

# **Plants, Nature and Health Initiative Strategic Plan 2025-2027**

**Co-PIs:**

**Charlie Hall  
Jay Maddock**

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# Plants, Nature and Health Initiative

## Strategic Plan 2025-2027

### Introduction

Plants, nature, and other green spaces play a vital role in promoting human health and well-being. Spending time in natural environments has been shown to reduce stress and anxiety levels, as green spaces provide a calming and restorative effect. This is largely attributed to the biophilia hypothesis, which suggests that humans have an innate connection to nature. Being surrounded by greenery, whether in a park, forest, or even a garden, can lower cortisol levels, decrease blood pressure, and improve overall mood. The sights, sounds, and smells of nature stimulate the senses and foster a sense of tranquility.

Green spaces also contribute to physical health by encouraging outdoor activities. Parks and natural areas provide an inviting environment for walking, jogging, cycling, and other forms of exercise. Physical activity in these settings not only boosts cardiovascular health but also improves mental health by releasing endorphins and reducing symptoms of depression. The availability of green spaces within urban areas is particularly beneficial for promoting active lifestyles, helping combat sedentary behaviors and associated health risks.

Furthermore, plants play a crucial role in improving air quality, which is essential for respiratory health. Vegetation absorbs carbon dioxide, produces oxygen, and filters harmful pollutants from the air, creating a cleaner and healthier atmosphere. Green spaces in urban areas help mitigate the urban heat island effect, providing cooler microclimates that can reduce heat-related illnesses during hot weather.

Socially, nature and green spaces foster community interaction and provide spaces for relaxation and connection. Shared green areas encourage social bonding and enhance a sense of community belonging, which can positively impact mental health. Whether it's a family picnic in a park or a quiet moment of reflection in a garden, these spaces nurture emotional well-being and strengthen the human connection to the environment.

### “The Why” Underlying the Initiative

In October 2023, representatives from all across the Texas A&M System working in this subject matter area came together for a half-day brainstorming session to: (1) share a short summary of their mission and direction, as well as major research, outreach projects, or other banner programs; (2) ideate regarding potential collaborations among the entities represented to mitigate redundancies and/or capture synergies; and (3) identify unique or novel ways to enhance knowledge transfer and/or educate clientele as to the benefits of plants and greenscapes in improving mental and physical health.

To set the stage for the meeting, Dr. Jay Maddock presented the Ellison Chair Distinguished Lecture the day prior entitled “Exploring the plant, greenspace, and human health connection.” A total of 207 unique ideas were generated during that meeting which were prioritized to seven focal areas on which to move forward. Central to these seven focal areas was “the development of a university-wide initiative, center, or institute that would capture the synergies of the research, teaching, and outreach efforts of these internal and external partners identified.”

In the wake of this meeting, a steering committee was formed to direct the efforts of that particular focal area that has come to be known as the **Plants, Nature, and Health Initiative (PNHI)**. The charge of this steering committee is to: (1) conduct a thorough assessment of the resources and capabilities of internal and external partners in the plant, nature, and health arena, and (2) hold a formal strategic planning process to assess the preferred mechanism(s) for moving these initiatives forward. The initial steering committee members include:

- Jay Maddock, Director, Center for Health and Nature
- Charlie Hall, Ellison Endowed Chair in International Floriculture
- Amit Dhingra, Horticultural Sciences
- Marco Palma, Agricultural Economics
- Mike Arnold, Director, TAMU Gardens, Professor, Dept of Horticultural Sciences
- Scott Shafer, Campus and Community Enrichment within the Office of the President
- Debra Kellstedt, AgriLife Extension
- Rebecca Seguin-Fowler, Institute for Advancing Health through Agriculture/Nutrition
- PJ Ellison, External Advisor
- John Dole, NC State University
- Ryan Heare, Office of Lois Kolkhorst, State Senator, Mental health policy for the Health and Human Services Committee

In October 2024, again as part of the Ellison Chair Advisory Committee meeting, a follow-up session of lightning talks was held so that members of the original brainstorming team who had expressed an interest in the Initiative could come together to share more details about their respective projects and capabilities in this subject matter area. It was then that group settled on early 2005 as the date for the initial strategic planning meeting.

A strategic planning session was then held in January 2005 for the new Plants, Nature, and Health Initiative, an incubator project within the IHA that addresses the health benefits of both nature in the wild and urban-based nature within improved residential and municipal landscapes. Dr. Jay Maddock (Director of the Center for Health and Nature) and Dr. Charlie Hall (Endowed Chair in Horticultural Sciences) are leading this initiative, after securing seed money funding from the Institute for Advancing Health Through Agriculture (IHA), that addresses both the Healthy Living and Responsive Agriculture hubs within IHA. Other key individuals interested in the Initiative were also invited to the meeting. This meeting laid the groundwork for a broad interdisciplinary effort to explore the critical relationship between

human health and nature. Through collaborative discussions, key themes emerged, including scientific research on nature’s health benefits, walking-based interventions, economic analyses, and education-driven outreach.

After hearing the results of a network analysis of current collaborative efforts, a three-year vision was set for the initiative, as well as an annual action plan for the year that prioritizes the research, outreach, and teaching efforts among the initiative participants that represent departments and centers spanning across horticulture, health systems, public health, agricultural economics, education, and landscape design. Key representatives of external partners were also represented at the meeting. External collaborations are critical to the function of the initiative including organizations like Texas Parks and Wildlife, Texas Children & Nature Network, Texas Nursery and Landscape Association, the Texas Department of Agriculture, and more.

The planning team also set a game plan in motion for enhancing their collaborative capabilities with quarterly meetings that combine mini-symposiums, professional development, connections with external partners, and sharing of outcomes and best practices. A directory of potential collaborators has been developed (see Appendix), comprising TAMUS/Agency faculty and external partners identified to date. Interested parties not in the directory should contact the project directors for more information.

**Plants, Nature, and Health Initiative: Internal Partners**



## Mission Statement

The **Plants, Nature, and Health Initiative** at Texas A&M University cultivates interdisciplinary research, education, and outreach to explore and promote the vital connections between human well-being and the natural world. We strive to understand and enhance the positive impacts of plants and nature on physical, mental, and social health, fostering a healthier and more sustainable future for all.

## Vision Statement

We envision a future where the profound benefits of plants and nature are fully integrated into our lives, communities, and healthcare systems, leading to a healthier, more resilient, and thriving society for all.

## Short-Term Goals of the Plants, Nature, and Health Initiative

Discussions during the first meeting of the steering committee and the inaugural strategic planning session regarding the purpose of the Initiative culminated with a consensus of the following short-term goals:

1. Facilitate collaborative research and outreach efforts that advances the science regarding health and well-being benefits associated with human-plant interactions of all kinds.
2. Serve as a short-term structure for collaboration among faculty in departments, centers, institutes, colleges, and agencies that are already doing work in this area.
3. Develop a strategic roadmap in conjunction with external partners for expanding the awareness of and appreciation for the current and future research and outreach efforts with TAMU and agency collaborators being recognized as world-wide leaders in this area.
4. Develop a complete inventory of faculty and projects at Texas A&M and agencies/affiliates and be a vehicle for initiating and fostering additional linkages between TAMU/Agencies and other universities and external partners.
5. In the longer term, determine the best organizational structure for the initiative going forward that is compelling, encompasses the breadth of the work being done.

## Strategic Milestones 2025-2027

Milestones are essential to the success of the initiative, serving as measurable markers that guide our progress and ensure meaningful impact. By setting clear objectives, we can track advancements in research, education, and community engagement, ultimately strengthening the connection between plants, nature, and human health.

These benchmarks help us assess the effectiveness of programs that promote green spaces, advocate for plant-based wellness solutions, and foster environmental stewardship. Milestones also provide motivation and accountability, allowing us to celebrate achievements while identifying areas for improvement.

Through well-defined milestones, we can enhance public awareness, influence policy, and create sustainable, evidence-based strategies that harness nature's power to improve mental and physical well-being. Each step forward brings us closer to a healthier, more harmonious relationship with the natural world. The following milestones are projected for the next three years of the PNHI.

- By 2027, at least 50 faculty system-wide will be actively involved in the PNHI.
- By 2027, faculty will have improved collaboration across the system as measured by a network analysis.
- By 2027, at least 3 pilot studies will have been conducted as evidenced by at least 3 collaborative research publications.
- By 2027, at least 5 strategic partnerships with other universities and external partnerships will be developed.
- By 2027, applications for at least 3 collaborative external grants will have been submitted.
- By 2027, an analysis and report of considerations and recommendations for future organizational structure will be written.

## Potential Areas of Emphasis for Research, Teaching, and Outreach

A growing body of research highlights the extensive health benefits of human interactions with nature, which include:

- **Physical Health:** Reduced incidence of obesity, cardiovascular disease, respiratory illness, diabetes, and enhanced immune function.
- **Mental Health:** Decreased stress, anxiety, depression, PTSD mitigation, and cognitive development improvements.
- **Behavioral and Social Benefits:** Increased physical activity, reduced crime rates, improved sleep quality, and enhanced social cohesion.
- **Economic and Environmental Impacts:** Increased property values, reduced urban heat islands, improved air quality, and enhanced creativity and productivity.

While the benefits of nature exposure are evident, **many questions remain** regarding dosage, delivery methods, and mechanisms for optimizing these benefits. Addressing these knowledge gaps will allow for more targeted interventions that maximize the potential of green spaces in improving well-being. To date, brainstorming efforts among those interested in participating in the PNHI have identified the following strategic areas of focus:

### Lab-Based Studies: Quantifying Nature's Impact

One of the fundamental research priorities is defining the **optimal dose and duration of exposure to green spaces** to maximize health benefits. The following research/outreach questions are critical:

- **What dose and duration of green space interactions optimize health benefits?** These findings could directly inform University Health Services programs to support student mental health and stress mitigation strategies.
- **How does plant and nature contact improve immune function?** Identifying biological markers and the role of the human microbiome.
- **Can virtual nature exposure provide similar benefits?** Exploring the effectiveness of digital engagement with nature.
- **How can hospitals integrate plant exposure?** Investigating the impact of “plant paradise” chemo rooms and green recovery spaces.
- **How does nature exposure interact with different lifestyle factors?** Understanding how diet, sleep, and exercise influence the benefits of nature exposure.
- **Music and nature interactions**—such as the Marimba/Music Pods Research Study—could be explored, including the integration of musical programming in outdoor settings to enhance mental well-being. This research would seek to understand whether auditory experiences in natural settings amplify relaxation and cognitive benefits.

### Walking-Based Studies: Movement, Nature, and Restoration

- Walking has emerged as a **powerful mechanism** for unlocking nature's health benefits. Walking programs will also be explored for their long-term impact on reducing healthcare costs and improving productivity. Key research/outreach areas could include:
- **Comparing health outcomes of walking in various landscapes** (green spaces, blue spaces, brown spaces).
- **Seasonal variations in the impact of walking**—how different times of year influence well-being.
- **Effect of plant diversity on mental restoration.**

- **Engagement with technology**—how interactive educational apps impact mental well-being during walks.
- **Hospital gardens and healing spaces**—examining recovery rates for patients with nature exposure.
- **Walking and socialization**—studying the role of group walks (e.g., walking clubs for mothers, birding walks) in reducing isolation and improving mental health.
- **Comparing walking with pets vs. walking alone.**
- **Identifying thresholds of diminishing returns for walking benefits.**
- **How does terrain affect walking benefits?** Examining the influence of elevation, trail type, and accessibility.
- **Does cultural or historical context in nature trails influence mental well-being?** Studying the psychological impact of interpretative signage and guided history walks.
- The **economic impacts of walking infrastructure**—such as proximity to business districts and workplace wellness programs—could be assessed.

### **Economic Studies: Nature as an Investment**

The financial benefits of green spaces are significant yet often undervalued. Collaborations with private, national, and university-based funding sources will be critical in sustaining these initiatives. Further analyses could focus on how investments in green infrastructure contribute to long-term urban resilience and sustainability. Key research/outreach directions might include:

- **Economic and health benefits of campus green spaces**—Assessing the impact of **Aggie Park and The Texas A&M Gardens** on students, staff, and visitors.
- **Monetary valuation of community beautification initiatives**, such as **Tree City USA and Keep Brazos Beautiful**.
- **Passive data collection** through QR codes in green spaces to track engagement and outcomes.
- **Disaster resilience**—how nature-based solutions can mitigate the psychological and economic impact of disasters.
- **Funding strategies for maintaining and expanding urban green spaces.**
- **Economic viability of therapeutic landscape designs in hospitals.**
- **How do businesses benefit from proximity to green spaces?** Investigating customer satisfaction and employee well-being in nature-integrated work environments.
- **What are the economic and health benefits of AgriLife agency programs** such as *Get Outside!*, *Junior Master Gardener* (Learn, Eat, Grow, Go), the *Outdoor Learning Environment (OLE!) Texas* statewide initiative, *Better Living For Texans*, *Walk Across Texas*, *Texas Healthy Building Blocks*, and *Healthy [South] Texas*?

### **Education: Fostering a Nature-Literate Society**

Education plays a pivotal role in deepening human connections with nature. Additionally, partnerships with **AgriLife Extension faculty** could help bridge research with practical, community-level applications. Programs aimed at increasing environmental literacy and nature accessibility among diverse populations would also need to be explored. Research and outreach priorities in this area could include:

- **Defining the "wildness" necessary for effective nature exposure**—examining plant diversity, sensory engagement, and urban-rural differences.
- **Integrating nature into formal education**—developing courses, teacher training programs, and professional development opportunities.
- **Expanding youth engagement programs**—enhancing **Junior Master Gardener initiatives**, edible plant education, and urban forestry programs.
- **Leveraging social media and public engagement**—creating campaigns that amplify the health benefits of nature through storytelling and outreach.



- **Measuring long-term retention of nature education benefits.**
- **How do childhood experiences with nature influence adult health behaviors?**
- **What messaging regarding the benefits of people-plant interactions resonates most with clientele** so they proactively engage in horticulturally intensive greenscapes? What areas of the brain are being triggered prior to and during engagement in these interactions?
- **Develop a coordinated social media campaign around the health and wellness benefits of plants, nature, and other green spaces**, perhaps using a celebrity champion or influencer; create consistent messages across this group for outreach purposes; investigate the usage of QR codes and/or other tools.
- **Develop pre-service teacher training courses to support garden- or outdoor-based learning to remove the fear of gardening.**
- **Develop and launch a core course that includes the interaction between people and nature, consumptive, and medical benefits of horticulture.** Lobby for the inclusion of horticultural benefits information in health-related classes where appropriate.
- **Engage green industry experts in creating nature and other green space experiences for learners of all ages.** Put plants in offices and common areas around campus in a way that makes people notice and ask why; place benefits signage in common areas; educate faculty and staff regarding the wellness associated with plants and green spaces, model for other businesses, social media contest for office plants; develop an adopt a plant program; sponsor plant-oriented health/wellness-themed tailgate parties; better utilize our green spaces on campus (TAMU Gardens and Aggie Park) in research, teaching, and outreach programs.

#### **Multidisciplinary Studies**

- **Which metrics of plants and nature contact best predict health outcomes?** For each such metric, what is its accuracy? What is its precision? What is the role of subjective assessments, and of “nature connectedness,” in measuring nature contact? How do exposure metrics vary in their performance by population and other factors?
- **Harvest research findings** and provide infographics and other deliverables to green industry businesses and the medical profession so industry can utilize these messages in marketing campaigns to educate and reach the end consumer; add health and well-being benefits to plant tags, similar to the care tag used for plants.
- **Partner with county-level AgriLife Extension staff and master gardener volunteers** to provide professional development to community businesses/industries to create worksite wellness and mental health programs. Integrate mental health and wellness research with existing extension outreach programs in horticulture or gardening topics; use in schools, parks, public gardens, outdoor spaces, etc.

## Next Steps and Implementation

To translate these ideas into actionable strategies, the members of the Plants, Nature, and Health Initiative will work collaboratively to:

1. **Prioritize the projects, form working groups, and refine research and outreach methodologies**—establish standardized measurement tools for nature exposure benefits.
2. **Secure funding**—pursue grants, corporate sponsorships, and government partnerships to sustain research efforts.
3. **Launch pilot projects**—implement real-world interventions in urban parks, university campuses, healthcare settings, community gardens, etc.
4. **Enhance public engagement**—integrate social media, signage, and interactive programs to communicate findings to broader audiences.
5. **Establish quarterly half-day meetings of the PNHI members**—lightning talks highlighting the progress of ongoing projects, refine strategic priorities, and expand collaborations.
6. **Establish an annual PNHI conference**—bringing together internal and external thought leaders to showcase PNHI efforts to all stakeholders and invite input from external stakeholders.

## Conclusion: Plants and Nature as a Pillar of Public Health

The Texas A&M Plants, Nature, and Health Initiative is at the forefront of a transformative movement that recognizes that **plants and nature do not merely offer aesthetic benefits but represent an essential component of human health and well-being**. Through rigorous research, economic analysis, and educational outreach, this initiative aims to inform policies, enhance community well-being, and **make green spaces a fundamental part of personal and societal health solutions**.

By committing to rigorous interdisciplinary collaborations in innovative studies, and integrating findings into real-world applications, this initiative envisions a future where **plants and nature are recognized as cost-effective, evidence-based interventions for improving public health**.

## APPENDIX: Directory of PNHI Participants to date.

<b>TAMU &amp; AgriLife Agency Representatives</b>	
Charlie Hall	Ellison Endowed Chair in International Floriculture, Dept of Horticultural Sciences
Jay Maddock	Director, Center for Health and Nature; Executive leadership for Center for Health Systems and Design
Zienna Blackwell	Director, Prevention & Population Health, University Health Services
Amit Dhingra	Department Head & Professor, Department of Horticultural Sciences
Mike Arnold	Director, TAMU Gardens, Professor, Dept of Horticultural Sciences
Marco Palma	Director, Human Behavior Lab, Dept of Agricultural Economics
Jodi Nerren	Assistant Professor & Extension Specialist – Early Childhood Health & Safety, Family & Community Health Unit, Texas A&M AgriLife Extension
Deb Kellstedt	Assistant Professor & Extension Specialist, Family & Community Health Unit, Texas A&M AgriLife Extension
Babak Taheri	Professor, Dept of Hospitality, Hotel Management, and Tourism
Mike Lopez	Assistant Professor & Extension Health Specialist, Family & Community Health Unit, Texas A&M AgriLife Extension
Arianna Pikus	School of Education and Human Development - Teaching, Learning, & Culture (nature-based learning)
Renee Abbott	Doctoral student in the Department of Aerospace Engineering
Rebecca Seguin-Fowler	Associate Director for Precision Nutrition, Insitute for Advancing Health Through Agriculture
Dongying Li	Assistant Professor, Department of Landscape Architecture & Urban Planning, Center for Health Systems & Design
Chanam Lee	Professor and Coordinator of Ph.D. Program in Urban and Regional Sciences, Department of Landscape Architecture & Urban Planning, Center for Health Systems & Design
Courtney Suess-Raeisinafchi	Associate Professor, Dept of Hospitality, Hotel Management, and Tourism; Medical Tourism and Healthcare Facility Development, Center for Health Systems & Design
Morgan S. Abbott	Regional Woodland Ecologist, Urban & Community Forestry, Texas A&M Forest Service
Gerard Kyle	Professor, Department of Rangeland, Wildlife and Fisheries Management
Jade Wu	Assistant Professor and Extension Specialist, Department of Family and Community Health   Texas A&M AgriLife Extension
Lindsay Sansom	Research Assistant Professor, Department of Environmental and Occupational Health   School of Public Health
Garret Sansom	Assistant Professor, Environmental and Occupational Health
Lynn Vartan	Percussion Interarts Performance, College of Performance, Visualization & Fine Arts
Nancy Fehrenwald	Associate Vice President, University Health Services, Texas A&M Health
Bill McKinley	Benz Endowed Chair of Floral Design, Department of Horticultural Sciences
Lisa Whittlesey	National Junior Master Gardener Program Coordinator, Texas A&M Agricultural Extension
Randy Seagraves	National Junior Master Gardener Program Extension Program Specialist and Curriculum Director
Jayla Fry	State Coordinator, Master Gardener Program, Texas A&M Agricultural Extension
Alexis Cordova	Project Specialist III Early Childhood Professional Development, Family & Community Health Unit, Texas A&M AgriLife Extension Service
Rusty Hohlt	Healthy Texas initiative (formerly Healthy South Texas)
Renda Nelson	Director, Better Living for Texans
Austin Fannin	Director, Aplan Center
Neil Peltier	Associate Director, Aggie Park
Billy Bielamowicz	Director, Aggie Park
D. G. Cliff Lamb	Director, Insitute for Advancing Health Through Agriculture
Regan Bailey	Associate Director for Healthy Living, Insitute for Advancing Health Through Agriculture
Zhipeng Lu	Associate Director, Center for Health Systems & Design
Ximena Garcia-Rada	Assistant Professor, Department of Marketing, Mays Business School
Robert Brown	Professor, School of Architecture, how the urban landscape modifies the microclimate which affects health and well-being
Ana Diaz Artiles	Asst. Prof, Aerospace Engineering, virtual nature contact in astronauts
Annamarie MacNamara	Associate Professor, Psychological & Brain Sciences, College of Arts & Sciences
Taehyun Roh	Assistant Professor, Dept of Epidemiology & Biostatistics, School of Public Health
Jamie Rae Walker	Associate Professor and Extension Specialist - Urban and Municipal Parks, Dept of Hospitality, Hotel Management, and Tourism
Donna McCrary	Professor, Associate Professor of the Early Childhood Education, Department of Curriculum & Instruction
Mary Pearl Meuth	Texas Master Naturalists
Neo Jang	IT Professional III, SEA Development
<b>Administrative Contacts</b>	
Susan Ballabina	Chief of Staff, Office of the President, Texas A&M Univ.
Scott Shafer	Executive Director of Campus and Community Enrichment, Office of the President, Texas A&M Univ.
Natalia Rodriguez	Projects Director, Center for Health and Nature
<b>Marketing Support</b>	
Adam Russell	Communications Coordinator, Texas A&M AgriLife Marketing and Communications
Kim Topp	Associate Director, Communications/Marketing, Texas A&M AgriLife Marketing and Communications
Laura Muntean	Media Relations Coordinator, Texas A&M AgriLife Marketing and Communications
<b>Ellison Endowed Chair Advisory Committee Members</b>	
Monique Hakkert	Ball Horticultural Co., Ellison Endowed Chair Advisory Committee
Chris Scott	Altman Plants, Ellison Endowed Chair Advisory Committee
PJ Ellison	Formerly Ellison's Greenhouses, Chair of the Ellison Endowed Chair Advisory Committee
Jim Ellison	Formerly Ellison's Greenhouses, Ellison Endowed Chair Advisory Committee
Jimmy Klepac	Klepac Greenhouses, Ellison Endowed Chair Advisory Committee
Paul Lowry	Landmark Nurseries, Ellison Endowed Chair Advisory Committee
Jack Weatherford	Formerly Weatherford Farms, Ellison Endowed Chair Advisory Committee
Debbie Hamrick	NC Farm Bureau, Ellison Endowed Chair Advisory Committee
Ricardo Campos	Ball Seed Company, Ellison Endowed Chair Advisory Committee
Liza Roeser	50Flowers.com, Ellison Endowed Chair Advisory Committee
Jan Patranella	Formerly Ball Horticultural Company, Ellison Endowed Chair Advisory Committee
Amy Graham	President/CEO, Texas Nursery and Landscape Association, Ellison Endowed Chair Advisory Committee
Sarah Riggins	Texas Nursery and Landscape Association, Director, Industry Education and Certifications
Martha Trubey	Berger (Peat Moss), Ellison Endowed Chair in International Floriculture
<b>External Agency Representatives</b>	
Margo Richards	Vice President of Community Resources at LCRA
Karen Reichel	Administrator for Trade & Business Development, Texas Department of Agriculture
Ryan Heare	Office of Lois Kolkhorst, State Senator, Mental health policy for the Health and Human Services Committee
Rodney Honerkamp	Director of Development, Houston Zoo
Robert Jackson	Physician and on the Board for the Center for Health and Nature
Michael Spohn	Associate Dean for Bryan/College Station Campus (Campus Dean Representative)
Jason Fischer	Director of Sustainability at Houston Methodist
Dr. John Dole	Director, Food Systems Leadership Institute, NC State University