Healthy Foods, Healthy Lives Institute
Community-University Partnership Grants
&
Faculty Planning Grants
Awarded Spring 2016
(Fall 2015 funding cycle)

COMMUNITY-UNIVERSITY PARTNERSHIP GRANTS

"Exploring and assessing the needs, challenges and opportunities to provide culturally appropriate outreach with Hmong American farmers in Minnesota"

Amount Awarded: $ $49,991
Timeframe: February 4, 2016 - February 3, 2017
Community Partners: Mai Pa Kou Yang, Communications Associate, Farmers' Legal Action Group, Inc. (FLAG)
Kathy Zeman, Operations Manager, Minnesota Farmers Market Association (MFMA)
University PI: Annalisa Hultberg, MS, Research Fellow, Department of Bioproducts and Biosystems Engineering, College of Science and Engineering (CSE) and the College of Food, Agricultural and Natural Resource Sciences (CFANS)

Abstract: Hmong-American farmers comprise a significant and growing portion of the farmers in Minnesota and the region, yet many of these farmers describe a lack of access to culturally-appropriate agricultural education. Through previous outreach projects (some funded by HFHL), the project team has documented a concerning lack of assistance or outreach that is targeted to the needs or learning styles of Hmong farmers. These farmers have questions regarding agricultural production, food safety and postharvest handling, crop disease and pests, marketing, organic/sustainable production practices, improving soil health, record keeping, insurance and applications for loans and land purchase, yet there are few resources or organizations able to answer these questions. Current University or non-profit based agricultural outreach is primarily targeted toward English-speaking farmers and is often web-based. This innovative partnership will use participatory research methods to hear from the farmers themselves about these concerns, documenting farmer's stories and ideas, and then will share the information with the Hmong community, educators, Extension, and others who are interested in improving educational resources for Hmong farmers.

The goal of this project is to 1.) Work directly with to Hmong farmers to document the unique challenges that they face as they farm in the region, 2.) Identify the information that Hmong farmers seek for their farming operations and how they wish to access information, and 3.) Based on this information, suggest innovative outreach strategies and methods for Extension and other agricultural educators to better work with Hmong farmers. This project will use surveys, focus groups and in-depth interviews to hear from Hmong farmers, and will share results via a Community Research Forum with partners, Extension, Minnesota Department of Agriculture and others. As a result, Hmong and other underserved farmers will show improved farm sustainability and profitability, access to farm-related information, and long-term collaborations and partnerships with organizations and resources in the state.

"The Community Apiary Project, Year II: Education, Job Training, and Project Sustainability"
Amount Awarded: $49,837.75
Timeframe: February 4, 2016 - February 3, 2017
Community Partner: Mark-Peter Lundquist, VP Outreach, Urban Ventures

University PI: Rebecca Masterman, Associate Program Director, University of Minnesota Bee Lab's Bee Squad, CFANS

Abstract: Today, bees across the globe are facing an array of environmental threats to their health and viability. The USDA estimates that 30% of our fruits and vegetables are pollinated by insects, and that bees are responsible for 80% of that pollination. This community-university collaboration seeks to develop the capacity and increase the sustainability of our successfully established Community Apiary Project. This project focuses on beekeeping, community outreach & education, and honey production for South Minneapolis food-insecure community members.

In 2015, the Community Apiary Project team used hands-on beekeeping training and community outreach to reach over 500 south Minneapolis community members on the importance of bees and other pollinators to our food system. The team's mentorship program provided paid training and jobs to five low-income immigrant women and collaborated with Urban Ventures' farming initiatives to grow healthy produce for food-insecure families. Next steps for this work includes: a) increasing the Community Apiary honey production and continue the Apiary Mentoring Program b) develop a business plan focused on using the honey produced at our apiary in a way that sustains workers, benefits Urban Ventures' established school lunch program, and supports healthy food and pollinator education; and c) increasing the program's impact by creating accessible curriculum while training high-school age students to be Pollinator Ambassadors (Presenters) in their schools, thereby imparting knowledge about food systems, bee and other insect pollinator biology to their contemporaries.

"Collaborative Evaluation of Urban Agricultural Best Management Practices for Ecosystem Services and Crop Production"
Amount Awarded: $50,000
Timeframe: February 23, 2016 - February 22, 2017
Community Partners: Dylan Bradford-Kesti, Program Coordinator/Organizer, Community Based Food Systems, Land Stewardship Project
University PIs: Nic Jelinski, Assistant Professor, Department of Soil, Water and Climate, CFANS
Mary Rogers, Assistant Professor, Sustainable & Organic Horticultural Food Production Systems, Department of Horticultural Science, CFANS

Abstract:
Interest in urban agriculture is rapidly expanding at both national and local levels (NGA, 2014, Gardening Matters, 2014). The credibility of urban agricultural land use and management practices to serve as a recognized green infrastructure strategy that can serve multiple ecosystem functions and support horticultural crop production must be addressed to effectively evaluate and promote urban agricultural land use from a policy perspective. Despite this information demand, major gaps exist in research and available data on best management practices for urban agriculture, particularly at a local scale. In addition to horticultural crop production, effective management practices for urban agriculture may serve multiple important functions in the built environment, including increased infiltration, stormwater management, and habitat diversification. For example, in the City of Minneapolis, people who use best stormwater management practices (BMPs) on their properties can apply to receive reductions in their monthly stormwater utility fee as Stormwater Credits. Could urban agriculture serve as one of these best practices?

Land Stewardship Project (LSP), in collaboration with Afro Eco (AE), Hope Community Inc. (Hope), The Freshwater Society (FWS), and University of MN partners (UMN) are utilizing community based participatory action research to investigate the potential for urban agriculture as a credible green infrastructure strategy with co-benefits to land access, food access, economic development, and environmental sustainability. In order to investigate and quantify the ecosystem services and benefits of urban agriculture best stewardship practices on a site-specific scale the team designed and built five test urban agricultural sites. On these sites the team plans to evaluate the effects of urban agricultural management practices from the perspectives of crop production, soil quality and

ecosystem services. This research will provide valuable information regarding the potential of urban agriculture as a credible green infrastructure strategy and the co-benefits of land access and food access building community health and wealth.

In Phase I of the project, (*Listening/Learning and Planning with Community,* June- November 2015) the project team convened and engaged 50(+) community gardeners and urban farmers in focus groups to explore urban agriculture and water best management practices. These engaged community gardeners and urban farmers have informed the research and will be involved in Phase II of the project. The planning team managed Phase I of the project and built a team and a decision making/governance process for the future phases of the project.

"Next Steps in Reshaping the North Minneapolis Local Food System: Connecting to North High School"
Amount Awarded: $50,000
Timeframe: February 23, 2016 - February 22, 2017
Community Partners (Co-PI): Michael Chaney, Community Activist & Organizer, Project Sweetie Pie
University PIs: Dr. Mary Rogers, Assistant Professor, Sustainable & Organic Horticultural Food Production Systems, Department of Horticultural Science, CFANS

Abstract:
The purpose of this project is to 1) build on the work already underway at North High and in the North Side around healthy food, community gardens, composting and recycling, youth education, and community engagement; 2) engage North High students in meaningful STEM experiential learning and skill development projects; 3) bring community leaders and researchers inside the classroom and students to the "classroom" outside the school walls, 4) pilot test practices around the cultivation of microgreens, aquaponics and comporting needed for future gardening and greenhouse projects planned for the North Side, 5) foster a cadre of young adults that have a greater understanding of the relationship between the food they eat and their own health, 6) foster a cadre of young adults and community leaders that have the skills and the motivation to continue working on improving health outcomes in the North Side through healthy food habits, knowledge of food systems, STEM job skills and community engagement.

This project also builds on PSP's HFHL planning grant received in the Fall of 2015, which focused on community engagement and participatory planning for the Camden Greenhouse at Humboldt and Dowling. The planning team completed over 120 surveys, held multiple community meetings and a design workshop attended by some 50 Northside residents and stakeholders. From these discussions three priorities emerged: youth engagement, learning and leadership; a business facility focused on horticulture, local food production and processing; and adult education focused on urban farming, nutrition and healthy living. In this phase, the green room at North High and other community projects will be demonstrations that test and provide directly relevant information for the design and implementation for the Camden Greenhouse, while also leading directly to positive health impacts.

FACULTY PLANNING GRANTS

"A multidisciplinary team to establish a lasting solution for childhood iron deficiency"
Amount Awarded: $10,000
Timeframe: February 1, 2016 – August 1, 2016
PI: Sarah Cusick, PhD, Assistant Professor, Division of Global Pediatrics, Department of Pediatrics, Medical School (primary corresponding investigator)
Co-Investigators: Daniel Gallaher, PhD, Professor, Department of Food Science and Nutrition, FSCN, CFANS

Tonya Schoenfuss, Ph.D., Associate Professor, Department of Food Science and Nutrition, FSCN, CFANS
Paul Porter, PhD, Professor, Department of Agronomy, CFANS
Ryan Fink, PhD, Adjunct Professor Department of Food Science and Nutrition, FSCN, CFANS

Abstract: Iron deficiency is the most common nutrient deficiency in the world, affecting approximately 70% of the global population, with 30% thought to be anemic as a result.1 The primary effect in adults is a profound, debilitating fatigue. Childhood iron deficiency, however, is far more insidious. In the early stages, activity of hemoproteins in the brain is altered, dopamine neurotransmitter synthesis is blunted, and neuronal energy production is diminished. If the timing of deficiency coincides with a period of peak brain need for iron, irreparable structural damage to the hippocampus and striatum may occur, resulting in deficits in cognition that remain apparent decades later. The devastating impact of childhood iron deficiency lies in the sheer number of children affected. More than 500 million children worldwide are iron-deficient.1 In some regions of the world, including in Africa and South Asia, two out of every three children younger than five years of age have some degree of iron deficiency.1 When two-thirds of an entire region's children have insufficient iron to support brain development and thus achievement of an optimal developmental trajectory, economic productivity and quality of life of the entire region are lowered.

We have brought together an interdisciplinary team of experts to address the intractable challenge of childhood iron deficiency using an innovative, agriculturally based approach. The current approaches to preventing iron deficiency—supplements and fortification—are simply not working, despite three decades of global recognition of iron deficiency as a substantial public health burden and intense global effort aimed at its resolution. We think instead that the solution may lie in a common tree, and in this proposal we will describe how our team will work towards HFHL health issue #2 by preventing the diet-related disease of childhood iron deficiency with a solution that promises to exact profound policy-level change (HFHL priority #2).
What we know: Global policy aimed at addressing childhood iron deficiency is not working and may be dangerous in high-infection settings.

The seemingly intractable problem of childhood iron deficiency may have a solution in the form of a common tree. The Moringa tree is native to the sub-Himalayan tracts of India, Pakistan, Bangladesh, and Afghanistan, but grows in more than 100 countries in tropical and sub-tropical zones, including in Africa, Asia, South and Central America, and Oceania. The tree has more than 30 different names, including Horseradish Tree, Drumstick Tree, and Mother's Best Friend. The Moringa tree has 13 distinct subspecies, the most common being *Moringa oleifera*. It is drought-resistant and fast-growing, maturing from seed to flower in only eight months. Moringa leaves, bark, stem, and seeds are widely recognized for their nutritional and anti- infective properties and are informally used in re-feeding centers, from Haiti to India to the Philippines. Moringa leaves, in particular, are nutrient-dense, with sizeable amounts of protein, calcium, zinc, β-carotene, and iron. They are most often consumed as a tea or are ground into a powder and mixed into food. Despite substantial anecdotal evidence of Moringa tree's benefit in boosting nutritional status and some laboratory analysis of nutritional content, no research base exists to support the widespread use of Moringa for specific health outcomes, including improvement of iron status. Our project will bridge this gap in knowledge and use of Moringa to determine whether the tree could become a solution for safe and sustainable achievement of optimal iron status in young children.

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"Sucralose, Stevia, Gut Microbiome and Glucose Metabolism"
Awarded Amount: $28,560
Timeframe: April 4, 2016 – October 7, 2016

PI: Lyn M. Steffen PhD, MPH, RD, Associate Professor, Division of Epidemiology & Community Health, School of Public Health
Co-Investigators: Shalamar Sibley, MD, MPH, Associate Professor, Division of Diabetes, Endocrinology and Metabolism, Department of Medicine, Medical School
Dan Knights, PhD, Assistant Professor, Department of Computer Science and Engineering and the Biotechnology Institute, College of Science and Engineering

Over 25 million people have diabetes now and by 2050, it is predicted that 1/3 of Americans will have developed diabetes (www.cdc.gov). Major risk factors for type 2 diabetes include glucose intolerance, overweight and obesity. The prevalence of obesity increased from 14.5% in 1971-74 to 23.2% in 1988-94 to 34.9% by 2011-12 (Ogden CL, 2014). Interestingly, the number of Americans consuming **non-caloric sweeteners (NCS)** products grew from 70 million in 1987 to 160 million in 2000. **NCS products, such as saccaharin, sucralose, aspartame, and stevia, are pervasively used by children, adolescents, and adults in the general population**, with diet beverages being the greatest contributor to NCS consumption (Gardner, 2012).

Although NCS use may help regulate blood sugar control acutely, use of particular NCS agents has been associated with increasing adiposity, insulin resistance, and incident T2DM longitudinally in some studies (Swithers, 2013). A 2014 study by Suez et al. demonstrated intakes of NCS saccharin, sucralose, and aspartame promoted glucose intolerance by altering the gut microbiota in a mouse model (Suez, 2014). Alterations in the gut microbiota have also been shown to play a causal role in obesity (Al-Ghalith, 2015). In contrast, there is evidence suggesting that the NCS stevia is metabolically different than other NCS, including sucralose, aspartame, and saccharin. Many animal and human studies testing the effect of stevia on glucose metabolism have demonstrated lower insulin and glucose levels (Anton, 2010) but no studies (using a commercial stevia product) to date have examined glucose tolerance status. However, one Brazilian study in adults found improved glucose tolerance when consuming for 3 days an aqueous extract of stevia rebaudiana leaves (Curi, 1986).

The epidemiologic evidence is mounting that NCS consumption is associated with metabolic abnormalities in healthy populations (Lutsey, 2008; Swithers 2013). And more recent experimental results of Suez et al. link NCS consumption with impaired glucose tolerance (Suez, 2014); however, other studies of the NCS Stevia show contrasting results (Anton, 2010). Therefore, further controlled experimental research is needed to confirm the opposing results of the different NCS. Though one recent meta-analysis failed to find adverse effects related to NCS use on weight gain, (Rogers, 2015), there are few studies published about the influence of longer term use of sucralose or stevia on glucose tolerance among lean and obese adults.

The human gut is home to trillions of microorganisms that typically belong to around 300 and 1000 bacterial species. These microbes help train the immune system, protect us from pathogens, and assist in dietary nutrient extraction, among other roles. Over the last few decades, the incidence of chronic conditions such as obesity, allergy, asthma, inflammatory bowel, disease, metabolic syndrome, insulin resistance and diabetes mellitus have increased dramatically, and a growing set of these diseases has been linked to shifts in host-associated microbial communities. The gut microbiome of the human is highly susceptible to disruptions, and alterations in gut bacterial species which can have long-term effects. Numerous prospective studies have associated intake of artificial sweeteners with the development of T2DM, abnormal lipid levels, and cardiovascular disease (CVD) (Lutsey, 2008; Nettleton 2009). In addition, animal studies have linked alterations in the

microbiome to certain NCS consumption, such as aspartame, sucralose, and saccharin (Suez 2014; Abou-Donia 2008). However, clinical studies in humans exploring the influence of NCS sucralose and stevia on the gut microbiome and glucose tolerance among lean and obese adults have not yet been conducted.

This project leverages complementary strengths in epidemiology, complex diseases including obesity and metabolic syndrome, clinical informatics, and microbiome analysis from investigators at our university. This team's prior work demonstrates that the investigators have extensive experience with clinical research in the fields of obesity and diabetes, specifically with defining the epidemiology and pathophysiology of these conditions, and with the collection, processing, and analysis of human gut microbiome data and other data; to assess and characterize perturbations in the microbial composition in host organisms.