

**Sustainable Food Systems and Environment:
A proposal for a New Research, Teaching, and Community Engagement Program at ESF**

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1) Description of Discovery Opportunity: It is increasingly recognized that food production through conventional agriculture is a prime contributor to a host of environmental problems, including water quality (nitrogen, phosphorus, sediment, harmful algae blooms in lakes, coastal eutrophication), greenhouse gas emissions (CO₂, N₂O, CH₄), carbon losses from soils, etc. These agricultural impacts are systemically linked to the processes and practices of globalized food production, distribution, processing, marketing, and consuming. Because critical systems of energy, water, soils, land use, and transportation intersect through the food system, it is one of the most strategic points for developing integrative approaches to sustainability. Emerging agroecological and sustainable food system approaches aim to address the significant ecological impacts as well as the related labor issues, public health problems, and the economic and social injustices of contemporary food systems. In this context, ESF is strongly positioned to be a leader in sustainable and integrative food systems research, teaching, and multi-stakeholder engagement. We have a strategic geographic situation as well as institutional resources of diverse environmental sciences linked with place-based policy, engineering, and design expertise.

New York State, like much of the Northeastern US, is a mosaic of urban, rural, forest, and agricultural land uses. Food production in NY State is diverse in scale and scope, including dairy farms, apple and vegetable production, advanced greenhouses, livestock farms, large irrigated farms, hobby farms, small urban growers, vineyards, organic farms, and conventional farms. While Cornell has a strong presence in conventional agricultural disciplines (field crops, dairy, crop breeding), less attention has been given to small-production landscapes in urban to rural settings. Syracuse and Onondaga County are also home to many new immigrant and Native American communities who want to cultivate their traditional foods in the midst of this highly urbanized post-Rust Belt landscape. In addition, agroforestry systems are gaining prominence, both nationally and internationally. These less represented agricultural and food systems are underserved and ripe for engagement from ESF, which has strengths in each of these areas.

The fundamental and integrative nature of food systems provides an opportunity for developing a transdisciplinary systems approach to the complexities of environmental challenges. This Sustainable Food Systems and Environment (SFSE) initiative at ESF will be coordinated through a new undergraduate concentration, a new Graduate Program in Environmental Science (GPES) area, a faculty hire in Agro-ecology, opportunities for integrated research projects in Syracuse and at Lafayette Field Station, and a seed grant program for faculty and graduate students for projects related to three focal areas, as described below:

i. Urban and Regional Food Systems: As populations in once densely packed urban centers of Rust Belt cities have dwindled, urban agriculture has been a means to repurpose vacant urban space. Urban agriculture is often less focused on yield and commercial success but more on community engagement and restoration of abandoned urban properties for food production. ESF's location in the City of Syracuse makes it an ideal location to delve more deeply into urban

agriculture and food systems. Food systems also provide a very practical and strategic means for policy, planning and design engagement with diverse stakeholders and communities. ESF offers the unique opportunity for grounding food system change in an ecological and place-based engineering and design approach.

ii. Agroecology and ecosystem services: When properly managed, agricultural systems can provide a host of ecosystem services, in both urban and rural landscapes. These services include habitat for wildlife (e.g. willow fields provide habitat for nesting birds and deer), increased pollination opportunities for many insects, recreational opportunities for local populations, and fuel/energy security (e.g. bioenergy). In urban areas, agriculture can also contribute to temporary water storage and infiltration. But, how can we maximize ecosystem services in managed and urban agricultural landscapes?

iii. Irrigated Agricultural Systems: With climate change, irrigated agriculture will likely become more important in the Northeast, but remains largely understudied. There are critical questions that remain to be answered: Can vegetable production from traditional growing regions in the West be moved to the East? How will the allocation of irrigation water be governed, when there is no legacy or legal structure in place? Can new food safety standards be met using local water? Is there adequate water supply and what ecosystem trade-offs might need to be made? An ESF team, led by PI Shaw, was a finalist in the NYS Canal Corporation's *Reimagine The Canal Competition* with a concept centered around irrigation in Western NY and ESF is well positioned to be more involved as this concept is integrated in future uses of the canal.

In this context, with strengths in both social and biophysical sciences, ESF is uniquely positioned to significantly advance our understanding of how to best engage with agriculture and food systems in both rural and urban landscapes to address emerging environmental and societal concerns. Our team includes faculty from five departments at ESF and crosses social, biophysical, design and engineering disciplines. Many individual faculty at ESF, including our team, have been actively working on different facets of SFSE research independently, and extramural grant support for ESF faculty has been strong. However, there has been little effort to more closely tie these researchers together and to position ESF to engage in agriculture and food systems related research and teaching.

2) A description of undergraduate and graduate programs that will be impacted: We propose to create both a new undergraduate concentration and a new GPES area in Sustainable Food Systems and Environment (SFSE). There is growing interest among undergraduates¹ and graduates in many departments at ESF in these issues, and this provide a key recruitment opportunity for students coming from urban areas of the Northeastern US who are interested in environmental issues at the urban-rural interface such as food systems. A longer-term goal would be to create an undergraduate major. There are expanding job opportunities in the SFSE area, in policy, engineering, and natural resources fields. In researching SFSE as a potential niche for ESF, we found very few programs that combine social and biophysical sciences related to agriculture and environment. ESF's location in Syracuse and Onondaga County adds a unique context of a post-Rust Belt city with high concentrations of

¹ Between Fall 2014-Spring 2019, ESF undergraduates enrolled in over 220 Food Studies course at Syracuse University (ESF Registrar).

urban poverty surrounded by rural agricultural land uses, and inhabited by sizeable immigrant and Native American populations, and a history of Green (and edible) infrastructure.

(3) A list of agencies, partners, and funding entities either currently or anticipated to be interested in funding research, education, and outreach projects in the initiative area.

- Onondaga Agricultural Council – Funding for FoodPlan CNY, regional food system plan in collaboration with over 50 local stakeholders.
- Canal Corp
- Local and regional foundations have identified community food systems as important means of addressing economic disparities and rebuilding critical infrastructure. The Allyn Foundation is supporting multiple projects including an urban market/food hall that focuses on economic opportunities for New American food cultures.
- USDA NIFA has several relevant programs, from which our team members have been successful in gaining funding.

(4) A description of how the initiative will expand current or create new partnerships: The SFSE will expand existing and create new partnerships. Partners could include: NYS Department of Ag and Markets, NY NOFA (Organic Farming Association), Syracuse University Department of Food Studies, Upstate Medical, Canal Corporation, and community organization such as Syracuse Grows, and RISE (Refugee Immigrant Self-Empowerment).

(5) A description of how the initiative will increase the use of ESF assets:

The extensive and diverse ESF properties provide opportunities for assessing and developing new models of ecologically based food production. We propose to create a small research/teaching farm at Lafayette Rd Field Station or at Heiberg Forest. The farm would provide hands-on learning opportunities for students and a setting for conducting experiments.

(6) How the initiative will inform policy decisions, enhance ESF's reputation:

ESF can offer a unique and critical approach to the ecological and social implications of agriculture and food systems in natural resources conservation, planning and design, given our strengths in environmental science, environmental engineering, landscape design, and community-engagement. There is also demand at the regional level for informed food policy as Onondaga County is working on developing a new food policy council. We are situated to be at the core of what will be ongoing and expanding focus on the critical role of agriculture and food systems in the regional ecology, economy, and social justice issues. ESF has very strong existing relationships with local community organizations focused on urban food production and food justice, such as Syracuse Grows, Salt City Harvest Farm and RISE (Refugee Immigrant Self-Empowerment).

(7) A description of new investments (including new faculty hires and support) required:

This SFSE initiative would include the following investments:

1. Seed grants for faculty and students related to the areas outlined above;
2. Support for recruiting 2-4 graduate students in SFSE over 3 years;
3. One new faculty hire in Agro-ecology.

1) Project feasibility: We will provide seed grants for 2-3 years for pilot research and salary support for faculty teams to write grant proposals for research, as well as to plan new interdisciplinary courses at both the undergraduate and graduate levels to facilitate recruiting new cohorts of undergraduate and GPES students in the SFSE area. SFSE will also serve interests of current ESF students, who, as stated in our initial proposal, have enrolled in over 220 Food Studies courses at Syracuse between 2014-2019. In addition, SFSE could also recruit co-majors with Syracuse Food Studies Program. After the initial seed money is used, we anticipate the SFSE program will be self-sustaining because faculty will be successful at leveraging extramural and local funds. SFSE will also provide an opportunity for recruitment of additional students who are interested in a hands-on program focused on urban environmental issues in the Northeast. Our team represents five departments at ESF, with a balanced team in terms of gender, rank, and expertise related to SFSE that includes Environmental Engineering, Hydrology/Water Quality, Landscape Design and Community Engagement, Science and Environmental Communication, Ecosystem Restoration and Agro-ecology, Environmental Policy, and Social Dimensions of Food Systems and Environment. Faculty members involved in this proposal have been very successful in securing funding from extramural and local sources for SFSE-related work and plan to leverage past successes to secure funding for this initiative. For example, USDA has several relevant programs from which our team members have been successful in gaining funding for research (e.g. USDA Higher Education Grant for Program Development, USDA NIFA Foundational Program, USDA Water for Agriculture Challenge Area, USDA Forest Service). Other programs that have funded team members in recent years include: USGS NIWR, the Canal Corporation, Onondaga Agricultural Council, the Northeastern SARE (Sustainable Agriculture Research Extension) Program. NSF also has relevant programs such as Advancing Sustainable Urban Systems Research Networks, and Coupled Natural and Human Systems. Additionally, foundations that have identified community food systems as an important way to address economic disparities, improve health, and rebuild critical infrastructure include: The Allyn Foundation; The Robert Wood Johnson Foundation; The Health Foundation of Western and Central New York; HealthConnections – Syracuse and Central New York; The Kresge Foundation; The Doris Duke Charitable Foundation; The New York Farm Viability Institute; and The Foundation for Food and Agriculture Research (FFAR).

2) A Transformational Proposal: Our SFSE initiative represents a paradigm shift that addresses the underlying dynamics of food and agricultural systems that are currently major drivers of global deforestation, freshwater resource consumption, water pollution, soil degradation, and climate change. This approach positions ESF at the nexus of transdisciplinary engagement generating new knowledge and practices around the fundamental relationship to food and environment. The Union of Concerned Scientists released a statement in September 2018 highlighting the need for greater public investment in agro-ecological research. While historically land-grant universities served the public interest, increasingly these institutions rely on private sources and leverage public investment largely for the benefit of the private sector. In addition, Cornell University has little focus on urban food systems, and our location in Syracuse, which resembles other upstate post-industrial cities, provides a learning laboratory for how food systems can address socio-economic and environmental problems and inequalities. The essential and integrative nature of food systems also provides the impetus for new approaches to education, research, and public service. At the core of this new model is an emphasis on project-based research and education grounded in a multi-stakeholder context where knowledge is co-created through transdisciplinary collaboration and multi-stakeholder engagement.