hubspot will also house data to be utilized as a sampling frame for annual surveys, listening sessions, and/or case studies for mid-year and long-term outcomes.

Summative evaluation will assess long-term impact through indicators such as adoption of IRN frameworks by stakeholder groups, utilization of IRN-developed best practices, number of developed and funded research projects, and publications in high-impact journals among those participating in professional development offerings and/or using Data Hub resources. Comparative analyses will examine differences in research development and dissemination (e.g., acceptance rates by journals and impact factors) overall and by stakeholder type, region, and utilization of the project's resources (high vs. low) levels, as well as against publications rates identified in the peer-reviewed literature. Case studies and interviews will provide deeper insights into how IRNs, the Data Hub, and training activities influence the longer-term outcomes. Annual surveys, listening sessions, and/or case studies will also be used to understand how the IRNs, Data Hub, and professional development offerings supported the development of research, adoption of best practices or IRN frameworks, and the faster dissemination of research to peer-review.

Evaluation Activities

Outcome	Activity	Process Evaluation (ongoing)	Summative Evaluation (mid-term and final reports)
<p>Increase national and/or cross-institutional research collaboration and training efforts</p>	<p>Building and facilitating National Integrated Research Networks (IRNs) that will convene experts across key topic areas to generate research agendas and share best practices</p>	<p>Rates of participation by participant and organizational characteristics (e.g., tenure status, LGU type, expertise); stakeholder type</p> <p># of incubation projects identified and/or supported overall and by IRN areas and by stakeholder type</p> <p>Research agenda and best practices development by meeting agenda, minutes, action items completed; # of RFAs responded to within research agenda topical areas; # of and type of best practice offerings developed and disseminated</p> <p>Annual survey and/or listening sessions to identify research gaps and support needs of stakeholders</p>	<p>#, %, rates of change related to adoption/implementation of IPN frameworks key stakeholders overall and by U.S. region</p> <p>Rates of best practices utilization in research publications or products</p> <p># of funded research projects within research agenda topical areas</p> <p># of publications in high impact factor journals and response of journal (e.g., desk acceptance, major revision, minor revision)</p> <p>Annual surveys, case studies, and/or interviews with stakeholders to assess the extent to which goals were achieved</p>
<p>Improve the quality and accessibility of data related to urban ecosystem and agriculture research and research products (e.g., de-silo the current fragmented state of urban data systems)</p>	<p>Developing and maintaining an Urban Data Hub that will house data from research projects, research outputs, and make accessible urban data sets nationwide. Products include a Research repository and Urban Map Room to facilitate sharing of</p>	<p>Create an inventory of research projects</p> <p>#/% changes in products available to researchers and stakeholders (type, topic area)</p> <p>Rates of product utilization and by user characteristics</p>	<p># of funded research projects using Data Hub products</p> <p># of publications or funded proposals using Data Hub products</p> <p># of publications in high impact factor journals and response of journal (e.g., desk acceptance, major revision, minor revision)</p>

Outcome	Activity	Process Evaluation (ongoing)	Summative Evaluation (mid-term and final reports)
	<p>data and data visualization</p> <p>Increase the quality and utilization of standardized metrics of urban nature-based solutions</p>	<p>(LGU/org type; researcher type/tenure)</p> <p>#/% of cross-institutional research projects using Hub</p> <p># of standardized metrics developed and utilized overall, by IRN area, and by service user characteristics</p> <p>Annual survey and/or listening sessions to identify needs and service gaps</p>	
<p>Increase the amount and speed at which high quality research is developed, implemented, and disseminated</p>	<p>Providing professional development and training in multiple modalities including in-person skill building, online and/or hybrid training opportunities, and resource dissemination</p>	<p>Changes in rates of participation with professional development offerings overall and by stakeholder type</p> <p>Participant characteristics (e.g., LGU type, tenure status); stakeholder type</p> <p>Pre/Post tests to examine changes in knowledge, beliefs, and behavior intention</p> <p>Participant satisfaction ratings</p> <p>Identification of needs through interviews or listening sessions</p> <p>Annual needs assessment and service utilization survey</p>	<p># and rate of research proposals development overall and by high and low-service user</p> <p># and rate of publications in high impact factor journals compared to national averages identified in the peer reviewed literature</p> <p># and rate of publications in high impact factor journals overall and by high and low service user</p> <p># of abstracts submitted, accepted, or invited overall and by high and low service users</p>

Data Sources:

Data Hub and Repository Analytics. These data will be used to understand evaluate changes in the availability, and utilization, of data by stakeholders and by topical area.

Event participation. Hubspot is a CRM that will be used to track event registration, participation, and engagement with the myriad resources disseminated throughout the life of the project. It will also be used as a sampling frame for annual surveys, listening sessions, case studies, and other evaluation-related activities.

Annual surveys. Surveys will be conducted annually with stakeholders and event participants to understand changes in adoption of research products, frameworks, as well as gaps in services. This will also allow for comparisons in research development outcomes to by a variety of characteristics, including high vs. low service users; organizational characteristics; IRN topic areas; regional differences; and the potential mediating or moderating effects of services on the development and dissemination of high-quality research.

Interviews, listening sessions, and/or case studies. These data sources will be used to identify gaps in services and to evaluation the extent to which IRNs, Data Hub, and professional development activities are influencing the project outcomes.

Appendix 4: MOU between NLC and NUREC

We agree that:

Both Parties share the common goal of building and strengthening the relationship between NLC members and their Extension resources so that municipal leaders understand and have access to the skills and scholarship provided by NUREC and NUREC has opportunities to share its innovations directly with municipal leaders.

Both Parties are interested in pursuing partnerships with networks, organizations, and other institutions that share the same mission to enhance the effectiveness and sustainability of their respective efforts and commit to cooperate as follows:

To this end we have a systematic approach to engaging NLC members, they are laid out in the approach both parties agree is most effective:

1. **Synthesis and acceleration:** Catalyze rigorous understanding of innovative programs. NLC has dozens of cohorts active in municipalities across the country. These cohorts encourage and support municipal leaders in promising, transformative and innovative practices across a wide range of subject areas. Cohorts range from 4 cities exploring how to better connect their workforce and education institutions to supporting 50 cities in economic mobility programming and 10 cities in implementing smart surface policies for their infrastructure needs.

Many of these practices expand on existing theory where there is little scientific evidence of their impact or return-on-investment (ROI). There is so little research on many of these practices due to three key factors a) the academic/scientific field is often unaware of projects in incubation, b) even with awareness trust between researchers and practitioners is key to successful evaluations of promising practices – something difficult to build for a single project and c) scholarly research often relies on funding to execute.

By capitalizing on already existing relationships with funders who invest in technical assistance at NLC, from start-to-finish, an evaluation process by which we provide added value to all involved, from municipalities, to funders, to the scholarly field can easily be integrated into NLC's work. NLC is uniquely trusted by municipal leaders allowing it access to the implementation of these practices so as to capture the necessary evidence to understand their potential for scale. Despite this status, NLC has limited capacity to be deeply embedded in its work as an R&D arm. However, NUREC provides unique opportunities to engage scholars in relevant fields early in the cohorts to ensure rigorous evaluation of these new and innovative practices as well as to inform them with scientific guidance throughout the implementation. This work would allow us to expand beyond "innovative" into "best" practices leading to the next phase.

2. **Best Practices and Expansion:** NLC has a unique position from which it can inform the broader fields of municipal research, policy and practice. NLC is

often leading the scaling of these innovative practices making it well-aware of innovations in the field before many others are. NLC members trust NLC to provide evidence on promising practices and will be eager for support in learning when, how and for whom promising practices provide impact or return-on-investment. Extension can partner with NLC to take best practices and support expansion of programming beyond the initial cohort (innovators) through the waves of adoption diffusion theory (early adopters, early majority, late majority) while also supporting both local adaption and data and impact collection for common metrics of change and impact.

To achieve these goals we aim to do the below:

1. **Durable Educational materials** targeted to audiences of both parties, co-produced and branded by both parties (e.g., fact sheets, research reports, policy briefs, etc.).
2. **Learning opportunities** to connect the audiences from both parties to each other (e.g., webinars, podcasts, professional / workforce development trainings and micro-credentialling) including, but not limited to, NLCU Executive Education course sequences and free learning opportunities. To facilitate this engagement and its potential continuation both Parties agree to discuss a potential master services agreement for NLC from Washington State University (organizational home of NUREC), revenue share on NLCU courses and badging and credentialing from these courses.
3. **Technical Assistance cohorts and Scaled Models of Practice.** Pursue opportunities to leverage each party's expertise and audience/members to co-create, support, and scale the development and / or translation of knowledge into practice.
 - a. In the long-term we will use these cohorts to explore a program evaluation component that includes evaluation of baseline and outcome metrics as well as collection of core program data to identify key outcomes of innovative programming. Capitalizing on the unique network of academics and scholars present in NUREC we will be able to provide municipal governments with the capacity to rigorously understand these programs and their impacts. This allows for opportunities to scale rigorous programs through dissemination of effective programs through new TA cohorts as well as through informing the field of scholarship on these programs in collaboration with scholars engaged in the work throughout the programming of the cohort.

Appendix 5: Green Infrastructure Report

Thriving Communities Index - NUREC Report

Location

Seattle-Tacoma-Bellevue, WA Metro Area

Green Infrastructure

Forested Acres

This indicator displays the percent of total acreage in a county that is forested.

Report Area	Acres	Woodland Acres	Percent of Woodland Acres	Forested Acres	Percent of Forested Acres	Percent of Acres not in Forest or Woodland
Seattle-Tacoma-Bellevue, WA Metro Area	9,330,365.22	3,570,298.85	38.27	1,550,694.58	16.62	45.11
King County, WA	3,466,178.73	1,228,559.04	35.44	601,898.48	17.36	47.19
Pierce County, WA	2,621,054.52	892,232.06	34.04	398,240.50	15.19	50.77
Snohomish County, WA	3,243,131.97	1,449,507.75	44.69	550,555.60	16.98	38.33
Washington	100,770,199.42	29,159,102.30	28.94	9,650,567.14	9.58	61.49
United States	3,438,000,071.88	447,054,567.91	13.00	342,236,028.51	9.95	77.04

Note: This indicator is compared to the state average.

Data Source: Multi-Resolution Land Characteristics Consortium, National Land Cover Database, 2024.—

[Show more details](#)

Park Access

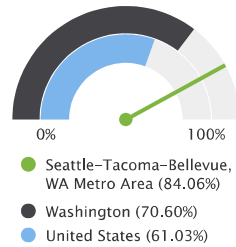
This indicator reports the percentage of population living within 1/2 mile of a park. This indicator is relevant because access to outdoor recreation encourages physical activity and other healthy behaviors.

Report Area	Total Population, 2016-20	Population Within 1/2 Mile of a Park	Percent Within 1/2 Mile of a Park
Seattle-Tacoma-Bellevue, WA Metro Area	3,928,498	3,302,260	84.06%
King County, WA	2,225,064	2,071,534	93.10%
Pierce County, WA	891,862	608,249	68.20%
Snohomish County, WA	811,572	622,475	76.70%
Washington	7,512,465	5,303,800	70.60%
United States	326,569,308	199,317,503	61.03%

Note: This indicator is compared to the state average.

Data Source: Centers for Disease Control and Prevention, [CDC - National Environmental Public Health Tracking Network](#). 2020. → [Show more details](#)

Percent Population Within 1/2 Mile of a Park



Population Within 10 Minute Walk of a Park

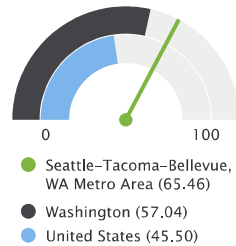
This indicator displays the number of people who live within a 10-minute walk from a park

Report Area	Total Population (2020)	Population Within a 10-Minute Walk	Percent of Population Within a 10-Minute Walk
Seattle-Tacoma-Bellevue, WA Metro Area	4,018,762	2,630,625	65.46
King County, WA	2,269,675	1,832,149	80.72
Pierce County, WA	921,130	405,567	44.03
Snohomish County, WA	827,957	392,909	47.46
Washington	7,705,281	4,395,168	57.04
United States	334,735,155	152,294,403	45.50

Note: This indicator is compared to the state average.

Data Source: [Trust for Public Land, 2025](#) → [Show more details](#)

Percent of Population Within a 10-Minute Walk



Protected Area

This indicator displays the percent of acres in a county that are in the Protected Areas Database owned by Local, State, or Federal governments and open to the public.

Report Area	Total Acres	Recreational Land Acres	Percent of Acres in Recreational Land
Seattle-Tacoma-Bellevue, WA Metro Area	4,037,546	1,680,168	41.61
King County, WA	1,476,770	520,955	35.28
Pierce County, WA	1,155,495	374,340	32.40
Snohomish County, WA	1,405,281	784,873	55.85
Washington	45,632,383	14,969,833	32.81
United States	2,439,683,092	611,466,613	25.06

Data Source: [United States Geological Survey \(USGS\) Protected Areas Database. 2023.](#) → [Show more details](#)

Tree Canopy Area

This indicator reports the percentage of the report area that is covered by tree canopy. Report data is based on analysis of the 2023 National Land Cover Database - Tree Canopy analytical dataset.

Report Area	Total Population	Area Covered by Canopy, Percent (Crude)	Area Covered by Canopy, Percent (Population Weighted)
Seattle-Tacoma-Bellevue, WA Metro Area	4,021,467	52.92%	28.82%
King County, WA	2,262,713	53.74%	28.64%
Pierce County, WA	924,106	49.25%	26.65%
Snohomish County, WA	834,648	55.18%	31.73%
Washington	7,740,984	32.81%	25.51%
United States	330,128,653	22.22%	21.68%

Note: This indicator is compared to the state average.

Data Source: [Multi-Resolution Land Characteristics Consortium, National Land Cover Database. 2023.](#) → [Show more details](#)

