Asap Local Food Research Center

Economic & Health Benefits of Farm Fresh Produce Prescription

Implementation and impacts of a direct-market Food is Medicine program that nourishes families and provides economic benefits to rural family farmers.

APRIL 2026

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Executive Summary

Food Is Medicine (FIM) initiatives, including produce prescription (PPR) programs, have been shown through research studies to improve diet, decrease food insecurity, and support chronic disease management. The Community Guide (2025) recommends fruit and vegetable incentive programs to reduce household food insecurity and increase household fruit and vegetable intake. Therefore FIM program inclusion in healthcare payment models, federal and philanthropic grant programs, and state plans has grown nationwide to prevent and treat costly diet-related health conditions.

To describe the implementation of a regional farm fresh FIM, this report uses the RE-AIM Implementation Science framework. The framework helps in describing the implementation and impact of the Appalachian Sustainable Agriculture Project's (ASAP) **Farm Fresh Produce Prescription (FFPP) model** with partners in Western North Carolina (WNC). It includes assessment of viability in real-world conditions and ability to meet multi-sector business and healthcare operational flows and requirements. The report provides details on its impact on community members (health, food security) and farm businesses (economics).

Produce prescription programs that provide locally grown products paired with education and experiential services can support multiple benefits and be a regenerative strategy. These locally tailored programs can improve client food security and health, support connections between customers and farmers, support healthy food infrastructure and distribution processes, provide stable financial benefits to farmers and local food businesses (i.e. direct markets such as farmers markets, farm stands, food hubs), and provide community food access sites for the population at large.

Direct market models have **system-level ripple effects in helping regional food systems gain self-sufficiency.** FIM programs that utilize local food prescriptions also strengthen connections of healthcare systems with trusted, front-line community-based organizations and local food systems organizations, helping with efficiencies and authentic collaborations in rural communities.

Momentum is growing to design FIM programs with the local economy in mind. According to the Rockefeller Foundation's Report on Farm to FIM, "When states intentionally prioritize locally-based providers and locally-sourced food, FIM can do more than treat disease—it can strengthen local economies. Directing healthcare dollars toward small and mid-sized farmers and regional food businesses helps those dollars circulate locally, supports rural communities, builds needed infrastructure, and can encourage more resilient and regenerative production practices."

ASAP's FFPP program was implemented in phases and primarily utilized two models that were adaptive to geographic areas, specifically a **farmers market model** (FMM) implemented in an urban area (city of 100,000) with adjacent rural areas and a rural community-focused **farm box model** (FBM). During the intense implementation phase (2022-2024) ASAP and partners worked with:

- 6 counties in Western North Carolina including an urban city center and rural communities
- 13 farmers markets and their managers
- 3 local food aggregators
- More than 100 farmers
- 16 healthcare sites
- More than 160 referral providers

These providers made:

- 1,593 referrals, of which
- **1,312** clients were enrolled and received prescriptions

The evaluation used mixed-methods and found in surveys of clients very high satisfaction with the program, lower food insecurity, increased fruit and vegetable intake, better health, and intent to continue purchasing local fruits and vegetables. Specific survey results were:

- The majority 93.9 percent of farmers market model (FMM) and 92.1 percent of farm box model (FBM) clients had a positive or very positive experience with the program (follow-up survey results).
- Food insecurity decreased as measured by the Hunger Vital Sign Questionnaire, with 53.7 percent reporting food insecurity at baseline and 43.9 percent reporting food insecurity at follow-up.
- A modest increase in the average daily cups of fruits and vegetables consumed (including legumes, excluding french fries) with 2.61 cups at baseline and 2.76 cups at follow-up.
- Better general health, with 38.4 percent of clients reporting poor or fair health at baseline compared to 26.7 percent at follow-up.

Nutrition education was paired with the produce offerings including taste tests and recipes at farmers markets and information/recipes within the food boxes. In addition, 41.9 percent of clients reported use of **experiential activities**; of those, 45.6 percent took part in one and 54.4 percent took part in two. Use of experiential activities did vary between the program models, with 26.3 percent of FMM clients and 59.4 percent of FBM clients taking part in at least one experiential event.

Per assessment of maintenance, at the post survey the majority of clients reported that they would keep shopping for local produce when their prescription ends with **86.5 percent reporting intent to occasionally or monthly purchase local produce** with variation by model: 79 percent of FMM and 95 percent of FMB with positive intent to keep purchasing local foods; **75% of clients felt better connected to local farms/farmers.**

The program models led to the providing of:

- 12,826 produce vouchers redeemed at markets
- 2,907 market model special assistance mobility boxes
- 3,054 rural community food boxes
- **$716,232** for local farms through FFPP fruit and vegetable models

This evaluation finds that the two models of FFPP are viable and ready for future scaling. The programs support clients' health and lead to positive intent for future local food purchasing. The FFPP models supported over 100 farmer businesses in the region with three-quarters of a million dollars in purchases supporting the local farming economy and helping boost WNC's local food system and its economic resilience. The client and farmer need for these programs persists, therefore, ASAP continues to implement and sustain the FFPP program with partners as one of its **Farm Fresh for Health** initiatives.

Background and Place-Based Conditions

Appalachian Sustainable Agriculture Project (ASAP) is a nonprofit based in Asheville, North Carolina, serving the Southern Appalachian region since 2002. The organization's mission is to help local farms thrive, link farmers to markets and supporters, and build healthy communities through connections to local food. ASAP's Local Food Research Center supports evaluation of ASAP's initiatives.

Community Characteristics

Preventable diet-related disease negatively impacts the quality of life of Western North Carolina (WNC) residents leading to premature disease and death and costs millions in yearly healthcare costs. Research points to the role that social norms and food environments play in healthy behavior change. ASAP's community incentive programs are designed to promote access to local, healthy food, and increased affordability to support a shift to healthier eating.

ASAP's role as a place-based local food systems organization and its focus on research and learning for the past two decades led to ASAP's **Farm Fresh for Health (FF4H)** initiative. FF4H is a place-based, farm-centered approach to improving the health and well-being of Western North Carolina (WNC) families and communities. Based on the promise that creating positive food and farm experiences builds a social context that reinforces healthy food choices, FF4H centers direct-to-consumer markets as an opportunity to leverage healthy food environments and the relational benefits of local food systems. Shopping at local markets and purchasing local food is a relatively normative behavior in WNC. A 2024 survey found that over 80 percent of residents had purchased local food at least once in the past month.[1]

Integrated throughout ASAP's programs, FF4H centers positive experiences with fresh local food as preventive health strategies that can be implemented across everyday settings to encourage behavior change and reduce barriers to participation in the local food system. The **Farm Fresh Produce Prescription (FFPP)** program has a dual benefit strategy that supports small, family-owned farm businesses in the region in having a stable clientele for purchasing their farm products.

[1] https://asapconnections.org/local-food-research-center/

Program Description

ASAP worked with partners to design two adaptive farm-direct models to best meet the needs of partners, families, and communities. Both the farmers market model (FMM) and farm box model (FBM) place emphasis on the role of local produce, incentivizing participants to utilize the program as a benefit to themselves, their families, local farmers and economy, and connect with the community (**Table 1**).

Farmers markets provide participants with the opportunity to choose foods that meet their families taste and cultural preferences and allow clients to engage directly with the farmers they are receiving or purchasing food from, and allows clients to ask questions about seasonal products, growing practices, storage practices, cooking tips, and recipes.

The programs also offered nutrition education offerings and experiential opportunities, for example, providing clients the opportunity to tour farms to learn more about the farmer, their practices, and to see where their food is grown.

Table 1.
ASAP's Community Adaptive Model Characteristics, Farmers Market and Farm Box

MODEL	GEOGRAPHY	MODE	HEALTHCARE SITES/ PROVIDERS	DOSE	PRODUCE VALUE	EDUCATION & EXPERIENTIAL	COUNTIES
Farmers Market (FMM)	Urban & Rural	Voucher - Token/ *Mobility Box Pilot*	16 healthcare /150	6 mo; optional +	$20-$60*/ household Market Voucher; Adaptive Box Model	On-site; Monthly Offering	4
Farm Box (FBM)	Rural	Pick-up/ Delivery	2 public health sites /site-specific staff (e.g. 2-5)	3/6 mo	Box (range $20-$60)	In-Box; Monthly Offering	2

**Note: mo = month; NC Healthy Opportunities Pilot (HOP)[2] provided $62 per household, regardless of household size*

[2] https://www.ncdhhs.gov/about/department-initiatives/healthy-opportunities/healthy-opportunities-pilots

Models

ASAP's primary model is the **farmers market model** (FMM), in which participants are referred to the FFPP program by partner healthcare providers for a six-month fruit and vegetable prescription. Participants are sent a paper voucher and allotted $20-$60 a week depending on the number of people in the household, or $62 a week if they were referred through the NC Healthy Opportunities Pilots (HOP). Clients present their voucher with a unique ID to the market manager and are provided Farm Fresh tokens to spend like cash on fruit and vegetables at participating farmers markets. This program was offered in four counties (including 12 farmers markets) comprising both rural and urban geographies.

ASAP's second model is a **farm box model** (FBM), designed to meet the needs of clients living in more rural communities with limited access to the more urban farmers market network. In partnership with MountainWise, Swain County Health Department, Macon County Health Department, Darnell Farms, and various other contributing community-based organizations, the farm box model provided pre-packaged food boxes through Darnell Farms. Boxes were available weekly for 50 families in Swain County for three months in 2023, and 100 families in Swain and Macon counties for six months in 2024.

Nutrition Education, Support Services, and Experiential Activities

In addition to the food component, ASAP partners with farmers, community-based organizations, and allied health providers, including dietitians, to provide essential nutrition education and wrap-around support for program participants. Wrap-around supports include, but are not limited to, cooking demonstrations and classes, farm tours, farmers market tours, recipes, and more.

Farmers Market Model: In addition to free choice of seasonal produce and a weekly farmers market experience, FMM participants received regular

communications from program staff and were offered farmers market tours, farm tours, u-pick opportunities, cooking demos, meal kits, and food preservation/storage classes. Childcare support and activities and gas cards were offered to incentivize families to attend events.

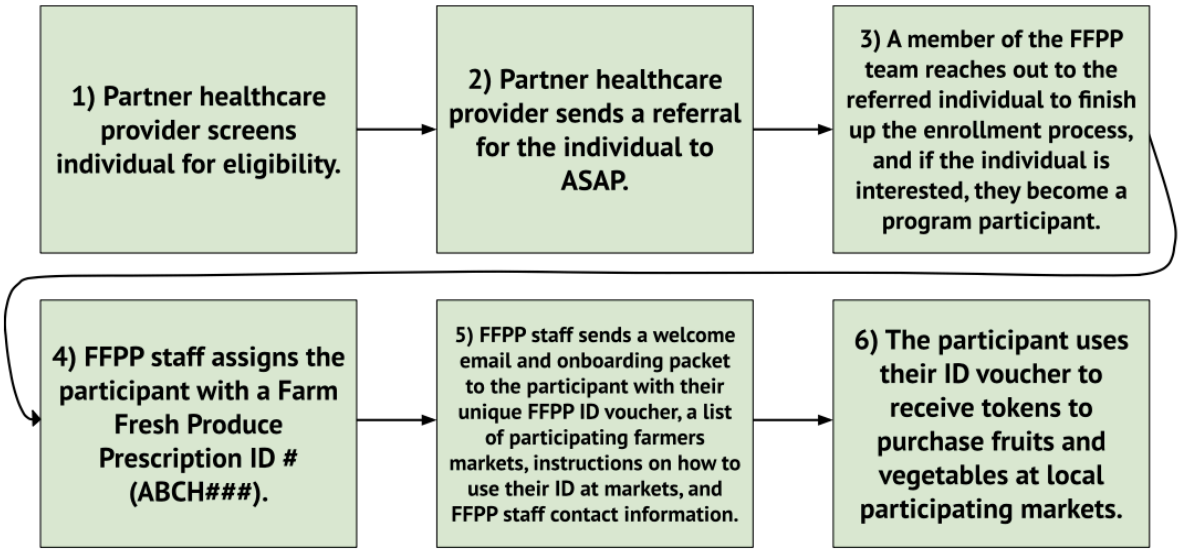
Farm Box Model: For participants in the rural FBM, boxes were delivered weekly through a local farm and included both local produce as well as other ingredients for seasonal recipes. Monthly events were held in community centers for the duration of the prescription. Events were optional and encouraged, and participants were incentivized to participate with gas stipends and a cooking demonstration with a free meal. Activities were provided for children at each event from ASAP's Growing Minds program, as well as sent home in boxes with families along with books, recipes, and/or cooking tools. Participants were able to pick up their box for the week and engage with a variety of community organizations providing various services, including health screenings, additional food resources, and legal assistance. The last event for each cohort was a farm visit, tour, and u-pick activity.

Eligibility

Eligible clients were a member of a low-income household that suffers from, or are at risk of developing, a diet-related condition AND meet one of the following criteria:

- Eligible for a federal supplemental nutrition program, such as SNAP
- Enrolled in Medicaid or Children's Health Insurance Program (CHIP)

Figure 1.
Farmers Market Model, Produce Prescription Client Enrollment Process



Program Evaluation

The following section describes the evaluation of the FFPP program. Using components of the Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM) framework[3], we assess key tenants of ASAP's program. The RE-AIM framework (**Figure 2**) is applied as a practice-based evaluation or implementation science tool for analyzing real-world programs as it provides a structure for understanding concepts such as adoption, implementation, effectiveness, and maintenance of interventions[4].

Figure 2.
RE-AIM Elements: Planning and Evaluating Questions

Operational Adoption and Geographic Reach

Farmers Market Model: For the FMM, ASAP partnered with numerous healthcare providers, community-based organizations, and farmers markets in a four-county region. Primary referral partners included Buncombe County Health and Human Services, Community Family Practice, Council on Aging of Buncombe County, The Family Health Centers, French Broad Pediatrics, Hendersonville Pediatrics, Madison County Health Department, Mountain Area Health Education Center (MAHEC), Mission Health Partners, UNETE, and Western North Carolina Community Health Services (WNCCHS).

Prescriptions for market model clients were available for redemption and used to purchase fruits and vegetables at farmers markets in Buncombe, Haywood, Henderson, and Madison counties, and included: Asheville City Market, Black Mountain Tailgate Market, East Asheville Tailgate Market, Enka-Candler Farmer's Market, Haywood's Historic Farmers Market, Hendersonville Farmers Market, Mars Hill Farmers and Artisans Market, Mills River Farm Market, North Asheville Tailgate Market, River Arts District Farmers Market, Southside Community Farmers Market, Weaverville Tailgate Market, and West Asheville Tailgate Market. From spring 2022 to spring 2024, as an innovation pilot, ASAP also partnered with local food aggregator Mother Earth Foods to provide a food box delivery alternative to the market model for

[3] Glasgow, R. E., Harden, S. M., Gaglio, B., Rabin, B., Smith, M. L., Porter, G. C., Ory, M. G., & Estabrooks, P. A. (2019). RE-AIM Planning and Evaluation Framework: Adapting to New Science and Practice With a 20-Year Review. *Frontiers in public health*, *7*, 64. https://doi.org/10.3389/fpubh.2019.00064

[4] https://re-aim.org

select participants with transportation and/or mobility barriers. Providers included transportation/mobility barriers in the referral notes that were shared with ASAP to determine participants in the delivery pilot.

Farm Box Model: For the FBM, ASAP partnered with groups in two rural counties, including MountainWise, Swain County Health Department, Macon County Health Department, and Darnell Farms. MountainWise served as the community-based organizer for events and logistics around box pick-up/delivery, health departments enrolled participants, and ASAP provided engagement activities, nutrition educational materials, and funding for local produce aggregated by Darnell Farms.

Implementation Acceptability

Participation by markets and healthcare partners in the FMM grew significantly over the course of the project design and implementation phases. Project design occurred between August 2021 and March 2022. The buildout involved relationship-building and onboarding with healthcare staff, onboarding farmers market staff, and creating structures and processes to both support and monitor implementation. The intense implementation phase was during the peak harvest period starting in summer of 2022 through summer of 2024.

Farmers Market Model: Farmers market managers found the program to be acceptable and of value to take part in. Interviews with managers of the 13 participating markets were conducted in August-November 2024 and found that market staff were satisfied with ASAP's role of providing interconnectedness through training and assistance. Several staff that adopted the program named ASAP's resources to be helpful with the fidelity of the program and engagement of clients including recipe cards, program fliers, and signage. Market managers generally found ASAP's weekly electronic software reporting form to be streamlined and user-friendly.

Farm Box Model: Project design occurred between August 2021 and March 2022. The buildout involved relationship-building and onboarding the farm stand partners and creating structures to implement and monitor program implementation. The partner organization was a trusted and known food system partner in the rural community.

Healthcare Partner Engagement

Healthcare partners began making the FFPP referrals in April 2022, corresponding with the opening market season of the majority of participating farmers markets.

For the FMM, ASAP initially collaborated with the Mountain Area Health Education Center (MAHEC) to design a referral process that would fit within the healthcare providers' workflow and systems. While MAHEC has been the primary referral partner throughout the project, 16 different healthcare entities participated with varying levels of frequency. This expansion happened intentionally and organically, as ASAP staff identified partners who could engage particular audiences and providers shared about their experience with the program with others. Due to its high acceptability, diffusion occurred and more providers were trained and onboarded. Over the intense implementation years, the following core group of seven healthcare partners regularly made referrals to the FFPP program: Buncombe County Health and Human Services, Community Family Practice, Council on Aging of Buncombe County, French Broad Pediatrics, MAHEC, Mission Health Partners, and WNCCHS. Each partner entity had multiple providers (doctors, nurses, community health workers, etc.) writing prescriptions. In total, over 150 individual providers, based in Buncombe, Haywood, Henderson, and Madison counties, have prescribed farm fresh produce through the market model.

For the FBM, ASAP partnered with healthcare groups in two counties, including the Swain and Macon County Health Departments, with staff members having various levels of public health and allied-health training and/or experience. The more limited staff makeup supported efficient consistency of the implementation in the rural communities.

Client Reach

Information in this section was collected during the April 2022-August 2024 implementation phase. For the FMM clients, the intake process was conducted by ASAP staff over the phone with participants after they received a referral from their healthcare provider.

During 2022-2024, 1,593 referrals were made for participants through the FMM. For the FBM, intake data was collected by Health Department staff. Following a referral, ASAP staff contacted participants to finalize enrollment and send an onboarding packet. On average, 82 percent of those referred were enrolled. The other 18 percent either did not respond to contact attempts, or determined the program was not a good fit for their needs. **A total of 1,312 participants were enrolled across models and provided with a unique ID number for prescription redemption.**

Program Usage and Prescriptions Redeemed

Program usage data for the FMM was collected through weekly reporting conducted by each participating farmers market manager through a Google Form, and later through the platform Smartsheet—a centralized system for data collection and analysis. Program usage data for the FBM was reported by Darnell Farms and MountainWise staff. Data included whether or not a box had been delivered by Darnell Farms staff, or picked up by the participant at the farm.

Farmers Market Model: Thirteen markets participated, including nine in Buncombe County (the population center for the region), two in Henderson County, one in Haywood County, and one in

Madison County. From April 2022 to December 2024 a total of 12,826 prescriptions were redeemed at farmers markets. The majority of prescriptions were redeemed at one of 13 participating farmers markets.

Community-Adaptive Pivots: From the fall of 2022 through spring of 2024, a delivery option was available for participants who could not access a market due to health, transportation, or mobility issues. From these tailored strategies, 106 produce boxes were delivered by AVL Box from July 2022 through October 2022, and 2,811 produce boxes were delivered by Mother Earth Foods from February 2023 through April 2024.

Farm Box Model: An additional 3,054 boxes were prepared and delivered to participants in the Rural Community model in Swain and Macon counties from January through March 2023, and January through June 2024.

Economic Benefits to Farmers

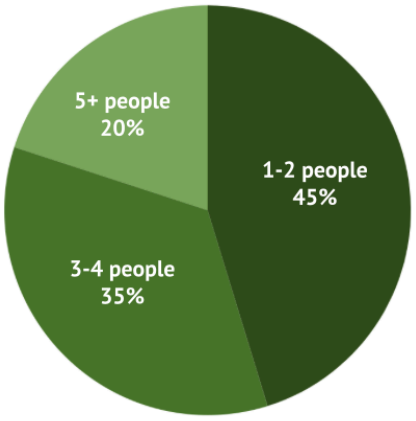
From Smartsheet software reporting and formal redemption invoicing procedures, we determined that in total the 2022 to 2024 program distributed $716,232 for local farms through the two FFPP fruit and vegetable models.

Client Impacts

Information in this section was collected during the April 2022-August 2024 implementation phase. The enrollment/intake process in both models captured key client information such as age, family size, and preferred language. As seen in **Figure 3**, the median household size was three, with 45 percent reporting one or two people in the household, 35 percent reporting three or four, and 20 percent reporting five or more people. Age varied from 0-65+ with a median age of 36.

Roughly a quarter of those referred were between ages 0-17 (including 14 percent under age five), 27 percent between ages 18-34, 30 percent between ages 35-64, and 18 percent over the age of 65. Approximately five percent of enrolled participants listed Spanish as their preferred language and were offered translated enrollment information, as well as Spanish language educational materials.

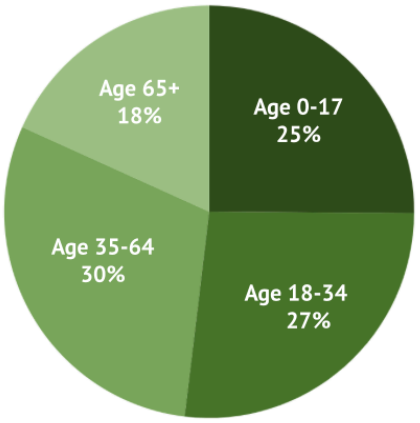
Figure 3.
Intake Form Data: Household Size



Client Survey Information

Participant level impact data was collected via surveys for one of the specific federally funded United States Department of Agriculture grant-funded projects. Beginning in April 2022, enrolled participants were mailed or emailed a survey as part of their onboarding packet. The survey collected demographics and information on participant SNAP usage, fruit and vegetable consumption, quality of life, and frequency of purchasing local food. The majority of participants completed the survey online but the survey modality differed by model with 31.3 percent of FBM clients having someone read them the questions over the phone or zoom (versus 0.5 percent of FMM clients), and 4.9 percent using paper in the FBM (versus 0.9 percent of the FMM clients).

Figure 4.
Intake Form Data: Age of Enrolled FMM Participants



Food Insecurity and Hunger: Current household SNAP usage was high and varied by participant model type, with 68.7 percent among FMM and 46.2 percent among FBM clients. Among SNAP recipients, the history of use was similar by model type with two-thirds having utilized SNAP for 12 months or more. At baseline, food insecurity aspects were high among FFPP enrollees (**Table 2**).

Client self-reported health varied among FFPP enrollees. The baseline surveys found a high percent reporting poor or fair health (overall 40.3 percent; 43.5 percent in FMM and 40.8 percent in the FBM model, respectively). The differences between the self-reported health of FMM participants and FBM participants were negligible. The magnitude of poor or fair health is high in comparison to the state average of 17.6 percent of adults in North Carolina reporting poor or fair health (2024, Behavioral Risk Factor Surveillance System).[5]

[5] https://schs.dph.ncdhhs.gov/data/brfss/2024/index.htm

Table 2.
Participant SNAP client status, SNAP usage, food security status, and general health status at baseline by model-type (n= 354)

MODEL	SNAP CLIENT	SNAP HISTORY >12 MONTHS	FOOD INSECURE: Unable to Afford Food	FOOD INSECURE: Can't Afford Balanced Meals	FOOD INSECURE: Hungry but didn't eat, no money	POOR/FAIR HEALTH STATUS
Farmers Market (FMM)	68.7%	66.2%	41.0%	64.4%	32.2%	39.9%
Farm Box (FBM)	46.2%	66.7%	47.2%	54.2%	17.6%	40.8%

Prior Local Food Experience: Client experience with purchasing local food directly from a farmer had a small amount of variation among FFPP enrollees by model type. For example, 18 percent of FMM clients reported that they had never purchased local food directly from a farmer whereas only 10.5 percent of FBM members reported this (leading to an average of 15 percent). A similar proportion reported not in the last year, 18 percent and 18.9 percent respectively (**Table 3**).

The baseline surveys found that among FMM participants, 17.5 percent reported once a week purchasing local food directly from a farm in the last year, whereas 13.3 percent of FBM members reported this experience, and 34.1 percent of market model clients reported occasionally purchasing local food directly from a farm in the last year, whereas 42.7 percent of farm box clients reported this experience.

Table 3.
Baseline Local Food Purchasing: "In the last year, how frequently did you purchase local food directly from a farmer (e.g., at a farmers market or through a CSA produce box)?" (n=354)

	FMM		FBM		Total	
	n	%	*n*	%	*n*	%
Once a week	37	17.54%	19	13.29%	56	15.82%
Once a month	20	9.48%	18	12.59%	38	10.73%
Occasionally	72	34.12%	61	42.66%	133	37.57%
Not in the last year	38	18.01%	27	18.88%	65	18.36%
I have never purchased local food directly from a farmer	38	18.01%	15	10.49%	53	14.97%
Don't know/Prefer not to answer	6	2.84%	3	2.10%	9	2.54%

Effectiveness Among Participants with Matched Data (Pre-Post)

After six months in the program, all active participants were sent a second survey (henceforth called the post-survey), to assess usage and the impact of the program. In addition to the core metrics captured in the pre-survey, the post-survey included questions assessing change in knowledge and behavior related to local food purchasing and consumption. Pre- and post-surveys were voluntary and anonymous, and were linked to each other for analysis via a unique participant ID number. Surveys were developed by the Nutrition Incentive Program Training, Technical Assistance, Evaluation, and Information Center

(NTAE),[6] supported by USDA GusNIP, and IRB approved through University of North Carolina Asheville (UNCA). With funding from NTAE, ASAP was able to offer GusNIP-supported participants $10-15 stipends for their time to fill out both pre- and post-surveys.

Between April 2022 and the end of August 2024, 363 baseline surveys and 222 six-month surveys were completed. Only one in three clients completed both surveys. A total of 129 pre-post surveys were available to assess change metrics. Participants from both the FMM and FBM were included in the analysis.

Table 4.
Post-Survey Program Use: "How many times have you used Farm Fresh Produce Prescription to get fruits and vegetables?" (n=113)

USAGE	*n*	%
1-2 times	4	3.51%
3-6 times	12	10.53%
7-10 times	15	13.16%
More than 10 times	79	69.30%

*Percentages exclude those reporting "don't know/prefer not to answer" (*n=3)*

Participant-level Impact (FMM and FBM): The post-six month survey (cross-sectional, n=161) found that among the farmers market model clients, 90.4 percent got their produce at a farmers market. Reported use of the voucher among the farmers market clients found that frequency of use was very high, with two out of three clients using the program at least 10 times (**Table 4**).

This next section provides evaluation of derived client data analyzed by the GusNIP NTAE center using Qualtrics survey data captured in 2023-2024 that was available for this report (**Table 5**).

Table 5.
Health impacts among FFPP clients by model-type, among survey data (baseline and six-month post, 2023-2024, n=129).

MODEL	CUPS FRUIT	CUPS VEGETABLES	CUPP F&V	FOOD SECURITY STATUS (Food Insecure pre-post %)	POOR/FAIR HEALTH STATUS
Farmers Market (FMM)	1.29 vs 1.47	1.70 vs 1.91	3.11 vs 3.43	50.0% vs 25.1%	25.1% vs 0%
Farm Box (FBM)	1.15 vs 1.17	1.53 vs 1.60	2.63 vs 2.69	26.1% vs 28.3%	37% vs 23.9%
Overall	1.16 vs 1.19	1.54 vs 1.62	2.61 vs. 2.76	53.7% vs 43.9%	38.4% vs 26.7%

Health (Fruit and Vegetable Consumption, Food Security, General Health): Client data estimating the average daily cups of fruits and vegetables consumed (including legumes, excluding french fries) as measured by the 10-item Dietary Screener Questionnaire (DSQ), at both baseline (project start) and follow-up (project end) found a very modest increase in intake among 140 clients in the program*, with 2.61 cups at baseline and 2.76 cups at follow-up (analyzed by the GusNIP NTAE center using Qualtrics survey data captured in 2023-2024) (**Table 5**).

We also found a reduction in food insecurity at the post survey as measured by the Hunger Vital Sign Questionnaire, with 53.7 percent reporting food insecurity at baseline and 43.9 percent reporting food insecurity at follow-up. Similarly, we found better general health after program participation, with 38.4 percent of clients reporting poor or fair health at baseline compared to 26.7 percent at the follow-up survey (**Table 5**).

[6] https://www.nutritionincentivehub.org/

Experiential Activities: At the post survey, 41.9 percent of clients reported some use of experiential services; of those, 45.6 percent took part in one activity and 54.4 percent took part in two. Use of nutrition education activities did vary between the program models, with 26.3 percent of FMM clients and 59.4 percent of FBM clients taking part in at least one event (**Table 6**).

Table 6.
Post Survey Nutrition Education Activities: "Did you participate in any nutrition or food education activities as part of ASAP Farm Fresh Produce Prescription Program, such as cooking demos, recipe cards, nutrition cards, consultation with a registered dietitian, diabetes education class, farmers market tour, etc.?" (n=215)

	FMM		FBM		TOTAL	
	n	%	*n*	%	*n*	%
No, I did not participate in any activities	79	69.30%	39	38.61%	118	54.88%
Yes, I participated in 1 activity	21	18.42%	20	19.80%	41	19.07%
Yes, I participated in 2 or more activities	9	7.89%	40	39.60%	49	22.79%
Don't know/Prefer not to answer	5	4.39%	2	1.98%	7	3.26%

Assessment at the post survey found that, among the 215 clients who responded, the majority (79.1 percent) reported having a very positive experience in the FFPP program. This was similar across programs, with 79.8 percent among FMM clients and 78.2 percent among FBM clients. Overall, 93.0 percent reported a positive or very positive experience.

The post-survey allowed learning more about client experiences, with some variation by model type. Nutrition education and unique local food experiences were integral components of both the FMM and FBM. Assessment at the post survey found that among the 215 clients that responded to the survey, the majority learned about a new fruit or vegetable (53 percent) and/or learned a new recipe (55.4 percent). Just under half of all respondents learned about the health benefits of fruits and vegetables (41.9 percent), and 45.6 percent reported learning about where/how their food is grown. Learning about a new fruit or vegetable was more prevalent among FMM participants while more FBM clients learned a new recipe and/or information about the health benefits of fruits and vegetables. "Other" reported learnings by clients included how long fruits and vegetables can be stored, and making healthier choices (**Figure 5**).

Figure 5.
Post Survey Self-Reported Learning Outcomes

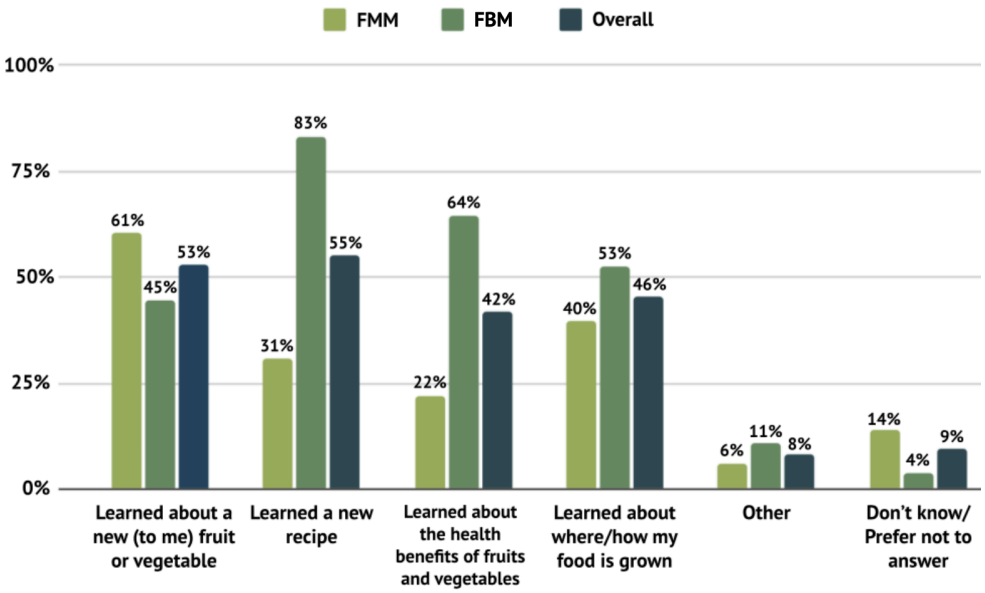
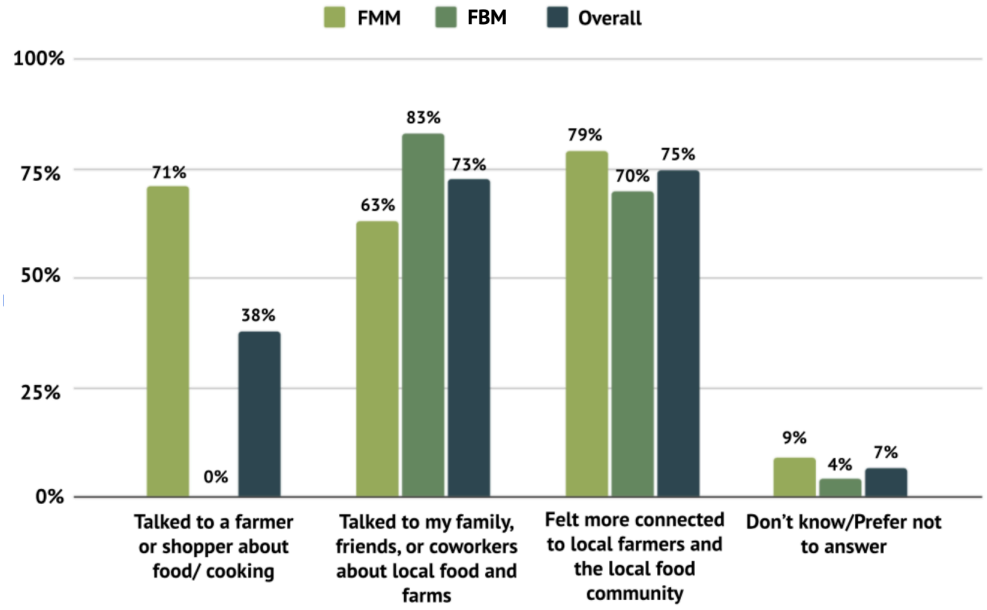


Figure 6.
Post Survey Experiences with Local Food System



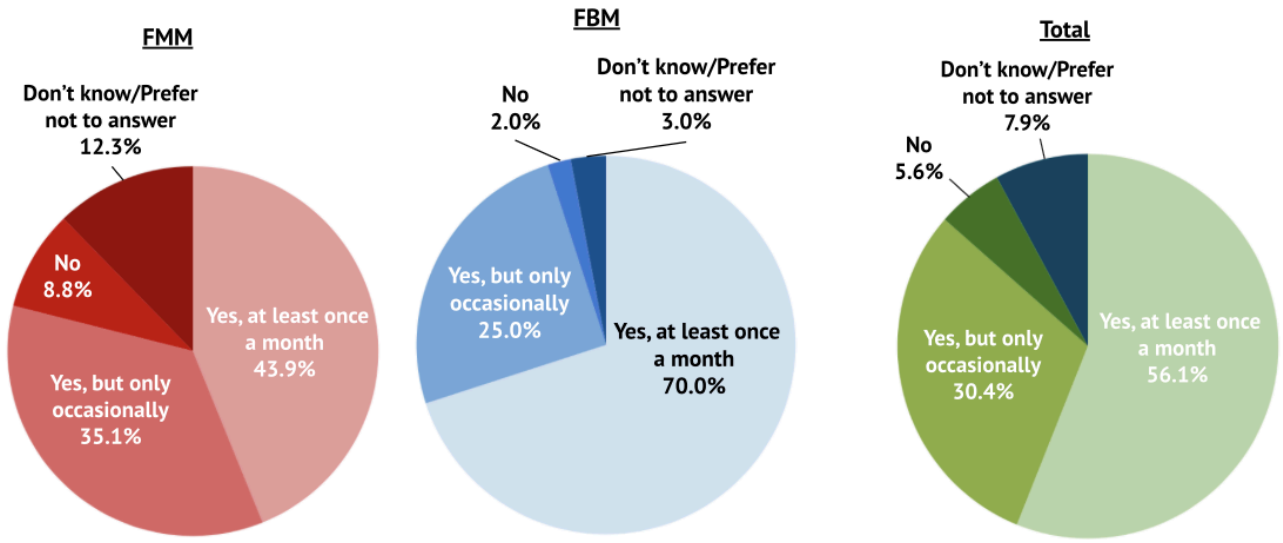
At the post survey, the majority of clients reported that they are motivated to do something different in relation to their food and eating (**Table 7**).

Table 7.
Changes in Eating Habits: "Has your experience at the farmers market/receiving local produce motivated you to do anything different related to food and eating?" (n=209, post-survey)

	FMM		FBM		TOTAL	
	n	%	*n*	%	*n*	%
Yes (if yes, what?)	92	85.19%	91	90.10%	183	87.56%
No	16	14.81%	8	7.92%	24	11.48%
Don't know/Prefer not to answer	0	0.00%	2	1.98%	2	0.96%

At the post survey, the majority of clients (86.5 percent) reported that they would keep shopping for local produce when their prescription ends. FMM: 79.0 percent reported intent to occasionally or monthly and 95 percent of FMB clients (**Figure 7**).

Figure 7.
Post Survey Intention to Continue Shopping for Local Food



In explaining why or why not for the above question of whether they would keep shopping for local produce when their prescription ends, comments by clients reporting wanting to eat local food at least monthly included:

> "I wouldn't be able to do it often due to tight income, but I'd try when I can."
>
> "I will definitely continue to search for fresh produce."
>
> "The freshness of produce makes it even hard to shop at the grocery stores."
>
> "I enjoy eating fresh veggies that come from local farmers. I love being part of my community."
>
> "We have learned to rely on farm fresh produce and it has been a well used and appreciated opportunity each month."
>
> "Yes, but having the prescription encourages me to go to as many farmers markets as I'm able to and definitely supports more healthy foods in our home."

For clients reporting that they would occasionally like to keep shopping for local food, comments included:

> "If so, we are motivated by the much appreciated resource given to drive out to the market, otherwise not going to town."
>
> "Eating healthier helps with my diabetes."

> "It has made a significant difference for us feeding nourishing fresh nutrient rich meals to our kids and ourselves, rebuilding my body post birth."
>
> "I don't know if I will be able to afford it."
>
> "This has given me the option to feed my family healthier options."
>
> "The food has literally tasted cleaner, and fresher, and has even left the kids asking for things they've only tried the one time. My elderly father has also had better days when consuming from the farm vs from the store."

Among the few clients that said no, almost all comments were regarding affordability and transportation/driving.

Comments on overall client satisfaction regarding their experience included:

> "Thank you for the help. It has made a huge difference for our family."
>
> "I'm so so so grateful for this program. As a single parent with a disability it's been a life saver!"
>
> "Never in my 71 years have I ever been so excited and grateful for this beautiful package [that] arrives at my door every week! Thank you to all the people that make this possible."

Implementation Challenges & Adaptations

Cohort Size: Implementation challenges included finding the right participant group size for the FMM. Enrollment rates were high throughout FMM implementation, but participant usage varied from week to week which impacted farmer business income.

Organizational Characteristics Including Human Infrastructure: Another implementation challenge that could impact fidelity was high market staff turnover at a few participating markets led to some confusion about the market's role in implementing the program. Although this did not lead to any major issues in implementation, it required repetitive training for markets experiencing turnover. A possible solution is changing to a digital incentive model that will place the onus with farmers participating in the program to have the requisite software to accept incentive and will cut out the high level of reliance on trained market staff to implement the program.

Organizational Characteristics Including Business Model Infrastructure: Market managers shared challenges with token management and storage. One disclosed some of the difficulties they face with physical token management, telling ASAP staff: "*From a practical perspective, tokens get wet, they bleed, or mold. I have definitely washed tokens. I find them around my house. They break a lot and I'm not sure whether to use them if they're close to a whole token.*" Many of the markets have multiple tokens that can be used to purchase different items, and managers found it challenging to explain the different tokens to participants with one market manager reporting, "*...customers mix up SNAP/FF tokens, and they mix up market-specific tokens. Customers stack tokens so vendors don't notice when accepting them, and only see at the end of market.*" Another shared this sentiment, stating, "*Having the two types of tokens causes people to blank—[we are] constantly reminding people. Most often, new folks come and ask questions and walk away feeling good but some walk away not totally understanding.*"

Organizational Characteristics Including Business Model Infrastructure: Token liability was also an implementation challenge of the bridging intermediary (ASAP). While it was straightforward to track the tokens going out to community members, it was more difficult to predict when those tokens might be spent. While this did not present any disruptions in ASAP's ability to provide the service, it required consistent tracking of tokens distributed without knowing if they would all be spent with farmers at the market and thus be redeemed (only redeemed tokens can be invoiced by USDA grant funds). A digital incentive model would provide more oversight of incentives distributed and redeemed and allow ASAP staff to budget expenditures without concern for creating estimates of token liability.

Quality and Fidelity: All clients received nutritional information including recipes. Use of extra nutrition experiential activities found slightly less than half taking part (41.9 percent of clients reporting some use of these support services); of those, 45.6 percent took part in one activity and 54.4 percent took part in two. Use of the extra experiential activities did vary between the program models, with 26.3 percent of FMM clients and 59.4 percent of FBM clients taking part in at least one event.

Maintenance challenges for FFPP include a reliance on sustained grant or philanthropic funding to support the program including administrative roles and fruit and vegetable incentive as it is not currently a covered benefit. Adaptive methods of implementation (FMM and FBM) increased the cost for maintenance long-term (e.g., delivery fees) but also allowed greater flexibility to meet participants' needs, especially those with transportation barriers.

Feasibility for Implementation Replication

We recommend that others seeking to implement a similar FF4H project in their communities, especially rural communities, review previous models and take into consideration:

- Engaging healthcare entities, farmers, markets, and community-based organizations with aligned interests as early as possible to gauge interest and ideas for program development and understand human capital as key infrastructure (e.g., allied health partners, public health, social services; scope of practice, position description; paid, in-kind, volunteer).
- Community mapping of similar activities. It is beneficial to have a baseline understanding of what organizations may already be doing in the community or region to meet unmet needs and to complement existing programs avoiding duplication and competition.
- Visiting and collaborating with local farmers markets to better understand vendor and customer trends. While the FMM was successful in population-dense areas with numerous farmers markets, rural markets with few produce vendors and low attendance did not see as many FFPP participants. In communities where farmers markets are not as accessible, we recommend looking at alternative models akin to the FBM, engaging food hubs, food aggregators, and farm stands to consider where households can pick up or have a delivery option (along with recipes and experiential community options including interactions with farmers).
- Tracking redemption trends and patterns amongst participants early to develop a sense of how much incentive will be utilized, and how many participants need to be enrolled to create an optimal cohort for both the business case and group activities such as cooking classes. It is also beneficial to engage participants beyond the point of enrollment to better understand their relationship with the program and ways to remind participants. Understanding early usage patterns and barriers to redemptions will help streamline implementation and create a sustainable program.

Recommendations for Sustainability and Scaling

Through in-depth assessment of the implementation of this FFPP, we learned that:

The program's success was built on strong partnerships between different sectors. ASAP's ability to implement a successful FFPP program was based on years of trust and strengthening partnerships with the healthcare sector and local food and farming system as part of FF4H.

A strong local food system allowed the existing food infrastructure to more easily become direct markets or farm box aggregators for FFPP. This helped in providing fresh produce all year long and in allowing participants to interact with dignity with their local food producers and be a part of their local food system.

Having engaged paid staff at farmers markets, healthcare sites, and county health departments is critical to implement the program within regular operational workflows and business requirements which allowed high acceptability of the program and helped ensure quality and fidelity. ASAP provided the majority of enrollment human infrastructure through paid staffing (majority grant funded) which was critical to ensure the program met client interest and intention.

Ensuring data and information capture through robust program evaluation. ASAP's FFPP program was found to be highly acceptable with clients reporting a positive experience with the program. In addition, we saw improved food security and general health. Economic data systems captured program impact with over $716,232 going back to local mountain farms.

Farm fresh FIM inclusion in the NC Healthy Opportunities Pilot, federal programs, and grant efforts supports food and nutrition security and has the potential to save payers including the state government on treating costly diet-related health conditions in NC and beyond.

Lumpkin et al., in a 2025 Health Affairs article articulates public values that our assessment also captured, particularly that "Generative Food Is Medicine programs value and prioritize distribution of locally grown, healthy food, thereby supporting community health and contributing to the local economy. Locally grown food tastes better to clients and is healthier than food sourced from producers across the country because it travels shorter distances and is often grown with more sustainable agricultural practices and minimal use of pesticides. Local farmers are compensated at fair market prices and are engaged in Food Is Medicine initiatives to help determine what food to grow to meet client needs, and in what quantities. A generative approach to FIM provides a reliable market for local farm products that helps support the sustainability of local farms."

Ongoing investments and funding to support FIM initiatives that encourage local food purchasing can lead to the measurable benefits of improved health and economic benefits to farmers and farm businesses. The models also have effects of strengthening healthcare in rural communities and the ongoing roles of trusted, community based-organization.

FF4H programs can provide a reliable market for local farm products that help farmers keep farming as well as support new and beginning farmers to enter agriculture as a reliable career. In addition, inclusion of local food in FIM models supports the larger local food system infrastructure, leading to food system ripple effects including greater community ownership and social capital among residents, improved population health, and more resilient local economies.

ASAP's models are viable in the real-world for small and large communities and can be adaptive to different healthcare, allied health professionals, public health entities, and a variety of food and farming partners.

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Thank you to the many partners who have supported the WNC FFPP efforts including the farmers and farm workers in our region, past and present ASAP staff and volunteers, and to the clients for their engagement and completion of surveys.

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- U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture's Gus Schumacher Nutrition Incentive Program, under award number 2021-70030-35870 and 2022-70423-38074
- Blue Cross Blue Shield Foundation of North Carolina
- Community Foundation of Western North Carolina
- Dogwood Health Trust
- Walnut Cove Member's Association
- Buncombe County ARPA

ASAP has provided services to eligible Medicaid members through NC's Healthy Opportunities Pilots (HOP), an 1115 waiver program to support health related social needs with Impact Health.

Appendix

The region of North Carolina in this report is characterized by a mountainous landscape and a predominantly rural population. WNC is unique in its abundance of small, family-owned farms and robust network of direct-to-consumer market opportunities. ASAP certifies roughly 630 farms in WNC as "Appalachian Grown" (AG). They are small-scale family-owned farms growing for local market outlets. Compared to the national average farm size (463 acres), AG farms are small, with an average of 50 acres. More than half operate on fewer than six acres. Most sell primarily to direct markets like farmers markets, agritourism, community-supported agriculture (CSA), farm stands, and to intermediate markets like restaurants, child care centers, and food banks. Some sell through food hubs and others to wholesale distributors to grocers, schools and other large volume buyers. In 2025, over two-thirds of AG farms reported selling some or all of their products through one or more of the 65 farmers markets that operate in the region. These markets offer positive food environments that foster direct connections between farmers and consumers, increasing engagement in the local food system and contributing to healthier communities and stronger local economies. Learn more at: appalachiangrown.org.

As a predecessor to launching Farm Fresh for Health, in 2018 ASAP hosted the Healthy Eating in Practice Conference. Working with partners at Duke World Food Policy Center, MAHEC, and UNC Center for Health Promotion and Disease Prevention, ASAP designed this hands-on conference with a goal of impacting the healthcare culture - providing over 200 participants with the evidence, ideas, and skills needed to prompt a cultural shift that better supports healthy eating behaviors. ASAP also has a robust and respected Dietetic Internship program. The program works with WNC colleges and equips pre-service students with knowledge and experience to incorporate local food and farm to education activities into their careers and connects people to local food- and farm-centered environments and activities.

Resources and Supporting Documents

- The Community Guide, Social Determinants of Health: Fruit and Vegetable Incentive Programs. Accessed at: https://www.thecommunityguide.org/findings/social-determinants-health-fruit-vegetable-incentive-programs.html
- From Farm to FIM: The Economic Impact of Local Food is Medicine. Accessed at: https://www.rockefellerfoundation.org/reports/from-farm-to-fim-the-economic-impact-of-local-food-is-medicine/
- Rural Produce Prescription Toolkit, Increasing Access to Healthy Food for Rural Communities. Accessed at: https://bestpractices.nokidhungry.org/sites/default/files/media/Rural%2520Produce%2520Prescription%2520Toolkit_4.2022.pdf
- Food For Thought: A Vision For Generative 'Food Is Medicine'. John R. Lumpkin, Merry Davis, and Valerie Stewart. Health AffairsVol. 44, No. 4: Food, Nutrition & Health, April 2025 Accessed at: https://www.healthaffairs.org/doi/10.1377/hlthaff.2024.01347

Acronyms

AG	Appalachian Grown
ASAP	Appalachian Sustainable Agriculture Project
BRWIA	Blue Ridge Women in Agriculture
FBM	Farm Box Model
FF4H	Farm Fresh for Health
FFPP	Farm Fresh Produce Prescription
FIM	Food is Medicine
FMM	Farmers Market Model
GusNIP	Gus Schumacher Nutrition Incentive Program
HOP	Healthy Opportunities Pilots
MAHEC	Mountain Area Health Education Center
NTAE	Nutrition Incentive Program Training, Technical Assistance, Evaluation, Information Center
RE-AIM	Reach, Effectiveness, Adoption, Implementation, Maintenance
SNAP	Supplemental Nutrition Assistance Program
USDA	United States Department of Agriculture
WNC	Western North Carolina