Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

Food Resilience Toolkit in action

David Conner,[a]* Claire Whitehouse [b]
University of Vermont

Neishaly Serrano-Cortés,[c] Robinson Rodríguez-Pérez [d]
University of Puerto Rico at Mayagüez

Naomi Cunningham,[e] Travis Reynolds,[f] Kerry Daigle [g]
University of Vermont

Valery Desravins [h]
University of Puerto Rico at Mayagüez

Jane Kolodinsky [i]
University of Vermont

Submitted April 27, 2023 / Revised July 31, August 31, and September 12, 2023 / Accepted September 13, 2023 / Published online December 1, 2023

Citation: Conner, D., Whitehouse, C., Serrano-Cortés, N., Rodríguez-Pérez, R., Cunningham, N., Reynolds, T., Daigle, K., Desravins, V., & Kolodinsky, J. (2023). Food Resilience Toolkit in action. *Journal of Agriculture, Food Systems, and Community Development*, *13*(1), 91–97. https://doi.org/10.5304/jafscd.2023.131.014

Abstract

Food systems scholars and practitioners are increasingly prioritizing food system resilience (FSR) as a conceptual framework. FSR has been the guiding topic of an ongoing partnership between the University of Vermont (UVM) and the University of Puerto Rico at Mayagüez (UPRM), involving faculty, graduate students, and community partners from both regions to collaborate on research, education, and outreach. The first major output of the UVM-UPRM partnership is a Food Resilience Toolkit developed by faculty and graduate students at both universities, available in written

[a] * *Corresponding author:* David Conner, PhD, Professor, Department of Community Development and Applied Economics, University of Vermont; david.conner@uvm.edu

[b] Claire Whitehouse, Research Specialist, Center for Rural Studies, University of Vermont; Claire.Whitehouse@uvm.edu

[c] Neishaly Serrano-Cortés, Master of Science Candidate, University of Puerto Rico at Mayagüez; neishaly.serrano@upr.edu

[d] Robinson Rodriguez-Perez, Professor, Agricultural Economics & Rural Sociology Department, University of Puerto Rico at Mayagüez; robinson.rodriguez1@upr.edu

[e] Naomi Cunningham, Housing Program Administrator, Vermont Agency of Commerce & Community Development.

[f] Travis Reynolds, Associate Professor, Department of Community Development and Applied Economics, University of Vermont; twreynol@uvm.edu

[g] Kerry Daigle, Research Project Specialist, Center for Rural Studies, University of Vermont; kerry.daigle@uvm.edu

[h] Valery Desravins, Master of Science Candidate, University of Puerto Rico at Mayagüez; valery.desravins1@upr.edu

[i] Jane Kolodinsky, PhD, Professor, Department of Community Development and Applied Economics, University of Vermont.
Dr. Kolodinsky is now Dean, School of Business, Western Colorado University; jkolodinsky@western.edu

Funding Disclosure

Funding for this work came from Enhancing Food Resilience as Disaster Preparedness: The Role of Anchor Institutions Partnerships (USDA Smith-Lever Award No. 2019-41210-30043); and Seeding Food Resilience Though Anchor Institutions (USDA NIFA Award No. 2021-67024-34436).

and video formats in both English and Spanish. This research brief provides the results of an application of one component of the toolkit, an asset mapping exercise. We analyzed the results using the community capitals framework to highlight areas of strength and areas in need of investment. We found Vermont has assets to apply to FSR, with built, human, and social capital assets most numerous, while financial and political assets are fewest. We conclude with recommendations which can be vetted in future stakeholder gatherings and a call to apply the toolkit elsewhere.

Keywords
Vermont, Puerto Rico, community capitals, stakeholders, asset mapping

Introduction and Literature Review

In the face of frequent shocks caused by climate change and global pandemics, food systems scholars and practitioners are prioritizing food system resilience (FSR) in their work. The concept of FSR draws from the larger body of community resilience literature. Magis (2010) defines resilience as "the existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise" (p. 401). Walker et al. (2007) characterize resilience as the ability to buffer disturbance. Narrowing in on food, Tendall et al. (2013) describe FSR as the "capacity over time of a food system and its units at multiple levels, to provide sufficient, appropriate and accessible food to all, in the face of various and even unforeseen disturbances" (p.19).

FSR has been the topic of many recent research and outreach efforts. Ferguson et al. (2022) framed FSR as a disaster preparedness strategy for island nations and emphasized increasing local food production and use, facilitated by strong networks. Campbell et al. (2022) created an audit tool for use by state and local government, food policy councils, and extension educators. This tool uses a socio-ecological systems approach as the theoretical framework, arguing that FSR is an integrated approach to understanding social, ecological, economic, and other systems. Their tool identified indicators of food resilience around seven core themes, including environmental sustainability, place-based economics, the importance of farmers and farmland, and fostering leadership and self-reliance.

Biehl et al. (2018) consider FSR in disaster preparedness in an urban setting, remarking that few cities have included food systems in disaster preparedness and resilience planning. Their analysis includes a fault tree to highlight the range and sequence of possible impacts, including supply chain failures (production failure, disruptions in processing, distribution and retailing activities) and circumstances where food is not economically (low income, high prices) or physically (unable to reach purveyors) available. The authors conclude that universities can foster collaboration and provide data to disaster resilience efforts, while acknowledging the difficulties in including broad segments of society and the complexity and unfamiliarity of the concepts.

FSR has been the guiding topic of an ongoing partnership between the University of Vermont (UVM) and the University of Puerto Rico at Mayagüez (UPRM). This partnership brings together faculty, graduate students, and community partners from both regions to collaborate on research, education, and outreach about FSR. The UVM and UPRM teams, along with colleagues at Clark University, came together to brainstorm a list of FSR indicators, drawing from the literature and personal experience. Inspired by the work of Magis (2010) on community resilience, we adopted the community capitals framework first developed by Flora et al. (2004), as our conceptual lens for this exercise. Flora et al. (2004) define seven forms of community capital: natural, cultural, human, social, political, financial, and built capital. We have mapped our hypothesized FSR indicators to the community capitals model in the list below. This list is present in the toolkit we developed (more discussion on this below) and was shown to participants in each presentation and workshop (more detail on this below) as part of the introduction to the exercise.

Natural capital:

- Fertile farmland
- Ecosystems services

- Clean water and fisheries
- Stable climate

Cultural capital:
- Foodways (healthful, regional, culturally appropriate)
- Credible leaders and champions
- Food citizenship ethos

Human capital:
- Labor and management capacity to produce and handle a diversity of food
- Adaptable workforce
- Communication skills
- Technical assistance

Political capital:
- Policies encouraging local purchases
- Regulations and adequate enforcement to protect workers, farmland, food safety, etc.
- Social safety nets ensuring adequate and appropriate nutrition for all
- Strong land tenure

Social capital:
- Trust within and between organizations
- Working partnerships and relationships
- Willingness and ability to share information

Financial capital:
- Credit access
- Emergency funds

Built capital:
- Food and farm business equipment and infrastructure able to handle diversity of products and adapt quickly
- Transportation infrastructure
- Reliable utilities

The first major output of the UVM-UPRM partnership is a Food Resilience Toolkit directed at extension and nonprofit professionals and community leaders. The toolkit was developed by faculty and graduate students at both universities and is available in written and video formats in both English (Serrano-Cortés et al., 2023a) and Spanish (Serrano-Cortés et al., 2023b). The first chapter of the toolkit introduces the concept of FSR and the community capitals model. The second provides four tools for assessment and planning: asset mapping, focus groups, nominal groups, and strategic planning. The third chapter examines the role of policy in supporting (or obstructing) FSR work. The toolkit concludes by summarizing lessons learned from our research efforts in both regions.

This research brief presents results from a trial run of the toolkit at a breakout session at Vermont's annual strategic food plan gathering. Specifically, it presents results of the assets mapping component, discovering what stakeholders perceive as assets to respond to a hypothetical future scenario. It builds on the work by Ferguson et al. (2022) and Biehl et al. (2018) by emphasizing FSR as disaster preparedness. Its intended users are similar to those of Campbell et al. (2022), yet with the community capitals model as a framework. Its application by the UPRM team can add to understanding of island locations' settings. The contribution of this paper is (i) mapping assets (ii) onto a community capital framework (iii) to address a potential shock (iv) by a statewide strategic planning organization. It integrates concepts and methods from previous studies including food resilience and disaster preparedness, community capitals, and mapping exercises within stakeholder collaboration groups; this integration is novel (especially in Vermont) to the best of our knowledge.

Applied Research Methods

After completing and publishing the toolkit, we performed a trial run at the Vermont Farm to Plate (FTP) Annual Gathering in November 2022. The Vermont FTP mission states: "Farm to Plate is Vermont's food system plan being implemented statewide to increase economic development and jobs in the farm and food sector, improve soils, water, and resiliency of the working landscape in the face of climate change, and improve access to healthy local foods for all Vermonters" (Vermont Farm to Plate, "Our Mission," para. 1). FTP holds a gathering each year to discuss and plan actions to achieve its mission. Authors David Conner and Claire Whitehouse applied for and were accepted to present at a breakout session. We chose the FTP Gathering because FTP's mission aligns closely

with our project and because it offered an occasion when a group with a unique combination of expertise and professional interest were already assembled.

The breakout session was attended by 22 people, including representatives from state and federal government agencies, nonprofit and technical assistance organizations, institutions of higher education, and UVM Extension. The majority of participants were white, female, younger professionals, a typical profile of food systems stakeholders in Vermont. After introducing the project and providing an overview of the toolkit, we reviewed the Asset Mapping protocol from Chapter 2 and led participants in an asset mapping exercise. We asked the group to consider the following scenario:

> *As a northern inland state, Vermont is positioned to be insulated from the most dramatic effects of the climate crisis, and is likely to receive an influx of climate refugees from both inside and outside the U.S. A large influx of refugees would require our small state to increase capacity on many fronts: housing, health care, and of course, food.*

In the event of rapid population growth caused by climate crisis:

- What **assets** could Vermont mobilize to "provide sufficient, appropriate and accessible food to all" (Tendall et al., 2015, p. 19)?
- Where are there **gaps**?

Participants broke into small groups to brainstorm possible assets and identify the gaps in their lists. After each group wrote up their asset and gap lists on flipcharts, we reconvened to present and discuss results with the full room. We gave them no further prompts, as part of the motivation was to understand how the participants named assets off the top of their heads without further guidance. After the event, two authors coded the flipchart notes to the seven community capitals and compared codes. We chose the capital that was the best fit, acknowledging that many responses could be placed in more than one category. For those that may fit in more than one capital category, the lead author assigned responses to a primary category and the second author suggested changes until consensus was reached. Full responses and codes are available upon request from the lead author.

Results

We mapped the responses from the Vermont Food Assets Brainstorm onto the community capitals categories (see Table 1).

Discussion

The responses above capture a snapshot of food resilience assets identified unprompted by a diverse array of food systems stakeholders in Vermont. We acknowledge that counting the number of examples under each category is not the same as measuring the strength or abundance of assets (there is no basis for stating that each mention has equal weight of importance, for example). We used this approach to understand how the participants named assets in this exercise. Nonetheless, it is interesting to note that the list of built assets is the longest. Human and social capital assets are also numerous, while financial and political assets are fewest within this framework. Yet although session attendees named many built and human assets, they also identified gaps in these categories. Based on their responses, the participants perceive that Vermont lacks both the expertise and infrastructure to feed a large influx of people through local production.

Like previous studies (Ferguson et al., 2022; Biehl et al., 2018) we found that FSR was a useful framework for thinking about disaster preparedness strategy, the need to increase local food production and use, and the importance of coordination through networks. Respondents reacted to the climate change risk scenario with both assets and gaps around local food production, distribution, and consumption (echoing Biehl et al., 2018, and their preparations around production and supply chain failures and lack of food access) and noted the value of Vermont's network of NGOs. We also collected the perspectives of a broad swath of stakeholders, including technical assistance providers (Extension educators and those from nonprofit organizations), state and federal government officials, researchers from higher education, as did Campbell et al. (2022). Unlike those studies, we applied the community capitals model (Flora et al.,

Table 1. Responses from Vermont Food Assets Brainstorm Mapped onto Community Capitals

Assets
Built
• Food banks
• Seed banks
• Perennial horticulture crops
• Urban farming
• Food access structures
• Processing and distribution infrastructure
• Old farm buildings, factories, second homeowners
• Transportation infrastructure (trains)
• Renewable energy infrastructure
Human
• Farming knowledge
• Farmer training programs (higher ed and NGO)
• Consumer education
• Workforce and workforce development, available jobs
• Indigenous knowledge
Financial
• Private investments in food business
• Public and philanthropic investments in food business
Cultural
• "Buy local" ethic
• Farm to table restaurants
• Indigenous foodways
Natural
• Farms and farmland
• Water resources
• Forests
Political
• Federal programs: Conservation Districts, Rural Development
• Planning and policy councils
Social
• Strong network of NGOs and other actors
• Granges and farmer organizations
• Community organizations: churches, common areas, schools
Gaps
Built
• Sustainable transportation
• Scale appropriate food processing
Human
• Acute labor shortage
• Poor working conditions, pay, and benefits
• Expertise in climate conscious and resilient production
• Expertise in food processing and preparation
• Indigenous knowledge
• Consumer awareness

2004), which highlighted that Vermont has many built capital assets that could be leveraged to improve food system resilience in the climate migration scenario.

While next steps were not part of our discussion in the exercise described above, we posit a number of recommendations which can be vetted in future stakeholder gatherings, based on the assets and gaps identified by the participants:

- Investment in workforce development and infrastructure for local and regional production, processing, and distribution. If and when Vermont does experience significant population growth, this infrastructure could help new Vermonters develop skills and find food system employment as well as access food.
- Improve working conditions and wages to make food jobs more desirable and less precarious.
- Maintain farmland and preserve water resources.

We acknowledge that these recommendations are not unique to Vermont or the modern day; rather, these are chronic needs in the food system that will become even greater under the climate migration scenario.

It is also important to note that the greatest number of identified assets (and all gaps) are in the built and human capital categories. These, along with natural capital and financial assets, may be the easiest to identify and name. In many cases they have implicit units of analysis (number of employees, dollars of investment, area of buildings and land). It may be that the respondents identified fewer assets and no gaps in the other capitals (social and especially political and cultural) because of lack of familiarity and because "investing" to increase stocks in these capitals involves deep changes in society which are difficult to quantify. Nonetheless, greater articulation of the existence and value of these more subtle capitals may help advance food system resilience efforts.

Conclusions

The recommendations for improving FSR in Vermont that we proposed above (investment in

workforce development and infrastructure, improved food system working conditions and wages, and farmland and water preservation) are neither new ideas nor easy to achieve. In Vermont, however, we are lucky to have existing statewide teams working on these goals under the auspices of the Vermont FTP Network, which already has priority strategy teams, topic exchanges, and communities of practice working to address each of these gaps. These collaborations will contribute to a more sustainable local food system and to broad community wellbeing, no matter which shocks come Vermont's way. Vermont FTP Network's existence is thanks to Vermont state government investment in local food infrastructure (political capital). This investment builds on existing social capital. To address the gaps in built and human capital would require policy and significant investment from government and businesses, and in some cases paradigm shifts (e.g., how we pay food labor, and subsequently how and how much we pay for food).

The major takeaways from the asset mapping and gap identification exercise are as follows. First, the topic (food system resilience) and background discussion on the partnership between UVM and UPRM drew a good crowd eager to participate. Second, the scenario we posed generated much discussion and many responses. Third, judging by the number of examples, respondents were most likely to name community capitals with identifiable units and clearer mechanisms for investment and measuring stocks. Fourth, assets and gaps in cultural and political capital may be more difficult to identify, yet the Farm to Plate Network is evidence of the state's stock in these capitals.

Limitations and Future Research Directions

These results are limited to a single group of stakeholders in Vermont at a single time. No generalizations or inference to other groups is advisable. Future research can focus on repeating the exercise in other regions, as well as testing the effects of prompts of assets within capital categories not identified in early rounds. We hope our toolkit and this paper spurs further work in this area, and we look forward to hearing about others' efforts and achievements.

References

Biehl, E., Buzogany, S., Baja, K., & Neff, R. A. (2018). Planning for a resilient urban food system: A case study from Baltimore City, Maryland. *Journal of Agriculture, Food Systems, and Community Development*, *8*(2), 39–53. https://doi.org/10.5304/jafscd.2018.08B.008

Campbell, C. G., Papanek, A., DeLong, A., Diaz, J., Gusto, C., & Tropp, D. (2022). Community food systems resilience: Values, benefits, and indicators. *Journal of Agriculture, Food Systems, and Community Development*, *11*(4), 89–113. https://doi.org/10.5304/jafscd.2022.114.006

Ferguson, C. E., Tuxson, T., Mangubhai, S., Jupiter, S., Govan, H., Bonito, V., Alefaio, S., Anjiga, M., Booth, J., Boslogo, T., Boso, D., Brenier, A., Caginitoba, A., Ciriyawa, A., Fahai'ono, J. B., Fox, M., George, A., Eriksson, H., Hughes, A., … Waide, M. (2022). Local practices and production confer resilience to rural Pacific food systems during the COVID-19 pandemic. *Marine Policy, 137*, Article 104954. https://doi.org/10.1016/j.marpol.2022.104954

Flora, C. B., Flora, J. L., & Fey, S. (2004). *Rural communities: Legacy and change* (2nd ed.). Westview Press. https://doi.org/10.4324/9780429494697

Magis, K. (2010). Community resilience: An indicator of social sustainability. *Society & Natural Resources, 23*(5), 401–416. https://doi.org/10.1080/08941920903305674

Serrano-Cortés, N., Whitehouse, C., Conner, D., Rodríguez-Pérez, R., Cunningham, N. M., Reynolds, T., Daigle, K., Desravins, V., & Kolodinsky, J. (2023a). *Food resilience toolkit* (Report No. 199). University of Vermont, College of Agriculture and Life Sciences Faculty Publications. https://scholarworks.uvm.edu/calsfac/199

Serrano-Cortés, N., Whitehouse, C., Conner, D., Rodríguez-Pérez, R., Cunningham, N., Reynolds, T., Daigle, K., Desravins, V. & Kolodinsky, J. (2023b). *Caja de herramientas: Desarrollando resiliencia en el sistema alimentario* [*Food resilience toolkit*] (Report No. 200). University of Vermont, College of Agriculture and Life Sciences Faculty Publications. https://scholarworks.uvm.edu/calsfac/200

Tendall, D. M., Joerin, J., Kopainsky, B., Edwards, P., Shreck, A., Le, Q. B., Kruetli, P., Grant, M., & Six, J. (2015). Food system resilience: Defining the concept. *Global FoodSecurity*, *6*, 17–23. https://doi.org/10.1016/j.gfs.2015.08.001

Vermont Farm to Plate. (n.d.). *Our mission*. Retrieved August 14, 2023, from https://www.vtfarmtoplate.com/

Walker, B., & Pearson, L. (2007). A resilience perspective of the SEEA. *Ecological Economics*, *61*(4), 708–715. https://doi.org/10.1016/j.ecolecon.2006.04.010