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**ARTICLE**

# Cultivating Sustainable Health in the Rural Mississippi: A Need Study for Green Economic Developmental Initiatives through the SNAP-Ed program

***Babu George*[1*], *Martha Ravola*[2]**

[1] *Department of Business Administration, Alcorn State University, Lorman MS 39096, USA. ORCID: https://orcid.org/0000-0002-2791-828X*

[2] *Department of Human Sciences, Alcorn State University, Lorman MS 39096, USA. ORCID: https://orcid.org/0000-0002-3980-0350*

## ABSTRACT

This study explores the potential role of the Supplemental Nutrition Assistance Program Education (SNAP-Ed) in fostering a green economy in rural Mississippi, specifically in Adams, Claiborne, and Jefferson counties. Using a mixed-methods approach, we conducted a comprehensive needs assessment to identify the nutritional and physical activity challenges faced by elementary school-aged children in these communities. Our findings highlight critical issues, including high obesity rates, poor dietary patterns, and limited access to fresh, healthy foods. These challenges not only affect individual health but also have broader implications for community well-being and economic sustainability. We argue that SNAP-Ed interventions are uniquely positioned to address these issues while simultaneously advancing environmentally sustainable food systems. By encouraging healthy eating behaviors such as increased consumption of fruits and vegetables, SNAP-Ed can support local agricultural economies, minimize food waste, and reduce the carbon footprint associated with food production and distribution. Our recommendations emphasize the integration of community-based food initiatives into SNAP-Ed programming. Initiatives such as school gardens, farmers' markets, and community-supported agriculture can enhance food security, promote equitable access to nutritious foods, and empower residents to participate in sustainable farming practices. These efforts have the potential to transform rural Mississippi into a model of health-driven, community-centered, and environmentally conscious economic growth.

***Keywords:*** SNAP-Ed; Needs Assessment; Rural Health; Health Disparities; Regenerative Farming; Mississippi

*CORRESPONDING AUTHOR:
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# 1. Introduction

The Supplemental Nutrition Assistance Program Education (SNAP-Ed) plays a vital role in promoting healthy food choices and active lifestyles among low-income individuals and families in the United States. While its primary focus is on nutrition education and obesity prevention, SNAP-Ed also has the potential to contribute significantly to the development of a green economy, particularly in rural communities facing challenges related to food access, health disparities, and economic development [1]. This is particularly crucial in states like Mississippi, which grapples with high rates of poverty, food insecurity, and obesity.

A green economy is characterized by sustainable production and consumption patterns that prioritize environmental sustainability, social equity, and economic efficiency [1, 2]. In the context of food systems, a green economy approach emphasizes local, seasonal, and sustainably produced food, reduced food waste, and equitable access to healthy food for all. SNAP-Ed interventions, with their focus on improving dietary habits and food resource management among low-income individuals, can be instrumental in promoting these green economy principles [2,4].

The integration of green economy principles with sustainable farming underscores the critical relationship between nutrition, environmental sustainability, and the vitality of local economies [5]. Sustainable farming approaches prioritize minimal soil disturbance, permanent organic soil cover, crop diversity, and livestock integration, offering a pathway to both environmental and nutritional benefits. These systems have been shown to produce more nutrient-dense foods compared to traditional tillage-based or even organic methods [6]. For example, regenerative practices enhance soil health and biodiversity, which in turn increase the levels of essential secondary metabolites and micronutrients in crops, contributing to healthier diets. By promoting these farming practices, local economies can benefit from diversified agricultural outputs, reduced reliance on external inputs, and stronger community-based food systems, creating a synergistic framework that supports both human health and environmental resilience.

Several independent comparisons show regenerative farming practices ultimately lead to the most desirable forms of farming sustainability [6]. Nature's laws of declining soil productivity are centered around the idea that disturbing the natural state of the soil leads to its degradation and reduced capacity to support plant life [7]. Conservation agriculture practices through community gardening and other small-scale initiatives that do not fundamentally disturb the soil ecosystem are emphasized in the SNAP-Ed program. Also, by encouraging the consumption of fruits, vegetables, and other healthy foods, SNAP-Ed can support local farmers, reduce reliance on processed and industrially produced foods, and promote more sustainable farming concepts. Furthermore, SNAP-Ed initiatives that strengthen community-based food systems, such as school gardens, farmers' markets, and community-supported agriculture, can enhance food security, create economic opportunities, and reduce the environmental impact of food transportation [8].

This study focuses on Adams, Claiborne, and Jefferson counties in rural Mississippi, where challenges related to nutrition, physical activity, and socioeconomic disparities are particularly acute. These counties experience high rates of poverty, limited access to healthy food options, and suboptimal health outcomes, making them ideal candidates for examining the potential of SNAP-Ed to promote green economy principles while addressing critical community needs. Through comprehensive needs assessment, this study aims to identify the key nutrition and physical activity challenges faced by elementary school-aged children and their families in these counties. By understanding their dietary habits, barriers to healthy eating, and learning preferences, we can provide evidence-based recommendations for SNAP-Ed programming that not only improves health outcomes but also contributes to the development of a more sustainable and equitable food system. The findings of this study will have implications for SNAP-Ed programming in other rural communities facing similar challenges and seeking to leverage SNAP-Ed as a tool for promoting green economy goals.

# 2. Literature Review

SNAP-Ed is a federally funded grant program that

collaborates with community organizations to provide nutrition education and obesity prevention initiatives to low-income populations and thereby promote health and sustainable living [1]. Initially focused on nutritional education, SNAP-Ed expanded its scope under the 2010 Healthy, Hunger-Free Kids Act to include a significant emphasis on obesity prevention [9]. The program aims to enhance the likelihood that SNAP-eligible individuals make healthy food choices within budget constraints and adopt physically active lifestyles in line with dietary guidelines [4].

SNAP-Ed plays a crucial role in improving dietary outcomes, addressing food insecurity, and preventing chronic diseases among low-income populations [10]. By providing evidence-based nutrition education, SNAP-Ed encourages SNAP recipients to make healthier food choices consistent with the Dietary Guidelines for Americans [11]. Participation in SNAP-Ed programs has been shown to enhance participants' food resource management, leading to improvements in diet quality [12]. SNAP-Ed interventions have been associated with positive changes in meeting recommendations for healthy eating and food resource management behaviors among low-income individuals in various states [13].

The impact of SNAP-Ed extends beyond individual behavior change to encompass broader community health outcomes. The program aims to improve the nutritional quality of supermarket purchases through policy actions such as financial incentives for fruit and vegetable purchases and increasing SNAP benefits [14]. SNAP-Ed interventions have been linked to increased fruit and vegetable intake among participants, contributing to improved dietary habits [15]. Additionally, SNAP-Ed initiatives have been instrumental in enhancing cardiovascular fitness, increasing fruit and vegetable consumption, and reducing the risk of cardiometabolic issues among participants [16].

Through a socioecological framework adopted under the Healthy, Hunger-Free Kids Act, SNAP-Ed delivers nutrition education and health promotion resources to support healthy lifestyle choices [17]. The program leverages policy, systems, and environmental change strategies to promote nutrition education and obesity prevention, aligning with the USDA's goal of empowering SNAP-eligible households to make informed food choices [17]. By implementing PSE initiatives, SNAP-Ed aims to create sustainable changes in food environments and support healthier behaviors in communities [18].

SNAP-Ed interventions have been effective in reaching diverse populations and improving nutrition-related behaviors among low-income individuals [19]. By offering peer-to-peer programs and nutrition education in schools, SNAP-Ed addresses barriers to healthy eating and physical activity in rural communities [20]. The program's reach extends to farmers' markets, where incentives for produce purchases have been associated with increased consumption and improved food security outcomes [8]. Moreover, SNAP-Ed interventions have demonstrated positive outcomes in terms of food security, dietary quality, and physical activity levels among participants [21].

In response to the COVID-19 pandemic, the USDA expanded the SNAP Online Purchasing Pilot program to enable eligible participants to purchase groceries online, enhancing access to healthy food options during challenging times [22]. The flexibility and adaptability of SNAP-Ed have been crucial in supporting participants during periods of economic uncertainty and increased food insecurity [23]. By providing nutrition education, promoting healthy choices, and fostering food security, SNAP-Ed continues to play a vital role in improving the well-being of individuals and communities across the United States.

Regenerative farming practices, such as cover cropping, crop rotation, and agroforestry, align closely with SNAP-Ed's goals of promoting healthy eating and sustainable food systems [24]. Cover cropping enhances soil health by preventing erosion and increasing organic matter, resulting in more nutrient-dense crops that can support improved dietary outcomes. Crop rotation helps reduce pests and soil depletion, leading to greater yields and a wider variety of fresh produce, which can benefit SNAP-Ed participants through programs like farmers' markets and community-supported agriculture. Agroforestry integrates trees and shrubs with crops and livestock, fostering biodiversity and carbon sequestration while creating additional income streams for farmers. By encouraging these practices, SNAP-Ed can help build sustainable local food systems, increase access to nutrient-rich foods for underserved

populations, and strengthen economic resilience through farmer engagement and community empowerment.

## 2.1 The State of Mississippi in Context

Mississippi faces a critical juncture in addressing its multifaceted health and nutrition challenges. In Mississippi, approximately 40% of all adults were obese in 2021. About 1 in 7 Mississippi adults have type 2 diabetes, which is a consequence of obesity. With an adult obesity prevalence of 39.7% in 2021, the second highest in the nation, and childhood obesity affecting 25.4% of adolescents in grades 9-12, the state grapples with a complex interplay of factors, including limited access to healthy foods, high rates of physical inactivity, and stark racial disparities in health outcomes. Obesity rates are even more alarming among certain populations, with 40.6% of Black adults and 43.3% of adults with annual household incomes below $15,000 experiencing obesity. According to the 2019 Mississippi Obesity Action Plan, only 5.9% of Mississippi adolescents consumed fruits and vegetables five or more times per day in 2017. In Adams County, only 38.9% of females and 47.4% of males met the recommended levels of physical activity in 2011. The figures were 39.2% and 48.6% for Claiborne County, and 34.8% and 42.0% for Jefferson County, respectively. While more recent figures are not available, substantial improvements might not have occurred.

**Table 1** below consolidates certain key numbers related to health and nutrition, comparing Mississippi with the national average:

| Metric | Mississippi (%) | National Average (%) |
|---|---|---|
| Fruit Consumption (Adults) | 49.9 | 55.5 |
| Vegetable Consumption (Adults) | 30.6 | 48.6 |
| Achieving Recommended Activity Levels (Adults) | 37.4 | 53.8 |
| Overweight (Adults) | 35.2 | 36.2 |
| Obesity (Adults) | 35.5 | 29.7 |
| Fruit Consumption (Adolescents) | 51.1 | 56.0 |
| Vegetable Consumption (Adolescents) | 44.8 | 57.7 |
| Regular Physical Activity (Adolescents) | 25.9 | 27.1 |
| Overweight (Adolescents) | 13.2 | 15.3 |
| Obesity (Adolescents) | 15.4 | 16.8 |
| Breastfeeding (Child Nutrition) | 57.6 | 84.1 |
| Overweight (Children aged 2-4 years) | 15.0 | 13.9 |
| Obesity (Children aged 2-4 years) | 14.8 | 9.4 |

Sources:

Behavioral Risk Factor Surveillance System (BRFSS): The BRFSS provides data on health behaviors, including fruit and vegetable consumption, physical activity, and obesity rates. You can find state-specific data on the CDC's BRFSS website.

WIC (Special Supplemental Nutrition Program for Women, Infants, and Children): The WIC program collects data on child nutrition, breastfeeding, and overweight/obesity rates among children aged 2 to 4 years. You can explore WIC data on the USDA's WIC website.

Hunger and Food Insecurity: The information on hunger and food insecurity in Mississippi comes from various sources, including reports by organizations like the Mississippi Food Network and Feeding America. These organizations work to address hunger and provide assistance to those in need.

**Table 1**: Nutrition and food-related statistics. Mississippi Vs the national averages

Targeting approximately 437,000 Mississippians who participated in SNAP each month in 2021, representing 15% of the state's population, SNAP-Ed has the potential to catalyze positive change. The program's focus on comprehensive nutrition education, promoting healthy eating habits, and facilitating access to affordable, nutritious foods is crucial, as SNAP participants face dispropor-

tionate rates of obesity, food insecurity, and diet-related chronic diseases. However, the success of SNAP-Ed in Mississippi hinges on its ability to adapt to the unique needs of diverse communities. With a low average food environment index score of 4.1 out of 10 and the prevalence of food deserts in underserved areas, strategies must go beyond education, focusing on improving the accessibility and affordability of healthy food options. Collaborations with local farmers, food banks, and community organizations can help bridge the gap between knowledge and access.

SNAP-Ed must prioritize equity in its programming, recognizing the stark racial disparities in health outcomes, such as 44% of Black children living in poverty compared to 15% of White children. Tailoring interventions to communities grappling with the most significant health disparities and barriers can help reduce the gap in health equity. This may involve partnering with trusted community leaders, incorporating culturally relevant nutrition education materials, and addressing the specific barriers faced by different populations. Physical activity promotion is another critical component of SNAP-Ed's mission. With 30% of Mississippi adults reporting no leisure-time physical activity, the program must focus on increasing access to affordable and accessible exercise opportunities. Collaborating with parks and recreation departments, schools, and community centers to create safe spaces for physical activity and promote active living can help address this issue.

The success of SNAP-Ed in Mississippi requires a comprehensive, collaborative, and equity-focused approach. By leveraging partnerships, adapting to the unique needs of diverse communities, and prioritizing evidence-based strategies, the program can make significant strides in improving the health and nutrition of Mississippi's residents. With only 17.2% of adults meeting fruit intake recommendations and a mere 5.9% meeting vegetable intake guidelines, the path forward is challenging. However, with the right investments and a commitment to creating a culture of health, Mississippi can build a healthier, more equitable future for all.

## 2.2 The Importance of Needs Assessment

SNAP-Ed targets both SNAP participants and food-insufficient nonparticipants to support policies that encourage the purchase of healthful foods while limiting unhealthful choices like sugary beverages [25]. Research has shown that interventions within SNAP-Ed settings can positively influence mediators associated with vegetable intake, particularly among fourth-grade students [26]. Moreover, SNAP-Ed has been found to increase long-term food security among households with children, emphasizing the program's role in promoting healthy choices on a limited budget [27].

A study evaluated the benefits of a SNAP-Ed-funded community garden intervention using Ripple Effect Mapping, highlighting how SNAP-Ed supports policy, systems, and environmental change interventions to enhance access to physical activity and healthy foods [28]. Policy, systems, and environmental change strategies within SNAP-Ed aim to improve the likelihood that eligible individuals will make healthy food choices and adopt physically active lifestyles in line with dietary guidelines [4]. SNAP-Ed interventions have been successful in promoting health behavior changes among adults, contributing to improved diet and food security among low-income households [10].

To overcome barriers in delivering policy, systems, and environmental changes in rural communities through SNAP-Ed, best practices and innovative solutions have been identified, emphasizing the importance of understanding the types of nutrition-related programming and implementing effective strategies [18]. SNAP-Ed has been shown to improve food security independently of food assistance programs, highlighting its significant impact on enhancing food security among participants [29]. Additionally, SNAP-Ed aims to encourage healthier food purchases consistent with dietary guidelines, promoting nutrition education among recipients to make informed choices [11].

Research indicates that SNAP-Ed plays a crucial role in preventing obesity and chronic diseases by facilitating healthy eating and active living among eligible families [30]. By providing evidence-based nutrition education, SNAP-Ed helps households eat better and utilize available food resources effectively, contributing to improved diet and

food security outcomes [10]. The program targets low-income individuals to enhance their nutritional intakes and promote healthier lifestyles [31]. SNAP-Ed interventions have been associated with improvements in nutrition-related behaviors, indicating positive changes in healthy eating habits among participants [32]. Moreover, SNAP-Ed has been linked to reductions in health care expenditures compared to non-participants, underscoring the program's broader impact on healthcare costs and outcomes [33]. By increasing awareness and knowledge about healthy food choices and resources, SNAP-Ed interventions have been successful in promoting positive attitudes towards nutrition and food security [8]. Efforts to improve mealtime practices among families receiving SNAP and WIC benefits have shown promising results in enhancing nutrition and health outcomes [34].

Participation in SNAP-Ed programs has been found to enhance food resource management, leading to improvements in diet quality and overall health outcomes [12]. By establishing a lexicon to guide the implementation of policy, systems, and environmental change strategies, SNAP-Ed aims to optimize service delivery and promote health education effectively [35]. Understanding the barriers and facilitators to delivering direct nutrition education in rural communities is essential for enhancing the reach and impact of SNAP-Ed initiatives [18].

### 2.3 Why Adams, Jefferson, and Claiborne Counties?

While Mississippi as a State is dependent heavily on SNAP programs and SNAP-Ed is important for the entire state, this research originated from the opportunity to write a SNAP-Ed intervention grant. The team of researchers needed to focus on a geographic area that was manageable. However, we aimed to choose a few counties that required the most urgent SNAP-Ed interventions. Key contextual factors that support our decision to concentrate our attention upon the identified three counties include:

1. Poverty: All three counties have childhood poverty rates well above the state average of 28% (Adams: 35%, Claiborne: 44%, Jefferson: 50%). Poverty is a strong risk factor for food insecurity, poor nutrition, and obesity.
2. Food Environment: Adams, Claiborne, and Jefferson counties have low food environment index scores (5.2, 4.2, and 3.1 respectively), indicating significant challenges with food access and affordability. Limited access to healthy food options makes it difficult for families to make nutritious choices.
3. Health Outcomes: All three counties rank in the bottom quartile of Mississippi counties for health outcomes (Adams: 60th, Claiborne: 78th, Jefferson: 77th out of 82 counties). Poor diet and physical inactivity contribute to high rates of obesity, diabetes, heart disease, and other chronic conditions.
4. Race/Ethnicity: The vast majority of residents in Claiborne (84%) and Jefferson (85%) counties are African American, as are over half (53%) of Adams County residents. As noted above, African American Mississippians experience disproportionately high rates of obesity and other diet-related health disparities.
5. Educational Attainment: Educational attainment is lower in these counties compared to state averages, with 24%, 25%, and 27% of adults in Jefferson, Claiborne, and Adams counties respectively having no high school diploma (vs. 15% statewide). Lower educational attainment is associated with higher rates of poverty, food insecurity, and poor health outcomes.

## 3. Methods

To comprehensively assess the nutrition and physical activity needs of elementary school-aged children in Adams, Claiborne, and Jefferson counties, this study employed a mixed-methods approach, combining secondary data analysis with primary data collection. The use of multiple data sources allowed for a more robust understanding of the target population's needs, preferences, and challenges, as well as the contextual factors influencing health behaviors in these rural communities.

## 3.1 Secondary Data Analysis

Secondary data analysis involved the examination of existing data sources to identify key nutrition and physical activity indicators, health outcomes, and socioeconomic factors relevant to the target population. The following data sources were utilized:

1. Mississippi State Department of Health (MSDH): Annual reports from the Mississippi Behavioral Risk Factor Surveillance System (BRFSS) provided data on adult obesity, fruit and vegetable consumption, and physical activity levels at the state level. The Mississippi State Health Assessment and State Health Improvement Plan offered insights into the overall health status and priorities of the state.
2. Centers for Disease Control and Prevention (CDC): The Youth Risk Behavior Surveillance System (YRBSS) provided data on obesity, dietary habits, and physical activity among adolescents at the state level. The CDC's Nutrition, Physical Activity, and Obesity Data, Trends and Maps offered a comprehensive overview of these health indicators across different states and counties.
3. County Health Rankings & Roadmaps: This database provided county-level data on health outcomes, health behaviors, and social determinants of health, allowing for a comparison of Adams, Claiborne, and Jefferson counties with other counties in Mississippi and the national average.
4. USDA Economic Research Service (ERS): The Food Environment Atlas and Food Access Research Atlas provided data on food access, food insecurity, and the availability of healthy food options at the county level.
5. USDA Food and Nutrition Service (FNS): State-level data on SNAP participation, SNAP-Ed reach, and WIC eligibility were obtained from the USDA FNS.
6. National Survey of Children's Health (NSCH): This survey provided state-level data on child health outcomes, including obesity, dietary habits, and physical activity.
7. US Census Bureau American Community Survey (ACS): County-level data on demographic characteristics, poverty, and educational attainment were obtained from the ACS.

The secondary data analysis focused on identifying the most recent and relevant data points for the target population and counties of interest. Data were compiled, analyzed, and synthesized to provide a comprehensive overview of the nutrition and physical activity needs, health disparities, and socioeconomic context of the target communities.

## 3.2. Primary Data Collection

Primary data collection involved conducting a survey among residents of Adams, Claiborne, and Jefferson counties to gather insights into their dietary habits, physical activity levels, nutrition knowledge, barriers to healthy eating, and learning preferences. The survey was designed to complement the findings from the secondary data analysis and provide a more nuanced understanding of the target population's needs and perspectives.

Survey Development: The survey questionnaire was developed based on a review of existing SNAP-Ed needs assessment tools and relevant literature [36]. The survey included a combination of closed-ended and open-ended questions, covering the following topics:

1. Demographic characteristics (e.g., age, gender, race/ethnicity, household size, income, education level)
2. Dietary habits (e.g., daily fruit and vegetable consumption, whole grain intake, lean protein consumption)
3. Physical activity levels (e.g., frequency and duration of physical activity)
4. Nutrition knowledge (e.g., familiarity with nutrition labels, understanding of healthy eating principles)
5. Barriers to healthy eating (e.g., time constraints, cost, access to healthy foods, family preferences)
6. Learning preferences (e.g., preferred learning methods, topics of interest)

The survey questionnaire was reviewed by a panel of experts in nutrition, physical activity, and SNAP-Ed programming to ensure its validity and relevance to the target population. The survey was then pilot tested with a small sample of community members to assess its clarity, comprehension, and ease of completion. Based on the feedback received, the survey was refined and finalized.

Sampling and Recruitment: A convenience sampling method was used to recruit participants for the survey. SNAP-Ed program staff approached potential participants at community events, food pantries, and other community settings in Adams, Claiborne, and Jefferson counties. Individuals were eligible to participate if they were adults (aged 18 or older) residing in one of the three target counties and had at least one child or grandchild of elementary school age (5-11 years old).

Interested individuals were provided with information about the study, including its purpose, procedures, and voluntary nature of participation. Those who agreed to participate were asked to provide verbally informed consent and were given the option to complete the survey either on paper or online using a tablet or smartphone.

Data Collection and Analysis: Survey data were collected during April – May 2024 by SNAP-Ed program staff. Paper surveys were manually entered into a secure electronic database, while online responses were automatically recorded. Data were cleaned, checked for accuracy, and analyzed using appropriate statistical software.

Descriptive statistics (e.g., frequencies, percentages, means, standard deviations) were used to summarize the demographic characteristics of the sample and the responses to closed-ended questions. Chi-square tests and t-tests were conducted to examine associations and differences between demographic variables and key outcomes of interest (e.g., fruit and vegetable consumption, physical activity levels, nutrition knowledge). Regression analyses was used to explore relationships between key variables. Analysis of variance (ANOVA) was used to compare means across different subgroups. Cluster analysis was used to identify distinct subgroups within the target population. Qualitative comparative analysis (QCA) was used to examine combinations of conditions associated with the outcome of interest [37]. Open-ended responses were analyzed using a thematic content analysis approach [17]. Responses were coded and categorized into themes based on their content and meaning. The frequency and saliency of each theme were examined to identify the most common barriers, learning preferences, and topics of interest among the target population.

The primary data collection and analysis aimed to provide a rich, contextualized understanding of the nutrition and physical activity needs, barriers, and preferences of the target population, complementing the findings from the secondary data analysis. The results of both the secondary and primary data analyses were triangulated to inform the development of evidence-based recommendations for SNAP-Ed programming in Adams, Claiborne, and Jefferson counties.

# 4. Results

The needs assessment results are presented in two main sections: secondary data findings and survey findings. The secondary data findings provide an overview of the nutrition and physical activity status, health outcomes, and socioeconomic context of the target population and counties, based on an analysis of existing data sources. The survey findings offer insights into the demographic characteristics, dietary habits, nutrition knowledge, barriers to healthy eating, and learning preferences of the target population, based on primary data collected through a survey of residents in Adams, Claiborne, and Jefferson counties.

## 4.1. Secondary Data Findings

The secondary data analysis revealed several key findings related to the nutrition and physical activity needs of elementary school-aged children in Adams, Claiborne, and Jefferson counties:

Obesity Prevalence:

- Adult obesity rates in Adams (42%), Claiborne (44%), and Jefferson (43%) counties were higher than the state average of 39%.
- Statewide, 25.4% of Mississippi adolescents in grades 9-12 had obesity (YRBSS, 2019), with

childhood obesity rates likely higher in the target counties given their adult obesity rates.

- Among Mississippi children aged 10-17, 22.9% had obesity, and an additional 17.8% were overweight.

Fruit and Vegetable Consumption:

- Only 17.2% of Mississippi adults met the recommended daily fruit intake, and just 5.9% met the recommended vegetable intake.
- Among Mississippi adolescents, only 8.5% ate vegetables three or more times per day, and 11.0% ate fruits three or more times per day.
- Adams, Claiborne, and Jefferson counties had low food environment index scores (5.2, 4.2, and 3.1, respectively), indicating limited access to affordable, healthy food options.

Physical Activity:

- 31.9% of Mississippi adults reported no leisure-time physical activity in the past month.
- Among Mississippi adolescents, only 24.5% were physically active for at least 60 minutes per day on all 7 days of the week.
- In Adams, Claiborne, and Jefferson counties, 33%, 37%, and 31% of the population had access to exercise opportunities, compared to 54% statewide.

Socioeconomic Context:

- Childhood poverty rates were high in Adams (35%), Claiborne (44%), and Jefferson (50%) counties, exceeding the state average of 28%.
- All three counties had significant African American populations (Adams: 53%, Claiborne: 84%, Jefferson: 85%), with African American children facing disproportionate rates of obesity and food insecurity.
- Educational attainment was lower in these counties compared to state averages, with 24-27% of adults having no high school diploma, compared to 15% statewide.
- The secondary data findings highlight the significant challenges related to obesity, poor dietary habits, physical inactivity, and socioeconomic disparities faced by the target population in Adams, Claiborne, and Jefferson counties. These findings underscore the need for targeted, evidence-based SNAP-Ed interventions to address these disparities and promote health equity.

## 4.2. Survey Findings

The survey findings provide a more detailed understanding of the nutrition and physical activity needs, barriers, and preferences of the target population, based on primary data collected from residents in Adams, Claiborne, and Jefferson counties.

Responder Characteristics

The survey sample consisted of 97 participants, with the majority residing in Claiborne County (47.4%) and Jefferson County (36.1%). The sample was predominantly African American (93.8%) and female (81.4%), with a mean household size of 3.1 individuals. The age distribution was diverse, with the largest proportion of participants falling within the 35-44 age group (23.7%).

- Over half of the participants (55.7%) reported having children or grandchildren of preschool or school age.
- More than half of the sample (55.6%) had annual household incomes below $50,000, with 30.9% earning less than $25,000 per year.
- Educational attainment levels varied, with the largest groups holding an associate degree (23.7%) or having attended some college (18.6%).
- Approximately one-quarter of the participants (26.8%) were currently participating in the Supplemental Nutrition Assistance Program (SNAP).

The demographic characteristics of the survey sample reflect the diversity of the target population in terms of age, household composition, and socioeconomic status. The high proportion of African American participants and those with low household incomes highlight the need for culturally relevant and accessible SNAP-Ed interventions that address the unique needs and barriers faced by these subgroups.

Dietary Habits and Nutrition Knowledge

The survey findings revealed several key insights

into the dietary habits and nutrition knowledge of the target population:

Fruit and Vegetable Consumption:

- SNAP participants tended to have slightly higher daily fruit and vegetable consumption compared to non-participants, although the differences were not statistically significant.
- The majority of participants (59.8%) reported consuming 1-2 servings of fruits per day, while 63.9% reported consuming 1-2 servings of vegetables per day.
- Only 12.4% of participants reported consuming the recommended 3 or more servings of fruits per day, and 17.5% reported consuming 3 or more servings of vegetables per day.

Whole Grain and Lean Protein Intake:

- Whole grain consumption was relatively low, with 35.1% of participants reporting consuming whole grains less than once per week.
- Lean protein intake was more frequent, with 46.4% of participants reporting consuming lean proteins 3-4 times per week.

Nutrition Knowledge:

- Nutrition label familiarity was positively associated with education level, with participants holding an associate degree or higher being more likely to report being somewhat or very familiar with nutrition labels ($\chi 2 = 7.038$, $p = 0.008$).
- However, overall nutrition label familiarity was low, with only 33.0% of participants reporting being very familiar with nutrition labels.

These findings suggest that while some participants are making efforts to consume fruits, vegetables, whole grains, and lean proteins, there is still room for improvement in terms of meeting recommended intake levels. The low nutrition label familiarity highlights the need for education and skill-building activities to help participants make informed food choices.

Barriers to Healthy Eating

Participants identified several key barriers to maintaining a healthy diet, including:

Time Constraints and Busy Schedules:

- Many participants reported that lack of time and busy lifestyles made it difficult to plan and prepare healthy meals.

Cost and Affordability of Healthy Foods:

- Participants frequently cited the high cost of healthy foods as a barrier to maintaining a healthy diet, particularly for those with lower household incomes.

Lack of Knowledge and Skills:

- Some participants reported lacking the knowledge and skills needed to prepare healthy meals, suggesting a need for education and hands-on learning opportunities.

Family Preferences and Picky Eaters:

- Participants with children or grandchildren often reported difficulties in getting family members to eat healthy foods, particularly vegetables.

Limited Access to Healthy Food Options:

- Particularly in rural areas, participants reported having limited access to fresh, healthy food options, with convenience stores and fast food restaurants being more readily available.

These findings highlight the multifaceted nature of the barriers to healthy eating faced by the target population, spanning individual, interpersonal, and environmental levels. Addressing these barriers will require a comprehensive approach that includes education, skill-building, and policy, systems, and environmental (PSE) changes to create supportive environments for healthy eating.

Learning Preferences and Topics of Interest

The survey findings provided valuable insights into the learning preferences and topics of interest among the target population:

Preferred Learning Methods:

- In-person classes were the most preferred learning method across all age groups, with 58.9% of participants expressing interest in this format.
- Online videos and webinars were the second most popular choice (31.1%), followed by printed materials (21.1%) and mobile apps (17.8%).

Topics of Interest:

- Meal planning and budgeting was the most popular topic of interest, with 39.5% of participants expressing interest in this area.

- Cooking skills and techniques were the second most desired topic (25.6%), followed by healthy eating for specific conditions (20.9%) and nutrition for different life stages (14.0%).

These findings suggest that SNAP-Ed interventions should offer a variety of learning formats to cater to the diverse preferences of the target population. The high interest in meal planning, budgeting, and cooking skills highlights the need for practical, hands-on education that helps participants overcome barriers related to time, cost, and lack of knowledge.

The survey findings provide a rich, nuanced understanding of the nutrition and physical activity needs, barriers, and preferences of the target population in Adams, Claiborne, and Jefferson counties. These insights can inform the development of tailored, evidence-based SNAP-Ed interventions that address the unique needs and challenges faced by this population.

Bivariate Analyses (Chi-square tests and t-tests)

Chi-square tests were conducted to examine the associations between SNAP participation, education level, age group, and relevant variables such as fruit and vegetable consumption, nutrition label familiarity, and learning preferences.

A chi-square test of independence between SNAP participation and meeting the recommended daily fruit servings (2 or more servings per day) yielded a borderline significant association ($\chi2 = 3.841$, $p = 0.050$), suggesting that SNAP participants were more likely to meet the recommendation compared to non-participants.

However, a chi-square test of independence between SNAP participation and meeting the recommended daily vegetable servings (2 or more servings per day) did not reveal a significant association ($\chi2 = 0.146$, $p = 0.702$).

A chi-square test of independence between education level (less than high school vs. high school or higher) and nutrition label familiarity (not at all/not very familiar vs. somewhat/very familiar) showed a significant association ($\chi2 = 7.038$, $p = 0.008$). Individuals with high school education or higher were more likely to be somewhat or very familiar with nutrition labels compared to those with less than high school education.

A chi-square test of independence between age group (18-44 years vs. 45+ years) and preference for in-person classes did not reveal a significant association ($\chi2 = 0.742$, $p = 0.389$).

Regression Analyses

Regression analyses were conducted to explore the relationships between key variables and predict outcomes such as daily fruit and vegetable servings and nutrition label familiarity.

A multiple linear regression analysis predicting daily fruit servings based on SNAP participation, age, and education level found that SNAP participation had a borderline significant positive relationship with daily fruit servings ($\beta = 0.437$, $p = 0.089$), while age ($\beta = 0.002$, $p = 0.704$) and education level ($\beta = -0.022$, $p = 0.718$) did not have significant associations with fruit consumption. The overall model had a low R-squared value ($R2 = 0.043$), indicating that it explained only a small portion of the variance in daily fruit servings.

A multiple linear regression analysis predicting daily vegetable servings based on SNAP participation, age, and education level did not find any significant associations between the predictors and daily vegetable servings (SNAP participation: $\beta = 0.149$, $p = 0.488$; age: $\beta = 0.005$, $p = 0.294$; education level: $\beta = -0.005$, $p = 0.923$). The overall model had a low R-squared value ($R2 = 0.022$), indicating that it did not explain much of the variance in vegetable consumption.

A logistic regression analysis predicting the likelihood of being familiar with nutrition labels (somewhat/very familiar vs. not at all/not very familiar) based on education level found that education level had a significant positive relationship with the likelihood of being somewhat or very familiar with nutrition labels ($\beta = 0.739$, $p = 0.001$). Higher education levels were associated with increased familiarity with nutrition labels.

Analysis of Variance (ANOVA)

One-way ANOVA tests were conducted to compare the means of relevant variables across different subgroups.

A one-way ANOVA test comparing the mean daily fruit servings across different age groups did not reveal a significant difference ($F(5, 91) = 0.653$, $p = 0.659$).

Similarly, a one-way ANOVA test comparing the mean daily vegetable servings across different education

levels did not find a significant difference ($F(5, 77) = 0.710$, $p = 0.617$).

A one-way ANOVA test comparing the mean household size across different income levels showed a borderline significant difference ($F(4, 72) = 2.308$, $p = 0.066$). Lower-income households tended to have larger household sizes compared to higher-income households.

Lastly, a one-way ANOVA test comparing the mean whole grain consumption frequency across different SNAP participation statuses did not reveal a significant difference ($F(1, 86) = 0.084$, $p = 0.773$).

Although most of the ANOVA tests did not yield statistically significant results, the borderline significant difference in household size across income levels may be of interest for the SNAP-Ed program needs assessment.

Cluster Analysis

A K-means cluster analysis was performed using variables related to dietary habits and nutrition knowledge, including daily fruit servings, daily vegetable servings, whole grain frequency, lean protein frequency, and nutrition label familiarity. The analysis identified three distinct subgroups within the SNAP-Ed eligible population:

Cluster 1 (n=35):

- Higher daily fruit (mean: 1.9) and vegetable (mean: 2.1) servings
- Higher whole grain (mean: 3.1) and lean protein (mean: 3.4) frequency
- Higher nutrition label familiarity (mean: 3.3)

Cluster 2 (n=28):

- Moderate daily fruit (mean: 1.4) and vegetable (mean: 1.6) servings
- Moderate whole grain (mean: 2.4) and lean protein (mean: 3.1) frequency
- Moderate nutrition label familiarity (mean: 2.8)

Cluster 3 (n=25):

- Lower daily fruit (mean: 0.8) and vegetable (mean: 1.0) servings
- Lower whole grain (mean: 1.6) and lean protein (mean: 2.3) frequency
- Lower nutrition label familiarity (mean: 1.8)

These clusters suggest that there are distinct subgroups within the population with different levels of healthy eating behaviors and nutrition knowledge. This information can be used to develop targeted interventions for each cluster.

Qualitative Comparative Analysis (QCA)

A Qualitative Comparative Analysis (QCA) was conducted to explore the combinations of conditions associated with high fruit and vegetable consumption (defined as 2 or more servings per day for each). The conditions examined were SNAP participation (SNAP), nutrition label familiarity (LABEL), presence of children in the household (CHILD), and low perceived barriers to healthy eating (BARRIER).

The analysis revealed two sufficient pathways to high fruit and vegetable consumption:

1. SNAP * LABEL * CHILD * BARRIER
2. ~SNAP * LABEL * ~CHILD * BARRIER

In other words, high fruit and vegetable consumption was associated with:

1. SNAP participation, high nutrition label familiarity, presence of children in the household, and low perceived barriers to healthy eating, or
2. No SNAP participation, high nutrition label familiarity, no children in the household, and low perceived barriers to healthy eating

# 5. Discussion

This section discusses the key findings and their implications for SNAP-Ed programming, as well as recommendations for evidence-based strategies and examples.

## 5.1. Key Findings and Implications

The secondary data analysis revealed that the target counties face significant challenges related to obesity, poor dietary habits, physical inactivity, and socioeconomic disparities. Adult obesity rates in these counties were higher than the state average, and childhood obesity rates were likely to be even higher given the state-level data on adolescents and children. Fruit and vegetable consumption was low, with limited access to affordable, healthy food options in these counties. Physical activity levels were also suboptimal, with a significant proportion of adults and adolescents not meeting recommended guidelines.

The survey findings provided a more nuanced understanding of the dietary habits, nutrition knowledge, barriers to healthy eating, and learning preferences of the target population. While some participants reported consuming fruits, vegetables, whole grains, and lean proteins, there was still room for improvement in meeting recommended intake levels. Nutrition label familiarity was positively associated with education level but was generally low overall.

The bivariate analyses and regression analyses provided insights into the relationships between key variables and helped identify potential predictors of nutrition-related outcomes. The chi-square test between SNAP participation and meeting the recommended daily fruit servings suggested that SNAP participants were more likely to meet the recommendation compared to non-participants. This finding highlights the potential role of SNAP participation in promoting fruit consumption and underscores the importance of developing targeted interventions for SNAP participants to further encourage healthy eating habits.

The chi-square test between education level and nutrition label familiarity revealed that individuals with high school education or higher were more likely to be familiar with nutrition labels compared to those with less than high school education. Additionally, the logistic regression analysis found that higher education levels were associated with increased familiarity with nutrition labels. These findings emphasize the need for SNAP-Ed programming to promote nutrition label familiarity and use, especially among individuals with lower education levels, to help them make informed food choices.

Although the ANOVA tests did not yield many statistically significant results, the borderline significant difference in household size across income levels suggests that lower-income households tend to have larger household sizes compared to higher-income households. This finding has implications for SNAP-Ed programming, as interventions may need to consider the unique challenges and needs of larger, low-income households, such as budgeting, meal planning, and food distribution within the household.

The cluster analysis identified three distinct subgroups within the SNAP-Ed eligible population based on their dietary habits and nutrition knowledge. These clusters suggest that there are varying levels of healthy eating behaviors and nutrition knowledge among the target population. SNAP-Ed programming should consider developing targeted interventions for each cluster, such as providing basic nutrition education and cooking skills for those with lower healthy eating behaviors, and more advanced nutrition education and skill-building for those with healthier habits.

The QCA revealed two sufficient pathways to high fruit and vegetable consumption, both involving high nutrition label familiarity and low perceived barriers to healthy eating. This finding suggests that promoting nutrition label familiarity and addressing perceived barriers are critical components of SNAP-Ed interventions aimed at increasing fruit and vegetable consumption. Additionally, the presence of children in the household may serve as an additional motivator for SNAP participants to consume more fruits and vegetables, highlighting the potential for family-focused interventions.

Participants identified several key barriers to maintaining a healthy diet, including time constraints, cost and affordability of healthy foods, lack of knowledge and skills, family preferences and picky eaters, and limited access to healthy food options. These barriers highlight the need for a comprehensive approach to SNAP-Ed programming that addresses individual, interpersonal, and environmental factors influencing dietary habits.

The learning preferences and topics of interest identified by participants provide valuable guidance for the development of SNAP-Ed interventions. The high preference for in-person classes suggests that hands-on, interactive learning opportunities may be most effective in engaging participants. The interest in topics such as meal planning, budgeting, and cooking skills underscores the need for practical, skills-based education that helps participants overcome common barriers to healthy eating.

The sociodemographic characteristics of the survey sample, with a high proportion of African American participants and those with low household incomes, highlight the importance of developing culturally relevant and accessible SNAP-Ed interventions. Strategies that address the unique needs and challenges faced by these subgroups,

such as incorporating culturally traditional foods and addressing food access barriers, may be particularly effective.

Overall, these findings suggest that SNAP-Ed interventions should not be viewed solely as health interventions but also as integral components of a broader strategy to promote a green economy. By addressing the interconnected challenges of food access, dietary habits, and physical activity, SNAP-Ed can contribute to a more sustainable, equitable, and healthy community for all.

Focus Areas that Emerged from the Analysis

The key findings and implications of this needs assessment suggest that SNAP-Ed programming in Adams, Claiborne, and Jefferson counties should focus on:

1. Developing targeted interventions for SNAP participants to further encourage fruit and vegetable consumption, considering the potential role of SNAP participation in promoting healthy eating habits.
2. Promoting nutrition label familiarity and use, especially among individuals with lower education levels, to help them make informed food choices.
3. Addressing the unique challenges and needs of larger, low-income households in intervention design and implementation, such as budgeting, meal planning, and food distribution within the household.
4. Tailoring interventions to the different subgroups identified through cluster analysis, addressing their specific needs and levels of nutrition knowledge.
5. Prioritizing strategies that address perceived barriers to healthy eating, such as time constraints, cost, and lack of knowledge and skills, through a comprehensive approach that considers individual, interpersonal, and environmental factors.
6. Developing family-focused interventions that leverage the presence of children as a motivator for healthy eating habits among SNAP participants.
7. Increasing access to and consumption of healthy foods, particularly fruits and vegetables, through collaborations with community partners and addressing environmental factors influencing dietary habits.
8. Improving nutrition knowledge, skills, and self-efficacy through tailored education and skill-building opportunities, with a focus on hands-on, interactive learning and practical topics such as meal planning, budgeting, and cooking skills.
9. Developing culturally relevant and accessible interventions that address the unique needs and challenges faced by African American participants and those with low household incomes, such as incorporating culturally traditional foods and addressing food access barriers.

SNAP-Ed can promote regenerative farming practices alongside nutrition education by fostering partnerships between local farmers and community-based programs to enhance both food quality and sustainability. By incorporating principles of regenerative agriculture such as soil health improvement, crop diversity, and sustainable livestock integration, SNAP-Ed can support farmers in producing nutrient-rich, environmentally sustainable food. Nutrition education programs can highlight the benefits of consuming food grown under these practices, emphasizing their superior nutritional value and reduced environmental impact. Initiatives such as farm-to-school programs, community-supported agriculture, and farmers' markets can create demand for regenerative produce, while SNAP-Ed resources can educate participants on the connections between sustainable farming, healthy eating, and environmental stewardship, building a stronger, more resilient local food system.

## 5.2. Recommendations for SNAP-Ed Programming

Specific evidence-based interventions that could be implemented in the target counties include school-based, family-focused, and community-based strategies. For schools, the Coordinated Approach to Child Health (CATCH) curriculum has demonstrated effectiveness in improving dietary habits and increasing physical activity

levels among elementary students [38]. Additionally, establishing school gardens and incorporating garden-based learning into nutrition education have been associated with increased fruit and vegetable consumption [39]. Family-focused interventions can include offering the EFNEP low-income families, which has proven successful in enhancing dietary habits and food resource management skills [40]. Another impactful initiative is the Healthy Home-Cooked Family Meals program, which combines nutrition education and cooking classes to encourage healthy meal preparation and family mealtime practices [41]. On a community level, partnering with local farmers' markets to provide SNAP incentives and nutrition education has shown potential to boost fruit and vegetable consumption among low-income families [42]. Collaborations with community organizations can engage faith communities in promoting healthier eating and physical activity [43].

In this context, the following specific recommendations are proposed for SNAP-Ed programming in Adams, Claiborne, and Jefferson counties:

1. Develop a mix of learning formats, including in-person classes, online videos/webinars, and printed materials, to cater to the diverse learning preferences of the target population.
2. Prioritize topics such as meal planning and budgeting, cooking skills, and healthy eating for specific conditions, while also addressing the unique needs of different subgroups identified through the needs assessment.
3. Provide practical strategies, resources, and hands-on learning opportunities to help participants overcome common barriers to healthy eating, such as time constraints, cost, and lack of knowledge and skills.
4. Promote nutrition label familiarity and use through education and skill-building activities, tailored to different education levels and learning styles.
5. Develop family-focused interventions for SNAP participants with children to encourage fruit and vegetable consumption and healthy eating habits, leveraging the presence of children as a motivator for behavior change.
6. Collaborate with community partners, such as schools, faith-based organizations, and local businesses, to improve access to affordable, healthy foods and create supportive environments for healthy eating.
7. Continuously evaluate and refine SNAP-Ed programming based on participant feedback, outcomes, and emerging needs to ensure the interventions remain relevant and effective.

These recommendations provide a framework for developing comprehensive, evidence-based SNAP-Ed interventions that address the multiple levels of influence on dietary habits and physical activity levels among elementary school-aged children and their families in the target counties.

A diagrammatic summary of the recommendations is presented in **Figure 1**.

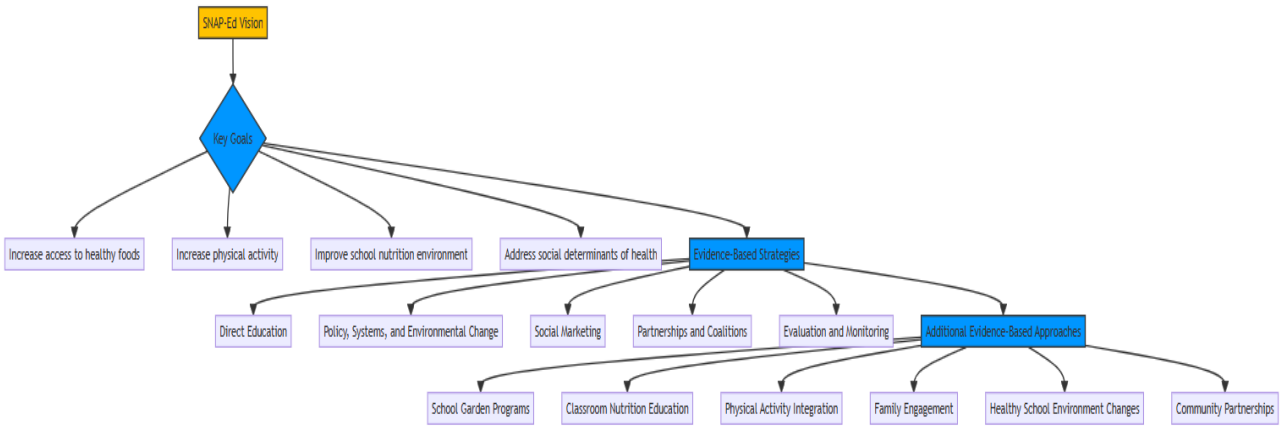


**Figure 1.** SNAP-Ed Intervention recommendations for the identified counties

## 5.3. Evidence Based Regenerative Practices

To implement the recommendations for SNAP-Ed programming effectively and ensure lasting impacts, the following evidence-based strategies and examples are proposed, incorporating the transformative potential of regenerative practices:

1. Direct Education:

- Deliver grade-appropriate, culturally responsive nutrition education to elementary students using evidence-based curricula like CATCH or Serving Up MyPlate. Incorporate lessons on sustainable agriculture and the benefits of regenerative practices to strengthen environmental awareness.
- Offer family-focused nutrition education and cooking classes to engage parents/caregivers in promoting healthy habits at home, highlighting the use of locally sourced, nutrient-dense foods produced through regenerative farming.

2. Policy, Systems, and Environmental Change (PSE):

- Collaborate with school districts to develop and enforce comprehensive wellness policies that integrate nutrition education with lessons about sustainable agriculture and its role in a healthier future.
- Partner with school nutrition services to improve the nutritional quality of meals by sourcing ingredients from local farms that practice regenerative agriculture. This could include increasing offerings of seasonal, locally grown fruits and vegetables.
- Establish school gardens or farm-to-school programs that not only provide access to fresh produce but also serve as platforms for teaching students about soil health, crop rotation, and other regenerative practices.
- Advocate for green spaces and recreational facilities in underserved communities and integrate agrarian learning hubs or community gardens to promote both physical activity and agricultural literacy.

3. Social Marketing:

- Develop and disseminate targeted, culturally relevant messages that connect healthy eating and physical activity to the benefits of regenerative agriculture, fostering a sense of stewardship for the environment.
- Leverage social media, local media outlets, and community events to amplify messaging about the role of sustainable farming in creating equitable food systems and promoting long-term health.

4. Partnerships and Coalitions:

- Build strong partnerships with schools, local farmers, community organizations, and faith-based institutions to promote regenerative practices and support agrarian initiatives like community-supported agriculture (CSA).
- Engage local coalitions to align efforts in child health, regenerative farming, and food systems transformation, sharing best practices and advocating for supportive policies and programs.

5. Evaluation and Monitoring:

- Design a robust evaluation framework that not only tracks progress towards SNAP-Ed goals but also measures the impact of integrating regenerative farming practices on nutrition, food access, and environmental outcomes.
- Gather baseline and follow-up data on key indicators related to nutrition, physical activity, obesity, and sustainable food systems within the target population.
- Use findings to refine SNAP-Ed programming, ensuring that the inclusion of regenerative practices enhances both immediate outcomes and long-term sustainability.

## 5.4. Future Directions

Integrating sustainable practices into local food systems is essential to address nutritional disparities while fostering environmental and economic resilience [29]. Programs involving school feeding initiatives, social feeding programs, and supermarket collaborations play pivotal roles in promoting sustainable food production and equitable access [36]. The SNAP-Ed program in the US incor-

porates these in its scope. School feeding programs, for example, can source diverse, nutrient-rich produce from local farmers practicing sustainable agriculture, supporting both child nutrition and local economies. Similarly, social feeding initiatives and open kitchens can prioritize partnerships with regenerative farmers to ensure a steady supply of fresh, sustainable food [43]. Supermarket collaborations, such as creating dedicated spaces for local and sustainably produced goods, can enhance consumer access while encouraging farmers to adopt conservation and regenerative practices. Successful models, such as FAO-supported programs in developing regions, have demonstrated how aligning local agricultural practices with sustainable farming principles not only address food security but also promotes ecological health and market opportunities, offering a blueprint for replication in underserved communities [44].

While the needs assessment identified key barriers to healthy eating and physical activity, it did not fully explore the social, cultural, and environmental factors that shape these behaviors in the context of a green economy. Future research could employ qualitative methods, such as focus groups and in-depth interviews, to gain a deeper understanding of the contextual factors influencing health behaviors and inform the development of culturally responsive, environmentally sustainable interventions. For instance, exploring community perspectives on local food systems, sustainable agriculture, and food sovereignty could provide valuable insights for designing effective SNAP-Ed programs that promote green economy principles.

Furthermore, the needs assessment primarily focused on the needs and preferences of the target population but did not fully examine the capacity and readiness of local organizations and stakeholders to implement SNAP-Ed interventions that align with green economy goals. Future needs assessments could include an assessment of organizational capacity, resources, and partnerships to support the implementation of sustainable and equitable food system initiatives.

Despite these limitations, this needs assessment provides a strong foundation for developing SNAP-Ed programming in these counties, with a focus on promoting a green economy. Future programming should build on the findings and recommendations of this assessment while addressing its limitations and exploring new avenues for research and intervention.

Some key areas for future SNAP-Ed programming and research include:

- Developing and evaluating culturally responsive interventions that address the unique needs and preferences of African American and low-income populations in the target counties, while integrating green economy principles such as local food sourcing and sustainable agriculture practices.
- Exploring innovative strategies for increasing access to affordable, healthy foods in underserved communities, such as mobile markets, community-supported agriculture, and healthy corner store initiatives, while considering their environmental sustainability and economic viability.
- Examining the impact of SNAP-Ed interventions on long-term health outcomes and their contribution to a green economy, such as obesity rates, chronic disease risk factors, healthcare utilization and costs, as well as environmental sustainability indicators.
- Investigating the role of technology, such as mobile apps and telehealth, in delivering SNAP-Ed interventions and supporting behavior change in relation to healthy eating and sustainable food practices.
- Assessing the impact of SNAP-Ed interventions on social determinants of health, such as food security, social connectedness, and community resilience, within the context of a green economy framework.
- Incorporating regenerative farming practices such as cover cropping, agroforestry, and crop rotation into SNAP-Ed programming to enhance soil health and biodiversity, reduce environmental impact, and improve crop nutritional value. For instance, programs can support local farmers in adopting these practices while connecting them to community-supported agriculture initi-

atives that supply fresh, nutrient-rich produce to SNAP-Ed participants.

- Demonstrating the community impact of regenerative practices through case studies, such as the establishment of school gardens using composting and crop rotation techniques or partnerships with farmers practicing holistic grazing to supply local feeding programs. These initiatives not only promote ecological sustainability but also create opportunities for education, economic development, and community engagement.

# 6. Conclusion

The findings of this study highlight the significant challenges faced by rural Mississippi communities, including high rates of obesity, poor dietary habits, physical inactivity, and socioeconomic disparities, which are interconnected with issues of food access, environmental sustainability, and economic development. By promoting healthy eating habits, increased fruit and vegetable consumption, and supporting local agriculture, reducing food waste, and contributing to a more environmentally sustainable food system, the SNAP-Ed could make fundamental improvements in the system.

The secondary data analysis underscored the prevalence of adult obesity, low fruit and vegetable consumption, limited access to affordable and healthy food options, and suboptimal physical activity levels in the target counties. The survey findings further emphasized the need for improved nutrition knowledge, skill-building, and addressing barriers related to time constraints, cost, and family preferences. The analysis suggests that SNAP-Ed interventions can play a fundamental role in promoting sustainable food systems, strengthening community-based food economies, and improving the health and well-being of residents in these underserved communities. By fostering healthy eating habits, particularly increased fruit and vegetable consumption, SNAP-Ed can support local agriculture, reduce food waste, and contribute to a more environmentally sustainable food system. The assessment also proposes evidence-based strategies and examples for implementing these recommendations, such as delivering grade-appropriate nutrition education, establishing school gardens, offering family-focused nutrition education and cooking classes, partnering with local farmers' markets, and collaborating with community organizations to promote healthy eating and physical activity.

While acknowledging the limitations of this assessment, such as reliance on convenience sampling and self-reported data, it provides a strong foundation for developing evidence-based SNAP-Ed programming in the target counties within a green economy framework. Future programming and research should build on these findings while addressing the limitations and exploring new avenues for intervention, such as developing culturally responsive interventions, increasing access to affordable healthy foods, examining long-term health outcomes, investigating the role of technology, and assessing the impact on social determinants of health.

In summary, this needs assessment highlights the transformative potential of SNAP-Ed to enhance the health and well-being of individuals and families in underserved communities while advancing a more sustainable, equitable, and resilient food system. By embedding green economy principles into SNAP-Ed initiatives, we can foster a healthier future for both people and the planet. While systemic changes rooted in regenerative practices may require more time and effort to implement, their long-term sustainability merits greater attention and prioritization from policymakers.

# Author Contributions

For research articles with several authors, a short paragraph specifying their individual contributions must be provided. The following statements should be used "Conceptualization, B.G. and M.R; methodology, B.G.; formal analysis, B.G.; investigation, B.G. and M.R; resources, M.R.; writing—original draft preparation, B.G.; writing—review and editing, M.R.; visualization, B.G. All authors have read and agreed to the published version of the manuscript." Authorship must be limited to those who have contributed substantially to the work reported.

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## Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

## Data Availability Statement

Data is available with the authors.

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## Conflicts of Interest

The authors declare no conflict of interest

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