

# DIGGING IN

NOVA SCOTIA HORTICULTURE FOR HEALTH NETWORK

Summer 2025 Volume 11 Issue 3 [nshhortnetwork@gmail.com](mailto:nshhortnetwork@gmail.com)

The Nova Scotia Horticulture for Health Network is a coalition of people interested in supporting horticulture for health initiatives through resource-sharing, exchange of practices/knowledge, and networking.



## Advancing Accessibility - The Rick Hansen Foundation Accessibility Certification Program

Text by Antonia Phillips

Photo by L. Fleming

The Accessible Canada Act defines disability as “any impairment, including a physical, mental, intellectual, cognitive, learning, communication, sensory or a functional limitation whether permanent, temporary or episodic in nature, or evident or not, that in interaction with a barrier hinders a person’s full and equal participation in society” ([The Accessible Canada Act, 2019](#)).

*Barrier* refers to any social or physical obstacle that prevents a person with a disability from fully participating in society. Removing these barriers is based on multiple frameworks with an understanding of disabilities in relation to the world today.

Disabilities can involve vision, hearing, mobility, flexibility, dexterity, pain, learning, human development, mental health, and memory, and be both visible and invisible.

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Photo top right: L. Fleming

*Meaningful access* is defined as meeting the real accessibility needs of all users of a site, regardless of their physical ability. It recognizes the accessibility of any given site is based on the entire user experience, rather than simply evaluating its physical access features. Meaningful access differs from the usual approach which relies on minimum requirements, such as building code. A planned meaningful access strategy creates a built environment that anticipates the needs of all its users and meets those users' needs as equals.

Previously, people relied on building codes and public policy to resolve access issues in the built environment. However, this “code minimum” approach has led to a built environment that focuses mostly on wheelchair users, ignoring the needs of the other 75% of the population of people with disabilities.

The Rick Hansen Foundation provides [accessibility and disability inclusion education](#), offering several courses. [The Rick Hansen Foundation Accessibility Certification Program](#) (RHFAC) is a planned *meaningful access* strategy that creates a built environment that anticipates the needs of all users and meets those users' needs as equals. Meaningful access is a fundamental premise of the RHFAC program and it is the first program of its kind to measure the current level of meaningful access of a site, based on the holistic user experience of people with varying disabilities affecting mobility, vision, hearing and neurological experiences, through a rating survey.

The RHFAC uses a rating system to measure the level of meaningful access of a site based on the user experience of people with varying disabilities. This practice provides a consistent and people-focused approach to measuring the experience of meaningful access and supports an organization's journey and commitment to accessibility through the rating and certification of its sites. With this practice, the RHFAC rates *real accessibility*, not code compliance. The RHFAC is designed to challenge building owners and operators to go beyond code minimum and embrace creative solutions to make their sites universally accessible.

In relation to scoring, a building can have a Pre-Construction Rating completed which follows the same criteria as the Completed Site Rating. There are two levels of certification: RHF Accessibility Certified and the RHF Accessibility Certified Gold in contingency with certification pre-requisites.

Meaningful access is the goal, going beyond the regulatory code compliance, because, there are people moving forward and people moving forward behind them.

*Antonia Phillips, Landscape Horticulturalist was educated at Nova Scotia Agricultural College (NSAC). Her commitment to using the natural world for health improvements includes people-plant interactions at a variety of settings, Chief Caretaker of Caribou Munroes Island Nova Scotia Provincial Park, owner/operator of Bent not Broken Farm where people and horses come together, and 15 years of experience working with vulnerable populations Input was provided by the Rick Hansen Foundation.*

## “National AccessAbility Week May 25-31, 2025

Celebrates the contributions of people with disabilities. It also promotes inclusion and accessibility in communities and workplaces across Canada. The Act states that National AccessAbility Week will be celebrated each year starting on the last Sunday in May”  
(Government of Canada, 2022).



2<sup>nd</sup> in the 5-Part Series

## **Practitioner Tool: Therapeutic Horticulture Goals with THAD Activity Examples: Physical Domain**

Text by Lesley Fleming, HTR

Photos by L. Fleming & Crystalsjo on Unsplash

Original Publication: Fleming, L. (2025). Practitioner Tool: Therapeutic Horticulture Goals with THAD Activity Examples: Physical Domain. *Cultivate*, 5(2).

Therapeutic goals in the physical health domain used in therapeutic horticulture and horticultural therapy are primarily focused on improving mobility, physical strength, range of motion, balance, fine and gross motor skills, and adaptations for tasks and skills. There is an extensive range of therapeutic goals possible for physical challenges across health diagnoses, injury, and physical functioning.

Therapeutic goals are an essential component of therapeutic horticulture practice. In the second article in the 5-part series, therapeutic goals are identified by the physical health domain, intended to be used as an index for identifying possible goals. Subsequent articles will cover other health domains – psychological/emotional, sensory, and social, along with relevant therapeutic goals. A previous [article for cognitive/intellectual health domain](#) is available online. Examples from THAD ([therapeutic horticulture activities database](#)) have been selected to demonstrate applications for use in therapeutic horticulture interventions.

“Setting therapeutic goals is based on client assessment and need, working toward specific outcomes, which can be measured informally or clinically charted. Achieving desired health outcomes requires intention, therapeutic techniques and client engagement.

Therapeutic goals can fall into more than one health domain. The THAD examples identify multiple therapeutic goals in each of the five domains for each activity, though typically only one or two would be emphasized in a given session.

A *Journal of Therapeutic Horticulture* article, [Therapeutic Horticulture and Its Therapeutic Goals: Expanding the Scope and Practice Through the Therapeutic Horticulture Activities Database and Its](#)

Use of Health Domain-Specific Goals organizes TH goals also using health domains, referring to functional and goal areas, not specific therapeutic goals.

This series—Practitioner Tool—identifies specific therapeutic goals intended to expand practitioner knowledge and applications, this one focused on physical health” (Fleming, 2024).

## Physical Health Domain: Therapeutic Goals + THAD Activity Example

Goal Areas	Therapeutic Goal	THAD Examples
Gross Motor Skills	Strengthen gross motor skills	<a href="#">Fall Leaf Luminaries</a> (Fleming, 2023)
Fine Motor Skills	Strengthen fine motor skills	<a href="#">Plant Maze &amp; Phototropism</a> (Fleming, 2025)
Hand Functions	Address dysgraphia, functional digital grasp or other hand grip challenges	<a href="#">Love &amp; Heart-Shaped Leaves</a> (Fleming & Hildinger, 2025)
Motor-Eye Integration	Strengthen hand-eye coordination	<a href="#">Insect Hotel</a> (Poláčková, 2023)
	Strengthen vision, acuity, spatial perception, tracking or visual perceptions challenges	<a href="#">Nature’s Colors Game</a> (Fleming, 2023)
Range of Motion	Improve range of motion	<a href="#">Pounding Pansies</a> (Sherman, 2024)
Mobility	Augment functionality for amputations or wheelchair skills	<a href="#">Harvesting Herbs Grown for Roots, Rhizomes &amp; Bulbs</a> (Fleming, Relf & Predney, 2023)
	Improve sit to stand function	<a href="#">Seed Planting in Trays</a> (Hildinger & Stivland, 2024)
	Extend standing stamina	<a href="#">Flower Arrangement in a Box</a> (Fleming, 2023)
	Improve balance and gait	<a href="#">Field Trip to Community Garden</a> (Fleming & Relf, 2023)
	Strengthen physical endurance	<a href="#">Cut Flower Production</a> (Miller, 2024).
Sleep	Improve melatonin production to improve sleep	<a href="#">Green Exercise – Dementia Populations</a> (Fleming, 2023)
	Reduce sleep disruptions related to grief	<a href="#">Poem + Nature Walk-Bereaved</a> (Fleming & Tham, 2023)
Mood-Related	Identify and address physiological symptoms of depression, sadness, mood disruptions	<a href="#">Fairy Garden Planters</a> (Lilley, 2023)

Goal Areas	Therapeutic Goal	THAD Examples
Addiction-Related Physical Symptoms	Address & recognize physical symptoms of addictions, identifying & implementing strategies for recovery (cravings, jitters)	<a href="#">Physical Exertion – Substance Use Addiction</a> (Poláčková & Fleming, 2024)
	Manage food, tobacco, alcohol use related to improving healthy lifestyle choices	<a href="#">Blueberry Activities</a> (Marcaccio & Fleming, 2023)
	Reduce PTSD-related anxiety	<a href="#">Harvesting Herbs for Oil</a> (Fleming, Relf & Predney, 2023)
	Reduce physiologically based irritability and restlessness due to cravings for substances	<a href="#">Calming Exercises in the Garden</a> (Fleming & Morgan, 2024)
Pain Management	Adapt movements to minimize pain in muscles/joints (adaptive gardening)	<a href="#">Adaptive Gardening: Repetitive Motion Disorders</a> (Fleming & Morgan, 2024)
	Lower stress	<a href="#">Eco Seed Orbs</a> (Brown, 2024)
Other	Practice “risky” behavior for children developing sense of independence	<a href="#">Game: Gathering Nature’s Treasures</a> (Fleming & Bethel, 2023)
	Practice grooming skills	<a href="#">Cheese Chive Biscuits</a> (Fleming & Relf, 2023)
	Manage blood pressure, A1C diabetes metric, or weight	<a href="#">Plan, Plant &amp; Eat the Rainbow</a> (Fleming, 2023)

Of note is the knowledge transfer from occupational and physical therapy disciplines to HT and TH practice. A long history of interdisciplinary treatment teams including HT professionals have contributed to the understanding of physical challenges, types of injuries, physiology of joints, muscles and body parts involved in healthy functioning.

Physical goals related to nutrition, recognizing signs and symptoms of addictions, coping mechanisms aligned with weight issues, and physical health goals related to specific health conditions like stroke, cerebral palsy and developmental delays are being seen in TH practice. The scope of goals used in TH within the physical health domain are expanding and are now integrating goals related to pain management, physiological inputs to self-regulation, well as adaptations for using artificial limbs and assistive devices (walkers, canes).

This listing of goals is not definitive, but is intended to broaden practitioner understanding and application of therapeutic goals for therapeutic horticulture delivered to multiple populations.

# Nova Scotia Horticulture for Health Network

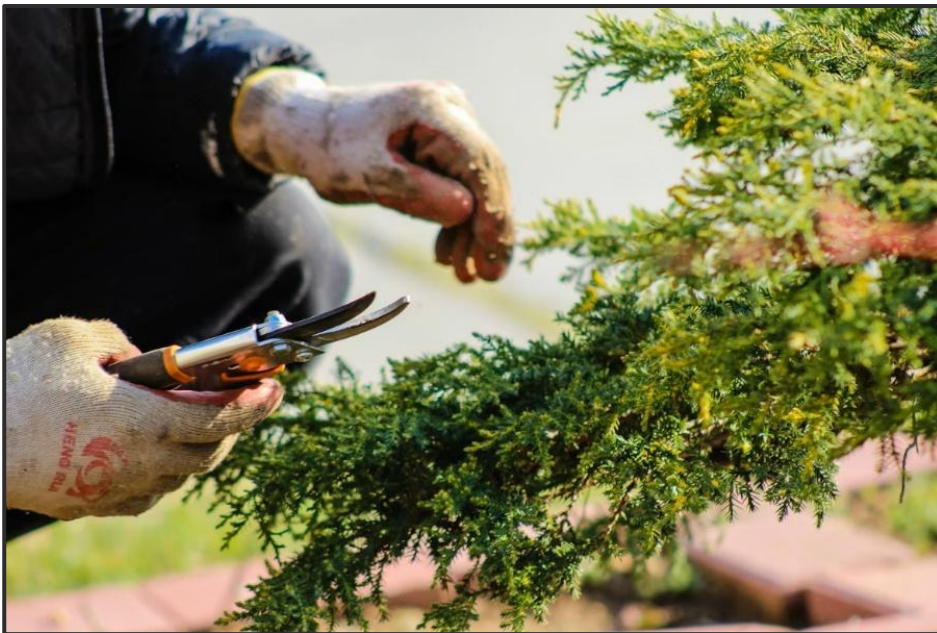
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Fleming, L. (2024). [Practitioner tool: Therapeutic horticulture goals with THAD activity examples: Cognitive domain](#). *Cultivate*, 5(1).

Fleming, L., Fungfoo, P., & Wu, Chen-Fa. (2025). Horticultural therapy intervention for sarcopenia, with a focus on physical domain functioning: Advances from Taiwanese practitioners. *Cultivate*, 5(2).

Fleming, L., Diehl, L., & Grimes, K. (2024). Therapeutic horticulture and its therapeutic goals: Expanding the scope and practice through the therapeutic horticulture activities database and its use of health domain-specific goals. *Journal of Therapeutic Horticulture*, 34(1).

*Lesley Fleming, HTR has delivered therapeutic horticulture to a variety of populations using specific therapeutic goals. She has led the THAD advisory team in developing the on-line database of therapeutic horticulture activities and their correlated therapeutic goals across health domains. Leah Diehl, RLA, HTM and Katie Grimes, HTR, MAT contributed to this article.*



## **Horticultural Therapy Intervention for Sarcopenia, with a Focus on Physical Domain Functioning: Advances from Taiwanese Practitioners**

Text by Lesley Fleming, HTR, Phasakorn Fungfoo, HT & Chen-Fa Wu, PhD

Graphics & photo: Yuan-Shan Hsu & J. Kemper

Original Publication: Fleming, L., Fungfoo, P. & Wu, CF. (2025). Horticultural Therapy Intervention for Sarcopenia, with a Focus on Physical Domain Functioning: Advances from Taiwanese Practitioners. *Cultivate*, 5(2).

An increasing focus on horticultural therapy and therapeutic horticulture goals by health domain is appearing more frequently in horticultural therapy (HT) literature (Fleming et al., 2024; Fleming, 2024). At the American Horticultural Therapy Association's (AHTA) 2024 conference, a presentation by Professor Chen-Fa Wu and PhD student Phasakorn Fungfoo focused on work being done in Taiwan using HT interventions targeting specific physical health challenges. Their presentation also included related areas - the use of nature-based laboratories and healing green spaces. Evident from their presentation, is the growth of horticultural therapy in Taiwan, the involvement by National Chung Hsing University (NCHU), and the broader community that includes nursing and speech associations.

Of particular note were health strategies addressing needs of the aging population. The Taiwanese approach has included green diet, green space, green therapy, green care stations in farmers and fisheries associations, and green companionship. These are part of a greater whole, with research on physical and mental health accelerating HT since 2021, and evidence-based research in several areas including Parkinson's Disease, stress, dementia and obesity in women, and sarcopenia (Wu & Fungfoo, 2024).

Sarcopenia, defined as a syndrome with progressive loss of muscle mass and lowered muscle function is a health challenge among the elderly, across countries, including Taiwan, according to School of Nursing Taipei Nursing Health University. Their data indicates people aged 65 or older exhibit sarcopenia; 24% in USA, 21% Taiwan, 15% Netherlands. This condition presents real challenges and the need for health interventions (Hsu, 2024).

Sarcopenia's physical symptoms are linked to disability and multiple health issues in senior populations including higher risk of falls, reduced mobility, impacts on activities of daily living, and increased need for long-term care according to Wu and Fungfoo (2024). Their work identified psychometric measurements used in Taiwan, for assessing sarcopenia: hand grip strength (male less than 28 kg; female less than 18 kg), bioelectrical impedance analysis of muscle quality (male less than 7 kg/m<sup>2</sup>; female less than 5.7 kg/m<sup>2</sup>), and walking speed slower than 1 meter/second for either gender.

Wu and Fungfoo's framework for HT that addresses sarcopenia focuses on challenges to physical functioning. Tools for evaluating physical functioning used moderate and high-intensity ratings including metabolic equivalents (METs), percentage of maximum heart rate, and ratings of perceived exertion (RPE) scale. These informed horticultural activities, and horticultural therapy interventions. Horticulture activities involved using guided resistance exercise, muscle activation, repetition of movements, and a planned degree of intensity for gardening tasks. A multi-week HT intervention incorporated intensity cycles that increased over the duration of the program. The sarcopenia

intervention targeted upper muscles (biceps, brachioradialis, flexor carpi ulnaris) and lower limb muscles (vastus lateralis, vastus medialis, erector spinae, lateral gastrocnemius, medial gastrocnemius, erector spinae, biceps femoris, gluteus maximus, gluteus medius, tibialis anterior, rectus femoris). Muscle activation during horticultural activities played a prominent role in the intervention, as identified in the slide below (*Muscle activation during horticultural activities*). By classifying horticultural activity by degrees of intensity, the program developed a 4 phased progressive plan over a 10-week duration, integrating horticultural tasks and tools, with varying degrees of physical intensity (refer to slide *Classification of Horticultural Activity Intensity*). Preparation of gardening tools and materials, gardening and plant maintenance tasks, and equipment clean-up were part of the process for the interventions, again with a focus on physical health domain challenges and desired outcomes for improving physical functioning (Wu & Fungfoo, 2024). Their recommendations were based on their program and its conclusions. Outcomes aligned with previous research by Hawkins et al., 2015 and Park et al., 2016. Evidence-based research by Wu and Fungfoo using psychometric tools to evaluate pre-intervention functioning, measuring of METs, and improvements to grip strength and leg strength demonstrated the effectiveness of an HT intervention for sarcopenia.

### Muscle activation during horticultural activities

**Upper limb exercises**

Resistance exercises	Deltoid	Triceps	Trapezius	Biceps	Brachioradialis	Flexor carpi ulnaris	Reference
Digging with a spade	●				●	●	Park et al., 2014
Raking soil					●	●	
Digging with a trowel, hammering with a rubber mallet	●				●	●	
Digging with a hand hoe					●	●	
Planting			●		●		Park, Oh, Lee, & Son, 2013
Covering soil in pots			●		●		Naveen Kumar et al., 2021
Loosening soil with a hoe			●	●			

**Lower limb exercises**

Resistance exercises	Vastus lateralis	Vastus medialis	Erector spinae	Gastrocnemius	Biceps femoris	Gluteus maximus	Gluteus medius	Tibialis anterior	Rectus femoris	Reference
Digging with a spade	●	●		●	●					Park et al., 2014

• Horticultural activities mainly use lower limb muscles for body support, resulting in less activation of these muscles. ( Park et al., 2014 )

Sources: Perfect Men and U Blog  
p.15

### Classification of Horticultural Activity Intensity

Intensity alternates every three weeks	♦ <b>Low Intensity:</b> Using a trowel, rake, tying ropes, clearing leaves, using a watering can ♦ <b>Light Weight:</b> Plant materials, tools, pots (long, 3-inch, 5-inch), bamboo poles, perlite, coconut coir, peat moss	♦ <b>Moderate Intensity:</b> Using a small hoe, leveler, soil sieve, hammer ♦ <b>Medium Weight:</b> Large pots, wooden stakes, bricks, leaf compost, small pebbles, cement	♦ <b>High Intensity:</b> Using a spade, large hoe, saw ♦ <b>Heavy Weight:</b> River stones, loam, gravel, wood (pallets), hollow bricks
<b>Easy Skills:</b> Carrying materials, digging, plant care/cleaning, soil mixing, planting in pots	1. Planting in pots 2. Tool handling 3. Watering 4. Leaf clearing 5. Mixing peat-based soil	1. Mixing compost 2. Covering soil 3. Planting in ground 4. Sifting leaf compost	1. Digging with spade 2. Turning compost 3. Digging gravel 4. Covering with gravel 5. Hill building
<b>Intermediate Skills:</b> Land preparation, plant propagation, arranging materials, planting in open ground	1. Dividing plants 2. Cuttings 3. Transplanting	1. Arranging bricks and stakes 2. Setting up wood structures 3. Leveling soil 4. Mixing cement	1. Hoeing soil 2. Placing hollow bricks 3. Planting shrubs
<b>Advanced Skills:</b> Layout marking, material installation, complex planting designs, carpentry work	1. Marking plant layout with water lines 2. Setting up plant supports with bamboo 3. Staking plants	1. Burying stakes and bricks, 2. Fixing with hammer, 3. Paving	1. Installing stones, 2. Sawing wood, 3. Placing wooden structures, 4. Nailing wood

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Fleming, L., Diehl, E., & Grimes, K. (2024). Therapeutic horticulture and its therapeutic goals: Expanding the scope and practice through the therapeutic horticulture activities database and its use of health domain-specific goals. *Journal of Therapeutic Horticulture*, 34(1).

Fleming, L. (2024). Practitioner tool: Therapeutic horticulture goals with THAD activity examples: Physical domain. *Cultivate*, 5(1).

Hawkins, J.L., Smith, A., Backx, K., & Clayton, D. A. (2015). Exercise intensities of gardening tasks within older adult allotment gardeners in Wales. *Journal of Aging and Physical Activity*, 23(2), 161-168.

Hsu, Y.S. (2024). The benefits of gardening activities on promoting muscular strength. Master thesis: Dept. Horticulture, National Chung Hsing University.

Park, S., Lee, A., Lee, G.J. et al. (2016). Horticultural activity interventions and outcomes: A review. *Horticultural Science & Technology*, 34(4), 513-527.

Lesley Fleming, HTR writes on topics related to horticultural therapy and horticulture for health. Her recent work and co-authored publication in *Journal of Therapeutic Horticulture* has focused on health domain-specific therapeutic goals used in therapeutic horticulture. Phasakorn Fungfoo is a PhD student in the Department of Horticulture at National Chung Hsing University, Taiwan. His research focuses on horticultural therapy, with a particular interest in its benefits for elderly populations. Chen-Fa Wu is the corresponding author of this research work and a professor in the Department of Horticulture at National Chung Hsing University, Taiwan. His research focuses on evidence-based horticultural therapy activities. He oversees the operation of a horticultural therapy garden at the university and actively promotes horticultural therapy in Taiwan.





## Horticulture for Health Programming Addresses Food Insecurity

Text by Lesley Fleming, HTR

Photos by L. Fleming

Food insecurity continues to be a serious issue impacting health of people worldwide. Food security is defined as people who “don’t have enough food to eat or don’t know where their next meal will come from, who have limited or uncertain access to safe and nutritious food” (USDA, 2024). Programs and services are addressing food insecurity including those within the horticulture for health paradigm. An examination of these efforts sheds light on approaches and successes.

### Scope of Food Insecurity

“In North America, statistics confirm that people living in rural communities, particularly in the Southern USA are more likely to lack access to food, particularly nutritious food (Food Research & Action Center, 2018; Coleman-Jensen, 2022). Marginalized communities - people with disabilities, LGBTQ, and people of color are at greater risk of food insecurity due to systemic problems and poverty. Research has investigated food insecurity among domestic abuse survivors and their families, incarcerated individuals, Latinx immigrant families, and indigenous people (Branco, 2018; Cochrane, 2019; Devine-Wright et al., 2019). The health impacts are far-reaching for children and adults, with correlations to mental disorders, obesity, and chronic disease (Burke, 2016; Hernandez et al., 2017;

Fleming, 2022)” (FLHHN, 2024a). Food insecurity touches all ages, socio-economic groups and communities. An increase in [food insecurity among university students](#) is being more widely acknowledged by colleges, communities and health professions (Fleming, 2024; Baur, 2020; Coffino et al., 2021).

## Programming Efforts Addressing Food Insecurity

Various types of programs are working towards easing and eliminating food insecurity. As a very complex issue, with challenges related to identifying and not stigmatizing individuals, and offering services or programs that require funding, there are some trends that seem to be making a difference. Of note are “[community gardens](#) and [urban farms](#) that are improving food access, food sovereignty and food advocacy across communities...These and other organizations are using various initiatives like [distributing free seeds](#), teaching people to grow healthy food, hospitals identifying and providing food to patients from their associated gardens, and master gardeners supporting community gardening, with these locally-driven efforts occurring in many communities” (FLHHN, 2024b). Additional strategies like food networks, food alliances, community kitchens, and mobile markets, identified in [FLHHN Food Action Initiatives](#) (2024c) have proven effective in addressing food insecurity.



The following programs are excerpted from the [FLHHN Resource Hub – Food Insecure Populations & Programs](#):

### Children/Youth Focus

- ❖ [Garden Grants](#) for schools, nonprofits and communities addressing food insecurity including Growing Spaces in-kind grants.
- ❖ [Campus Nature Rx](#) movement supports post-secondary students in nature engagement, campus gardens, [food security](#) and environmental activism.
- ❖ [Sprouting Readers program at PAWKids](#) after-school daycare center uses a school garden, literacy + gardening skills, and stem education to enhance learning and food literacy.

### Corrections Programs

- ❖ [Lookout Garden at Mission Institution](#) partners with Correctional Service Canada (in British Columbia) addressing food security, food access for inmates and local communities, in particular, Aboriginal communities.
- ❖ Farm and Rehabilitation Meals (FARM) program in San Diego grows and serves farm produce in prison.
- ❖ [Florida Prison Farmworker Programs](#) help the state and its inmates. “According to UF/IFAS, at the West Florida Research and Education Center in Jay, FL, prisoners produced nearly \$1 million of fresh produce that fed hundreds of needy families and saved the state money.”

## Hospital Partnerships

- ❖ [Food Security Program at Northern Light Acadia Hospital](#), Maine uses early intervention methods and local partners to address food insecurity by screening/identifying food insecure patients, supplementing patient food bags with produce from Acadia Therapeutic Garden, and identifying additional food insecurity resources.
- ❖ NW Youth Power Child Enrichment Center (daycare), Atlanta GA established a garden in partnership with Grady Health System Asa Yancey Neighborhood Health Center providing food for children, families and patients. It is one of 15 [Emory Urban Health Initiative Food Insecurity Programs](#).

## Other Models

- ❖ [Lettuce Live Garden Projects](#) involves multi-faceted approaches of building community gardens at work sites, community locations, schools, and backyards, based in Missouri, TX.
- ❖ [Sustainable CT](#) (Connecticut) promotes community growing spaces across the state as a strategy for wellness and food security using funding, regional collaborations, provision of tool kits, and highlighting success stories of funded projects like sidewalk snack beds, TH and green houses.
- ❖ [Afri-Can Food Basket](#) organization works towards food justice, food access and enhancing nutrition, health and employment of Toronto's African, Caribbean and Black community donating food baskets to food insecure individuals, creating 100 community and backyard gardens, and delivering youth horticulture programs.
- ❖ [Grace Grows](#) in Gainesville FL provides community development, therapeutic horticulture, and education in partnership with the University of Florida Doctor of Plant Medicine Program, empowering individuals to grow nutritious food, learn vocational horticulture skills as strategies for addressing homelessness and food insecurity.

## Research Continues to Examine Food Insecurity

Various aspects of food insecurity are being examined by researchers including emergency food assistance (Bacon et al., 2024), three pillars of food insecurity – availability, utilization and stability (Calloway et al., 2023), and models like Nova Scotia's NGOs advocating for food security (Cameron et al., 2023). A more robust listing of research on horticulture for health programming specific to [food insecurity](#), as well as [food action](#) is available on the FLHHN Resource Hub.

## Resources

- Bacon, CM., Gleicher, A., McCurry, E. et al. (2024, April). Toward a justice approach to emergency food assistance and food waste: Exploring pantry-urban gardener partnerships in California's Santa Clara County. *Journal of Agriculture, Food Systems, and Community Development*.
- Baur, J. (2020). Campus community gardens and student health: A case study of a campus garden and student well-being. *J Am Coll Health.*, 5.
- Branco, P. (2018). How therapeutic horticulture help meet the complex needs of domestic violence survivors and their children? [food security a factor]. VAWnet.
- Burke, M.P., Martini, L.H., Çayır, E. et al. (2016). Severity of household food insecurity is positively associated with mental disorders among children and adolescents in the United States. *Journal of Nutrition*, 146(10).
- Calloway, E., Carpenter, L.R., Gargano, T. et al. (2023) New measures to assess the “other” three pillars of food security—Availability, utilization, and stability. *International Journal of Behavioral Nutrition and Physical Activity*, 20(1), Article 51.
- Cameron, G., Roach, J., Dukeshire, S., & Keys, D. (2023). Raising awareness and advocating change: The work of Nova Scotia food security NGOs. *Journal of Agriculture, Food Systems, and Community Development*, 12(4).

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- Cochrane, R. (2019). Passionate partners transform incarcerated women into urban farmers. *AHTA Magazine*, 47(3), 11.
- Coffino, J.A., Spoor, S.P., Drach, R., & Hormes, J.M. (2021). Food insecurity among graduate students: Prevalence and association with depression, anxiety and stress. *Public Health Nutr.*, 24(7).
- Coleman-Jensen, A., Rabbitt, M.P., Gregory, C.A., & Singh, A. (2022). Household food security in the United States in 2021. *U.S. Department of Agriculture, Economic Research Service*.
- Devine-Wright, H., Baybutt, M., & Meek, R. (2019). Producing food in English and Welsh prisons. *Appetite*, 143.
- Fleming, L. (2024). [American colleges support students' health & well-being through nature engagement programming on & off campus](#). *Cultivate*, 4(3).
- Fleming, L. (2022). [Health benefits of food gardening – More expansive than improved nutrition](#). *Cultivate*, 2(3).
- Florida Horticulture for Health (FLHHN) (2024a). [Food insecure populations & programs](#). *Resource Hub*.
- Florida Horticulture for Health (FLHHN) (2024b). [Community gardens](#). *Resource Hub*.
- Florida Horticulture for Health (FLHHN) (2024c). [Food action initiatives](#). *Resource Hub*.
- Food Research & Action Center. (2018). How hungry is America? Food hardship in America: A look at national, regional, state, and metropolitan statistical area data on household struggles with hunger.
- Hernandez, D.C., Reesor, L.M., & Murillo, R. (2017). Food insecurity and adult overweight/obesity: Gender and race/ethnic disparities. *Appetite*, 117.
- U.S. Dept. of Health and Human Services. (2024). *Food insecurity. Healthy people 2030*.





## Community Gardens Impact Food Security, Stress and Anxiety

Text by Tim Mason

Photos by Dalhousie Truro Community Garden & CommunityConservation.net

Food insecurity rates are rising across the globe (United Nation, n.d.) with 1 in 5 Nova Scotia households experiencing insufficient access to safe and nutritious food (Feed Nova Scotia, 2020). Community gardens are an important component in addressing this issue, with benefits that are felt beyond basic dietary intake. Community gardens also act as a social hub, fostering and strengthening local neighbourhood connections while improving the mental and physical state of each participant on an individual level ([Florida Horticulture for Health Resource Hub, 2025](#)).

Halifax Regional Municipality identifies more than 20 registered community gardens (Halifax Regional Municipality, 2025) with many more across Nova Scotia - including a 40-plot site on [Dalhousie University's Truro campus](#) (Dalhousie University, n.d.). Anecdotally, the majority of participants proclaim a wide range of positive effects as a result of their involvement with gardening. A recent study has shown that community gardens have the potential to be life-saving.

A 2023 study from University of Colorado measured the effects of community gardening intervention on diet, physical activity, and anthropometry outcomes with perceived stress and anxiety measured as a secondary outcome ([Litt et al., 2023](#)). Participants chosen were new gardeners (or had not gardened in the past 2 years). Another key element in the selection process was testing a group that was diverse in age, ethnicity, and socioeconomic status.

Over the course of a year at 37 community gardens, participants were found to have a significant increase in moderate to vigorous physical activity. Researchers theorized this might be because *'gardening is not perceived as exercise, but as something fun and useful to do'*. Fiber intake also increased, with gardeners identifying a variety of reasons to eat from their garden - *'superior taste and freshness, an emotional connection to the food they had grown themselves, and not wanting to waste food'*.

A significant factor of this study is from the secondary outcome - the reduction in perceived stress and anxiety levels, and their role in the prevention of chronic diseases and mental disorders. Notably, other significant improvements were experienced by participants who entered the study with elevated stress and anxiety levels - *'Our trial builds on these earlier studies by showing that community gardens can improve the psychosocial experience of diverse populations in the urban context, with increased therapeutic effects for individuals who start with higher levels of stress and anxiety'* (Litt et al., 2023).

This trial strengthens evidence for community gardening as a component of a nature-based social intervention that can improve health, and reduce stress and anxiety in a diverse population. *'A community garden is a setting that could be within reach for citizens across the world and can be tailored to meet the needs of people across different social and economic groups, cultures, geographies, and local environments. Land planners, health officials, and policy makers together can integrate gardens into the fabric of communities, and recognize gardens as a primary and permanent natural space.'* (Litt et al., 2023). The findings from this study are only the beginning, with further research needed - an excellent case for more community gardens.

Dalhousie University. (n.d.). [Campus map: Community garden](#). Dal.ca.

Feed Nova Scotia. (2020). [About food insecurity](#). Feednovascotia.ca.

Florida Horticulture for Health Resource Hub. (2025). [Community gardens](#).

Halifax Regional Municipality. (2025). [Community gardens](#). Halifax.ca.

Litt, J., Alaimo, K., Harrall, K. et al. (2023). [Effects of a community gardening intervention on diet, physical activity, and anthropometry outcomes in the USA: An observer-blind, randomized controlled trial](#). *Lancet Plant Health*, 4(7), e23-32.

United Nation. (n.d.). [Global issues food](#). UN.org.

Tim Mason is a nature-based gardener living in Halifax, Nova Scotia. Originally from Australia, Tim grew up with a deep love for nature which influences his work, garden design and creation, notably 'Wildlife Windows'.



### The American Community Garden Association

A 501(c)3 organization with a mission “to build community by increasing and enhancing community gardening and greening across the U.S. and Canada” (ACGA, 2025). With 1,000 individual and 252 organizational members linking 2100 gardens across the two countries, its diverse membership includes all types of gardens—tiny pollinator pocket parks, family allotments, school gardens, and urban farms, with an inclusive approach to participation. ACGA seeks to share resources, promote networking, and host an annual conference. Its mandate also includes addressing food insecurity:

“Community gardens offer a long list of benefits, to individual gardeners and families, to neighborhoods, and to the broader community, including to residents with no direct involvement in a garden. ...

Producing healthful food to improve nutrition and reduce family food costs, as well as growing fresh vegetables for distribution to those in need, and demonstrating environmentally sound and productive gardening techniques, including an honored place for heirloom vegetables and traditional varieties...

Participating in broad food security coalitions in both rural and urban areas...

Supporting school gardening, urban agriculture, horticultural therapy, food security, soil and water conservation, environmental stewardship, and other initiatives where community gardeners and garden organizations can share skills and experience ...

[And a statement] We believe that Black Lives Matter; that food security is a human right; that global warming is real and a looming threat now and to future generations; and that green infrastructure - including community gardens - and environmental stewardship are of the highest priority for communities, nations, and our shared planet." (ACGA, 2025). Photos: ACGA.





## Plant-Based Food and Connections to Health

Text & photos by Lesley Fleming, HTR

Research on plant-based diets has exploded, reflecting the interest and increasingly large number of people who are embracing plant-based food. Consumer driven trends for healthy, local and sustainably grown edible plants have become mainstream and continue to create demand within the green industry impacting food purchasing patterns across healthcare, hospitality and educational sectors (Lazaroiu et al., 2019).

The science-based research provides well-documented health outcomes associated with the consumption of high-quality plant-based diets. Positive impacts on diabetes, cardiovascular, kidney, Parkinson's and neurodegenerative diseases, as well as cancer, [weight loss](#), and dental health linked to these diets continue to explore the benefits (Derbyshire, 2017; Chen et al., 2023; Dresler et al., 2022; Carrero et al., 2020; Fam et al., 2022; Hardt et al., 2022; Khalid et al., 2022; [Zhu et al., 2021](#)).

The Florida Horticulture for Health Network's [Resource Hub: Food, Nutrition and Food Action Initiatives](#) identifies trends where plant-based foods are having an impact. These include "the [Food is Medicine Movement](#) [which] promotes strategies for using food in this capacity (Downer et al., 2022; Veldheer et al., 2021)...[and] *Produce prescription programs* providing access to fresh nutritious food via partnerships with community and healthcare providers, as part of the food is medicine movement (Downer et al., 2022; Everett et al., 2020; National Gardening Association, 2021; [National Produce Prescription Collaborative](#), 2022; [Fleming et al., 2022](#))" (2024).

Other trends of note, related to plant-based food involves ultra-processed food as a public health issue (van Tulleken, 2023), [plant-based substitutes for milk and meat](#) (Craig et al., 2023; Van Loo et al., 2020), animal vs. plant proteins, and [use in school meals](#) (Cohen et al., 2021), among others.

"Research on specific plants is expanding the scope of plant-based food linkages to health. These include studies of potatoes, ancient grains, cereal wheat, legumes, and mushrooms (Bailey et al., 2023, Cheng et al.; 2018; Cusworth et al., 2021; Deng et al., 2023). Alfalfa, chickpea, pistachios, black raspberries, cactus, broccoli, and golden thistle have also been studied for their health promoting properties (Hadidi et al., 2023; Heydarirad et al., 2019; Higgs et al., 2021; Huang et al., 2020; Monteiro et al., 2023; Nandini et al., 2020; Sergio et al., 2023)" (FLHHN Resource Hub, 2024). References for these studies are available at [Resource Hub-Food](#). The intersection and scope of plant-based food and health is shedding light on innovative plant products, food systems, underutilized food and food security, as well as dietary and nutrition research. This sector is experiencing robust research, innovation and exposure.

Bailey, T., Franczyk, A.J., Goldberg, E.M., & House, J.D. (2023). Impact of cooking on the protein quality of Russet potatoes. *Food Sci Nutr.*, 11(12), 8131-8142.

Carrero, J.J., González-Ortiz, A., Avesani, C.M. et al. (2020). Plant-based diets to manage the risks and complications of chronic kidney disease. *Nat Rev Nephrol.*, 16(9), 525-542.

Chen, V., Khan, T.A., Chiavaroli, L. et al. (2023, July). Relation of fruit juice with adiposity and diabetes depends on how fruit juice is defined: A re-analysis of the EFSA draft scientific opinion on the tolerable upper intake level for dietary sugars. *Eur J Clin Nutr.*, 77(7), 699-704.

Craig, W.J., Messina, V., Rowland, I. et al. (2023). [Plant-based dairy alternatives contribute to a healthy and sustainable diet](#). *Nutrients*, 15(15), 3393.

- Cheng, A. (2018). Review: Shaping a sustainable food future by rediscovering long-forgotten ancient grains. *Plant Sci.*, 269, 136-142.
- Cohen, J.F.W., Hecht, A.A., McLoughlin, G.M. et al. (2021). [Universal school meals and associations with student participation, attendance, academic performance, diet quality, food security, and body mass index: A systematic review](#). *Nutrients*, 13(3), 911.
- Cusworth, G., Garnett, T., & Lorimer, J. (2021). Legume dreams: The contested futures of sustainable plant-based food systems in Europe. *Glob Environ Change.*, 69, 102321.
- Deng, G., Li, J., Liu, H., & Wang, Y. (2023, Oct). Volatile compounds and aroma characteristics of mushrooms: A review. *Crit Rev Food Sci Nutr.*, 3, 1-18
- Derbyshire, E.J. (2017). Flexitarian diets and health: A review of the evidence-based literature. *Frontiers in Nutrition* 3, 55.
- Dressler, J., Storz, MA., Müller, C. et al. (2022, Nov). Does a plant-based diet stand out for its favorable composition for heart health? Dietary intake data from a randomized controlled trial. *Nutrients*, 14(21), 4597.
- Downer, S., Clippinger, E., Kummer, C. et al. (2022). [Food is medicine research action plan](#). Center for Health Law and Policy Innovation.
- Everett, W., Badaracco, C., & McCauley, S. (2020). [From hospital to home: Why nutrition counts](#). *Health Affairs*.
- Fam, VW., Charoenwoodhipong, P., Sivamani, RK. et al. (2022). Plant-based foods for skin health: A narrative review. *J Acad Nutr Diet.*, 122(3), 614-629.
- Fleming, L., Zhang, W., & Nelson, K. (2022). [Horticulture for health in U.S. hospitals: Horticultural therapy, gardens in hospitals, nutrition-led programs & affiliated community gardens](#). *Journal of Therapeutic Horticulture*, 32(1), 13-32.
- Hadidi, M., Palacios, J.C.O., McClements, D.J. et al. (2023). Alfalfa as a sustainable source of plant-based food proteins. *Trends in Food Science & Technology*.
- Hardt, L., Mahamat-Saleh, Y., Aune, D., & Schlesinger, S. (2022). Plant-based diets and cancer prognosis: A review of recent research. *Curr Nutr Rep.*, 11(4), 695-716.
- Heydarirad, G., Chooani, R., Pasalar, M. et al. (2019). The effect of a chickpea-based Persian diet on cancer-related fatigue in breast cancer patients: A semi experimental study. *Complement Med Res.*, 26(6), 390-397.
- Higgs, J., Styles, K., Carughi, A. et al. (2021). Plant-based snacking: Research and practical applications of pistachios for health benefits. *J Nutr Sci.*, 10, e87.
- Huang, Y.W., Lin, C.W., Pan, P. et al. (2020). Black raspberries suppress colorectal cancer by enhancing Smad4 Expression in colonic epithelium and natural killer cells. *Front Immunol.*, 11, 570683.
- Khalid, W., Arshad, M.S., Ranjha, M.M.A.N. et al. (2022). Functional constituents of plant-based foods boost immunity against acute and chronic disorders. *Open Life Sciences*, 17(1), 1075-1093.
- Lazaroiu, G., Andronie, M., Uta, C., & Hurloiu, I. (2019). Trust management in organic agriculture: Sustainable consumption behavior, environmentally conscious purchase intention, and healthy food choices. *Frontiers in Public Health*, 7, 340.
- Monteiro, SS., Almeida, RL., Santos, NC. et al. (2023). New functional foods with cactus components: Sustainable perspectives and future trends. *Foods*, 12(13), 2494.
- Nandini, D.B., Rao, R.S., Deepak, B.S., & Reddy, P.B. (2020). Sulforaphane in broccoli: The green chemoprevention! Role in cancer prevention and therapy. *J Oral Maxillofac Pathol.*, 24(2), 405.
- National Gardening Association Editors. (2021). Food is medicine. *The National Gardening Association Learning Library*.
- National Produce Prescription Collaborative. (2022). National produce prescription collaborative.
- Sergio, L., Di Venere, D., Gonnella, M. et al. (2023). Quality and safety of ready-to-eat golden thistle (*Scolymus hispanicus* L.): A new product for traditional Italian dishes. *Plants (Basel)*, 12(8), 1622.
- Van Loo, E.J., Caputo, V., & Lusk, J.L. (2020). Consumer preferences for farm-raised meat, lab-grown meat, and plant-based meat alternatives: Does information or brand matter? *Food Policy*, 95, 101931.
- van Tulleken, C. (2023). *Ultra-processed people*. Cornerstone Press.
- Veldheer, S., Scartozzi, C., Bordner, C.R. et al. (2021). Impact of a prescription produce program on diabetes and cardiovascular risk outcomes. *Journal Nutrition Education Behavior*, 53(12), 1008-1017.

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Zhu, R., Fogelholm, M., Poppitt, S.D. et al. (2021). [Adherence to a plant-based diet and consumption of specific plant foods—associations with 3-year weight-loss maintenance and cardiometabolic risk factors: A secondary analysis of the PREVIEW intervention study](#). *Nutrients*, 13(11), 3916.

Lesley Fleming, HTR compiled the research on plant-based food for the Florida Horticulture for Health Network's Resource Hub category Food, Nutrition and Food Action, with updates for 2024. The content for this article was drawn from this source. This article is concurrently published in the Florida Horticulture for Health Network's epub [Cultivate](#).



## Resources Summer 2025



Community gardens are plentiful in Canada, with several organizations promoting and organizing efforts.

[Healthy Tomorrow Foundation](#) and [Immigrant Services Association of Nova Scotia](#) host several community gardens in the Halifax area.

[Association for New Canadians](#) (ANC) in Newfoundland promotes community gardens for people immigrating to Canada.

[Community Garden Network](#), through Sustain Ontario and Hamilton-Wentworth Green Venture is developing an Ontario-wide network for community gardens.

[Seeds of Diversity](#), a Canadian organization, seeks to preserve, protect and study the cultivation of heirloom and endangered food crop varieties using [community grow-out events](#), seed library, and more.

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Practitioner Tool: Psychological Health Domain, Therapeutic Goals & TH Activities

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We would like to acknowledge Nova Scotia is traditional territory of the Mi'kmaq people.